

Quality improvement interventions in maternal and newborn care in Ethiopia: literature review

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58th Master of Public health/ International course in Health Development

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Quality improvement interventions in maternal and newborn care in Ethiopia: literature review

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by

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Abstract

Introduction: Ethiopia is among countries with the highest burden of maternal and neonatal mortality in the world. Efforts made so far are directed to increasing coverage by building more health facilities. However national and global goals could not be met with this quantity over quality approach. Over all score for quality of care is also found to be low, especially in the process component of care. The aim of this thesis is to explore quality improvement interventions done in Ethiopia to improve process component of care, assess their effectiveness, and to put forward recommendations to policy makers at the ministry level based on the findings, in order to reduce maternal and neonatal care.

Methodology: Literature review was done with 25 selected articles. The WHO framework for quality of maternal and newborn health was used to present findings and discussion organized into 4 sections: evidence based practice and human resources, actionable information system, functional referral systems and experience of care.

Results: Task shifting trainings were found to be effective in reducing maternal deaths. There is limited focus in availing of guidelines, especially regarding postnatal care. MPDSR is an excellent health information system for learning and improvement, but quality of data is still yet to be improved. Free ambulance service is a very effective intervention, referral feedback and protocols need attention. Training alone is found to be ineffective to improve respectful maternal care.

Conclusion: More interventions addressing availability of guidelines, referral feedback and protocols and improving respectful maternal care are needed to effectively reduce maternal and newborn deaths.

Key words: Quality, maternal care, interventions, effectiveness of care, process

Word count: 11896

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Abbreviations

ANC	Antenatal care
DHIS	District health information system
DRC	Democratic Republic of Congo
EPHI	Ethiopian public health institute
FMoH	Federal ministry of health
HEP	Health extension program
HEW	Health extension worker
HIS	Health information system
HMIS	Health management information system
IPC	Intrapartal care
LMIC	Low and middle income countries
MMR	Maternal mortality rate
MPDSR	Maternal and perinatal death surveillance and response
PNC	Postnatal care
QoC	Quality of care
RMNCH	Reproductive, maternal, neonatal and child health
UNFPA	United Nations population fund
UNICEF	United Nations International Children's Emergency Fund
WHO	World health organization

Glossary

Quality of care (QoC): “the degree to which health services for an individual or populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge”. (1)

Quality improvement:, applying a systematic approach using the understanding of the complex healthcare environment and designing, testing, and implementing changes using real time measurement for improvement. (1,2)

Domains of QoC: safety, efficiency, effectiveness, timely, patient centered and equitable care are known as domains of QoC.

Effectiveness of care: ability of an intervention to have a meaningful effect on patients or their treatment outcome.(3)

Maternal health: refers to health of a woman during pregnancy, childbirth and postnatal period. (4) Hence, it encompasses care during pregnancy (antenatal care), delivery(intrapartal care) and until 42 days after delivery (postnatal care). (5)

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Introduction

My name is Betelhiem Abebe Gebreselssie, a medical doctor from Ethiopia. After my training in medicine I had the chance to join the radiology department as a lecturer and focal person for quality improvement in the same medical school I went to. The institution being the second largest hospital in Ethiopia, patients from all over the country visit with mostly complicated cases.

I had no experience in quality improvement and no exposure to any of the concepts throughout my training and internship. But looking at the patients who had to suffer through the referral chain for unimaginable amount of time, given their complicated cases, the long line mothers in front of our emergency maternal OPD, the patients I could not help because I simply did not have the inputs I needed to help made me want to accept the role. I had to train myself with a lot of reading and as such, I started working on QI projects. My passion completely shifted from clinical care to quality improvement, health systems and public health as a whole. After six successful projects to improve quality of care in the department I was in, I felt like I had a lot to learn and joined KIT to learn public health.

My interest in maternal care was inspired by my long term career plan to join public health and contribute my part. I really paid attention to the numbers and causes for the very high burden of maternal and neonatal deaths in Ethiopia after joining KIT. Hence, my interest in this research. I was very interested in interventions being implemented by through the Network for quality improvement for maternal and neonatal health care, of which Ethiopia is one of the focus countries. Efforts were made to get in contact with the Ethiopian WHO through a contact from the headquarter. Unfortunately it was not successful and I had to stick to literature review.

This thesis aims to explore quality improvement interventions that focus on the process component of care for mothers and newborns in Ethiopia. Effectiveness of these interventions as described by the studies will be discussed and at the end recommendations will be forwarded for policy makers.

Working on this thesis made me think back to the time I was working in obstetrics department and reflect. I have seen a woman who had uterine rupture after 72 hours of labour, mothers die of bleeding under our watch, neonates get admitted to NICU even when the mother came to a hospital hours ago, had mother for whom extreme measures like hysterectomy had to be done due to a preventable cause. If we had a system to make sure adherence to protocols was maintained at all times, if we implemented a more respectful approach to give them the safe space where they can make decisions for themselves, if our referral systems were a bit more functional, we could have saved more mothers than we would if we had a bigger hospital.

This reflection is what draw me to focus on the process component of maternal care. Ethiopia is a poor country and can not afford to give us more inputs. But, even with the existing resources and facilities we have, quality of care can be improved if we direct our efforts towards ‘fixing the system’. I hope to see more and more facilities having QI teams learning from interventions in other hospitals, and going full circle by sharing their experience.

This thesis has 5 chapters. The first chapter is problem statement, justification and objectives of the study, second is about methodology, followed by the findings from the review. The 4th chapter is discussion and lastly, there are conclusions and recommendations sections.

Background

Geography, political and demographic overview

Ethiopia is a sub-Saharan African country with a population of 120 million in 2022. Females constitute 50% of the population. Ethiopia is among countries with highest fertility rate (total fertility rate = 3.44%) and lowest literacy rate of 51.8% in the world. The economy of the country is dependent on agriculture, with more than 70% of the population residing in rural areas. (6,7)

Ethiopia is a federal state with 9 ethnicity-based regional states and 2 city administrations. Each regional state has its own regional administrative body reporting to the Federal administration of its respective ministry. (8) For health, for example, each region and city administration has a regional health bureau that is accountable to the Federal ministry of health.



Figure 4: Map of Ethiopia(9)

There is an ongoing conflict since November 2020 in the Northern part of Ethiopia. Reports from UNFPA show the number of preventable deaths including maternal deaths is increasing since the beginning of war in Tigray. Although UNFPA is supporting more than 38 health facilities and deployed midwives, destruction of health facilities makes it difficult for women to access care. (10)

Healthcare system and burden of disease

Health care delivery in Ethiopia is organized in a three-tier system with primary, secondary and tertiary levels. There is a referral system in place to operate patient flow among facilities and between each level of care based on catchment areas. (11) Primary health care has been the focus of the health care system since the first health policy in the country in 1993.

Over the last two decades, the number of health centres and hospitals expanded significantly to increase coverage, while limited focus was given to the quality of care delivered. A study from 2020 indicated the number of health facilities (health centres and hospitals combined) increased from 775 in 2005 to 3858 in 2015 improving service coverage. (12) But, only 54% of 547 health facilities included in the same survey were found ready to provide general health services with optimal quality. Limitation in integrated service delivery, inadequate referral and feedback systems and shortage on well trained and motivated staff were main problems in this study. (12)

Ethiopia has double burden of communicable and non-communicable disease. According to a report(2017) based of global burden of disease in 2015, there is a 65% reduction in deaths related to communicable, maternal, neonatal and nutrition related disease over the last two decades. The burden of non-communicable disease, in contrast, shows increasing trend. (13) Despite the reduction, a significant disease burden in Ethiopia still comes from reproductive, maternal, neonatal and adolescent child care (RMNCH) and infectious disease. (14)

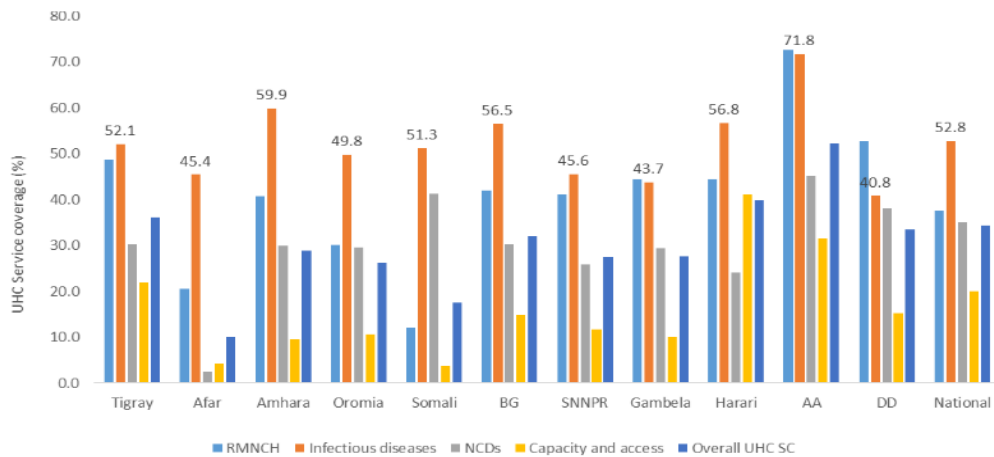


Figure 5: Universal health care coverage across regions(14)

The progress made towards increasing primary health care is frequently attributed to the Health Extension Program(HEP), launched in 2003. Health extension workers are trained for one year and deployed to health posts, where they serve 5000 people (two workers per health post). Areas covered by this program include promoting and providing family planning, maternal services, immunization and nutritional counselling. HE workers spend 75% of their work time in the community strengthening health promotion, early treatment and referrals. (12,15)

Overview of QoC

The concept of quality of health care and medical practice started to emerge in the 1970s and further developed in the 1980s. In the 1990s, there were models and frameworks being developed to guide implementation, assessment and measurement of quality care, which stemmed from different conceptual understandings of the subject. Quality of health care has evolved significantly with a wide range of areas where it is applied over the previous 20 years. (16) Maternal and newborn care take a major part among these areas.

Following the Ethiopian hospital reform alliance and the national health care strategy in 2016, Ethiopia has realized this need to change focus to quality in MNC. In the same year, Ethiopia joined the Global network to improve QoC for mothers, newborns and children, led by the WHO. Implementation of the road map to improve QoC in maternal and newborn care (MNC), formulated by the Ethiopian MoH and its partners started in July 2018. The quality improvement (QI) measures are being implemented in a total of 48 health facilities; 8 referral and general hospitals, 12 primary hospitals and 28 health centres found in 14 selected districts. The standards and monitoring and evaluation framework were adopted from WHO and is coordinated nationally through a technical working group. The MoH is responsible for financing, supervising and capacity building in these implementation plans. (17)

Quality of care, quality improvement and continuous quality of care are different but closely related concepts. Although there are many acceptable ways to define these terms, for this thesis, the most common definitions are included in the glossary.

Chapter 1: problem statement, justification and objectives

Statement of the problem

Around a quarter of maternal deaths occur during pregnancy worldwide. Direct causes of mortality that could have been prevented through effective (antenatal care)ANC follow-up account for 30-50% of these deaths.(18) Global reports suggest indirect causes of maternal mortality are frequently overlooked despite their increasing trend. (19,20) The other growing public health issue that is being overlooked is the burden of stillbirths. According to a report from UNICEF in 2020, 4 stillborn babies are delivered every minute. This is equivalent to 2 million stillbirths worldwide, half of which occurring in six countries (India, Pakistan, Nigeria, DRC, China and Ethiopia). (21) More than 98% of stillbirths in 2015 occurred in developing countries. (22)

The period in which maternal death occurs (antepartum, intrapartum or postpartum period) varies across regions in the world. In East Africa, 39% of maternal deaths occur in the postpartum period.(23) Presence of skilled attendants during labour, delivery, and the early postpartum period could reduce maternal mortality by an estimated 16-33%. (24) A report by UNFPA in 2020 states for every woman who dies, 20-30 more women experience pregnancy-related complications including those that are life-threatening. (25) Deeper understanding of these complications and their causes helps to design quality improvement interventions based on the impression they give about the overall QoC. Timely and appropriate interventions can prevent a more severe adverse outcome including death. (26,27)

Between the years 2005 and 2016, Ethiopia has shown a 39% decline in maternal mortality. Although this is a step towards the right direction, the country failed to achieve the national goal of reaching maternal mortality rate(MMR) of 199 in 2020, and has a long way to go to meet the ambitious SDG goal by 2030. Ethiopia is still among top 25 countries with the highest maternal mortalities, with MMR of 412 per 100,000 live births and neonatal mortality of 67 per 1000 live births.(28,29) Stillbirths are not registered in Ethiopia and there are different studies with wide range of rates. A meta-analysis done in 2020 reported still birth rate to be 36.9 per 1000 births from data pooled from included 34 studies from different parts of Ethiopia. (30) A high rate of stillbirth is considered a reflection of poor access and quality of obstetric care. (31)

In Ethiopia the initial approach towards the SDG commitment was directed to improving facility infrastructure, training care providers and promoting referrals to health facilities for birth ; quantity had more focus over quality. (16,32) With this approach, Ethiopia has been able to achieve a progress in increasing ANC coverage and access to skilled birth attendants. PNC contacts, on the other hand, have one of the lowest levels of coverage across the continuum of care for women and infants. (33) ANC coverage increased to 74% in 2019 compared to 34% in 2011 and 62% in 2016, with 43% of them having at least four visits. As for the quality of services, among women who received ANC in the years 2014-2019, 88% had their blood pressure measured, 79% had a blood sample taken, and 74% had a urine sample taken as part of an ANC visit. Nutritional counselling was given to 71% of the women during their ANC visits showing deviation from the standard QoC for ANC. (33)

Home delivery is still common in Ethiopia, especially in rural areas. In the same years (2014-2019), only 48% of live births were delivered in a health facility. Skilled birth attendants were present on 50% of the deliveries, and were primarily nurses or midwives. Postnatal care is important for both the mother and the infant as most of the maternal and neonatal mortalities are said to happen in the first 24 hours following delivery. In Ethiopia, only 34% of women who gave birth in the period 2017-2019 had a postnatal check in the first 48 hours after delivery.(33)

Although access and availability of services are necessary inputs to improve maternal and newborn health, they are not sufficient. The QoC given in the available facilities determine the health outcomes and its perception also plays a role for service utilization. Evidence from a systematic review including Ethiopia has shown women who perceive the quality of facility-based care to be poor, may choose to avoid facility-based deliveries, where life-saving interventions could be available. (16)

To end preventable maternal and neonatal morbidity and mortality, every pregnant woman and neonate should have skilled care at birth with evidence-based practices delivered in a humane, respectful, supportive environment. Good-quality care requires appropriate use of effective clinical and non-clinical interventions, strengthened health infrastructure, optimum skills and a positive attitude of health providers. These will improve health outcomes and give women, their families and the health care providers a positive experience. (34,35)

A study that included health care facilities from 81 LMICs indicated that among all the maternal deaths, neonatal deaths, and stillbirths that occurred in the period 2016-2020, 25% could have been prevented if resources and quality of care were as per the recommended standards. (36) This denotes the gap in the “quantity over quality” approach and the need to shift focus to quality improvement in ensuring a better health outcomes.

Quality improvement according to the Donabedian model has three components; input, process and output.(37) Increasing coverage i.e. increasing the number of health facilities, availing skilled birth attendants and preparing guidelines are all input- oriented improvements. The process, or how well and with what level of quality our inputs are put to work, has not been the part of improvement to focus on. Improvement in health care is 20% technical and 80% human; communication, clarity of approach and common understanding are the key factors for improvement. (2) Change can be made by making improvement to the “process” part of maternal and newborn care, and can be effective than adding more inputs. The impact from such interventions can not only improve immediate health outcomes, but also makes a difference in service utilization. (38,39)

A nationwide study evaluating status of QoC in 2021 demonstrated only 9.3% of health facilities (among 5 hospitals and 27 health centres included) met the standard cut-point for satisfactory quality of care in the process component of care. Similarly, only 15.6% and 10.7% of the facilities met the 75% satisfactory score for input and output components respectively. The quality of “process” component of maternal and newborn care (MNC) was found to be the lowest (43%) on a standard computing score used to measure the three components of quality in MNC compared to input and output components (average scores were 62% and 48% respectively). (40) (see annex 1 to see the components of process used for scoring)

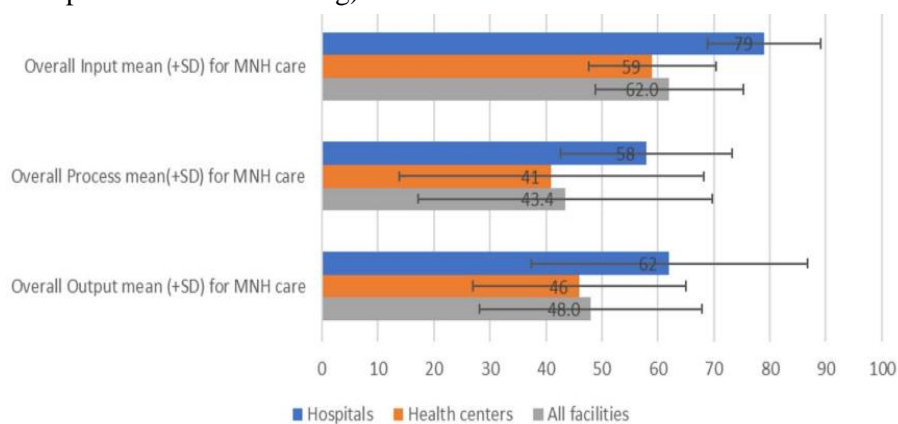


Figure 6: Quality scores in each component per facility(40)

The same study showed the average score for clinical care process to be less than half (48%) showing missed components of care, including assessing women for danger signs upon admission(47%), vitamin-K for neonates (missed in 62% of neonates), and assessment of neonates to determine if they need a special care or monitoring was not done in 42% of neonates despite the availability of necessary inputs. (40)

Focus on the process part of care is an invaluable step to take a step towards achievement of all the national and global goals to reduce maternal mortality, neonatal mortality and stillbirth rates in Ethiopia. Improving quality of care is particularly important, as 40% of still births happen after the onset of labour. Furthermore, evidence shows 8-50% of stillbirths are attributed to maternal infections. (21)

The impact of maternal mortality goes beyond individual and family loss. Yearly, a bout a million children are left motherless and with a higher possibility to die within year compared to children who have both parents living. This demonstrates the bigger picture behind efforts to reduce maternal morbidity and mortality for a better social and economic well- being of a community. (25) Improving maternal and newborn outcomes through interventions to improve the QoC goes beyond enabling the country achieving the national and SDG goals. It will also contribute to social and economic well-being in the country.

Justification

System-integrated quality improvement interventions are designed to provide effective care through sustainable, cost-effective and collaborative approaches. There are numerous interventions in maternal and newborn care that have been applied and proven to be or not to be effective in Ethiopia. Early results from the national programs are also said to be promising, although performance is varied across different set-ups. (41) However, the habit of publishing about specific interventions and their effectiveness and progress made in Ethiopia is still developing.

The role of this study is to identify important interventions from available literature, learn from implemented programs to improve QoC in MNC and help researchers identify unanswered questions in the current approaches to quality improvement. The challenges and opportunities while implementing a specific QI intervention in one set-up will help to design a better approach towards the same intervention in another similar set-up in Ethiopia. This study intends to describe and discuss existing best practices in QI and contribute to the existing knowledge gap in QoC.

Objectives

General objective

The aim of this thesis is to explore existing quality improvement efforts addressing process component of QoC in maternal and neonatal care in Ethiopia, identify interventions that effectively improved maternal and newborn outcomes, in order to recommend interventions to policy makers in the Ministry of health, Ethiopia to reduce maternal and neonatal mortality.

Specific objectives

1. To explore quality improvement interventions improving process component of care in maternal and neonatal care in Ethiopia.
2. To assess effectiveness of quality improvement interventions implemented in Ethiopia.
3. To provide recommendations for best practices in the context of the sub-Saharan Africa, with the main focus on Ethiopia.

Chapter 2: Methodology

A literature review will be conducted to explore quality improvement interventions done aiming to improve maternal and neonatal care in Ethiopia. The effectiveness of these measures will be assessed as per the difference they made in reducing adverse outcomes in maternal and child care. i.e. morbidity and mortality on an institutional level.

Literature will be searched using search engines like google to look for articles, reports and databases in PubMed, google scholar, VU library and Medline. Key phrases like “Quality of care in maternal health”, “QI interventions in Ethiopia”, “QoC and data” etc. will be used. Advanced search using Boolean operators AND and OR will be used combining key words. (see annex 2 to see combination of terms used) Related articles and articles cited by the search results will also be reviewed when within the inclusion criteria.

Inclusion criteria: Literature in English language published since 2015 will be included. Literature from Ethiopia will be the primary geographic area to be included. But, when there are interventions in MCH recognized as “best practice” or effective in other LMIC set ups, studies from other set ups will also be included. A total of 25 articles have been included in this review.

Exclusion criteria: Literature about quality improvement in maternal and neonatal care that does not specify what the “interventions” are will be excluded as this review intends to describe effectiveness and gaps in interventions and not quality improvement initiatives as a whole.

Quality improvement interventions found from the search will be described using the WHO framework for the quality of maternal newborn care (Fig 1). (42) This framework was developed by WHO in 2016 to operationalise the vision to provide a high quality of care to every pregnant woman and newborn. The framework has eight domains for the process component of QoC and provides measures to be assessed, improved and monitored. Each domain represents a standard that defines what is required to achieve in maternal and child health care. For every standard, there explicit quality statements that enable to measure improvement. In total, there are 31 measurable quality statements that address the standards defined by the WHO. (42) This framework is used to cover the first two objectives; to explore interventions in MCH and assess their effectiveness.

The Donabedian model has been the starting point for many quality improvement programs and has been used as a cornerstone in implementing and measuring quality of care.(37) The WHO framework for the quality of maternal and newborn health care also encompasses the basic components of this model, with giving more emphasis for the process component, which is the focus of this thesis.

For the purpose of limiting the scope of this review, interventions dealing with striving to meet the standards will be reviewed than interventions addressing each statement. Articles, databases and reports about interventions done targeting to improve domains (standards) will be discussed in the finding section. (See annex 3 to see the complete list of standards and statements)

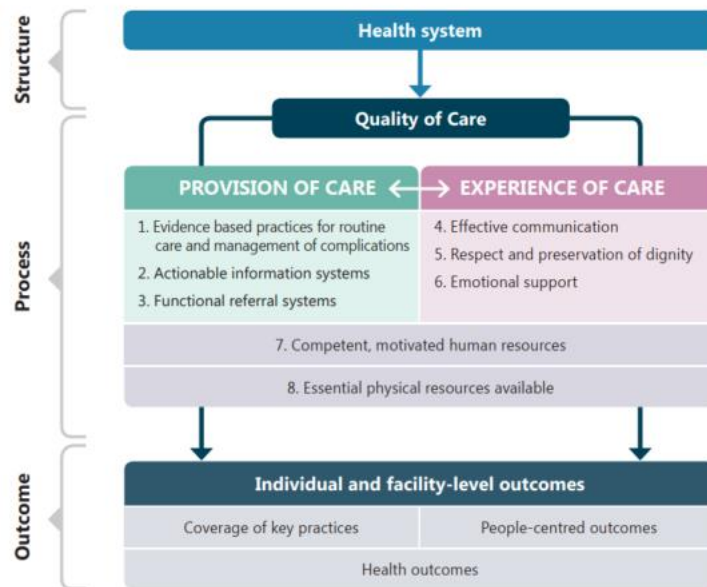


Figure 7: WHO framework for the quality of maternal and newborn health care(42)

In quality improvement, interventions intended to fix one gap also affects another one. Improving provision of care and the three domains under it will also improve perceived quality of care (experience of care). As such, among the eight standards represented by each domain, some are closely inter-related. In such cases, the two domains will be discussed in combination to avoid repetition.

Findings will be discussed under four sections by combining some domains. (more details on the next chapter)The rationale behind combining evidence based practice and human resource (Domain 1 and 7) is that the indicators used for the former measure the instances in which a specific routine (e.g. newborn care) or complication (e.g. preterm labour) are managed as per the appropriate guideline. In practice though, an intervention to avail these guidelines is not a complete intervention without a competent and motivated human resource. Combination of effective communication, respect and dignity and emotional support domains under experience of care is a more practical approach due to their close relation to one another in the interventions addressing them. Availability of physical resources has been described in the problem statement, and will not be discussed in results section.

Although the framework has the structure (health system) and outcome components, the scope of this literature review is limited to the process component. The structure part is briefly described in previous sections. Outcomes are discussed in terms of effectiveness when the pre and post intervention studies are available, but will not be described in-depth in terms of the three outcome domains.

As observed from the preliminary literature search, the possible limitation of this methodology is not including as many articles due to limitation in the number of published pre and post intervention studies with specific interventions in Ethiopia.

Chapter 3: Results

The findings from literature search on quality improvement interventions in Ethiopia will be described below. The results will be presented arranged in four sections derived from the eight process- related domains in the framework. The first section will be interventions improving evidence based practices and human resource factors, the second section will be actionable information systems, third section deals with interventions to improve referral systems and interventions towards experience of care will be discussed in combination.

Each section starts with a short situational-analysis about the respective domains, followed by description of interventions addressing the gaps. Whenever data is available, pre and post intervention changes will be described and gaps in the approach will also be presented.

Search results

Using the combination of key words literature was searched from the databases via search engines and snowballing from relevant articles. After selecting articles as per the exclusion/ inclusion criteria, 25 articles were reviewed. Eight of the articles were about evidence based practice and human resource-related articles, six articles included for information system related interventions and five articles were about interventions forwarded towards functional referral systems. The remaining five were concerning interventions in experience of care. The portion of articles included for each section is summarized in the figure below. Over all ANC is the most researched part of maternal care, followed by IPC. Despite the lowest coverage in PNC, limited focus is given for PNC evidenced by not as many articles.

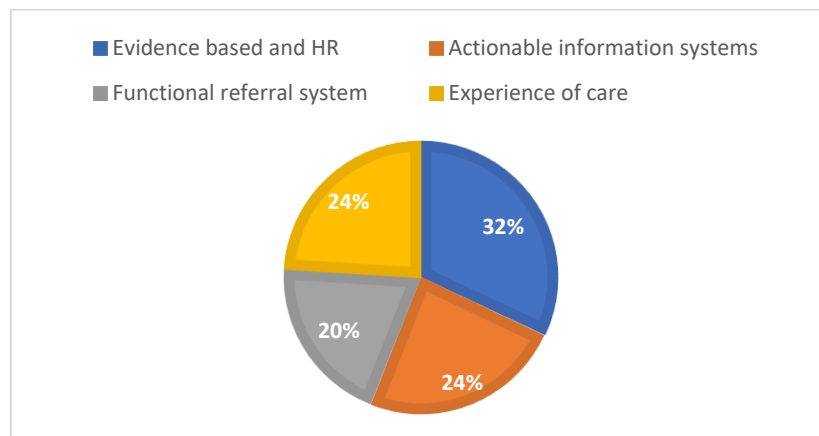


Figure 8: reviewed articles per domain

As for the type of study, four of the articles were systematic reviews while the remaining 21 were studies with primary data. Eight of these articles were qualitative studies, and other 8 studies were quantitative studies. Two of the quantitative studies with pre-post intervention approach were taken from a national quality and safety in healthcare bulletin published by the federal MoH in 2021.

Three articles were included from other African countries. Two were included to describe effective interventions that can be implemented in Ethiopia, and the last one was evaluation of an intervention that is already implemented in Ethiopia.

Findings

Evidence-based practice and human resource factors

Evidence-based practice

Seyoum et al. underlines evidence-based guidelines are invaluable for improved health outcomes when translated to daily provider practice.(43) This has been demonstrated throughout all clinical practices including MCH. (44–46) The federal ministry of health has developed its own management protocol in line with WHO for health centre and hospital levels, last updated in 2021, and these are now nationally accepted protocols. (47,48)

Assessment of availability of guidelines in all facilities that were providing delivery service in the year 2015, done by the Ethiopian public health institute (EPHI) shows that family planning (found in 78% of facilities), neonatal resuscitation(65%) and prevention of mother to child transmission of HIV (PMTCT) guidelines (65%) are the most common available guidelines in all facilities. Obstetric care guidelines were available only in 52% of health facilities. (49) No interventions demonstrating efforts to increase availability of MNC guidelines were found.

In addition to the limited availability of guidelines, qualitative studies from Ethiopia demonstrate provider adherence to existing guidelines is low even when guidelines are available. (50–52) *Seyoum et al* reported factors attributing to non- adherence to ANC protocols to be are unavailability of guidelines in health facilities, lack of provider motivation and commitment, variation in provider’s knowledge on the guideline, lack of competency, inadequate pre-service and in-service training and lack of support during clinical practice. (50)

One of the QI projects included in the National healthcare quality and safety bulletin published in 2021 was carried out in one of health centres in Addis Ababa. The aim of the project was to increase effective PNC coverage. The baseline assessment showed only 7% of the mothers received all components of PNC in this institution, which is much lower than the national average of 32% in 2019. The root cause analysis revealed that neither the care providers nor the management were aware of the revised PNC guideline, and mothers were not being counselled adequately as a result. They also demonstrated mothers and newborns were not being assessed for danger signs and vital signs were not taken in the early postpartum period. (41)

Interventions targeting each root cause were designed and put to practice. Providing orientation on the new guideline, preparing counselling checklist for providers, posting key messages about the components of care in the PNC room, engaging family members- especially husbands in the counselling process and developing PNC protocols were among the interventions done. After the implementation period, progress was monitored weekly. Within 8 weeks of implementation of all interventions, the PNC coverage increased from the baseline of 7% to 80%. The following is a run chart over the first 15 weeks after implementation. (41)

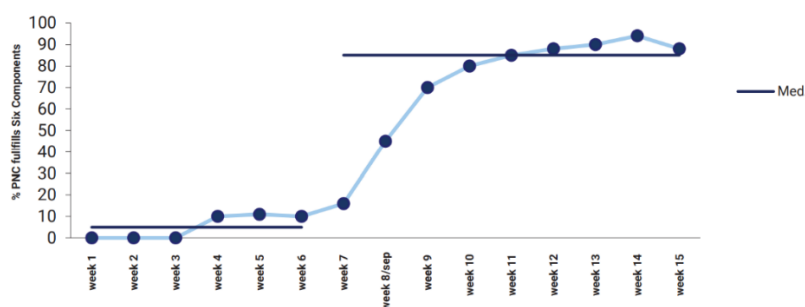


Figure 9: Proportion of mothers receiving complete PNC (41)

Human resources

The human resource factors from Seyoum et al. study include variation in provider's knowledge on the guideline, lack of competency, inadequate pre-service and in-service training and lack of support during clinical practice. (50) A wide range of interventions have been implemented to address these gaps over the last decade. Most of the interventions identified and reviewed are focused on capacity building for a better QoC; specialized training in emergency obstetric care, coaching and supervision of sites, and mentoring.

The first training intervention program that made a difference in the quality of MCH in Ethiopia is the launching of integrated emergency surgical and obstetric care officers (IESO) in 2009. This task-shifting program is provided as a three-years Masters program for health professionals with BSc in health sciences. This intervention was designed to provide emergency obstetric care in rural areas of the country, where there is a shortage of obstetricians and surgeons to do emergency surgical interventions. As a result, lower rates of referrals for caesarean deliveries (40% reduction), adverse maternal outcomes including uterine rupture and death associated with obstructed labour were reported by *Gobeze et al* in 2016. (53) Information from the professional association of IESOs web page indicates this program contributed to 70% reduction in the number of women dying as a result of child-birth complications. (54)

Harrison et al did a retrospective cohort study in 2019 as part of QI in a teaching hospital found in the Southern part of Ethiopia. The aim of the study was to assess the performance of graduates from this program working the hospital. This observational study included 1000 mothers who have birth in the hospital, attended by all the existing levels of obstetric care providers (midwives, IESOs, general practitioners, OB/GYN residents and specialists) and compares maternal and neonatal outcomes. The limitation with this study is the proportion of IESOs to physicians of all levels (12:1) resulting in an observation which might be attributed to this disproportion despite its statistical significance. (55)

According to this study IESOs are providing care to more acute, complicated and high risk cases compared to midwives. Although the results have very wide CI, the study proceeds to indicate because of this, women attended by them have a higher relative risk of having instrument assisted delivery (RR 88.4 CI (28.7-271.7) for forceps delivery and 45.5 CI (14.3-142.3) for vacuum delivery, $p < 0.001$), CS delivery (RR 161.8, CI (59.9 437.2) $P < 0.001$) as compared births attended by midwives. The odds of postpartum complications like requiring antibiotics (OR 13.4, $p < 0.05$) are also higher in this group. The neonatal outcomes of having a good APGAR score and having a live neonate upon discharge were significantly higher in the IESO- attended deliveries showing effectiveness. As compared to outcomes of births by physicians, IESOs had comparable outcomes with physicians except the neonates from deliveries attended by IESOs having a longer neonatal hospitalization than those attended by physicians. This demonstrates the high quality of care provided by IESOs and the effectiveness of the intervention in addressing the acute needs while quality is not compromised. (55)

Gobeze et al's mixed method cross-sectional study from 2016 evaluating decision making and surgical skills of IESOs over a two- years period also shows their potential in providing care with evidence based practice. The outcomes of the procedures performed were optimal as measured by proxy indicators including post-operation haematocrit level, anaesthesia time and post op hospital stay. Surgical obstetric interventions were done within acceptable rate according to the WHO recommended range (12.5% Vs 10-15%) for CS deliveries. The qualitative aspects of this study indicate the acceptance of the program among other health professionals. (53)

Lindtjorn et al suggests another approach on a report from a QI intervention done in 3 districts of Southern Ethiopia in collaboration of MoH. The intervention was training general practitioners and health officers to do CS through a 4 month long in-service training. The intervention program was implemented in 3 hospitals and 63 health centres found in three districts over a period of six years. The intervention was successful by not only reduction of maternal mortality by 64%, from 477 to 219 deaths per 100,000 live births (OR 0.46; CI 0.24-0.88) through timely surgical intervention with skilled providers, but also increasing service utilization for delivery and ANC. (56)

Studies from other LMICs show similar task-shifting or task-sharing interventions through training is a practice that has been proven to be effective in other African and Asian countries like Mozambique, Senegal, Malawi and Nepal. What makes the IESO program in Ethiopia unique is, only professionals with health science are eligible for the training given on a Master's level, while in some countries like Mozambique and Senegal qualifications of people who are eligible ranges from no medical background to medical graduates. People without health background take part in health promotion, especially family planning. Emergency obstetric care trainings are given to GPs and other health professionals. (57–60)

The challenges with these programs and the training-focused approach has not been studied in Ethiopia. However, a systematic reviews from other LMICs underlines the challenges and potential problems with such intervention. *Deller et al* (2015) suggests the first policy implementation step for task-sharing/shifting programs should be having a clear boundaries and chain of referral systems to a higher level professional. Task shifting without clearly defined roles and process undermines decision making, team work and professional protection by both sides and should be done based on a task analysis. (61)

The other potential challenge, pointed in a systematic review done by *Lassi et al* in 2016 is, the regulation of professionals that tasks are shifted to. Qualification, licensing and supervision of cadres requires additional resources and in such critical areas like emergency obstetric care, needs extra caution. The effectiveness of the whole intervention is also completely dependent on the input component and requires set-ups where professionals can practice within their scope with all the necessary resources and standards met. The education and training costs, while usually found to be cost effective, scale-up might require revisions in the existing pre-service training to ensure good standards and consistent use of evidence- based guidelines. (60)

Actionable information systems

Health information system(HIS) involves various systems ranging from personal medical records to data on several areas of health systems like DHIS (district health information system) and HMIS, where reporting to a higher level takes place. The application of HIS is cross-cutting along health systems and is one of the building blocks of health systems. HIS is used for planning, resource allocating, surveillance and decision making and provides basis to improve QoC by showing gaps, trends and areas to intervene granted a good quality of data. (62) With the health sector transformation plan in 2016, HIS in Ethiopia has been through a great reform and re-designing in terms of standardization, integration and simplification of reporting forms and indicators at all levels. These efforts aim to improve quality of data within HIS. (63)

Maternal and perinatal death surveillance and response (MPDSR) system is a “continuous cycle of identification, notification and review of maternal and perinatal deaths followed by actions to improve QoC and prevent future deaths”. (64) This system enables to identify causes and trends of maternal deaths and intervene systematically. Ethiopia is among the pioneers to align and synergize the efforts in improving QoC with improving data quality of MPDSR; and designing QI interventions as a part of the response based on the available data from the MPDSR. (64)

Maternal death surveillance and response (MDSR) was adopted in Ethiopia since 2013, and later in 2017 evolved to MPDSR, by including perinatal deaths. The source of data is either community (based on verbal autopsy) or health facilities. Reporting is weekly, through an integrated disease surveillance and response system. Since 2017, MPDSR has been integrated to the Ethiopian public health emergency management reporting system. The reports are then reviewed by the regional MPDSR team quarterly and by national review team and MoH annually. (65,66)

Abebe et al and *Ayele et al* reflect a strong belief that driving force behind MPDSR is the political commitment of the country to reduce maternal mortality. This momentum has created motivation, and possibly will sustain to push through challenges and continue to improve the system. On the other side, they believe this top-to-bottom approach is perceived as an extra burden by most care providers. (66,67)

The Ethiopian national technical guide for MPDSR has principles it upholds for reporting. One of these principles is that MPDSR reporting is blame-free and findings will not be used as grounds for a medico-legal proceedings and have no consequence on the provider. (68) However practice is shown to be in contrary to this principle by two qualitative studies by *Melberg et al* and *Estifanos et al* (from 2019 and 2022 respectively). Due to the politicisation of maternal death, providers do not feel free to report cases as they are, and the blame culture continues in different forms. Avoidance of accountability and fear of consequences are noticeably leading to false-reporting and under-reporting of maternal deaths. (69,70)

While the transition between MDSR to MPDSR was planned, Tigray was one of the regions in which pilot studies were done for two years before national implementation. *Ayele et al.* did a mixed study looking into achievements, challenges and prospects of the program since its implementation in Tigray in 2019. The findings from this study point out early identification and reporting of maternal death at health post level is dependent on the number of health extension workers in kebeles (having 3-4 workers improve the odds of timely reporting by 6- times) availability of public health emergency management report at the kebele (4 times as likely compared to HPs where report were not available) at that level. Health posts (HP) with steering committee for MPDSR were found to be 9-times more likely to report deaths timely. As for the quality of data, the presence of a MPDSR- trained nurse, work experience and having a focal person were found to have a positive association (improving quality by 5, 3 and 4 times respectively compared similar set up lacking the variables). (66)

The qualitative part of this study also shows a cause for one of the challenges for the program- lack of motivation by care providers to report. The ultimate aim of MPDSR is to design response, and yet, only one-third of the health facilities included in the study developed at least one action plan to respond to perinatal deaths. This mentioned as a demotivating factor by few care providers to have commitment to report data of good quality. (66)

Besides the implementation of MPDSR to improve maternal health outcomes, further interventions to strengthen this and other reporting systems like routine HMIS have been made by the country, after joining The network for QI in MCH. These interventions are directed towards capacity building and technology enhancement, and were effective in improving the quality of data in maternal and newborn services, and are recognized as basic inputs and are more input-oriented interventions. (71–73)

Ghana, Tanzania and Nigeria are among African countries that implement the MPDSR system. A systematic review by *Mekbib et al* comparing MPDSR implementation in Ethiopia with other African countries like Tanzania and Nigeria shows the difference in reporting differs in that reporting is integrated into HMIS in other countries. (65) Integration of maternal reporting into another monitoring system is said to contribute to reduce blame on health professionals while improving quality of data and reducing workload. (74)

Tanzania introduced the MPDSR system in 2015. (65) According to the Tanzanian MDPSR guideline, narratives about a maternal death should be reviewed by a facility-based MPDSR committee, that is also responsible to have SMART action points to be recommended to the Ministry of Health maternal death through the reporting system. *Said et al* did a retrospective cross-sectional study reviewing death reports and documents with death narratives. Findings from this study shows only 1% of the narratives and reports were conducted as per protocol. Approximately 50% of the maternal death narratives had one or more missed components deemed necessary and only 42% of the recommendations by the MPDSR committee were found to be SMART. (75)

To strengthen the system and improve the skills of the review committee, the MoH of Tanzania in collaboration with Pan-American health organization and the WHO, launched a 3 hours virtual training platform about MPDSR framework. (76) No studies about the effectiveness of this intervention was found.

The other intervention for an actionable HIS is coaching and supervision. This was part of QI project and published in the national healthcare quality and safety bulletin in 2021 as a success story. It was implemented in one of the big MNC hospitals in Addis Ababa. The aim of the project was to improve completeness of medical records. Even though it was not an intervention focusing solely on maternal or neonatal care, the changes in both departments chart keeping were documented and showed improvement. The baseline assessment for completeness of medical records in the delivery department was 55% while the NICU had 60.2% of charts complete. Over a period of six-months, a one-day refresher training and weekly coaching with daily monitoring of charts of new admissions was implemented. The post intervention medical record completeness rate in the delivery department was 87.3% while Neonatal ICU (NICU) reached 86.8%. (41)

mHealth is the use of mobile phones for health related interventions. With a rapid growth of mobile phone and network coverage in Africa, mHealth is becoming a tool to reach the rural community for different health-related applications.(77) In Ethiopia, the mHealth has been used since 2014 for purposes of storing, sharing and processing client data for MNC purposes among HEWs. (78)

A community-based randomized controlled trial (RCT) was done by *Atnafu et al* in 2017. The aim of the intervention is to improve ANC and delivery services and strengthen referral systems by linking the HEWs to higher levels of care. Three districts were selected, of which two were interventional group with slight difference in interventions. The intervention is distributing mobile phones with an application that allows HEWs to register pregnant women into a system including obstetric history, enabling the application to calculate the expected date of delivery automatically. Based on that, appointments for ANC schedules are made on weeks 14, 24, 30 and 36 and reminder messages are sent to HCWs on the dates. (78)

In district 1, only health extension workers were given phones with a mobile application while in district 2, two voluntary community health workers (vCHW) from the community were also given phones. Pregnant women who did not register were located by the vCHWs, who will report to HEWs in the second district. The third district was a control. The cost for mobile data and airtime was covered by providing 50ETB monthly for HEWs and vCHWs for whom phones were given to. (78)

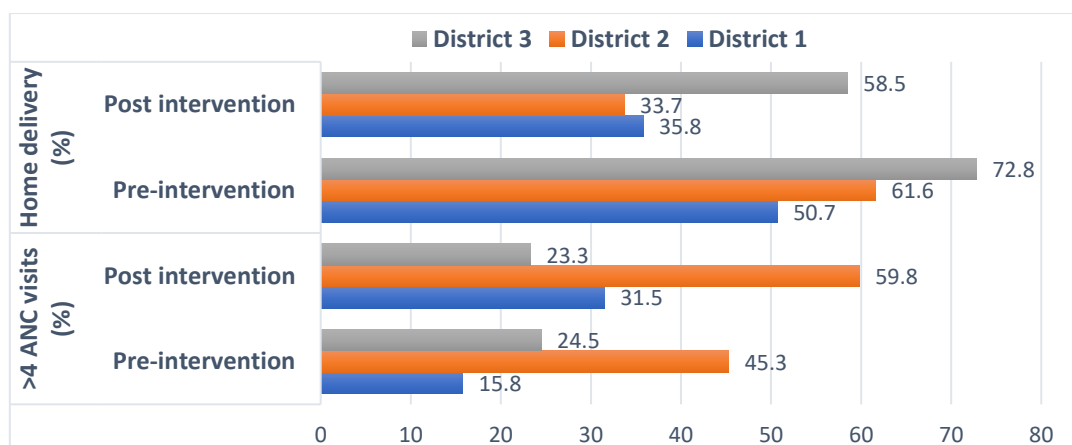


Figure 10: Change in the percentage of women with more than 4 ANC visits and home delivery after mHealth

After a 13 months intervention, the number of women who have at least 4 ANC visits has increased in the intervention districts from 15.8% and 45.3% to 31.5% and 59.8% respectively while it showed a slight decrease in the control district(24.5 to 23.3%). Similarly, the trend of home deliveries is shown to decrease in all three districts, but at a faster rate in the intervention districts.(78) (See figure 4)

Functional referral systems

The three-tier health system in Ethiopia is organised in such a way that referral networks are available in a horizontal or vertical hierarchical arrangement; including direct referrals from the first tier to specialized facility without necessarily passing through the immediate- higher level of care. The national referral system network is guided by a manual developed by FMOH in 2015, and dictates how the liaison officers in a facility manages referrals..(79)

Timely and effective care are major determinants of maternal and newborn outcomes. According to a quantitative cross-sectional study conducted by *Kitila et al* (in 2022), done in two demi-rural districts, the average time spent is around 3 hours for mothers and/or their newborn to go through the whole referral process in Ethiopia. (80) Two other qualitative studies from the biggest maternal care centre of the country found in Addis Ababa, by *Shiferaw et al* and *Mekuriaw et al* have similar conclusions. Both studies show most of maternal deaths in the hospital occur within one hour of arrival, indicating critical time for care might be wasted in the referral chain and transport to the facility.(81,82) Delays in referral are generally associated delays in reaching appropriate level of care.

Teklu et al in his qualitative study from 2020 states there is a notable difference in the occurrence of delays related to referrals between urban and rural areas. This is due to differences in proximity of the referring facility to the receiving hospitals, availability of transport, road access and other direct medical costs, which are found to be the barriers for effective referral in the rural area than cities. This qualitative assessment was done on the referral system for newborns across the three largest regions of Ethiopia. Barriers for effective referral were found in four major areas; namely transportation, communication, referral protocols and family refusal for referrals. (83)

One of the earliest nationwide interventions to solve the delay for transport was a free ambulance service for mothers and newborns, started by the government in 2012. This intervention started by distributing 1250 ambulances at a district level (each covering 150,000 people), to provide transport within the referral chain of health posts to health centres and primary hospitals. The total investment costed the federal government around 50 million USD, and the running costs were to be covered by the regional states.

This intervention is proven to be undoubtably effective by studies in multiple levels of care and areas of the country. A one-year assessment by *Hagos et al* included 131 areas in six different districts. It was found areas with a higher utilization of the free ambulance service had a significantly lower pregnancy-related mortality (MMR 202, 95% CI (135-291) Vs MMR 468, 95% CI (293-709). According to their regression model, without this intervention, MMR in Tigray region, where all the districts are located would have been 401 per 100,000 instead of the 266 per 100,000 deaths observed. (84)

Availing free ambulance service was found to be effective in other African countries in reducing maternal and neonatal mortality. For example, in one province in South Africa, MMR was reduced from 279 to 152 within 10 months of implementation after distributing 18 ambulances dedicated for maternal health in the aim to improve inter-facility transport. Uganda and Zambia are among the countries that implemented free ambulance services, ranging from bicycles to 4x4 vehicles. Although this intervention is proven to be beyond effective in improving facility deliveries and reducing maternal and neonatal mortality, there are short comings that are common to all set ups. (85,86)

Jackson et al argues the degree to which this intervention is a success is dependent on many factors. The road infrastructure and communication networks between facilities should be functional to have an effective referrals without delays. The extent to which the ambulance is equipped to deal with emergencies, and have a trained professional to accompany the mother or neonate is also another factor determining the outcome. The service utilization among the society and their perception are demand side factors to be taken into consideration before implementing the provision of free ambulance service. Similar findings were reported from a systematic review from LMCI by *Alaofe et al* in 2020. (86,87)

Hailemichael et al also identified some challenges with such an intervention. Maintenance and running costs for vehicles may pose threat for the sustainability. Hence, he suggests those factors should be well thought of before purchasing ambulances. Otherwise contradicting practices as seen in some facilities, where patients are asked to pay for fuel after referral will be common. (88)

The quote below was from a health extension worker in the rural part of Ethiopia, and is a story shared by many working in similar settings. (87)

“ Once I assisted a woman whose labour lasted more than one day to get to the hospital. I walked 20 kms to get a phone signal to call the ambulance but when that didn’t work I went home and we carried the woman for six or seven hours on a stretcher to the road. Then we called the APDA ambulance to come the last 40 kms.”(87)

Communication between the initiating (sending) facility and the receiving facility is important for the receiver to make necessary arrangement. According to the national referral protocol, after the initial communication, referral forms are sent to the receiving facility, which should provide a feedback confirming or refuting the appropriateness of the referral.(79) Findings from a mixed method study by *Hailemichael et al* about current practice shows referral forms are not sent after communication is made via telephone calls as a standard practice. and colleagues included more than a thousand referrals from four regions indicated 70% of clients get a written referral, of which only half get feedback. Among all the feedbacks given, third were verbal feedbacks presenting a missed opportunity for the sender to learn from the feedbacks and intervene accordingly. (88)

The other aspect of referral system that is so basic, but has no report for intervention to improve is the lack or non-adherence to referral protocols. Based on data from the EPHI censuses of all facilities where delivery service was available in 2015, only 26% of the health facilities had referral or counter-referral protocol.(49)

The same low availability was seen in *Hailemariam's* study, it is reported that only a quarter of health centres and 75% of hospitals included in his study had referral protocols. In primary health facilities, not only there is lack of protocols, but the knowledge about the existence of such document is also low. *Teklu's* findings also show that in hospitals, even when referral protocols exist, liaison officers still rely on their existing knowledge and capacity. (83,88)

Experience of care

In Ethiopia, the number of mothers with complete ANC follow-up, births attended by skilled attendants, facility based births and postpartum visits remain suboptimal. A community based cross-sectional study in Jimma zone by *Erchafo et al* (2018) concludes experience of care while utilizing services during pregnancy and childbirth is a major determinant factor for service utilization. Patient-centered care is critical in increasing effective utilization of MNC services for better outcomes. (89) A systematic review from *Weldegiorgis et al* exploring why women defer facility-based deliveries(FBD) done in 2021 showed previous facility delivery to be negatively associated to FBD (AOR= 0.24, 95% CI (0.11-0.52). This association roots from poor quality of services, mainly “unwelcoming and unfriendly approach” of health professionals. Same study showed such approach during previous delivery reduces the possibility of giving FBD by 45% in the next pregnancy. (90)

The perception of good QoC among clients and care providers show significant variation. For mothers, a good quality of care is mostly about the support, communication and respect from the provider's side. (91) In a qualitative study by *Gebremichel et al* women preferred to receive care from professionals who show sympathy and spoke in respectful and encouraging manner than any treatment by disrespectful and abusive providers. The same study shows women experience all levels of disrespect and abuse during delivery. This can range from not being asked a consent before procedures and examinations (e.g. vaginal examinations) and not being informed about the results of their status (progress of birth, lab results, ultrasound findings) denial of care and abuse including inflicting physical pain. (92)

A systematic review and meta-analysis done in 2020 by *Kassa et al* shows the pooled prevalence of disrespectful and abuse of women during childbirth in the Sub-Saharan region to be 44.1% (95% CI (29.4-58.2)). (93) A study in Ethiopia from 2019 showed a pooled prevalence of disrespect and abusive behaviour of professionals to be slightly higher than the pooled prevalence in SSA (49.4% (95% CI, (30.9-68.1)). Neglect and abandonment during childbirth, non-confidence and physical abuse were the commonest forms of mistreatment in this study. (94)

In Ethiopia, the issue of respectful maternal care (RMC) is recognised as such only recently with the increasing attention to the rights-based approach to reduce maternal adverse outcomes. Evidently, the first chapter in the latest version of obstetric management protocol published in 2021 by the MoH is dedicated to RMC. This chapter explains categories of disrespectful and abusive care with their examples and corresponding rights being violated for each category. Furthermore, it lists potential service delivery and provider related contributing factors and gives a good summary of principles of respectful care. (48) This is a big step in giving an input and creating awareness among all providers to practice RMC, as knowledge gap among providers is reported(*Bulto et al, 2020*) which has been found to be a major barrier for providers to practice RMC. (95) Adherence to these principles, however, is something that requires further study as there are no reports evaluating non-adherence rates.

The Ethiopian health sector transformation plan in 2016 inspired an intervention called “the caring, respectful and compassionate workforce” in the same year. This was before the introduction of respectful maternal care, which was at the time was being piloted in only few facilities. The intervention was giving series of trainings called “compassionate and respectful care (CRC)” for care providers to improve awareness about the issue. (96) Despite this intervention, studies continued to show the prevalence of mistreatment, abuse to be worryingly high.(97)

In collaboration with MoH and part of the pilot for RMC, an interventional study was conducted in 2018 in three hospitals in Ethiopia. The interventions employed in this study include a three days training for service providers using a RMC training manual, placement of wall posters in labour wards and post-training supportive visits for quality improvement. The comparison between pre and post intervention was done after ten months of implementation period. The findings show a reduction in the number of vaginal examinations and other procedures that were being done without a consent (pre Vs post-intervention values = 83.3% and 65.3%), more women were allowed to have companions while labouring, and more women had their preferences respected after the interventions. On the other hand, rude language, denying attention for prolonged period and some forms of physical mistreatments did not improve significantly. According to the author, this is an indicator that deep-rooted and normalised behaviours take time to change, and in-service training alone is not good enough to improve respectful maternal care, especially in a sustainable way. (96)

Asefa et al, concurring the conclusion from the previous study had a report in 2020 about lessons from previous interventions. Initially pre- intervention survey was conducted assessing the current prevalence, perception and practice of RMC among 64 health professionals (80% were midwives, 6% GPs, 6% IESOs, 5% nurses and 3% health officer). In the previous 30 days from the survey date, 39.1% of the professionals reported witnessing vaginal examinations done without maintaining privacy, 31.1% witnessed insults, intimidation, threats and coercion directed towards labouring women, while a quarter observed women in labour were neglected and left alone for a long period than they think is acceptable. Physical force including forcefully parting woman’s legs or restraining were observed by 21.9% of the professionals on the 30 days preceding the survey. Among the participants themselves, 29.7% admitted to mistreating a labouring woman in one of the above categories in the same period of 30 days. (98)

Although the participants report to gain new knowledge and their attitudes towards mistreatment was influenced by the training, none of the perceptions showed a statistically significant change post-intervention. The number of participants with positive perception regarding RMC had improved from the baseline 21.9% to 35.9%. The perception on beliefs about the necessity of yelling did not show a big difference either (21.9% pre and 20.3% post training). Additionally, more people agreed to the perception that it is not possible for health professionals to change how things are done in the labour wards (17.2% to 18.7% pre and post training respectively). (98) The qualitative part of the study demonstrates why the perception of the participants regarding the possibility for improvement did not change significantly; training was not effective without eliminating the system related constraints. Challenges including inadequate infrastructures and supplies, high workload among professionals, lack of concern for provider’s perspective and poor attitude of women and their companions towards health professional were raised by the care providers. Hence, a combination of interventions addressing structural and systemic problems in parallel with the training is recommended by the author to make a tangible change in RMC. (98)

A systematic review by *Dhakai et al* with 13 studies from five countries (Ghana, Ethiopia, Tanzania, Kenya and Spain) focusing on educational interventions to improve RMC had similar findings. Studies in this review reported varying level of improvement in knowledge and perception among care providers in resulting in the reduction in disrespect and abuse during delivery. The level of improvement was found to be dependent in terms of the content of education/ training, duration of the training, timing for pre-post evaluations and tools used for evaluation. However, these trainings in most studies were part of a strategy with multiple activities, making it difficult to conclude the changes observed are purely as a result of the trainings given. (99)

In contrary, *Mihret et al* in 2019 implemented a series of interventions aiming to reduce disrespect and abuse during ANC and IPC in a general hospital the Northwest Ethiopia. A root cause analysis and intervention selection was done with a team of stakeholders. In addition to a five-day compassionate and respectful maternal care training for 133 professionals including supportive staff (porters, liaison officers, medical record unit coordinators), other interventions were also included. Some of these interventions are; mentoring and supervision, M&E and quality improvement training, and changes in physical(waiting and reception rooms, toilets) and administrative(IPC becoming part of in-patient care) structures enabling better practice of RMC. As a result, the overall prevalence of disrespect and abuse reduced from the baseline 71.8% to 15.9% (Mean difference 0.56, 95% CI (0.55-0.57)). (100) (The log frame from this interventional study is found in the annex.)

Another facility-based intervention by *Ratcliffe et al* from Tanzania is the open birth days (OBD) intervention that was first implemented in 2014. This intervention was designed to improve communication between women and care providers, which will bridge the information gap and eventually reduce the magnitude of disrespect and abuse among pregnant women during childbirth. OBDs include a participatory health education before clinical working times for all pregnant women in their third trimester, followed by a tour of the hospital. Furthermore, a “charter” containing information about birth preparedness, rights and responsibilities as a patient were written and translated in their local language. Copies were given to the women attending the OBDs. During the six- months implementation period, 362 women participated and the intervention had 100% acceptance rate. The post intervention survey was done using a tool with questions in the different domains of rights, process of delivery and preparedness. Improvements were noted in the knowledge of women regarding when and where to check in and move around between different parts of the hospital (from the baseline of 27.1 to 44.7%. Rights to consent, privacy and to be free of physical abuse are the areas where significant change was observed. (see Fig 3) Care providers also reported they could tell if a woman attended an OBD based on the level of preparedness and ease of communication and 100% of the participants agree the intervention adequately prepared women for delivery. (101)

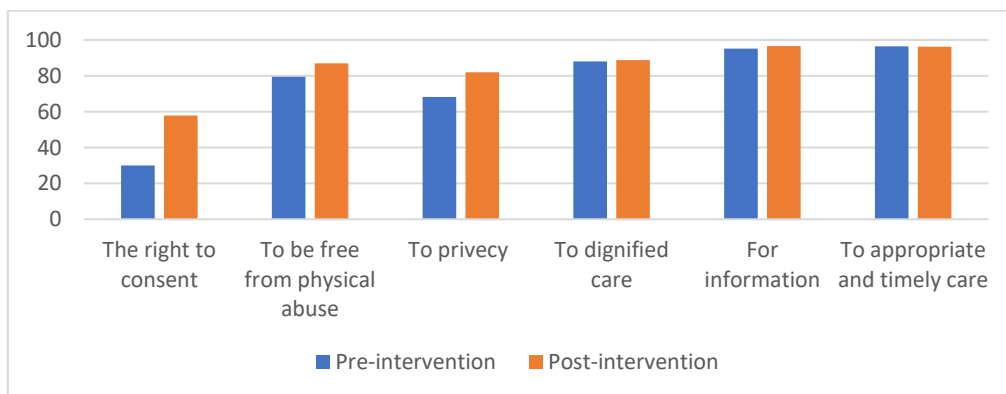


Figure 11: knowledge change about their right before and after intervention(101)

Chapter 4: Discussion

In this sections the summery of findings, relevance of the framework and limitations of the study will be will be discussed. Since all the relevant literature was presented with the findings, citations are not included in this section.

Summery of findings

Considerably limited amount of studies included specific quality improvement interventions done in Ethiopia. Some interventions, for example the IESO program, are a nationwide programs that have been implemented long ago of and are researched better. Other interventions, on the other hand are small scale, facility based interventions that are assessed only at one specific point in time

Interventions on evidence- based care and HR

Evidence- based practice is a basic part of QoC. Clinical guidelines provide a means for evidence-based practices that ensure a client has an effective and efficient care. When an effective care is given, treatment outcomes are likely to be optimal. This will go a long way in developing trust between the community and health professionals, which improves perceived quality of care and service utilization.

In Ethiopia, there is a noticeable difference on the focus given for evidence-based practice in ANC and IPC than PNC. Much more guidelines and studies about the first two areas are available despite the lowest coverage in PNC. Possibly, this limited attention given to it contributed for low PNC coverage.

There is a significant gap in availability of guidelines in health facilities, which is not addressed by any intervention found for this review. Even when guidelines are available, there is a high rate of non-adherence for clinical guidelines, and the magnitude of the problem in Ethiopia is not well-studied yet. One of the most frequently mentioned reason for non-adherence to clinical guidelines and protocols is lack of trained personnel. Hence, training, both higher level of training and in-service trainings for task-shifting are proven to be effective.

IESO training provides access and coverage to emergency obstetric care to the rural parts of Ethiopia. Its effectiveness has been proven by the reduction in preventable maternal deaths. There are also studies that evaluate the performance in terms of quantity and quality of care given by the IESO program graduates, although the quality of data supporting these results is low, the overall reports show satisfactory progress. What seems to be the gap in evidence regarding this program is how the roles for midwives, GPs and IESOs are defined. Furthermore, the career path for these professionals after this master's program, like a PhD has not been designed. Career development being one of the strong motivators for professionals, such issues should be well thought of.

The study from a health canter to improve PNC coverage shows how quality improvement interventions in a package form (combined) can be most effective: starting from the root causes, involving all the stakeholders and different but complementary interventions applied addressing different aspects of the problem. The impact from short in-service trainings can be boosted by adding other timely interventions like mentoring and supervisions, developing checklists or protocols or a motivational factor for care providers. This can be a lesson for designing QI interventions with the limited inputs available, only focusing on the process component of care.

Interventions towards actionable information systems

MPDSR is a basic tool for learning as well as monitoring and evaluating the progress made in maternal care nationwide. Quality of data plays a key role for planning and designing effective interventions related to maternal death reduction. Findings show the quality of data is the major challenge. Different interventions, focused on training and system strengthening have been done.

In the current top-to bottom approach in MPDSR, along with the blame culture embedded in the administrative structure, it is unlikely to have effective interventions ensuring a good data quality. Interventions focused on depoliticization of maternal deaths and working on building trust of health care professionals through a non-blame approach for maternal care is a key intervention that can solve this problem.

The word “actionable” is key, indicating the presence of a platform alone is not good enough, but actions should be made based on the results of the reports. Developing action plans based on death reviews is a role given to the steering committee, or review committee on the higher levels. Although there are no studies about the reasons for this inaction, knowledge and skill gap in developing action plans and designing quality improvement interventions can be the potential problem. The intervention from Tanzania, that addressed this problem by a means of virtual training on reporting protocols can be something Ethiopia can adopt. In the presence of such a training platform for reporting and quality improvement, not only the actionability but the motivation of the care providers to report can be boosted.

With the wide application of digital health, mobile applications like mHealth are good alternatives to improve maternal healthcare provision. Although the RCT showed favourable outcomes in reducing home deliveries and increasing the number of mothers with at least 4 ANC visits, the questions of sustainably covering mobile data and airtime from the service providers is difficult to implement a scale-up. Furthermore, the rural area of the country is yet to have a complete telecommunication network and implementing such interventions only where networks are available leads to inequity. Hence, such interventions should take into consideration the overall status of inputs needed and be adoptable accordingly.

Interventions on functional referral systems

A functional referral system is instrumental to avoid delays in reaching the appropriate care, which has a higher association with adverse maternal and neonatal outcomes. The interventions found in this area are the nationwide implementation of free ambulance service, facilitation of communication between two facilities via liaison offices and introduction of referral protocols.

Free ambulance service was found to be an undoubtably effective intervention in Ethiopia as well as other African countries like South Africa, Uganda and Zambia by reducing or avoiding delays for care. The success of this intervention, however, is dependent on the availability of road infrastructure, communication network within the referral chain and appropriate arrangements to cover running and maintenance cost of the ambulances. The level to which ambulances are prepared to mitigate emergencies happening during travel is also an important factor that can potentially make this intervention stronger, but no interventions are reported about.

Communication between the initiating facility for referral and the receiver facility is carried out by liaison officers. Effective communication in the referral system enables the receiver to be prepared to provide optimal care and improve experience of care for the patient. In addition to communications via telephone calls, referral papers with a space for feedback from were developed to ensure continuous learning and quality improvement. There are no studies regarding the effectiveness of this

intervention, but findings from the review show there is a significant implementation gap evidenced by low feedback rates sent back to the referring centre.

Despite the introduction of referral protocols in 2015, lack/ non- adherence to this protocol is a barrier to have a fully functional referral systems. No interventions to bridge this gap were found during literature search.

Improving experience of care

Experience of care, which is a reflection of perceived quality of care has a significant effect in woman's decision to have facility-based delivery in the next pregnancy. In a country like Ethiopia, where social capital is valued, a negative experience during receiving maternal and neonatal care by one woman can affect health seeking behaviour for another leading to avoidance of care. Hence, improving experience of care through a respectful, dignifying and supportive care, especially during and labour and delivery are invaluable in increasing service utilization for MNC and preventing adverse outcomes. Trainings in RMC and CRC are the commonest forms of interventions done. Recognition towards the big burden of disrespect and abuse during child care, and incorporating a chapter dedicated to it in the management protocol was also done in 2021.

Trainings in compassionate and respectful care predates interventions related to respectful maternal care. Although the perception of care providers about these trainings was positive and gaining new knowledge was a universally agreed upon outcome from the trainings, no tangible change was seen in practice. Repeating the same approach for RMC, most of the interventions around it are training focused, with some additional activities like supportive visits and posters in labour wards. Due to the deep rooted beliefs and normalization of disrespect and abuse, the intended goals were not achieved through training only. Instead, an integrated approach to RMC with multiple strategies, including structural and administrative changes and an active involvement of stakeholders in the process alongside training was proven to make a big reduction in disrespect and abuse during ANC and childbirth.

An interesting intervention, yet again from Tanzania, that Ethiopia can learn from is the open birth days. Health education and tour of the hospital where a woman can be sent to during childbirth has been shown to increase birth preparedness, improve communication with providers and inform women about their rights and responsibilities as a patient. This has a great role in decreasing the occurrence of mistreatment or abuse of any kind by providers.

Relevance of the framework

The WHO framework for the quality of maternal and newborn healthcare was used in this literature review. The quality statements defining the process part of the framework (see annex 1) were used to understand the idea behind each domain and used as keywords for search input.

The framework with some modification was used to organize and present findings. The discussion part was also organized into sub-sections derived from the framework. The interlink between domain made it possible to merge and discuss some domains together.

Strength and limitation of the study

This literature review included data from peer-reviewed articles and from credible websites. Whenever possible, interventions and different arguments about them are derived from multiple sources. Recent articles are used. However, the findings are completely dependent on literature available. Publication bias is possibly the biggest limitation of the study as the culture of publishing quality improvement related changes is still a new practice, especially in the Ethiopian set up. Ineffective interventions are also unlikely to be published for experience sharing purpose. Articles written in English language are included, making it possible to miss other relevant articles from other LMICs that could otherwise fulfill the inclusion criteria.

Chapter 5: Conclusion and recommendations

Conclusion

This literature review explored and discussed quality improvement interventions that were implemented in Ethiopia and assessed their gaps and effectiveness based on findings from 25 peer-reviewed articles. The WHO framework for quality of maternal and newborn healthcare was used to present and discuss findings.

Trainings are the commonest form of intervention implemented across all domains. Although trainings are valuable interventions, the sustainability of effectiveness for training-only interventions frequently falls in question. An approach that combines trainings with other complementary efforts will have better outcomes.

The pre-service training for IESOs has been proven effective in reducing maternal and newborn adverse outcomes. Defining job descriptions pointing out all the roles expected from OB/GYN specialists, GPs and IESOs clearly and a career development plan for those who are at work are potential areas for further assessment in order to make teamwork smoother.

MPDSR provided an excellent opportunity to learn from maternal deaths that existed at every level and implement improvements accordingly. However, the existing quality of data is not optimal. The timing and completeness of data can be improved with few interventions, but the false-and under-reporting of maternal deaths is an issue that requires urgent attention.

Free ambulance service is another effective intervention in MNC. The effectiveness of this intervention is even higher where road and telecommunication services are of a better quality. In addition to this, out of service ambulances due to lack of maintenance cause interruption to this service and put sustainability of this intervention in question. Referral feedbacks are also communications that require intervention to function better.

Respectful maternal care is one of the areas where training alone is proven to be ineffective. A more coordinated approach by involving all the stakeholders and making structural and administrative changes are needed to complement the impact from training. Empowering women to be aware of their rights is also an intervention proven to be effective in a similar setup.

Finally, it is observed that the culture of publishing quality improvement related studies with clearly stated methods and interventions should be developed more. This will allow other institutions to adopt effective interventions and learn from the ineffective ones.

Recommendations

Based on the findings in this literature review, the recommendations for three stakeholders i.e. researchers, health facility leaders and the policy makers, will be forwarded as a short term and long term changes.

Researchers: should bridge the of information gap about the efforts made to mitigate problems in MNC. There are many programs that have not yet been researched in the area of quality improvement that needs research to understand the problem itself. When working on QI projects in a facility level, researchers should be keen to share their findings regardless of level of success from an intervention. A detailed information about the context of the institution and interventions applied should be given a special focus, in addition to the outcome to make benchmarking easier. Even failure stories can be learning points for other researchers and professionals working on QI.

Leaders of health facilities: continuous QI is proven to be effective in bringing a desirable outcome. Leadership is an important input for this process. An understanding and committed administration motivates professionals to contribute more to evidence-based practice. A safe environment free of blame is invaluable to improve maternal and newborn outcomes by encouraging learning from each complication and adverse outcome. Here is also where the strength of some national programs like the MPDSR is determined. Hence, leaders should take initiative to create accountability and discussions that pave way to high quality data, making evidence-based decisions and lead by example.

Policy makers: The following efforts will contribute to the betterment of maternal and newborn health outcomes.

- The existing policy gaps are noticeable in limited focus given to PNC than ANC and IPC. More guidelines and efforts to increase PNC coverage should be made.
- Professionals should be provided with a high quality pre-service training including respectful care.
- Adherence to evidence-based guidelines published by the ministry should be given due attention. Initiative to measure the magnitude of the problem and improve adherence will change outcomes for better.
- A Policy to implement adoption of a reporting system for adverse outcomes other than death (maternal near miss) should also be considered to design appropriate interventions based on trends before deaths occur.
- The Ministry should depoliticise the issue of maternal mortality, and follow through with the “no blame” principle for MPDSR to make sure there is a good reporting system.
- The task sharing interventions around emergency obstetric care are proven to be effective, quality of training in this programs should be well-regulated and roles and responsibilities of professionals in these pathways at all levels of care should be well defined to avoid conflicts that arise/are arising from overlaps.
- Nationwide interventions, for example free ambulance service, may face problems with sustainability if necessary arrangements are made ahead of the intervention, e.g, “maintenance and running cost to be covered by who and how”?
- There are always other setups with experience in MNC interventions, learning sessions should be arranged.
- More discussions with stakeholders should be held; both the problem and solutions are within them and policies have better acceptability when stakeholders are involved- e.g. in improving data quality for the health information systems we have with routine reporting.

References

1. Institute of medicine. Medicare: A Strategy for Quality Assurance, Volume I - Institute of Medicine, Committee to Design a Strategy for Quality Review and Assurance in Medicare - Google Books [Internet]. 1990 [cited 2022 Mar 22]. p. 21–21. Available from: https://books.google.nl/books?hl=en&lr=&id=zjn3Okf6kesC&oi=fnd&pg=PP10&ots=Q5dhyz4A9x&sig=tevJT-ZdS6Dx1ERslOz6RjcvSjY&redir_esc=y#v=onepage&q&f=false
2. Backhouse A, Ogunlayi F. Clinical Updates: Quality improvement into practice. *The BMJ* [Internet]. 2020 Mar 31 [cited 2022 Apr 7];368. Available from: </pmc/articles/PMC7190269/>
3. Enrique B, Marta B. Efficacy, Effectiveness and Efficiency in the Health Care: The Need for an Agreement to Clarify its Meaning. *International Archives of Public Health and Community Medicine*. 2020 Jan 25;4(1).
4. Maternal health [Internet]. [cited 2022 Apr 9]. Available from: https://www.who.int/health-topics/maternal-health#tab=tab_1
5. WHO recommendations on maternal and newborn care for a positive postnatal experience [Internet]. [cited 2022 Apr 9]. Available from: <https://www.who.int/publications/i/item/9789240045989>
6. data demographic-dividend ET - unfpa [Internet]. [cited 2022 Jul 15]. Available from: <https://www.unfpa.org/data/demographic-dividend/ET>
7. Ethiopia economic indicators | TheGlobalEconomy.com [Internet]. [cited 2022 Jul 26]. Available from: <https://www.theglobaleconomy.com/Ethiopia/>
8. Ethiopia government structure and political parties. | - CountryReports [Internet]. [cited 2022 Aug 9]. Available from: <https://www.countryreports.org/country/Ethiopia/government.htm>
9. Ethiopian Regional Map [Internet]. [cited 2022 Aug 9]. Available from: <https://www.mapsofworld.com/ethiopia/ethiopia-political-map.html>
10. Tigray conflict decimates maternal health services, overwhelms health workers [Internet]. [cited 2022 Aug 9]. Available from: <https://www.unfpa.org/news/tigray-conflict-decimates-maternal-health-services-overwhelms-health-workers>
11. Argaw MD, Desta BF, Bele TA, Ayne AD. Improved performance of district health systems through implementing health center clinical and administrative standards in the Amhara region of Ethiopia. *BMC Health Services Research* [Internet]. 2019 Feb 19 [cited 2022 Jun 3];19(1):1–13. Available from: <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-019-3939-y>
12. Assefa Y, Hill PS, Gilks CF, Admassu M, Tesfaye D, van Damme W. Primary health care contributions to universal health coverage, Ethiopia. *Bull World Health Organ* [Internet]. 2020 Dec 12 [cited 2022 Jul 11];98(12):894. Available from: </pmc/articles/PMC7716108/>
13. Abrha Damtew S, Krohn KJ, Achoki T, Blore J, Assefa Y, Naghavi M. National mortality burden due to communicable, non-communicable, and other diseases in Ethiopia, 1990–2015: findings from the Global Burden of Disease Study 2015. *Yohannes Adama Melaku*. 2017;2.
14. Eregata GT, Hailu A, Memirie ST, Norheim OF. Measuring progress towards universal health coverage: national and subnational analysis in Ethiopia. *BMJ Global Health* [Internet]. 2019 Nov 1 [cited 2022 Jul 7];4(6):e001843. Available from: <https://gh.bmj.com/content/4/6/e001843>

15. Federal ministry of health. HEP Roadmap FMOH. 2020.
16. Austin A, Langer A, Salam RA, Lassi ZS, Das JK, Bhutta ZA. Approaches to improve the quality of maternal and newborn health care: an overview of the evidence. *Reprod Health*. 2014 Sep 4;11(Suppl 2):S1.
17. FMOH. National Healthcare Quality and Safety Bulletin Integrated People-Centered Health Services: The Pathways for Better Clinical Outcomes and Confidence in the System. *National Healthcare and safety Bulletin*. 2021;94–9.
18. Lincetto O, Mothebesoane-Anoh S, Gomez P, Munjanja S. Antenatal Care III.
19. van den Akker T, Nair M, Goedhart M, Schutte J, Schaap T, Knight M. Maternal mortality: direct or indirect has become irrelevant. *The Lancet Global Health* [Internet]. 2017 Dec 1 [cited 2022 Jul 8];5(12):e1181–2. Available from: <http://www.thelancet.com/article/S2214109X17304266/fulltext>
20. Storm F, Agampodi S, Eddleston M, Sørensen JB, Konradsen F, Rheinländer T. Indirect causes of maternal death. *The Lancet Global Health*. 2014 Oct 1;2(10):e566.
21. Hug L, Mishra A, Lee S, You World Health Organization Allisyn Moran D, Louise Strong K, Cao World Bank Group Emi Suzuki B, et al. A Neglected Tragedy The global burden of stillbirths. 2020;
22. WHO Recommendations on Antenatal Care for a Positive Pregnancy Experience 1 WHO Recommendations on Antenatal Care for a Positive Pregnancy Experience: Summary. [cited 2022 Jan 22]; Available from: www.mcsprogram.org
23. Merdad L, Ali MM. Timing of maternal death: Levels, trends, and ecological correlates using sibling data from 34 sub-Saharan African countries. *PLoS ONE* [Internet]. 2018 Jan 1 [cited 2022 Jul 8];13(1). Available from: [/pmc/articles/PMC5771557/](https://pubmed.ncbi.nlm.nih.gov/30000000/)
24. Zenbaba D, Sahiledengle B, Dibaba D, Bonsa M. Utilization of Health Facility–Based Delivery Service Among Mothers in Gindhir District, Southeast Ethiopia: A Community-Based Cross-Sectional Study: <https://doi.org/10.1177/00469580211056061> [Internet]. 2021 Nov 20 [cited 2022 Apr 9];58:1–9. Available from: <https://journals.sagepub.com/doi/full/10.1177/00469580211056061>
25. UNFPA. " Every day 810 women die from preventable causes related to pregnancy and childbirth [Internet]. 2020 [cited 2022 Jul 8]. Available from: www.healthdata.org/
26. Geller SE, Koch AR, Garland CE, MacDonald EJ, Storey F, Lawton B. A global view of severe maternal morbidity: Moving beyond maternal mortality. *Reproductive Health* [Internet]. 2018 Jun 22 [cited 2022 Jul 8];15(1):31–43. Available from: <https://reproductive-health-journal.biomedcentral.com/articles/10.1186/s12978-018-0527-2>
27. SE G, D R, SM C, S K. Defining a conceptual framework for near-miss maternal morbidity. *J Am Med Womens Assoc* (1972) [Internet]. 2002 Jan 1 [cited 2022 Jul 8];57(3):135–9. Available from: <https://europepmc.org/article/med/12146602>
28. Maternal, Neonatal and Child Health | Ethiopia | U.S. Agency for International Development [Internet]. [cited 2022 Apr 9]. Available from: <https://www.usaid.gov/ethiopia/global-health/maternal-and-child-health>
29. Federal Democratic Republic Of Ethiopia Ministry Of Health.

30. Jena BH, Biks GA, Gelaye KA, Gete YK. Magnitude and trend of perinatal mortality and its relationship with inter-pregnancy interval in Ethiopia: A systematic review and meta-analysis. *BMC Pregnancy and Childbirth* [Internet]. 2020 Jul 29 [cited 2022 Aug 9];20(1):1–13. Available from: <https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-020-03089-2>
31. Antehunegn Tesema G, Derseh Gezie L, Gedlu Nigatu S. Spatial distribution of stillbirth and associated factors in Ethiopia: a spatial and multilevel analysis. *BMJ Open* [Internet]. 2020 [cited 2022 Aug 9];10:34562. Available from: <http://bmjopen.bmj.com/>
32. Biadgo A, Legesse A, Estifanos AS, Singh K, Mulissa Z, Kiflie A, et al. Quality of maternal and newborn health care in Ethiopia: a cross-sectional study. *BMC Health Services Research* [Internet]. 2021 Dec 1 [cited 2022 Mar 19];21(1):1–10. Available from: <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-021-06680-1>
33. The DHS Program - Ethiopia: DHS, 2019 - Mini Final Report (English) [Internet]. [cited 2022 Apr 9]. Available from: <https://dhsprogram.com/publications/publication-FR363-DHS-Final-Reports.cfm>
34. Standards for improving quality of maternal and newborn care in health facilities. Geneva, Switzerland. 2016.
35. Cavallin F, Maziku D, Mkolomi R, Azzimonti G, Manenti F, Putoto G, et al. Changes in maternal and neonatal care after a quality improvement intervention in a sub-Saharan setting. *J Matern Fetal Neonatal Med* [Internet]. 2020 Dec 16 [cited 2022 Mar 1];33(24):4076–82. Available from: <https://pubmed.ncbi.nlm.nih.gov/30880512/>
36. Chou VB, Walker N, Kanyangarara M. Estimating the global impact of poor quality of care on maternal and neonatal outcomes in 81 low- and middle-income countries: A modeling study. *PLoS Medicine* [Internet]. 2019 [cited 2022 Apr 10];16(12). Available from: </pmc/articles/PMC6919595/>
37. Donabedian A. Evaluating the Quality of Medical Care. *The Milbank Quarterly* [Internet]. 2005 [cited 2022 Aug 9];83(4):691. Available from: </pmc/articles/PMC2690293/>
38. Goodman DM, Ramaswamy R, Jeuland M, Srofenyoh EK, Engmann CM, Olufolabi AJ, et al. The cost effectiveness of a quality improvement program to reduce maternal and fetal mortality in a regional referral hospital in Accra, Ghana. *PLoS One* [Internet]. 2017 Jul 1 [cited 2022 Jul 8];12(7). Available from: <https://pubmed.ncbi.nlm.nih.gov/28708899/>
39. Broughton E, Saley Z, Boucar M, Alagane D, Hill K, Marafa A, et al. Cost-effectiveness of a quality improvement collaborative for obstetric and newborn care in Niger. *International Journal of Health Care Quality Assurance*. 2013;26(3):250–61.
40. Biadgo A, Legesse A, Estifanos AS, Singh K, Mulissa Z, Kiflie A, et al. Quality of maternal and newborn health care in Ethiopia: a cross-sectional study. *BMC Health Services Research*. 2021 Dec 1;21(1).
41. FMOH. National Healthcare Quality and Safety Bulletin Integrated People-Centered Health Services: The Pathways for Better Clinical Outcomes and Confidence in the System. *National Healthcare Quality and Safety Bulletin* . 2021;67–73.
42. World Health Organization. Standards for improving quality of maternal and newborn care in health facilities. *Who*. 2016;73.

43. Seyoum T, Alemayehu M, Christensson K, Lindgren H. Effect of complete adherence to antenatal care guideline during first visit on maternal and neonatal complications during the intrapartum and postpartum periods: a prospective cohort study in Northwest Ethiopia. *BMJ Open* [Internet]. 2021 [cited 2022 Jul 18];11:49271. Available from: <http://bmjopen.bmj.com/>
44. Amoakoh-Coleman M, Klipstein-Grobusch K, Agyepong IA, Kayode GA, Grobbee DE, Ansah EK. Provider adherence to first antenatal care guidelines and risk of pregnancy complications in public sector facilities: A Ghanaian cohort study. *BMC Pregnancy and Childbirth* [Internet]. 2016 Nov 24 [cited 2022 Jul 11];16(1):1–10. Available from: <https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-016-1167-6>
45. Lugtenberg M, Burgers JS, Westert GP. Effects of evidence-based clinical practice guidelines on quality of care: a systematic review. *Qual Saf Health Care* [Internet]. 2009 Oct [cited 2022 Jul 11];18(5):385–92. Available from: <https://pubmed.ncbi.nlm.nih.gov/19812102/>
46. Liu XL, Wang T, Tan JY, Stewart S, Chan RJ, Eliseeva S, et al. Sustainability of healthcare professionals' adherence to clinical practice guidelines in primary care. *BMC Primary Care*. 2022 Dec 1;23(1).
47. Centers FH. OBSTETRICS MANAGEMENT PROTOCOL. 2021;
48. Hospitals F. OBSTETRICS MANAGEMENT PROTOCOL. 2021.
49. Ethiopian public health institute. Ethiopian Emergency Obstetric and Newborn Care (EmONC) Assessment 2016 Final Report. 2016.
50. Seyoum Id T, Alemayehu, Christensson K, Lindgren H. Provider-perceived benefits and constraints of complete adherence to antenatal care guideline among public health facilities, Ethiopia: A qualitative study. 2021 [cited 2022 Jul 17]; Available from: <https://doi.org/10.1371/journal.pone.0255297>
51. Yeneabat T, Hayen A, Getachew T, Dawson A. The effect of national antenatal care guidelines and provider training on obstetric danger sign counselling: a propensity score matching analysis of the 2014 Ethiopia service provision assessment plus survey. *Reproductive Health* 2022 19:1 [Internet]. 2022 Jun 6 [cited 2022 Jul 17];19(1):1–14. Available from: <https://reproductive-health-journal.biomedcentral.com/articles/10.1186/s12978-022-01442-6>
52. Seyoum T, Alemayehu M, Christensson K, Lindgren H. Client Factors Affect Provider Adherence to Guidelines during First Antenatal Care in Public Health Facilities, Ethiopia: A Multi-Center Cross-Sectional Study. *Ethiopian Journal of Health Sciences* [Internet]. 2020 Nov 1 [cited 2022 Jul 17];30(6):903. Available from: </pmc/articles/PMC8047236/>
53. Gobeze AA, Kebede Z, Berhan Y, Ghosh B. Clinical Performance of Emergency Surgical Officers in Southern Ethiopia. *Ethiopian Journal of Health Sciences* [Internet]. 2016 Sep 1 [cited 2022 Jul 18];26(5):463. Available from: </pmc/articles/PMC5389061/>
54. Home | PAESOE [Internet]. [cited 2022 Jul 18]. Available from: <https://paesoe.org/>
55. Harrison MS, Kirub E, Liyew T, Teshome B, Jimenez-Zambrano A, Muldrow M, et al. Performance of Integrated Emergency Surgical Officers at Mizan-Tepi University Teaching Hospital, Mizan-Aman, Ethiopia: A Retrospective Cohort Study. *Obstetrics and Gynecology International*. 2021;2021.
56. Lindtjørn B, Mitiku D, Zidda Z, Yaya Y. Reducing Maternal Deaths in Ethiopia: Results of an Intervention Programme in Southwest Ethiopia. *PLOS ONE* [Internet]. 2017 Jan 1 [cited 2022

- Jul 18];12(1):e0169304. Available from:
<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0169304>
57. Chavane L, Dgedge M, Degomme O, Loquiha O, Aerts M, Temmerman M. The magnitude and factors related to facility-based maternal mortality in Mozambique. *Journal of Obstetrics and Gynaecology*. 2017 May 19;37(4):464–70.
 58. Ellard DR, Chimwaza W, Davies D, Simkiss D, Kamwendo F, Mhango C, et al. Up-skilling associate clinicians in Malawi in emergency obstetric, neonatal care and clinical leadership: The ETATMBA cluster randomised controlled trial. *BMJ Global Health*. 2016;1(1).
 59. Augusto O, Keyes EE, Madede T, Abacassamo F, de La Corte P, Chilundo B, et al. Progress in Mozambique: Changes in the availability, use, and quality of emergency obstetric and newborn care between 2007 and 2012. *PLoS ONE*. 2018 Jul 1;13(7).
 60. Lassi ZS, Musavi NB, Maliqi B, Mansoor N, de Francisco A, Toure K, et al. Systematic review on human resources for health interventions to improve maternal health outcomes: Evidence from low- and middle-income countries. *Human Resources for Health [Internet]*. 2016 Mar 12 [cited 2022 Jul 18];14(1):1–20. Available from:
<https://link.springer.com/articles/10.1186/s12960-016-0106-y>
 61. Deller B, Tripathi V, Stender S, Otolorin E, Johnson P, Carr C. Task shifting in maternal and newborn health care: Key components from policy to implementation. *International Journal of Gynecology & Obstetrics*. 2015 Jun 1;130(S2):S25–31.
 62. Asress BM. Health Information Systems in Ethiopia.
 63. Taye G, Ayele W, Biruk E, Tassew B, Beshah T. The Ethiopian Health Information System: Where are we? And where are we going? 2021; Available from:
<https://onlinelibrary.wiley.com/doi/10.1002/g>
 64. WHO.
 65. Mekbib T, Leatherman S. Quality improvement in maternal, neonatal and child health services in sub-Saharan Africa: A look at five resource-poor countries.
 66. Ayele B, Gebretnsae H, Hadgu T, Negash D, Gsilassie F, Alemu T, et al. Maternal and perinatal death surveillance and response in Ethiopia: Achievements, challenges and prospects. *PLoS ONE*. 2019 Oct 1;14(10).
 67. 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. *Global Health [Internet]*. 2017 [cited 2022 Jul 22];2:199. Available from: <http://dx.doi.org/10.1136/>
 68. Ethiopian public health institute. NATIONAL TECHNICAL GUIDANCE FOR MATERNAL AND PERINATAL DEATH SURVEILLANCE AND RESPONSE ETHIOPIAN PUBLIC HEALTH INSTITUE 2017. 2017;
 69. Estifanos AS, Gezahegn R, Keraga DW, Kifle A, Procureur F, Hill Z. “The false reporter will get a praise and the one who reported truth will be discouraged”: a qualitative study on intentional data falsification by frontline maternal and newborn healthcare workers in two regions in Ethiopia. *BMJ Glob Health [Internet]*. 2022 Apr 6 [cited 2022 Jul 22];7(4). Available from: <https://pubmed.ncbi.nlm.nih.gov/35387770/>

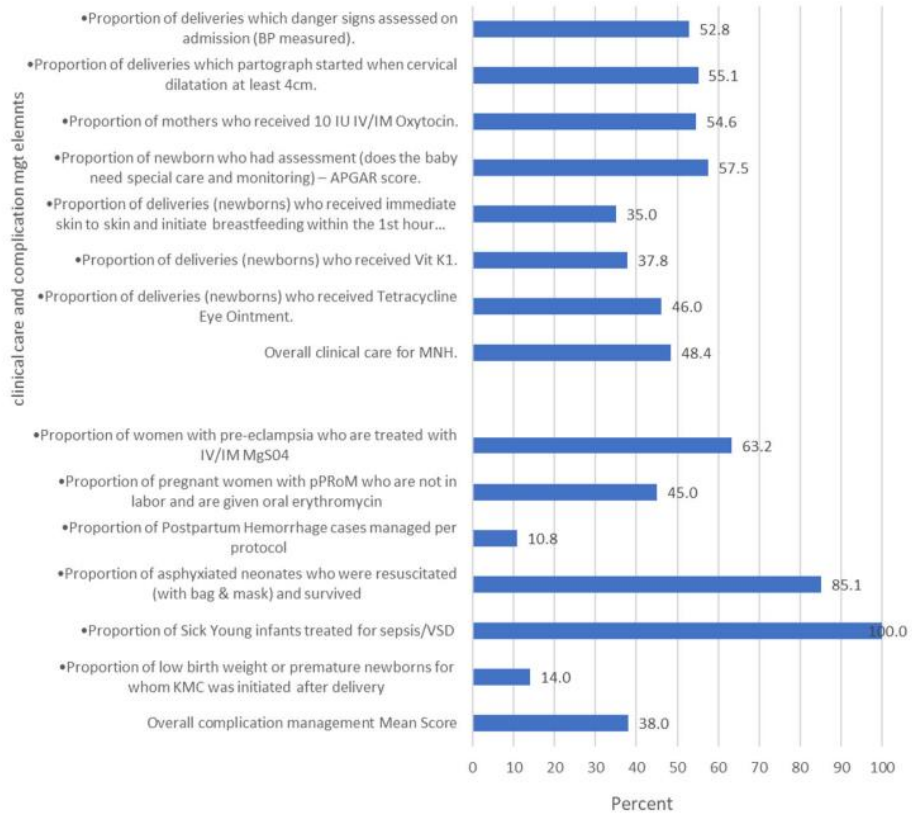
70. Melberg A, Mirkuzie AH, Sisay TA, Sisay MM, Moland KM. ‘Maternal deaths should simply be 0’: politicization of maternal death reporting and review processes in Ethiopia. *Health Policy and Planning* [Internet]. 2019 Sep 1 [cited 2022 Jul 22];34(7):492–8. Available from: <https://academic.oup.com/heapol/article/34/7/492/5542079>
71. Mulissa Id Z, Wendrad N, Bitewulign B, Biadgo A, Abate M, Alemu H, et al. Effect of data quality improvement intervention on health management information system data accuracy: An interrupted time series analysis. 2020 [cited 2022 Jul 22]; Available from: <https://doi.org/10.1371/journal.pone.0237703>
72. Busza J, Lemma S, Janson A, Adem SO, Berhanu D, Defar A, et al. Strengthening routine health data analysis in Ethiopia: the Operational Research and Coaching for Analysts (ORCA) experience. <https://doi.org/10.1080/1654971620211901390> [Internet]. 2021 [cited 2022 Jul 22];14(1). Available from: <https://www.tandfonline.com/doi/abs/10.1080/16549716.2021.1901390>
73. Tilahun B, Gashu KD, Mekonnen ZA, Endehabtu BF, Asressie M, Minyihun A, et al. Strengthening the national health information system through a capacity-building and mentorship partnership (CBMP) programme: a health system and university partnership initiative in Ethiopia. *Health Res Policy Syst* [Internet]. 2021 Dec 1 [cited 2022 Jul 22];19(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/34886865/>
74. WHO. *Maternal and Perinatal Death Surveillance and Response: Materials to Support Implementation*. 2021.
75. Said A, Pembe AB, Massawe S, Hanson C, Malqvist M. Maternal death surveillance and response in Tanzania: comprehensiveness of narrative summaries and action points from maternal death reviews. *BMC Health Services Research* [Internet]. 2021 Dec 1 [cited 2022 Jul 23];21(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/34886865/>
76. *Maternal and Perinatal Death Surveillance and Response Framework Virtual Course - 2019 | Virtual Campus for Public Health (VCPH/PAHO)* [Internet]. [cited 2022 Jul 23]. Available from: <https://www.campusvirtualsp.org/en/course/maternal-and-perinatal-death-surveillance-and-response-framework-virtual-course-2019>
77. Osei E, Kuupiel D, Vezi PN, Mashamba-Thompson TP. Mapping evidence of mobile health technologies for disease diagnosis and treatment support by health workers in sub-Saharan Africa: a scoping review. *BMC Medical Informatics and Decision Making* [Internet]. 2021 Dec 1 [cited 2022 Aug 10];21(1):1–18. Available from: <https://bmcmedinformdecismak.biomedcentral.com/articles/10.1186/s12911-020-01381-x>
78. Atnafu A, Otto K, Herbst CH. The role of mHealth intervention on maternal and child health service delivery: findings from a randomized controlled field trial in rural Ethiopia. *Mhealth* [Internet]. 2017 Sep [cited 2022 Aug 7];3:39–39. Available from: <https://pubmed.ncbi.nlm.nih.gov/34886865/>
79. Federal Ministry of Health National Referral System Network Development Liaison Officer Reference Manual.
80. Kitila SB, Abera Tesema A, Bekele G, Kebede Olika A, Terfa YB, Sinkie SO, et al. Average Time Spent in Referral Process and its Determinants Among Clients of Maternal and Child Health Service in 2 Districts of Jimma Zone, Ethiopia. 2022 [cited 2022 Jul 29]; Available from: <https://us.sagepub.com/en-us/nam/open-access-at-sage>

81. Shiferaw MA, Bekele D, Surur F, Dereje B, Tolu LB. Maternal Death Review at a Tertiary Hospital in Ethiopia. *Ethiopian Journal of Health Sciences* [Internet]. 2021 Jan 1 [cited 2022 Jul 13];31(1):35. Available from: [/pmc/articles/PMC8188111/](#)
82. Mekuria T, Abdosh A. A one year review of eclampsia in an Ethiopian Tertiary Care Center (Saint Paul's Hospital Millennium Medical College, SPHMMC). Vol. 45, *Journal of Perinatal Medicine*. Walter de Gruyter GmbH; 2017. p. 903–7.
83. Teklu AM, Litch JA, Tesfahun A, Wolka E, Tuamay BD, Gidey H, et al. Referral systems for preterm, low birth weight, and sick newborns in Ethiopia: a qualitative assessment. 2020 [cited 2022 Jul 28]; Available from: <https://doi.org/10.1186/s12887-020-02311-6>
84. Godefay H, Kinsman J, Admasu K, Byass P. Can innovative ambulance transport avert pregnancy-related deaths? One-year operational assessment in Ethiopia. [cited 2022 Jul 30]; Available from: www.jogh.org
85. Schoon MG. Impact of inter-facility transport on maternal mortality in the free state province. *South African Medical Journal*. 2013;103(8):534–7.
86. Alaofe H, Lott B, Kimaru L, Okusanya B, Okechukwu A, Chebet J, et al. Emergency transportation interventions for reducing adverse pregnancy outcomes in low-and middle-income countries: A systematic review. *Annals of Global Health* [Internet]. 2020 Nov 18 [cited 2022 Jul 31];86(1):1–18. Available from: <http://www.annalsofglobalhealth.org/articles/10.5334/aogh.2934/>
87. Jackson R, Tesfay FH, Gebrehiwot TG, Godefay H. Factors that hinder or enable maternal health strategies to reduce delays in rural and pastoralist areas in Ethiopia. *Tropical Medicine and International Health*. 2017 Feb 1;22(2):148–60.
88. Hailemichael A, Belayihun B, Asnake M, Lulu K, Fekadu Desta B, Genene L, et al. Referral Service Barriers in Ethiopia: experiences and perceptions of actors.
89. Erchafo B, Alaro T, Tsega G, Adamu A, Yitbarekid K, Siraneh Y, et al. Are we too far from being client centered? 2018 [cited 2022 Aug 1]; Available from: <https://doi.org/10.1371/journal.pone.0205681>
90. Weldegiorgis SK, Feyisa M. Why Women in Ethiopia Give Birth at Home? A Systematic Review of Literature. *International Journal of Women's Health* [Internet]. 2021 [cited 2022 Aug 1];13:1065. Available from: [/pmc/articles/PMC8590518/](#)
91. Izugbara CO, Wekesah F. What does quality maternity care mean in a context of medical pluralism? Perspectives of women in Nigeria. *Health Policy and Planning* [Internet]. 2018 Jan 1 [cited 2022 Aug 1];33(1):1. Available from: [/pmc/articles/PMC5886285/](#)
92. Gebremichael MW, Worku A, Medhanyie AA, Edin K, Berhane Y. Women suffer more from disrespectful and abusive care than from the labour pain itself: A qualitative study from Women's perspective. *BMC Pregnancy and Childbirth* [Internet]. 2018 Oct 4 [cited 2022 Aug 1];18(1):1–6. Available from: <https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-018-2026-4>
93. Kassa ZY, Tsegaye B, Abeje A. Disrespect and abuse of women during the process of childbirth at health facilities in sub-Saharan Africa: A systematic review and meta-analysis. *BMC International Health and Human Rights*. 2020 Sep 7;20(1).

94. Kassa ZY, Husen S. Disrespectful and abusive behavior during childbirth and maternity care in Ethiopia: a systematic review and meta-analysis. *BMC Research Notes* [Internet]. 2019 Feb 13 [cited 2022 Aug 3];12(1). Available from: [/pmc/articles/PMC6375170/](#)
95. Bulto GA, Demissie DB, Tulu AS. Respectful maternity care during labor and childbirth and associated factors among women who gave birth at health institutions in the West Shewa zone, Oromia region, Central Ethiopia. *BMC Pregnancy and Childbirth* [Internet]. 2020 Aug 3 [cited 2022 Aug 1];20(1). Available from: [/pmc/articles/PMC7398399/](#)
96. Asefa A, Morgan A, Gebremedhin S, Tekle E, Abebe S, Magge H, et al. Mitigating the mistreatment of childbearing women: evaluation of respectful maternity care intervention in Ethiopian hospitals. *BMJ Open* [Internet]. 2020 [cited 2022 Aug 1];10:38871. Available from: <http://bmjopen.bmj.com/>
97. Desalegn Sisay F, Mekonnen ZA, Mekonnen Kelkay M, Tilahun B. Importance of CRC In-Service Training on Implementation of Compassionate and Respectful Care Delivery, in Gondar Town Governmental Health Facilities Northwest Ethiopia. *Ethiopian Journal of Health and Biomedical Sciences* [Internet]. 2022 Apr 11 [cited 2022 Aug 1];12(1):19–37. Available from: <https://journal.uog.edu.et/index.php/EJHBS/article/view/323>
98. Asefa A, Morgan A, Bohren MA, Kermode M. Lessons learned through respectful maternity care training and its implementation in Ethiopia: An interventional mixed methods study. *Reproductive Health*. 2020 Jul 2;17(1).
99. Dhakal P, Creedy DK, Gamble J, Newnham E, Mcinnes R. Educational interventions to promote respectful maternity care: A mixed-methods systematic review ☆. 2022 [cited 2022 Aug 6]; Available from: <https://doi.org/10.1016/j.nepr.2022.103317>
100. Mihret H, Atnafu A, Gebremedhin T, Dellie E. Reducing Disrespect and Abuse of Women During Antenatal Care and Delivery Services at Injibara General Hospital, Northwest Ethiopia: A Pre-Post Interventional Study. 2020 [cited 2022 Aug 6]; Available from: <http://doi.org/10.2147/IJWH.S273468>
101. Ratcliffe HL, Sando D, Lyatuu GW, Emil F, Mwanyika-Sando M, Chalamilla G, et al. Mitigating disrespect and abuse during childbirth in Tanzania: An exploratory study of the effects of two facility-based interventions in a large public hospital. *Reproductive Health*. 2016 Jul 18;13(1).

Annex

Annex 1: Components of the standard scoring for process component of care(40)



Annex 2: Combination of key terms used

OR	overall	AND		
		Quality	MNC	
		Interventions	Maternal care	Ethiopia
		Improvements		Sub-Saharan Africa
	Projects	Adherence	Africa	
	Domain 1 (results)	guidelines	Mothers	LMIC
		Routine PNC		
		Complication management	Neonates	
		Appropriate care		
		Human resource	ANC	
		standards of care		
	Domain 2	Medical records	IPC	
		Digital health	Implementation	
		data		
		MPDSR	Effectiveness	
	Domain 3	referral	Improvement	
		delays		
		ambulance	Trainings	
		Liaison		
		referral feedback		
		referral protocol		
	Domain 4	Respectful care		
		Dignity		
		support		
		abuse		
		CRC		
		companionship		

Annex 3: List of standards and quality statements from the WHO framework for the quality of maternal and newborn health care

Standards	Statements
<p>Standard 1: Every woman and newborn receives routine, evidence-based care and management of complications during labour, childbirth and the early postnatal period, according to WHO guidelines.</p>	<p>1.1a: Every woman and newborn receives routine, evidence-based care and management of complications during labour, childbirth and the early postnatal period, according to WHO guidelines.</p>
	<p>1.1b: Newborns receive routine care immediately after birth.</p>
	<p>1.1c: Mothers and newborns receive routine postnatal care.</p>
	<p>1.2: Women with pre-eclampsia or eclampsia promptly receive appropriate interventions, according to WHO guidelines.</p>
	<p>1.3: Women with postpartum haemorrhage promptly receive appropriate interventions, according to WHO guidelines.</p>
	<p>1.4: Women with delay in labour or whose labour is obstructed receive appropriate interventions, according to WHO guidelines.</p>
	<p>1.5: Newborns who are not breathing spontaneously receive appropriate stimulation and resuscitation with a bag-and-mask within 1 min of birth, according to WHO guidelines.</p>
	<p>1.6a: Women in preterm labour receive appropriate interventions for both themselves and their babies, according to WHO guidelines.</p>
	<p>1.6b: Preterm and small babies receive appropriate care, according to WHO guidelines.</p>
	<p>1.7a: Women with or at risk for infection during labour, childbirth or the early postnatal period promptly receive appropriate interventions, according to WHO guidelines.</p>
<p>1.7b: Newborns with suspected infection or risk factors for infection are promptly given antibiotic treatment, according to WHO guidelines.</p>	
<p>1.8: All women and newborns receive care according to standard precautions for preventing hospital-acquired infections.</p>	
<p>1.9: No woman or newborn is subjected to unnecessary or harmful practices during labour, childbirth and the early postnatal period.</p>	
<p>Standard 2: The health information system enables use of data to ensure early, appropriate action to improve the care of every woman and newborn.</p>	<p>2.1: Every woman and newborn has a complete, accurate, standardized medical record during labour, childbirth and the early postnatal period</p>
	<p>2.2: Every health facility has a mechanism for data collection, analysis and feedback as part of its activities for monitoring and improving performance around the time of childbirth</p>
<p>Standard 3: Every woman and newborn with condition(s) that cannot be dealt with effectively with the available resources is appropriately referred.</p>	<p>3.1: Every woman and newborn is appropriately assessed on admission, during labour and in the early postnatal period to determine whether referral is required, and the decision to refer is made without delay</p>
	<p>3.2: For every woman and newborn who requires referral, the referral follows a pre-established plan that can be implemented without delay at any time.</p>
	<p>3.3: For every woman and newborn referred within or between health facilities, there is appropriate information exchange and feedback to relevant health care staff</p>
<p>Standard 4: Communication with women and their families is effective and responds to their needs and preferences.</p>	<p>4.1: All women and their families receive information about the care and have effective interactions with staff</p>
	<p>4.2: All women and their families experience coordinated care, with clear, accurate information</p>

	exchange between relevant health and social care professionals
Standard 5: Women and newborns receive care with respect and preservation of their dignity.	5.1: All women and newborns have privacy around the time of labour and childbirth, and their confidentiality is respected
	5.2: No woman or newborn is subjected to mistreatment, such as physical, sexual or verbal abuse, discrimination, neglect, detainment, extortion or denial of services
	5.3: All women have informed choices in the services they receive, and the reasons for interventions or outcomes are clearly explained.
Standard 6: Every woman and her family are provided with emotional support that is sensitive to their needs and strengthens the woman's capability.	6.1: Every woman is offered the option to experience labour and childbirth with the companion of her choice.
	6.2: Every woman receives support to strengthens her capability during childbirth.
Standard 7: For every woman and newborn, competent, motivated staff are consistently available to provide routine care and manage complications.	7.1: Every woman and child has access at all times to at least one skilled birth attendant and support staff for routine care and management of complications
	7.2: The skilled birth attendants and support staff have appropriate competence and skills mix to meet the requirements of labour, childbirth and the early postnatal period.
	7.3: Every health facility has managerial and clinical leadership that is collectively responsible for developing and implementing appropriate policies and fosters an environment that supports facility staff in continuous quality improvement
Standard 8: The health facility has an appropriate physical environment, with adequate water, sanitation and energy supplies, medicines, supplies and equipment for routine maternal and newborn care and management of complications	8.1: Water, energy, sanitation, hand hygiene and waste disposal facilities are functional, reliable, safe and sufficient to meet the needs of staff, women and their families
	8.2: Areas for labour, childbirth and postnatal care are designed, organized and maintained so that every woman and newborn can be cared for according to their needs in private, to facilitate the continuity of care.
	8.3: An adequate stock of medicines, supplies and equipment is available for routine care and management of complications.

Annex 4: Reviewed articles

References	Title	Evidence-based practices and HR factors	Efficient information system	Efficient referral systems	Effective communication, respect, dignity and emotional support
Gobeze et al. (2016) [44]	Performance of Integrated Emergency Surgical Officers at Mizan-Tepi University Teaching Hospital, Mizan-Aman, Ethiopia: A Retrospective Cohort Study	X			
Harrison et al. (2021) [45]	Clinical Performance of Emergency Surgical Officers in Southern Ethiopia	X			
Lindtjorn et al. (2017) [43]	Reducing Maternal Deaths in Ethiopia: Results of an Intervention Programme in Southwest Ethiopia	X			
Augusto et al. (2018) [49]	Progress in Mozambique: Changes in the availability, use, and quality of emergency obstetric and newborn care between 2007 and 2012	X			
Lassi et al. (2016) [50]	Systematic review on human resources for health interventions to improve maternal health outcomes: Evidence from low- and middle-income countries	X			
Deller et al. (2015) [51]	Task shifting in maternal and newborn health care: Key components from policy to implementation	X			
Dawson et al. (2014) [52]	Task shifting and sharing in maternal and reproductive health in low-income countries: a narrative synthesis of current evidence	X			
FMoH, 2021a	National quality and safety bulletin; Improving Early Postnatal Care Linked to Quality Improvement Interventions at Nefas Silk Lafto Woreda 3 Health Centre	X			
Ayele et al. (2019) [58]	Maternal and perinatal death surveillance and response in Ethiopia: Achievements, challenges and prospects		X		
Mulissa et al. (2020) [62]	Effect of data quality improvement intervention on health management information system data accuracy: An interrupted time series analysis		X		
Busza et al. (2021)[63]	Strengthening routine health data analysis in Ethiopia: the Operational Research and Coaching for Analysts (ORCA) experience		X		
Tilahun et al. (2021) [64]	Strengthening the national health information system through a capacity-building and mentorship partnership (CBMP) programme: a health system and university partnership initiative in Ethiopia		X		
Said et al. (2021) [66]	Maternal death surveillance and response in Tanzania: comprehensiveness of narrative summaries and action points from maternal death reviews		X		
FMoH, 2021b	National quality and safety bulletin; Improving Quality of Inpatient Medical Record Completeness at Najo General Hospital, Oromia region, Ethiopia		X		
Teklu et al. (2020) [71]	Referral systems for preterm, low birth weight, and sick newborns in Ethiopia: a qualitative assessment			X	
Godefay et al	Can innovative ambulance transport avert pregnancy-related deaths? One-year operational assessment in Ethiopia			X	
Jackson et al. 2017	Factors that hinder or enable maternal health strategies to reduce delays in rural and pastoralist areas in Ethiopia			X	
Alaofe et al. 2020	Emergency transportation interventions for reducing adverse pregnancy outcomes in low- and middle-income countries: A systematic review			X	
Hailemichael et al. n.d.	Referral Service Barriers in Ethiopia: experiences and perceptions of actor			X	
Asefa et al. 2020	Mitigating the mistreatment of childbearing women: evaluation of respectful maternity care intervention in Ethiopian hospitals				X
Asefa et al. 2021	Lessons learned through respectful maternity care training and its implementation in Ethiopia: An interventional mixed methods study				X
Dhakil et al. 2022	Educational interventions to promote respectful maternity care: A mixed-methods systematic review				X
Mihret et al. 2020	Reducing Disrespect and Abuse of Women During Antenatal Care and Delivery Services at Injibara General Hospital, Northwest Ethiopia: A Pre-Post Interventional Study				X
Ratcliffe et al. 2016	Mitigating disrespect and abuse during childbirth in Tanzania: An exploratory study of the effects of two facility-based interventions in a large public hospital				X

Annex 5: Logical framework for reducing disrespect and abuse in maternal care in ANC and delivery services at Injibara hospital

Description of the Interventions	OVI	Data Sources	Assumptions
<p>Goal: Improving maternal health care service utilization</p>	<ul style="list-style-type: none"> Number of Maternal health services utilized (ANC, Delivery, PNC, FP) 	<ul style="list-style-type: none"> DHIS2 reports KPI reports EHSTG report Registrations of maternal health services 	<ul style="list-style-type: none"> If the trained professional stay at the hospital and work as to the standard If all the required equipment, essential drugs, and supplies are sustained
<p>Objective: Reducing disrespectful and abusive maternal care</p>	<ul style="list-style-type: none"> The proportion of mothers who received respectful maternal care 	<ul style="list-style-type: none"> Respectful maternal care survey checklist 	
<p>Strategies: (I) Training to health care providers (II) Improving facility infrastructure (III) Strengthening monitoring and evaluation system through supportive supervision and mentorship (IV) Establishing motivation mechanisms for high performer employees</p>	<ul style="list-style-type: none"> Number of healthcare providers who received CRC training Number of RMC trained health worker Availability of waiting room for pregnant and labouring mothers Availability of enough screens or curtain Availability of all the required equipment, essential drugs and supplies for maternal health service provision Number of supportive supervision and mentorship on RMC conducted Number of written feedbacks provided after the mentorship Number of employees selected as best employee of the month/rewarded 	<ul style="list-style-type: none"> HRIS staff training profile Observation and inventory of tangible resources IFRR (Intra facility report and request) form Supportive supervision and mentoring checklists 	
<p>Activities</p> <ul style="list-style-type: none"> Communicating and preparing training materials in collaboration with ARHB and UoG Purchasing and prepare the same training materials Providing the training on RMC Preparing written policies and procedures that describe the responsibilities of healthcare providers in the RMC process Prepare and provide a written code of ethics for providers Purchasing equipment, essential drugs and supplies; Develop TOR on regular supportive supervision Perform the regular supportive supervision and mentorship Conduct a discussion with staff and provide written feedbacks after a mentorship Develop TOR on motivation strategies for high-performance employees Motivate high-performer employees on monthly bases. 			

Abbreviations: ARHB, Amhara Regional Health Bureau; ANC, antenatal care; EHSTG, Ethiopian Hospitals Standards Treatment Guideline; CRC, compassionate respectful and caring; FP, family planning; HMIS, Health Management Information System; KPI, key performance indicators; OPD, outpatient department; OVI, objectively verifiable indicators; PNC, postnatal care; RMC, respectful maternal care; TOR, term of reference; UoG, University of Gondar.