Women search for normality in birth

Solutions empowering resilience and reproductive agency while reducing adverse outcomes for Somaliland women

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Abstract


This thesis aimed to explore the causes of severe pregnancy outcomes and maternal deaths in Somaliland (studies I and II) and how these causes are influenced by the context of the wider health system (studies III and IV).

Methodology: Both quantitative and qualitative methodologies were used. A prospective cross-sectional design was used to collect data for studies I and II. Study II focused on maternal deaths using a mixed method design. Studies III and IV used individual interviews to explore the needs of women when choosing a place of birth and the role of traditional birth attendants (TBAs) in maternity services in Somaliland.

Analysis: Data were analysed using descriptive statistics and percentages. An inductive content analysis was used for study III, and a qualitative thematic analysis was used for study IV.

Results: Study I showed that the maternal near-miss (MNM) ratio was 56 MNMs per 1,000 live births according to the Sub-Saharan Africa (SSA) criteria and 13 MNMs per 1,000 live births according to the WHO criteria. The mortality index was highest among women with medical complications. Study II highlighted that 89% of these women self-referred to the hospital and that only 25% were admitted to the intensive care unit. Poor risk awareness and inadequate interprofessional collaboration contributed to missed opportunities. Study III showed that the lack of reproductive agency involved in facility-based births makes home births a first choice, regardless of potential risks and medical needs. Study IV demonstrated that TBAs need to be better connected with health facilities and skilled birth attendants (SBAs) to reduce maternal and neonatal mortality and morbidities in Somaliland.

Conclusion: Women search for normality in birth, and the midwifery profession could provide this normality by facilitating resilience and reproductive agency while reducing adverse outcomes of pregnancy, birth and the postpartum period. There is a need to improve the quality of maternal health services by implementing evidence-based obstetric interventions and continuous in-service training. The referral system needs to be strengthened by utilising TBAs as a community resource to support community maternal and child health centres.

Keywords: Maternal death, maternal near miss, midwifery care, reproductive agency, sexual and reproductive health, Somaliland

Jama Ali Egal, Care Sciences

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This thesis and my life I dedicate to my wonderful mother, Deeqa M. Noor and the memory of my beloved father Ali Egal Qaalib (May Allah grant him Jannah) who have both provided me with the confidence and courage as a young girl to peruse my dreams and encourage other to do the same. I would also like to dedicate this thesis to my husband and best friend, Ahmed Cabdi Hussein who has been the main reason and backbone of this thesis and my life since the day we met. May Allah reward you for all your love, support and sacrifices.

Dedication
In my second visit back to Somaliland in 2004, I met a cousin that was pregnant, we had become very close and a week later she died in labour. When I asked about what happened, my aunt explained to me that the midwife sat on her abdomen to help push the baby out during a difficult birth. This has left me sad and shocked for weeks investigating further about this. Everyone I asked explained that almost seven of every ten women they know die during labour and birth which is normal part of womanhood. I was devastated and have then firmly decided to come back to Somaliland as a Midwife to contribute as much as I can to the reduction of preventable maternal mortality and to support strengthening midwives as women and as a profession.

According to the World health organisation statement (2015) identified the factors enabling poor maternity services at three different but interconnected levels in society. The first is governance at Government level where weak leadership causes government institutions not to do their jobs and allowing malpractice. Secondly, on the health institutional level where managers have failed to supervise their staff performance. Thirdly, the community and the individual level which requires people to be aware of their own rights. Since my return to live in Somaliland in 2013, I have been working for many years in the Somaliland context on the maternity wards and maternal and child health centres (MCHs) as a clinical supervisor to nursing and midwifery students. This gave me valuable experiences that coincide with the above WHO statement. To improve quality of care, it is important to understand that there are pre-existing, complex causes that are embedded into multi layered systems and individuals. Working with international organisations aiming to reduce maternal mortality and morbidity in this context have been disappointing and upsetting to say the least. Many projects are based on other countries data, priorities and targets causing top-down approach to maternal health and a miss match between what women want and what they are offered. In Somaliland context, women are offered facility-based delivery as the golden standard and only option for place of birth and women are predominately giving birth in their homes with no support from a midwife that is available a few meters away. I believe that women know what is best for them, their health and well-being and that Somali women in particular, are very autonomous about their reproductive health. So much so, that this is evident and reported in other countries where Somali women live and give birth. The idea for this Thesis
was born from a curiosity and a genuine desire to empower women’s reproductive agency by hearing their voices that are normally ignored and recommend solutions based on these. Hence, I am proud to say that this thesis is organic, context driven and involves both health facilities and home settings. It includes accounts of women, their families, health care providers and traditional birth attendants to give an overall picture and a solid base for future studies and interventions to reduce maternal morbidities and mortalities.
List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals.


II. Egal JA, Essa A, Osman F, Klingberg-Allvin M, Erlandsson K, Facility-based maternal deaths: their prevalence, causes and underlying circumstances—a mixed method study from the National Referral Hospital of Somaliland. Accepted in Sexual Reproductive Health care.


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## Abbreviations

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<tbody>
<tr>
<td>CHW</td>
<td>Community health workers</td>
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<tr>
<td>EPHS</td>
<td>Essential health package of services</td>
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<td>FGM/C</td>
<td>Female genital mutilation or cutting</td>
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<tr>
<td>HMIS</td>
<td>The Health Management Information System</td>
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<tr>
<td>ICM</td>
<td>International confederation of midwives</td>
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<tr>
<td>ICU</td>
<td>Intensive care unit</td>
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<td>MCH</td>
<td>Maternal and Child Health centres</td>
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<td>MDGS</td>
<td>Millennium development goals</td>
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<td>MMR</td>
<td>Maternal Mortality Rate</td>
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<tr>
<td>MoHD</td>
<td>The Ministry of health development</td>
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<tr>
<td>QMNC</td>
<td>Quality Maternity and Newborn Care framework</td>
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<td>RMC</td>
<td>Respectful Maternity Care Charter</td>
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<tr>
<td>SBAs</td>
<td>Skilled birth attendants</td>
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<tr>
<td>SRHR</td>
<td>Sexual and Reproductive Health and Rights</td>
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<tr>
<td>SSA</td>
<td>Sub-Saharan Africa</td>
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<tr>
<td>TBA</td>
<td>Traditional birth attendants</td>
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<tr>
<td>UN</td>
<td>The United Nations</td>
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<tr>
<td>UNFPA</td>
<td>United Nations Population Fund</td>
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<td>WHO</td>
<td>The World Health Organisation</td>
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Dignity is a vital part of maternal health care, not a luxury reserved only for the well-off in a society. All women have the same rights and access to facility-based health care before, during and after pregnancy, regardless of geographical location or social class.

One of the most important goals of the Somaliland national development agenda in 2016 was the reduction of maternal mortality and morbidity through the improvement of maternal and child health care services in Somaliland. This is also important for achieving the sustainable development goals (2016–2030) of reducing maternal mortality to less than 70 per 100,000 live births (1, 2, 3). Therefore, with the current indicators showing high maternal mortality and morbidity rates, there is need to develop pragmatic interventions that can address the problem and underlying causes of maternal illnesses and deaths. The results of this thesis will inform policy decision makers in order to improve the quality of maternal health care in public health care facilities. Understanding women’s views and decision-making regarding their place of birthing is crucial since they are the service users of Somaliland maternity services. Moreover, as the majority of women in Somaliland give birth at home with the support of traditional birth attendants (TBA), it is important to understand the role, views and experiences of such attendants in the Somaliland community. Such knowledge will provide a unique and previously unexplored perspective.

In 2014, the Lancet Series on Midwifery published the Quality Maternal and Newborn Care (QMNC) framework for quality maternity care, which focused on the mother and the new-born’s right to quality maternity care (4). In addition, Homer et al (5) used the Lives Saved Tool (LiST) to estimate the effects of scaling up midwifery services in 78 countries in terms of reducing maternal and neonatal deaths (5). They concluded that when midwives provide continuity of care linking the community to health facilities and complicated midwifery skills, they can help avert 83% of all maternal deaths globally (5). This was further confirmed, using the same methodology, in a recent publication (6).
This thesis uses the QMNC framework, as it aligns with the aims of this thesis to improve quality maternal care in Somaliland while empowering women and increasing their reproductive agency by listening to their voices and developing context-specific recommendations.
Pregnancy and childbirth are natural experiences and should be one of the most exciting and happiest periods of a woman’s life. Unfortunately, this largely depends on where a woman lives. Globally, it has been estimated that 289,000 maternal deaths occurred in 2013, 62% of which occurred in Sub-Saharan Africa (SSA) (1, 2). Progress has been made through the implementation of programmes planned and led by different actors, such as government ministries, private local organisations and non-governmental organisations, to reduce the maternal mortality rate (MMR). However, despite these efforts the MMR in low-income countries remains persistently high.

Sexual and reproductive health and rights (SRHR) are vital for the survival of individuals regardless of their status, background or where they live. To invest in SRHR means investing in the entire community’s health, well-being and economic development (7). The Guttmacher–Lancet Commission (2016) defines SRHR as a state of physical, emotional, mental and social well-being in relation to all aspects of sexuality and reproduction, not merely the absence of disease, dysfunction or infirmity (7). Global agreements, such as the 2030 Agenda for Sustainable Development, and the movement toward universal health coverage focus on particular components of SRHR (8). These include maternal and new-born health, HIV/AIDS and contraceptive availability and uptake. Remarkable advancements and progress have been achieved worldwide regarding these targets, but there are huge differences between countries depending on political and leadership commitments to addressing these sensitive topics and lack of resources (7). When people are able to make decisions about their own sexual and reproductive health without fear of consequences or marginalisation, then SRHR has been achieved. The availability of and access to comprehensive SRH services are also critical, which can be hampered by a lack of policies and political commitment as well as deeper barriers rooted in social norms and cultural beliefs (7).

According to the WHO, a successful reproductive health programme for reducing maternal and neonatal mortality must expand access to contraceptive services, safe abortion, safe antenatal care, childbirth and postnatal care. The implementation of effective and sustainable models of care is central to reducing maternal mortality and morbidity. In order to determine whether a health
system and its health workforce provide context-appropriate and effective coverage, four domains should be analysed: the availability, accessibility, acceptability and quality of health care services (9).

Two targets of the globally adopted 2030 Agenda for Sustainable Development are of importance for this thesis. Target 3.7 focusses on sexual and reproductive health: ‘By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes. Second, target 5.6—under the gender equality goal—aims to ‘Ensure universal access to sexual and reproductive health and reproductive rights. Unfortunately, while these targets explain what should be achieved, they fail to provide a comprehensive plan for how to do so, which would be extremely beneficial for countries with shortages of human and financial resources (10).

2.1 Quality of maternal health care

The 2000 International Conference on the Humanization of Childbirth held in Brazil promoted a move away from the medicalisation-based approach to childbirth toward a ‘women-centred approach’. The stated goal was to return to humanised birth and better aid women by providing obstetric carefree of violence (11). These findings were loosely correlated with obstetric violence. The authors described seven areas of disrespectful and abusive during maternal care, including ‘physical abuse, non-consented clinical care, non-confidential care, non-dignified care, discrimination, abandonment, and detention in health facilities (12). This laid the foundation for current efforts to reduce disrespectful maternity care. Based on these results, perception shifts and the need to protect women from childbearing-related disrespect and abuses on a global level have been further explored (13).

In 2011, The White Ribbon Alliance launched a global movement to end human indignities against all childbearing women, which it categorised as a universal human rights offense. The Respectful Maternity Care Charter (RMC) was developed to protect women’s human rights of dignity and respect when seeking facility-based childbearing services across the globe. The RMC Charter is also known as the Universal Right for all Childbearing Women. Over the years, RMC has encompassed several areas related to women’s maternal rights. It is rooted in the Childbirth Activism in Latin America movement in the 1990s, which shed light on the changes women were experiencing after facility-based childbearing maternity care increased. These significant changes, which were caused primarily by a medicalisation-based approach, dehumanised childbirth, treating it as a pathological condition. This drastic
shift in medicalised childbirth care was linked to increased obstetric violence and a spike in the number of caesarean sections performed. REFERENCE

2.2 Skilled birth attendants and traditional birth attendants

Between the 1970s and 1990s, to reduce maternal deaths, the WHO invested in training traditional birth attendants (TBAs) to improve their skills when supporting women during pregnancy and delivery. This was successful in reducing still births and perinatal and neonatal deaths but was unsuccessful in reducing maternal deaths (5, 6). According to the United Nations (UN), TBAs are persons who acquire their skills in assisting childbirth through apprenticeships with other TBAs and, in turn, assisting mothers during childbirth. Most deliveries worldwide, particularly in developing countries, are attended by TBAs (7). Skilled health personnel, also known as skilled birth attendants (SBAs) providing care during labour and birth are different cadres of personnel who can provide effective, uninterrupted and quality care because they are competent medical professionals who hold identified competencies. They are educated, trained and regulated to national and international standards and supported within an enabling environment and health system. Skilled health personnel, in this thesis equivalent to the term skilled birth attendant (SBA) defined as an accredited health professional, such as a midwife, nurse or physician, who has been educated and trained to manage normal, uncomplicated pregnancies, childbirth and the immediate postnatal period as well as to identify, manage and refer complications in women and new-borns. A critical progress indicator towards achieving the SDG 3 and also in the Global Strategy for Women’s, Children’s and Adolescents’ Health 2016–2030, and by the framework for ending preventable maternal mortality 2015–2030, is the “proportion of births attended by skilled health personnel” (1, 2, 14)

2.3 Midwifery-led care

Midwifery-led care is a model of care that identifies pregnancy and birth as a normal physiological process in life and the midwife as an autonomous professional who is specialised in all aspects of pregnancy, birth and the postnatal period. It is a woman-centred model that allows midwives to lead all aspects of care for women with a normal pregnancy and an uncomplicated birth and beyond (15). Midwifery-led interventions have been shown to be associated with the efficient use of resources and to have a positive impact on health outcomes (15). In fact, midwifery-led care during pregnancy, antenatal care,
labour, birth, post-partum care and contraception could avert 83% of all maternal deaths globally (5, 6). Studies have found that midwives play a critical role in the delivery of quality reproductive health care, possibly preventing 30–80% of maternal and new-born deaths and stillbirths (6). According to the ICM position paper, this model of care is most appropriate and cost effective for women and improves outcomes for women and their babies (5, 6). Based on international studies, it is evident that investing in midwifery care saves the lives of women and their babies (4). However, according to UNFPA, the increase in the number of SBAs has not reduced MMR globally (16), and studies suggest this is due to a focus on quantity and a lack of efforts to improve the quality of care (17, 18). Thus, to achieve a reduction in maternal mortality, it is vital to focus on high-quality midwifery care while also increasing the number of SBAs. To accomplish this, midwifery education should follow ICM global standards, there should be a strong midwifery professional association and regulations are needed (4, 19).

2.4 Reproductive agency
Reproductive agency is a central concept in SRHR and has been the subject of considerable discussion and research. Women’s decision-making in seeking care or accessing reproductive health services can make a huge difference in their birthing experiences and pregnancy outcomes. It is important for women to be able to make autonomous reproductive choices. Their choices should facilitate their agency, which refers to their ability to take action to achieve a personal goal with regard to their own reproduction (20, 21). Evidence shows that agency is not a free-standing ability but rather is deeply rooted in an individual’s beliefs and their context. It should be accepted and respected without causing disruption to local norms attempting to adopt foreign norms. Research has demonstrated the importance of educating women on their potential choices to empower women to develop greater agency (22). Somali women in the western countries are reported to have adverse pregnancy outcomes compare with native born (23). The search for normality in birth and avoidance of intervention of Somali women is a very well documented phenomenon in western countries and Europe (24, 25). This normality is connected to culture and the notion that pregnancy and birth are normal and could be managed in a home-based setting (26).

2.5 The Somaliland context
Somaliland is located on the southern shore of the Gulf of Aden and the Red Sea at the top of the Horn of Africa. The famous neolithic paintings of Las Geel in Somaliland are 12,000 years old and are evidence of one of the most
ancient civilisations in the world. Indeed, Somaliland was a major trading partner of ancient Egyptians and Ottomans due to its strategic trade location (27).

Somaliland became a British protectorate in 1884 administered by a commissioner. In May 1960, the British government stated its intention to grant the protectorate sovereignty, and the State of Somaliland was recognised on 26 June 1960 (27). On 1 July 1960, the two territories united and formed the Somali Republic. Mohamed Siad Barre ruled the country from 1969 until 1991, when a bloody civil war erupted. The Somali Salvation Democratic Front and the Somali National Movement defeated the government of Somalia and declared the Northern part of the country the independent Republic of Somaliland. This claim was based on original sovereignty and the 1960 borders. Since 1991, Somaliland has been safe and stable, although it is unrecognised by the international community (27).

The civil war in Somaliland caused a collapse of all basic governmental systems, which was exacerbated by the mass migration of more than a quarter of the population, resulting in the destruction of infrastructure. This led to a severe lack of water, medications, electricity and medical equipment in health facilities (28). During times of conflict, health care facilities are targeted, and post-conflict settings are characterised by a shortage of qualified health care workers due to death and migration. Millions of people in Somaliland became refugees, including many highly qualified health care workers. This caused the collapse of the health care system including maternity care, resulting in a dramatic shortage of SBAs in Somaliland, which persists today (28, 29). In the past 20 years, the government of Somaliland has been rebuilding the health care system, with a focus on strengthening institutional capacity and increasing the number of SBAs (30).

2.6 Somaliland Health system

The Somaliland health sector rebuilding efforts started in 1999, when the first National Health Plan was launched. These efforts focused on building collaborations, decentralisation in health care services and the development of a legal framework and health financing system (30). The Health Management Information System (HMIS) was also introduced and played a vital role in establishing a nation-wide network connecting all six regions of Somaliland. In 2011, health sector reform was initiated to improve the quality of services and strengthen health governance in Somaliland. Primary health care units and many district hospitals were established (30). Further, accountability of the local services was increased through decentralisation to the local offices of the Ministry of Health Development (MoHD). According to the National Health
Policy 2022, the Somaliland health system consists of seven regional hospitals, eight district hospitals, 94 health centres and 165 primary health units. Based on the disease control priorities (DCP3), a package of essential health package of services (EPHS) for Somaliland was used to propose cost effective health provision in five health care levels (30). The first level consists of community level services. These are run by female health workers that provide health promotion and education to the local communities. They give advice on nutrition, advice about treating the minor issues of ill health and best hygiene. Secondly, the primary health units (600 - 1000 population each). These are staffed by community health worker (CHW) that treat minor condition referred by the female health workers, provide immunizations and if required refer further. The third level are health centres (20000 - 30000 population) and staffed by Midwives, Nurses and auxiliaries providing six EPHS services. The fourth level are District Hospitals (120000- 150000 Population) staffed by all types of health professionals amongst which doctors, nurses, midwives and auxiliaries. At this level additional four types of EPHS services are provided. The fifth level of care provision is the National level Hospital (30). These five levels are demonstrated better in Figure 1.

![Somaliland service delivery pyramid. Adapted from the Somaliland national health policy III.](image)

2.7 Somaliland Maternity health care service

The most recent Somaliland Health and Demographic Survey, conducted in 2020, revealed a high MMR—396 deaths per 100,000 live births (31). Maternal deaths in Somaliland are typically caused by postpartum haemorrhage, preeclampsia, eclampsia, prolonged labour or infection. Limited access to
contraceptives, sexual and reproductive health services and information about health increases the risk of maternal and neonatal mortality and morbidity (32, 33). Somaliland has a high estimated level of illiteracy (39%), which further impedes women’s access to and understanding of health information(31).

Somaliland is experiencing an extreme shortage of midwives who can provide comprehensive maternity care. Around 48% of women in Somaliland receive antenatal care from a trained health care provider, and only 33% of deliveries are attended by SBAs(31). In low-resource settings such as Somaliland, pregnant women often have to rely on non-professional TBAs, who acquired their skills through assisting mothers during home-based childbirth (34). The majority (67%) of women in Somaliland have home births supported by a TBA (3, 31, 32, 33, 35, 36).

During the Somali Civil War, TBAs became involved in practices targeting women and girls in villages, including female genital mutilation or cutting (FGM/C), fertility treatment, basic pregnancy support and home deliveries (37). When assisting in pregnancy and childbirth, TBAs offer cultural competence and psychosocial support (35). FGM/C are practices that involve the partial or total removal of the external female genital organ or other harm to the female genitalia performed for nonmedical purposes (38). A 2016 study in Somaliland reported an FGM/C prevalence of 99%, with 80% of women suffering infibulation according to the WHO classification (Table 1) (28). Studies show that FGM/C has immediate and long-term impacts on women’s health. After the procedure, girls can suffer infection or abscess formation, septicaemia, shock and even death. Longer-term effects of FGM/C can increase the risk of prolonged labour, instrumental delivery, obstetric tears and obstetric haemorrhage(37).

In the last 26 years, health authorities have emphasised the training of new health care professionals in Somaliland to address the huge gap in professionals caused by the Somali Civil War and to improve women’s access to health care. However, research evidence suggests that an increase in the number of SBAs has not reduced maternal mortality globally, and more focus is needed on improving the quality rather than the quantity of care (9, 16, 39). Thus, to achieve a reduction in maternal mortality in Somaliland, it is vital to focus on a high quality of care in addition to increasing the number of SBAs. Studies have suggested that it is possible to change the role of TBAs to include supporting and promoting facility-based deliveries and referring women to the health facilities (3, 31, 35). As shown by international studies, investing in midwives and midwifery care saves the lives of women and their babies(4).
3 THESIS FRAMEWORK

Poor quality of care is a major cause of maternal mortality and morbidity, and the Maternal Nearmiss (MNM) women who survive are often left to face medical, psychological and emotional consequences to themselves and their newborns. Women make maternity care choices based on their context, including consent to interventions, which may differ in different settings (17, 40).

This thesis adopts the QMNC framework published in the Lancet series 2015 (4) (see Figure 2). It is a comprehensive framework based on findings from systematic reviews of effective practice and women’s views and experiences of midwifery care. The framework consists of interlinked components that can be used for resource planning and allocation and assessing the quality of care. These components include practice categories, organisation of care, values, philosophy and care providers. Midwifery care is vital in this framework as part of a primary care philosophy for all childbearing women. In the Somaliland context, midwives are identified as experts in normal pregnancy (30). They are autonomous leaders of the maternal and child health units in communities, and they work in the maternity services as part of interprofessional teams. Hence, this framework is applicable to the Somaliland context.

According to the QMNC framework, communities and facilities providing maternity care are both important settings and should be balanced when planning care provision in the two settings (4). This thesis is focussed on both settings and yields important data from both communities and women’s homes. The results of this thesis also shed light on other components of the framework, such as the organisation of care. Study II presents health care providers’ accounts, while study IV is focussed on experiences of TBAs and their role in the maternity system. Study III provides insights on the values women expect from the maternity services and identifies why they value TBA care.

Health systems need to help women stay healthy by preventing the need for interventions, thus enabling them to continue contributing to the lives of their families, and when required, provide access to life-saving treatments (41). The QMNC framework is ideal for assessing health system delivery, teaching or new service planning. In the context of this thesis, this framework will be used to discuss the findings of the different studies in this thesis project.
Figure 2. The Quality Maternal Newborn Care (QMNC) published in the Lancet series 2014 (printed with permission from the authors).
In order to reduce maternal mortality and morbidity in Somaliland, it is vital to provide timely care and emergency treatment in pregnancy and childbirth at the most appropriate and cost-effective level in the health care system. The Somaliland MoHD has invested in increasing the midwifery workforce and scaled up the number health facilities. However, only 47% of the women attend ANC and 33% of women use these facilities when giving birth (31). The TBAs still perform most home-based deliveries, even though they are not officially part of the health care system or acknowledged by the MoHD (31). Yet, women often come to the health facilities in a poor condition with obstetric complications after planned homebirths, and there may be an unknown number of women who do not even make it to the hospital alive.

This thesis started with the notion that women know what is best for them, but something is causing them to take huge risks despite their awareness of the health care services available to them. Moreover, the maternity health care provided in health facilities lack quality assurance system and is characterised by poor medical record keeping. Access to reliable and accurate data to assess the prevalence of maternal mortality and morbidity, their causes and the use/non-use of life-saving obstetric interventions is non-existing. Therefore, it is crucial to determine the prevalence and causes of mortality and morbidity and their underlying circumstances. In addition, it is important to explore women’s needs and preferences underlying their choice of where to give birth. SBAs and TBAs are crucial and play a vital life-saving role in Somaliland when it comes to referring women with complications to health facilities. It is further important to understand their role and function when designing and planning maternal health care delivery in Somaliland.

The results of this thesis will provide insight on the factors causing severe maternal outcomes, the underlying circumstances and women’s experiences and choices of place of birth. This will help to provide a better understanding of the challenges faced by women when trying to access maternity care in Somaliland. The data will help program managers and policymakers develop realistic policies to reduce preventable adverse outcomes, mainly maternal morbidity and mortality, while improving women’s birthing experiences and
satisfaction, which could involve an increased uptake of maternity services (12, 13, 32, 42).
5 AIMS

The overall aim of the thesis was to explore the prevalence and causes of severe pregnancy outcomes and deaths in Somaliland (studies I and II) and to give voice to women’s experiences in the Somaliland maternity services (studies III and IV), with the ultimate goal of reducing adverse outcomes for women in Somaliland.

The specific aims are as follows:

- To describe the incidence and causes of severe maternal outcomes and the unmet need for life-saving obstetric interventions for women admitted for delivery at a referral hospital in Somaliland (study I).
- To identify the prevalence of facility-based maternal deaths in Somaliland, the causes of death and their underlying circumstances (study II).
- To explore women’s decision-making processes and the factors that influence their choice regarding place of birth in Somaliland (study III).
- To explore the role of TBAs in maternity care services in Somaliland (study IV).
6 METHODOLOGY

This section first provides an overview of the methods used in this thesis project (see Table 1). Then, it describes the setting of the thesis project and the participants. This is followed by an overview of each study’s sampling and data collection processes. Finally, ethical considerations are discussed.
Table 1. Overview of research design and methods

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<tr>
<td>I</td>
<td>Prospective cross-sectional design</td>
<td>WHO maternal near-miss tool</td>
<td>All mothers admitted to Har-geisa Group Hospital between 14 April 2019 and 31 March 2020 (n = 6658)</td>
<td>Descriptive statistics, computation of frequencies, proportions and ratios</td>
</tr>
<tr>
<td>II</td>
<td>Mixed method study</td>
<td>WHO maternal near-miss tool, inductive interviews with health care providers and relatives</td>
<td>All maternal deaths at HGH between 14 April 2019 and 31 March 2020 (n = 28), relatives (n = 28) and health care providers (n = 28)</td>
<td>Descriptive statistics, content analysis</td>
</tr>
<tr>
<td>III</td>
<td>Exploratory qualitative study</td>
<td>Individual in-depth interviews</td>
<td>Multiparous women with experience in home- and facility-based births (n = 25)</td>
<td>Content analysis, inductive approach</td>
</tr>
<tr>
<td>IV</td>
<td>Exploratory qualitative study</td>
<td>Individual in-depth interviews</td>
<td>TBAs actively working in all 6 regions of Somaliland (n = 24)</td>
<td>Thematic analysis, inductive approach</td>
</tr>
</tbody>
</table>
6.1 Study settings

All four studies were carried out in Somaliland. The Somaliland MoHD oversees all regional hospitals and maternal and child health centres (MCHs) and employs regional health officers, who manage health care activities throughout the country. The majority of Somaliland’s 3.5 million inhabitants have a low socio-economic background and a high level of illiteracy (31).

Studies I and II were carried out at Hargeisa Group Hospital (HGH), which is the main referral hospital located in the capital city of Hargeisa. HGH was established in 1953, and it provides delivery services to more than 6,000 women annually. It has around 40 staff members, including doctors, nurses and midwives. All staff work in the maternity and gynaecology departments. The HGH has a labour ward, two gynaecology wards, an outpatient department, an intensive care unit (ICU) and operating rooms providing blood transfusion services. All departments and their staff members were included in the first two studies.

Studies III and IV were carried out in the community. In study III, multiparous women who had experienced both hospital and home births were included. These women were interviewed in their homes and at four MCHs in Hargeisa. The four MCHs employ about 60 nurses and midwives and provide prenatal services to about 13,200 mothers, delivery services to about 3,120 mothers and postnatal care services to approximately 1,560 mothers. Study IV included TBAs from across Somaliland to learn about their roles in the western, more developed regions and the eastern, less developed regions.

6.2 Study I

6.2.1 Study design

Study I was a prospective cross-sectional study.

6.2.2 Study participants and inclusion criteria

The study participants were women admitted to the hospital between April 2019 and March 2020. Women who developed severe conditions were included in the study based on a modified version of the WHO MNM tool. The inclusion criteria were women with cardiovascular, renal, respiratory, coagulation, neurologic, hepatic or uterine dysfunction. The sub-Saharan MNM criteria were applied to include women who developed severe preeclampsia with ICU admission, eclampsia, sepsis or severe systemic infection, pulmonary oe-
dema, transfusion of ≥ 2 units of red blood cells, uterine rupture, severe abortion complications and laparotomy other than caesarean section. All maternal deaths that occurred during the study period were included in the study data. These data were only used for analysis of the MNM and maternal death indicators and the mortality index, as these data on maternal deaths were to be analysed in study II. Pregnant or postnatal women with conditions caused by non-obstetric complications were excluded from the analysis.

6.2.3 Variables

In this study, variables interested were sociodemographic characteristics of the women, obstetric characteristics (e.g., gestational age, parity, FGM, history of caesarean section, mode of deliver), MNM and death indicators as well as the underlying causes of MNM and death. Maternal mortality in this case was defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, excluding deaths from accidental or incidental causes.

The WHO MNM and SSA MNM criteria were used to assess the MNM and death indicators. According to the WHO (43) MNM is an indicator that can be used for monitoring and improving the quality of midwifery care. MNM refers to a woman who, during pregnancy, delivery or within six weeks post-partum, develops severe obstetric complications and nearly dies but survives (43). MNM cases are identified using specific criteria, this process starts with identifying women with potentially life-threatening conditions. If this condition develops into life threatening conditions, organ dysfunction or failure or admission to Intensive care unit. These meet the criteria and are included as cases and the last step of the process is to analyse the cause and learn to prevent in future cases. See Figure 3. adapted from L. Say et al. The flow diagram of identifying and analysing maternal near miss cases (44).

As the MNM criteria cannot be applicable in countries in Sub-Saharan Africa, SSA criteria was adapted from the WHO MNM tool (45, 46). SSA MNM criteria share indicators such as cardiovascular, respiratory, renal, coagulation, hepatic, neurologic and uterine dysfunction with the WHO criteria. However, it also includes severe preeclampsia on ICU admission, eclampsia, sepsis or severe systemic infections, pulmonary oedema, transfusion of ≥ 2 units of red blood cells, uterine rupture, severe abortion complications and laparotomy other than caesarean section (45).

The WHO’s MNM tool was first adapted in a pilot study we conducted in 2016 (33). During the preparation for this thesis project and studies I and II
the tool was further developed. We included both the WHO and the SSA criteria for better comparison. In addition, we included FGM section that includes a confirmation of the type of FGM from the health care professional. The tool used for studies I and II are attached in this thesis as an appendix. Although survival after MNM is considered to be a success story, real MNM cases provide a good learning opportunity to develop best clinical practices, as MNM and the maternal mortalities share many commonalities. However, research shows that MNM women can suffer from morbidities, loss of the baby and financial implications that may have long-term effects on family resources (47, 48). Empirical evidence has shown that investigation of MNM can provide valuable insights for reducing morbidity and mortality and designing, monitoring, evaluating maternal health programs (43, 47, 48).

![Flow diagram of identifying and analysing maternal near miss cases](Adapted from L. Say et al.) (44)

### 6.2.4 Data collection

At Hargeisa Group Hospital (HGH), many meetings were held with the MoHD and HGH leadership to explain the data collection process before clearance was provided by the MoHD and HGH for the study to be conducted. This type of study has never been successfully conducted at HGH due to the time, commitment, resources and training that required on the part of those conducting the study as well as the MoHD and HGH leadership. After the WHO MNM tool was contextualised, it was presented to HGH leadership, who shared aspects that were a priority to include in the final version. The chief medical officer at HGH identified important wards and health care staff working different shifts in these wards. The wards that were included were the labour ward, operating theatres, ICU and gynaecology wards. Identified ward
staff were offered information sessions. After this information session about the study objectives, these individuals were trained on data collection between January and March 2019. Upon admission of a patient (hereafter woman), the modified WHO MNM data collection form was attached to the woman’s medical file, and the midwife assigned to the woman used the tool to document background information, referral details, FGM/C status and, if the patient was postnatal, delivery information. Throughout the woman’s hospital admission, the assigned midwife updated the data collection form and documented changes in the medical notes. The MNM tool contained the following sections: screening questions, maternal and perinatal information, process indicators, underlying causes and contributing/associated factors (see appendix). The PhD student visited the hospital at the start of every shift, checked the availability of MNM tools in every ward, collected completed tools and double-checked them for completeness and against the admission and discharge information in the admissions book. When MNM tools were incomplete, staff members were prompted to complete them. Additionally, relatives of the patients were questioned directly in the wards after every maternal death, ensuring no data were missed. The HGH leadership agreed and allowed the research team to keep all the medical files and study tool together to ensure completeness and accuracy.

6.2.5 Sampling
All women admitted to HGH during pregnancy, childbirth or within 42 days after termination of pregnancy were recruited for study I. For MNM cases, women were sampled using the modified WHO MNM criteria. Women were also included if they experienced severe maternal outcomes, which is a broad category of clinical conditions that includes diseases that can threaten a woman’s life during pregnancy and labour and after termination of a pregnancy (43). All maternal deaths, as defined by the WHO (43, 49), that occurred during the study period were also included.

Each medical record was assessed by an obstetrician/gynaecologist and data collectors to determine whether the woman fulfilled the WHO and/or SSA MNM criteria. Maternal deaths were analysed in study II.

6.2.6 Data analysis
Before the data analysis began, the data collection tool and medical files were prospectively checked for completeness to ensure no data were missing due to poor documentation in the medical notes or a lack of a filing system for medical files. Data were cleaned and inserted into a Statistical Package for Social Sciences (SPSS) system every week.
Data were analysed in SPSS Statistics 22.0 using descriptive statistics and percentages. In this study, the total sample was divided into two groups: non-MNM women (n = 6289) and MNM women (n = 320). Maternal deaths were included only in the calculations for maternal death indicators, as maternal death data were analysed separately in study II.

MNM and mortality indicators were calculated as described by WHO as follows: the maternal death ratio (maternal deaths/live births), the MNM ratio (MNM/live births), MNM/maternal death ratio (MNM/1 maternal death), the mortality index (maternal deaths/maternald near miss + maternal death severe maternal outcomes (MNM + maternal deaths) and severe maternal outcome ratio (MNM + maternal deaths per 1,000 live births) (43).

6.3 Study II
6.3.1 Study design
Study II was a mixed method study using a convergent design, as the qualitative and quantitative data were collected simultaneously. Quantitative data of this study was a part of study I. Study I investigated MNMs, whereas this study focussed only on women who died during the study period [44]. These data on the maternal mortality cohort were then used separately and solely for study II.

6.3.2 Study participants and inclusion criteria
The study population included all women admitted to HGH between April 2019 and March 2020 who experienced maternal death at HGH. Maternal death was defined as the death of a woman while pregnant or within 42 days of terminating a pregnancy, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management. Maternal mortality caused by accidental or incidental causes was excluded according to WHO recommendations (43, 45). For each maternal death, the woman’s relatives and the health care providers who cared for her were individually approached and asked for an interview.

6.3.3 Data collection
The quantitative data collection occurred as part of study I since all women admitted to the HGH were included in the study. The study tool was completed for every woman at admission, and this tool was inserted into the medical file. After the maternal death was confirmed, the medical notes and tool were checked for completeness and moved to the maternal deaths folder. This
prompted the qualitative data collection. The research assistant midwife and PhD student led a discussion with the lead health care provider about the woman’s care from admission until death. This discussion was documented by the PhD student. Subsequently, the woman’s family was approached to discuss their experiences. The PhD student provided information about the study and the types of questions that would be asked, and after obtaining consent, a discussion was held with the family member who was present during the woman’s admission and care in the hospital. Questions intended for family members focused on the situation at home before coming to the hospital, what happened that required a transfer to the hospital, the family member’s perception of the care the woman received in the hospital, issues that were experienced throughout the hospital stay and suggestions the family member had for the future. In total, 28 relatives and 28 health care providers were interviewed.

6.3.4 Data analysis
Quantitative data were generated using the descriptive statistics in SPSS, which enabled computation of frequencies, percentages and ratios. Then, the data were analysed to determine the maternal death ratio using a 95% confidence interval (CI) and the mortality index ratio. The qualitative interview narratives (n = 56) were transcribed and inductively analysed using the qualitative content analysis approach described by Elo and Kyngas (50). NVivo 12 was used for coding. In the organisation phase, the transcripts were read and re-read to obtain a sense of the complete data set. Interview data from the relatives and health care providers were combined into one file per maternal death case. The original data were analysed through joint discussions within the research team. Text parts with the same meaning were allocated open codes, and then the codes were organised according to their similarities and differences. This led to the identification of subcategories, categories and one overarching category.

6.4 Study III
6.4.1 Study design
Study III employed a qualitative explorative approach and involved in-depth individual interviews with women in their homes.

6.4.2 Study participants and recruitment
The study participants were multiparous women. The number of children they had in total was not a criterion. Purposeful sampling methods were used for
this qualitative research. Only women who had experienced a facility-based birth after giving birth at home, or vice versa, within the previous three years were included. Women who only gave birth in MCHs or who had only experienced home births were excluded, as they would not have been able to meaningfully contribute to the study. Women who had experienced a home birth prior to a facility-based birth were approached by midwives employed at Ahmed Dhagah MCH clinic and HGH and asked to participate in the study. In addition, local TBAs working in Hargeisa identified and approached women they knew had experienced both home and facility-based births. Women invited to participate were provided with verbal and written information about the study. They were told that their participation was voluntary, their anonymity would be maintained and they could withdraw from the study at any time without explanation. After giving informed consent, the participants signed a consent form with a thumbprint signature. Then, an interview was arranged in the woman’s home.

6.4.3 Data collection

The researcher gave the participants detailed oral and written information about the study and answered their questions. Women who agreed to participate in the study were interviewed in Somali. An interview guide was developed and piloted. Examples of questions were as follows: Please tell me about your pregnancy and birth experiences. Please tell me why you decided on a home birth. What was your experience of antenatal care? Why did you decide on a facility birth? What was your experience of your home birth/facility-based birth? Who delivered your baby?

Prompt questions were asked regularly to encourage the participants to dive deeper into their stories. Twenty-six women were approached. One woman declined to be tape recorded and was not interviewed. Thus, 25 women were included in the final sample. Data were collected until no new information was gathered. The interviews were tape recorded and lasted 55–120 minutes. Interviewees were given as much time as was needed to answer freely and discuss their experiences.

6.4.4 Data analysis

Content analysis was performed on the data using a phase-wise analysis process that included preparation, organisation and reporting phases, in line with Elo and Kyngas (50). In the preparation phase, the units of analysis were the transcribed interviews. The transcripts were read and re-read to make sense of the complete data. Then, a coding sheet was developed. Text parts with the same meaning were grouped into categories, and then the text was abstracted to a running text that closely matched the participants’ words. Both the PhD
student and the student’s supervisor separately analysed the data using the coding sheet. Then, discussions were held until agreement was reached regarding the content of the main category and generic categories.

6.5 Study IV

6.5.1 Study design

Study IV applied an explorative qualitative design and focussed on individual in-depth interviews with TBAs (51).Study participants and recruitment

The study participants were recruited from six different regions of Somaliland to ensure that experiences and data were captured from across the country. Only TBAs who had been working in the region in the past year and who had more than three years of experience in the community were included. TBAs who had not been active in the community in the past year and those who only worked at MCHs were excluded. Health care providers at the health facilities were asked to identify TBAs that were working in the area. The first identified TBA was asked to connect the researchers with other active TBAs in the community until four TBAs were recruited per region.

6.5.2 Data collection

In every region of Somaliland, a regional health officer oversees the MoHD’s activities and facilities. The MoHD was asked to write a letter facilitating a visit between the research team and regional health officers. These officers met with midwives in their community and urged them to connect the research team with TBAs in the region. The research team sought to connect with four TBAs per region. Each midwife was asked to identify one TBA. After the interview with that TBA, the research team requested that she connect the research team with three other TBAs working in the region. This was done to ensure the participation of TBAs working in the region, connected to the health facilities and working independently. A purposive sampling technique was used to ensure the inclusion of participants from different geographical backgrounds in Somaliland.

6.5.3 Data analysis

All interviews were transcribed verbatim, and some of them were then translated from Somali to English to include the other research team, as Somali was not their mother tongue. The first three phases of the analysis were conducted in the original language (Somali) to capture the nuances in the language according to WHO guidelines (52). Qualitative thematic analysis inspired by
Braun and Clarke was performed (53). The analysis started with reading the transcripts several times to make sense of the content and become immersed in the data. Second, all texts referring to the aim were extracted and condensed. Third, the condensed texts were given individual headings (codes). In this stage, the coding was translated into English. In the fourth phase of the analysis, similar codes were shaped into sub-themes. The subthemes were split based on their content. Subthemes with similar content were grouped together under a theme, and finally a main theme was formulated. The original transcripts were read thoroughly to verify the interpretation of the data and ensure credibility (54, 55).

### 6.6 Ethical considerations

This section will discuss ethics, ethical considerations specific to the context of these studies and how the principles of ethics in health research influenced the studies conducted as part of this thesis. The thesis was performed according to the principles of the Declaration of Helsinki (56). Ethical approval was granted by the University of Hargeisa (Dr: CS/41105/18) and the Somaliland MoHD (MOHD/DG: 2/165/2018) for all four studies included in this thesis.

Ethics are the principles that remind individuals to do the right thing. The same is true for research ethics. Ethical policies motivate researchers to conduct research in line with these ethical codes. Every research project must be analysed legally, ethically and morally by the researcher and their colleagues. This should be part of the research process from the planning stage. Even when ethical vetting has been completed, planned research requires the researcher to remain aware of changes in the situation and how the methodology is affecting the research participants (57).

Although some research can have significant societal benefits, it is vital to evaluate the benefits against possible harms (58). Beneficence and non-maleficence are important aspects of both this thesis and the researcher’s professional ethical practice as a midwife. The researcher is committed to adhering to these standards throughout the current research, always ensuring the human dignity and empowerment of participants.

Integrity is required at all levels of society, from the individual to organisations and nations. It is vital to develop policies to prevent and investigate research misconduct that occurs in both community organisations and national institutions (59). Somaliland has only recently developed ethical research boards and policies. The University of Hargeisa’s ethical research board, although nascent, is led by the director of the department of research and sup-
ported by people from different professional backgrounds who have experience in research. Throughout the thesis, this ethical board has changed and is now a strong and experienced body within the university’s Department of Research. The Somaliland MoHD also has an ethical board from which every researcher handling patient data, regardless of whether such data are obtained from hospitals or health care centres, is obligated to seek approval before data is collected. Researchers must explain the application form, research proposal and data collection tools to the ethical board and attend an interview to clarify questions and explain any concerns. Then, the MoHD either recommends changes to the plan or grants ethical approval.

Approval for the studies conducted at HGH was received from the MoHD. Regular meetings were held to discuss all aspects of the research project with leaders and managers at HGH. This ensured their full understanding and support of the aims, objectives and training needs for staff members. The results of this thesis are vital, as they provide the knowledge base needed to design future strategies for reducing the high maternal and neonatal mortality in Somaliland. In addition, the results contribute to broader efforts to increase the number of facility-based births and the quality of maternity care in the Somali region. Thus, the results ultimately promote beneficence for Somaliland women (12, 13, 32, 42).

6.6.1 Sensitive data management
Confidentiality and privacy were guaranteed and maintained. Data from studies I and II were stored safely, first in a computer and later on an external hard drive with special security under the protection of the vice president of the University of Hargeisa. Data from studies III and IV were later added to the same external hard drive for data management. The informants’ personal information was not kept. Participants were given a unique number linked to an SPSS data number, and all personal details were removed and saved separately. The benefits of increasing the quality of care at the main referral hospital outweighed any risk associated with the studies (60).

Studies I and II aimed to map out severe maternal morbidity and mortality, women’s access to midwifery services in health care facilities and the acceptability of existing midwifery care at these facilities in Somaliland. These data are very sensitive and must be dealt with in a careful manner. During studies II, III and IV, individual interviews were conducted in privacy to instil confidence in and encourage truthful answers from the interviewees.
6.6.2 Informed consent

During the qualitative section of study II, a sensitive and informative introduction was given to all relatives and health care providers, and oral consent for the interviews was obtained. It was strongly emphasised that participants could withdraw from the study at any time. Extra time and personal counselling were offered in the event that the interview led to an emotional state of grief that needed to be handled by a professional midwife. The interviewees talked freely about the events leading up to hospital admission, the transport of the woman to the hospital and the care she received while in the hospital. The interviewees generally stated that it was a relief to express themselves and to talk about the events that led to the woman’s death. None of the relatives or health care providers involved in this study asked for a separate counselling session with a midwife.

Studies III and IV ensured the participants’ informed consent, autonomy and self-determination. After they were given clear information about the study, the participants were given printed information leaflets and consent forms in the Somali language. This ensured they had information to read at home and that their consent was informed to the fullest extent. After consent was given and the participants were discharged, they could call the contact number provided on the leaflets if they had further questions. In studies III and IV, women and TBAs were interviewed at home to ensure maximum comfort. Confidentiality and privacy were guaranteed and maintained. Study IV is the first study to identify the role of TBAs from their own perspectives, thus representing a unique, in-depth contribution.
7 RESULTS

This section presents the most important results from the studies in this thesis. The four studies are interlinked, and the findings of each contributed to the questions of the subsequent study. See figure 4.

Figure 4. Summary of the results of each study
7.1 Study I: What are the incidences and causes of severe maternal outcomes in Somaliland?

During the period, 15 April 2019 to 31 March 2020, a total of 6,658 women were admitted to the obstetrics ward of HGH. The results show that 1,864 women had complications, and 923 were classified as having potentially severe maternal complications. A total of 79 women were classified as MNM according to the WHO criteria, and 342 women were classified as MNM based on the SSA criteria. There were 28 maternal deaths, an analysis of which will be presented in the section on study II.

The participants’ sociodemographic and obstetric characteristics are presented in Table 2. The study sample is divided into women who experienced no MNM or death, MNM women included in the study based on the SSA criteria and women who were classified as maternal deaths during the study period. The collected sociodemographic and obstetric characteristics include age, education, residence, parity, gestation at delivery, FGM/C status and final mode of delivery.

Table 2. Sociodemographic and obstetric characteristics of the participating women

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No MNM or death n = 6,287</th>
<th>SSA MNM n = 342</th>
<th>Maternal death n = 28</th>
<th>Total cohort n = 6,657</th>
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<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 20 years</td>
<td>1,151 (18.3%)</td>
<td>69 (20.2%)</td>
<td>2 (7.1%)</td>
<td>1,222 (18.4%)</td>
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<td>20–34 years</td>
<td>3,976 (63.2%)</td>
<td>206 (60.2%)</td>
<td>19 (67.9%)</td>
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<td>≥ 35 years</td>
<td>1,160 (18.5%)</td>
<td>67 (19.6%)</td>
<td>7 (25.0%)</td>
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<td>0 (0.0%)</td>
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<td>No formal education</td>
<td>3,816 (60.7%)</td>
<td>246 (71.9%)</td>
<td>21 (75.0%)</td>
<td>4,083 (61.3%)</td>
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<td>Primary and secondary school</td>
<td>2,233 (35.5%)</td>
<td>89 (26.0%)</td>
<td>7 (25.0%)</td>
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<td>6 (21.4%)</td>
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<td>492 (7.4%)</td>
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<td>20 (71.4%)</td>
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<td>213 (3.2%)</td>
<td>349 (5.2%)</td>
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<td>184 (53.8%)</td>
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<td>1,095 (16.3%)</td>
<td>3,946 (59.4%)</td>
<td>1,616 (24.3%)</td>
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<td>72 (25.0%)</td>
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<td>4 (18.1%)</td>
<td>18 (81.8%)</td>
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<td>745 (13.4%)</td>
<td>4,817 (86.6%)</td>
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</table>

<table>
<thead>
<tr>
<th>Female genital cutting</th>
<th>Pharaonic</th>
<th>Sunna, other types or no female genital cutting</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2,948 (46.9%)</td>
<td>3,339 (53.1%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td></td>
<td>229 (67.0%)</td>
<td>113 (33.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td></td>
<td>23 (82.1%)</td>
<td>5 (17.9%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td></td>
<td>3,200 (47.9%)</td>
<td>3,457 (52.1%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Referral</td>
<td>11 (0.2%)</td>
<td>10 (2.9%)</td>
<td>1 (3.6%)</td>
</tr>
<tr>
<td>----------------------------------</td>
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<td>----------</td>
</tr>
<tr>
<td>Traditional birth attendant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health care providers at MCHs</td>
<td>106 (1.7%)</td>
<td>38 (11.1%)</td>
<td>5 (17.9%)</td>
</tr>
<tr>
<td>Self-referred</td>
<td>6,170 (98.1%)</td>
<td>294 (86.0%)</td>
<td>22 (88.6%)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mode of delivery</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal delivery</td>
<td>4,914 (78.1%)</td>
<td>121 (35.6%)</td>
<td>13 (46.4%)</td>
<td>5,048 (76.0%)</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>1,088 (17.3%)</td>
<td>158 (46.2%)</td>
<td>9 (32.2%)</td>
<td>1,255 (18.8%)</td>
</tr>
<tr>
<td>Discharged/died while still preg-</td>
<td>139 (2.2%)</td>
<td>24 (7.0%)</td>
<td>6 (21.4%)</td>
<td>169 (2.5%)</td>
</tr>
<tr>
<td>nant&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laparotomy for ectopic pregnancy</td>
<td>0 (0.0%)</td>
<td>7 (2.0%)</td>
<td>0 (0.0%)</td>
<td>7 (0.1%)</td>
</tr>
<tr>
<td>Dilatation and curettage</td>
<td>32 (0.5%)</td>
<td>20 (5.8%)</td>
<td>0 (0.0%)</td>
<td>52 (0.8%)</td>
</tr>
<tr>
<td>Complete spontaneous abortion</td>
<td>114 (1.8%)</td>
<td>126 (3.5%)</td>
<td>0 (0.0%)</td>
<td>240 (1.9%)</td>
</tr>
</tbody>
</table>

<sup>a</sup> Nulliparous women were not included in the analysis.
<sup>b</sup> These women recovered and were sent home.

A total of 6,055 live births were documented during the study period, which enabled calculation of different important MNM ratios. Using the SSA criteria, the MNM ratio was calculated at 56.5/1,000 live births, and using the WHO criteria, the MNM ratio was 13/1,000 live births. A very important indicator was the maternal death ratio, which was 462/100,000 live births (95% CI 310–670). The mortality index for the SSA MNM group was 7.6% (95% CI 5.1–10.7), and for the WHO MNM group it was 26% (95% CI 18.4–35.6). The MNM/death ratio was 12:2:1 for the SSA criteria and 2:8:1 for the WHO MNM criteria. The distribution of women who met the WHO and SSA MNM criteria were as followed, the number of women who met the SSA MNM criteria (n = 342), the number of SSA MNM events (n = 483), the number of women who met the WHO MNM criteria (n = 79) and the number of WHO MNM events (n = 191).
The total number of MNM events exceeded the MNM cases, as some women fulfilled more than one criterion during their care. Blood transfusion ≥ 2 units (n = 221), eclampsia (n = 54) and cardiovascular dysfunction (n = 44) were the most common SSA MNM criteria fulfilled, while blood transfusion ≥ 5 units (n = 36), cardiovascular dysfunction (n = 44) and neurologic dysfunction (n = 23) were the most common WHO MNM criteria fulfilled.

The mortality index calculated based on the SSA MNM criteria was highest among women with underlying medical complications (63%) that are considered indirect obstetric causes, such as pneumonia and severe hypothyroidism. Regarding direct obstetric causes, obstetric haemorrhage was associated with the highest mortality index (13%), followed by pregnancy-related infections (10%) and hypertensive disorders (7.9%).

The use of evidence-based obstetric interventions varied depending on the type of intervention. While 87% of all women giving birth received prophylactic oxytocin to prevent postpartum haemorrhage, only half (50%) of the women who underwent caesarean sections received prophylactic antibiotics within the recommended time. All women with eclampsia received magnesium sulphate, but most laparotomies performed for a ruptured uterus (60%) were conducted after three hours in the hospital.

### 7.2 Study II: What is the prevalence, causes and underlying circumstances of facility-based maternal deaths in Somaliland?

This section presents the results of the qualitative and quantitative analyses separately. The quantitative results reveal the prevalence and causes of maternal mortality, and they are presented in tables. The qualitative results reveal the underlying circumstances of maternal mortality, and they include direct quotations from the study participants.

#### 7.2.1 Quantitative results

The total number of women admitted to the hospital to give birth during the study period was 6,658, with 6,055 live births and 29 maternal deaths. One maternal death was excluded from this study, because it was the result of a road traffic accident. Thus, a total of 28 maternal deaths were included in the analysis. The maternal death ratio at HGH was calculated as 462/100,000 live births (95% CI 310–670), and the mortality index ratio was 7.6% (95% CI 5.1–10.7).
Table 3 lists the sociodemographic and obstetric characteristics of the women who experienced maternal death. In total, 68% of the maternal deaths occurred in women 20–34 years old, 75% of women who experienced maternal death did not have access to any formal education and 82% of these women had undergone pharaonic FGM. A total of 21% had no children, 43% had 1–4 children and 36% had more than four children. The majority (89%) were self-referred from their home directly to HGH. Moreover, 78.2% of the women who experienced maternal death lived in urban areas, 32% died after a caesarean section and 21.4% died while still pregnant.

Table 3. Sociodemographic and obstetric characteristics of the women who experienced maternal death

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Maternal death n = 28 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>&lt; 20 years</td>
<td>2 (7.1%)</td>
</tr>
<tr>
<td>20–34 years</td>
<td>19 (67.9%)</td>
</tr>
<tr>
<td>≥ 35 years</td>
<td>7 (25%)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>21 (75%)</td>
</tr>
<tr>
<td>Primary and secondary school</td>
<td>7 (25%)</td>
</tr>
<tr>
<td>University</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td></td>
</tr>
<tr>
<td>Rural area</td>
<td>6 (21.4%)</td>
</tr>
<tr>
<td>Urban area</td>
<td>22 (78.6)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0%)</td>
</tr>
<tr>
<td><strong>Gestational age at delivery</strong></td>
<td></td>
</tr>
<tr>
<td>&lt; 22 weeks</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>22–36 weeks</td>
<td>8 (28.6%)</td>
</tr>
<tr>
<td>37–42 weeks</td>
<td>20 (71.4%)</td>
</tr>
<tr>
<td>&gt; 42 weeks</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>-------</td>
</tr>
<tr>
<td>0 para</td>
<td>6 (21.4%)</td>
</tr>
<tr>
<td>1–4</td>
<td>12 (42.9%)</td>
</tr>
<tr>
<td>&gt; 4</td>
<td>10 (35.7%)</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Previous caesarean section (among multiparous women)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>4 (18.1%)</td>
</tr>
<tr>
<td>No</td>
<td>18 (81.8%)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Female genital cutting</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharaonic</td>
<td>23 (82.1%)</td>
</tr>
<tr>
<td>Sunna, other types or no female genital cutting</td>
<td>5 (17.9%)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Referral</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TBA</td>
<td>1 (3.6%)</td>
</tr>
<tr>
<td>Health care professionals at MCHs</td>
<td>5 (17.9%)</td>
</tr>
<tr>
<td>Self-referred</td>
<td>22 (88.6%)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Final mode of delivery</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal delivery</td>
<td>13 (46.4%)</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>9 (32.2%)</td>
</tr>
<tr>
<td>Died still pregnant</td>
<td>6 (21.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>28 (100%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Associated condition of anaemia</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>5 (18%)</td>
</tr>
<tr>
<td>Yes</td>
<td>23 (82%)</td>
</tr>
<tr>
<td>Total</td>
<td>28 (100%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neonatal outcomes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dead</td>
<td>16 (57%)</td>
</tr>
<tr>
<td>Alive</td>
<td>12 (43%)</td>
</tr>
<tr>
<td>Total</td>
<td>28 (100%)</td>
</tr>
</tbody>
</table>

The most common direct cause of maternal death was severe obstetric haemorrhage (46.4%), followed by severe hypertensive disorders (25%) and severe sepsis (10.7%). Regarding indirect obstetric causes, 17.9% of maternal deaths were caused by medical complications. No maternal deaths were the result of severe anaemia, although anaemia was an associated condition in 82% of cases.
Critical interventions were performed in cases of maternal mortality. With regard to blood transfusions, 21% of women received one unit of blood, 21% received 2–3 units of blood and only 7% received four or more units of blood. Of the women who were admitted to HGH during the study period, 25% were later admitted to the ICU. The most commonly organ dysfunction was cardiovascular dysfunction (35%), followed by neurological dysfunction (32%), renal and respiratory dysfunction (both 25%), hepatic dysfunction (11%) and coagulation dysfunction (4%).

7.2.2 Qualitative results
Two underlying circumstances contributed to facility-based maternal deaths: poor risk awareness at the community level and inadequate interprofessional collaboration in the hospital.

7.2.2.1 Poor risk awareness at the community level
7.2.2.1.1 Circumstances at home
The interviewed relatives explained that misconceptions about the severity of a woman’s postpartum health were caused by misunderstandings about the signs and symptoms of emergencies during pregnancy, birth and the postnatal period. The relatives included in this study made it clear that they wished they would have come to the hospital much sooner—The last thing they intended was to put the mother or child at risk. The relatives said that they were unaware of the severity of the situation for their female relatives and regretted their lack of knowledge about health risks during pregnancy and birth. Often, they had misconceptions about postnatal bleeding, fitting and signs of infection. Hence, women were advised to stay at home longer than they should have, causing them to arrive at the hospital in an acute condition. One relative said:

My sister [the woman giving birth] was told and believed that she suffered from evil spirits from jealous people, causing her to have health issues during this pregnancy. (Sister, Case 26).

Many relatives mentioned that they planned a home birth with a TBA. They explained that TBAs are trusted and respected in the community and that their advice is followed. However, some relatives said that the TBA left them soon after the birth, and it was at that point those complications developed. Other relatives stated that TBAs kept women at home and gave them herbal remedies instead of referring them to health facilities. This further delayed the transfer to the hospital.
7.2.2.1.2 Challenges to timely referral from home

Many relatives spoke about the financial implications of taking their female relatives to health facilities. Women, knowing their financial situation, often try to avoid going to health facilities to prevent having to ask anyone for money later. The costs associated with travel, medication and treatment were always considered before a decision was made to go to the health facility. The relatives explained that the cost is considered to be doubled because patients must pay for services at MCHs and, once they are sent to the hospital, they must pay again. The relatives explained that, most times, MCH staff will perform some tests, prescribe medications and send women with eclampsia back home with no explanation about their condition or signs and symptoms of which they must be aware. In addition, some women receive disrespectful treatment, reducing their confidence and willingness to use the MCH services. In such cases, women may opt to self-refer themselves to the hospital from their home, bypassing MCHs.

The health care providers explained that women in Somaliland do not receive antenatal care. They felt that it was a shame that even those who did seek care at an MCH were given inaccurate information, especially since pregnant women can face very severe conditions, which require good care to avoid death. In addition, the health care providers stated that women were often met with disrespect and indifference and were sent home with inadequate care.

7.2.2.1.3 Inadequate interprofessional collaboration and unsatisfactory communication with relatives at the referral hospital level

Some maternal deaths resulted from in-hospital challenges related to management, staff attitudes and communication with relatives. Inadequate teamwork between health care providers and inadequate communication with the patient’s relatives and family members were identified by the relatives. This shortfall in care has an enormous impact on the quality of care and slows broader efforts to reduce maternal mortality. One participant explained:

_These doctors and midwives do not talk to us in a respectful way....this is important to us as a family because we love our daughter, and we want to make sure she will be fine._ (Mother-in-Law, case 23).

7.2.2.1.4 Ineffective communication for the management of life-threatening conditions

The relatives complained of receiving mixed messages, which were confusing and delayed family decision-making. They felt there was a lack of communication between professionals at the main referral hospital, and they wished that staff members had been able to communicate better with one another, both
within and between departments. Maternity staff on different shifts and at different management levels advised different courses of management and gave conflicting advice regarding the woman’s care. This undermined their colleagues, caused confusion and increased the relatives’ lack of trust in the medical diagnosis.

The relatives were thankful for the skills and knowledge of the medical staff, and they expressed an understanding of the staff’s busy schedule and understaffing at the hospital. However, they were disappointed with the disrespectful way in which some health care providers responded to their questions about procedures and the reasons for interventions.

When maternal mortality was discussed with the participating health care providers, it was difficult to trace the series of events and the findings of investigations that underpinned the medical plan due to a lack of documentation. The health care providers complained that one of the most important ways for health care professionals to communicate is through written documentation in a patient’s medical notes. However, referrals documented in the medical notes were not followed up or prioritised, causing missed opportunities to prevent mortality.

*The doctors documented the patient to be transferred to Operation Theatres as they suspected a uterine rupture or cervical laceration, but this was not done and two hours later the patient passe away* (Midwife, Case 14).

7.2.2.1.5 Institutional challenges to the management of life-threatening conditions

Both health care providers and relatives believed that there were institutional challenges that hindered the management of obstetric emergencies in the hospital. These challenges led to missed opportunities and maternal deaths that, according to the participants, could have been prevented.

A vital issue affecting the sense of emergency, according to the health care providers, was the requirement to obtain consent for any life-saving treatment from the family and relatives rather than the patient. For this reason, obtaining consent for emergency treatment in Somaliland can take a few hours to several days. This often gives relatives a (false) sense that there is no real emergency that requires immediate decision-making.

Other institutional challenges stressed by health care providers were the lack of clear obstetric emergency guidelines and the lack of supervision or regular,
up-to-date training. Doctors and midwives mentioned that, at HGH, there is no alarm to ring during an emergency, the team had never undergone emergency training together and there was no emergency trolley standing ready with emergency resuscitation equipment. These factors caused many delays during emergencies.

The midwives supported the delivery, which was very quickly...They transferred the woman to the gynaecology ward for resuscitation, but the woman died. Resuscitation should be possible on all wards and health care providers need group training on emergency preparedness. (Midwife, Case 20)

7.3 Study III: What are the reasons for women’s choice of a place of birth?

This study focussed on women who had experienced both home and facility-based births. In-depth interviews were conducted in the participants’ homes.

The results showed that the lack of reproductive agency associated with facility-based births made home births a first choice for many women, regardless of the potential risks and medical needs. The women participating in this study were aware of the local maternity services available to them and appreciated the differences in function, competency and capability between a health care professional and a TBA. The women explained that they chose facility-based births because they truly valued the skills of midwives when there was an emergency. Meanwhile, they perceived the hospital as a rushed environment with a lack of privacy, and they reported regularly experiencing disrespectful and abusive behaviour in health facilities. One woman explained her experience of a facility-based birth: “I did not have any health problems, but still, I went to the health facility to give birth, but the healthcare professional slapped me.” (Case 3)

When the women sought antenatal care in health facilities, they expressed disappointment with the quality of the health education, information and advice they received from health care professionals. For instance, the women knew that pre-eclampsia is one of the main causes of maternal death in Somaliland, but the health care professionals in the health facilities did not explain the condition. Instead, the women were told that they had high blood pressure and were prescribed medications. One woman said that she bought as many of the tablets as she could afford at that time, and when she rechecked her blood
pressure, she was told it was normal. Hence, she stopped the medication and later developed severe pre-eclampsia.

According to the women interviewed in this study, the difference between home and facility-based birth is the trusting environment and emotional support they received from TBAs. TBAs were often nearby and provided individualised and respectful care, supporting women not just medically but also emotionally throughout their labour. The women greatly valued this support, and it motivated them to choose a home birth.

*Xalimo [her TBA] was very caring for me and my children. She checked on me regularly and encouraged me to listen to my body and to let her know how I feel whenever I needed something. (Case 1)*

The women reported that TBAs encouraged them to listen to and trust their bodies during labour. This made the women feel empowered, valued and in control of events during their labour. The women also appreciated the privacy of being in labour at home. The TBA would care for the other children, clean and cook while the women were in labour and postnatally. This greatly reduced the women’s anxiety and stress levels. One participant said:

*Home and hospital birth are completely different. Women search for normality, someone that assists you, who is kind and keeps your dignity intact. (Case 4)*

Given these factors, the women interviewed in this study recommended that TBAs be included in the maternity health care system. The women indicated that health care professionals and TBAs have complementary roles and expertise, and they felt that greater collaboration could improve maternity services in Somaliland.

### 7.4 Study IV: What are traditional birth attendants’ views on their roles in the community and formal health care system?

The results of study IV showed that TBAs have the capacity and status to bridge the gap between communities and facilities in hard-to-reach areas, especially rural settings, to support the timely referral of women to health facilities. The first theme that emerged related to TBAs’ roles in pregnancy, deliv-
ery and FGM/C. The second theme was TBAs’ transition to community mobilisation. The third theme was TBAs’ transition into a link between the community and facilities. The participating TBAs explained that they began working in their communities during the 1980s. This was not planned but rather a response to the urgent need to attend to and support women in their community. A TBA reported that after the Somali civil war began, everyone had to flee the cities and ended up in settlements over the Ethiopian border, mostly in mountainous areas and refugee camps. According to the TBAs, it was courage and a sense of duty that enabled them to do what they did. They explained the importance of being respected for working bravely during difficult times to support women and their families in Somaliland. One TBA said:

*Somehow, the civil war made us a lot more courageous than we thought we were, only that way we were able to do what we did when we supported women.* (TBA, Erigabo)

The TBAs said that, regardless of the skills and medications available in the health facilities, midwives fail to give women privacy and holistic care that does not impede on the women’s wishes. The TBAs stated that women want to choose for themselves where to give birth, and they accept the consequences of their choices. The TBAs felt that an important aspect for many women was the home environment. Since midwives do not come to women’s homes, this gives TBAs an advantage over midwives. The TBAs also stated that poverty is a reason women avoid facility-based birthing. Often, women and their families cannot afford the costs of transport, treatment and medication. The TBAs stated that they not only provide assistance with home births but also provide women with social support. They raise funds for delivery costs and find women food and clothing donations.

*We often raise and collect money and food if there are families that need it. For example, if there is a mother who just gave birth and is in need, we bring her food and other people help her with the house chores until she gets better that is the only thing. We are great when we stand together in time of need.* (TBA, Sanaag)

When asked about their role as circumcisers, the TBAs explained that it was a common procedure to perform circumcision on a group of girls. Families celebrate their daughter’s circumcision, and it is an important social event in the community. This role results in another form of income for TBAs. One TBA said:
'Gudniinka fircooninga' infibulation is my source of income and when something is your source of income you can never say something bad about it” (TBA, Awdal).

The TBAs explained that they had been travelling to villages beyond mountainous areas, and during their travels, they assisted with early pregnancy complications and births and provided advice on issues related to fertility. In rural and hard-to-reach areas, TBAs play a central role in giving health advice. Therefore, the participating TBAs felt that they were the perfect agents to reach out to the community, understand the community’s needs and deliver health messages that would be accepted by women and their families. In other words, TBAs are transitioning to become a link between the community and the health care system. TBAs assigned to MCHs were trained by midwives on risk signs during pregnancy and how to assist midwives in MCHs with basic midwifery care procedures and new-born care. Other groups of TBAs were linked with MCHs and financially compensated for every referral of a women in labour. Participating TBAs that lived in rural areas far from a health care facility only served as a referral source, whereas those closer to MCHs were considered to be part of the staff of the MCH, despite not having an official role. TBA explained,

Yes, midwives recognize our work, support us frequently, we work together. I come to work early and before any of them do so, they appreciate my dedication, experience, and often ask me for advice but without payment. I appreciate and respect them for everything they do. (TBA, Saxil)

Unfortunately, due to donor involvement and funding provided to short-term projects, some TBAs were connected to MCHs without regulations or clearly documented rules and responsibilities. Some respondents who received training from the MoHD to support midwives in health care facilities reported that the training and experiences they gained from working with midwives gave them the confidence to assist with home births and circumcision activities to secure more income. However, the TBAs clarified that there are still regions, especially in the eastern part of the country, where TBAs conduct the majority of deliveries and that they are struggling to provide these services without knowledge, medication or equipment. They suggested that those TBAs require training and support until more midwives are available.

One TBA expressed:

I would like to add that the Ministry of Health needs to recognize TBA women. We supported Somaliland’s community from a very difficult time; we deserve respect for that. We need the chance to improve our knowledge and become part of health workers. (TBA, Sool)
8 DISCUSSION

The studies included in this thesis were the first of their kind to be conducted in Somaliland. They have yielded new knowledge and findings that will provide a better and deeper understanding of the challenges and barriers to providing high-quality maternity care in health care facilities and in the community in Somaliland. The results of this thesis show that poor risk awareness and misconceptions about the risks of pregnancy caused women to stay home longer than medically advisable even when severe symptoms developed. The majority of women bypassed community services, even when these were available, and self-referred to hospital. In the hospital, poor use of guidelines and documentation was identified. Interdisciplinary collaboration and communication between staff with regard to patients’ needs requires improvement. In addition, financial considerations and disrespectful care at facilities motivated women and their relatives to avoid transferring to the health facilities. Women in Somaliland view pregnancy and birth as a normal part of life that needs to be protected and kept as such.

The QMNC framework is based on the importance of fostering women’s capabilities and reproductive agency and assuring that care is tailored to their needs and that services are integrated between facilities and community. The next sections discuss the findings from studies I, II, III and IV, with a focus on five particular findings from the different studies that could reduce maternal mortalities and morbidities in Somaliland.

8.1 Improved access and adherence to antenatal care for increased reproductive agency

Women’s health choices can have lifelong consequences for themselves and their unborn children (61). Antenatal care has the potential to educate pregnant women on the benefits of healthy eating and exercise, changes that may occur in pregnancy and signs of risks during pregnancy, birth and methods for birth spacing. Such care supports women’s reproductive autonomy from a life course perspective and increase their awareness and understanding of when to seek care at a health care facility (61, 62, 63).
According to ICM, antenatal care is the ideal time to give women and their families screening to detect risk signs, assess their progress during pregnancy and provide counselling about their birth options and family planning after birth (64). The WHO recommends at least four antenatal care visits, which should start in the first trimester of pregnancy (49). However, the data show that only 47% of women who give birth in Somaliland have received any form of antenatal care (31). Study II revealed that 75% of all women who had experienced maternal death had never been to school, and when their relatives were asked why they did not transfer the woman to the health facility they explained that they had misconceptions about the signs and symptoms of emergencies during pregnancy, birth and the postnatal period. According to the latest health and demographic data from Somaliland, the illiteracy rate is 17% for males and 41% for females (31). This thesis showed that 61% of all the women who received maternity services at HGH had never been to school, and only 35% had access to primary and secondary education (3, 31, 65). Education provides women with information about the importance of birth spacing and increases their reproductive agency. Moreover, the findings of study II indicate that the women and their relatives had not received sufficient information about signs and symptoms that would require them to go to a health care facility. Women also reported that they felt there were no benefits from ANC. When they were in the facility, health professionals did not explain anything or plan care with the women. Hence, the women did not go back to the health facilities for antenatal care or birthing, increasing the rate of home births and related risks (35). This scenario is consistent with the views of women in many countries who have expressed the importance of women-centred care (61, 66, 67, 68). The practice categories start with education, information and health promotion, all of which should be carried out during antenatal and/or postnatal care visits. Additionally, women should be given opportunities for assessment and care planning during antenatal visits to ensure they are prepared and aware of what to do in the event of an emergency.

Study III showed that women experienced poor-quality maternity care from midwives in health facilities, where, moreover, they experienced neglect and verbal and physical abuse and felt restricted, unvalued and rushed. A study conducted in similar settings confirmed that communication was poor and that women’s rights to respectful care, choices and informed consent was violated [41]. Further, a qualitative synthesis of 34 studies from 17 low- and middle-income countries describing barriers to facility-based birth reported that SBAs were rude and disrespectful, failed to provide privacy and did not obtain informed consent or encourage women to ask questions (13, 35). Midwives and other midwifery care providers are required to communicate with women and their families to ensure that the women are offered planned care, have the opportunity to choose their care, are encouraged to ask questions and receive results in an appropriate way (13).
The results of study III also reveal missed health education opportunities in Somaliland, where midwives in the health facilities could have given women appropriate health education regarding the risks involved in pregnancy and birth appropriate to their gestation and discussed their planned birthing options. The importance of this consideration is evident in the QMNC framework, as it is mentioned in many categories. The values section of the framework emphasises the importance of interacting respectfully with women and their families, using good communication skills and ensuring the planned care is based on the women’s circumstances, preferences and needs. The results of this thesis show that this is not currently the case in Somaliland.

Further, study III provides insight into the values women expect from the maternity services. The women in the study indicated that TBAs provide more culturally tailored care and recommended they be included in maternity care services. In a strongly oral culture, it is important to provide important information during pregnancy to ensure women are informed about possible risks and what to do when they see signs and symptoms of obstetric emergencies (69). Fear of limited autonomy and rushed care is a previously identified barrier to care-seeking among Somali women. The research findings identified that patient–provider communication can improve trust and that cultural competence and traditional conceptualisation of autonomy are very important to consider in the encounter with Somali women (70). It is important to acknowledge different types of knowledge, based on culture, and that some are devalued. Health care providers and policy makers may believe that they know what is best for the women cared for within maternal and health care services (26). Somali women know what is in their best interest, and their knowledge and wishes should be valued and attended to (26). Studies show that health care professionals in western countries often experience dilemmas and conflict between supporting Somali women’s wishes while adhering to hospital guidelines (71). In many instances this is contributed to communication issues in the west, but in the Somaliland context, where health care professionals have the same language and cultural background as Somaliland women, it is interesting that the results of this thesis still show dissatisfaction and miscommunication. This is an important indicator that the issue lies not with the staff themselves, but with the maternal health system in which they are working.

8.2 Referral pathway from communities to hospitals can improve acceptability of MCH

The results of this thesis show that around 70% of women gave birth without complications at HGH instead of giving birth in the Mother and Child Health
Centres (MCH) supported by midwives. The results of study I show that 89% of women self-referred directly to HGH, arguably leading to overcrowding and suboptimal care in the hospital (65, 72). According to the findings of this thesis and other studies in similar settings, MCH services are not trusted by women because they give incomplete advice, send women home after costing them money and time and have no referral system (73, 74, 75, 76). Women have also reported experiencing disrespectful and abusive treatment at care facilities. According to the women interviewed in study III, midwives did not plan care with women, give women the opportunity to choose their care or encourage women to ask questions (77). Thus, midwives in Somaliland are failing to empower women’s capabilities and decision-making regarding their care.

To achieve universal health coverage, which is one of the most important goals of the MoHD, it is necessary to create adequate referral pathways from primary care to secondary and tertiary levels of care. In this model, primary health care is intended to enable access to care for all. In the maternal health care field, midwives are best positioned to be primary health workers (77). The midwifery profession in Somaliland is widely accepted and places importance on a community approach. All MCHs in Somaliland are under governmental management, and the MoHD assigns midwives as leaders. These midwives are autonomous practitioners who are mandated to provide antenatal, intrapartum, postnatal and new-born care as well as family planning and early childhood services, such as immunisations. In hospitals, midwives manage maternity care but do so under the supervision of physicians.

Midwives need to be empowered to implement a midwifery-led care model, protect women’s rights and fulfil their full scope of practice, according to ICM (77, 78). To ensure effective community midwifery-led care, a good referral system needs to be in place. This is especially true in settings with high maternal morbidity and mortality rates. Women need to feel safe and that they will be referred in the event of an emergency. Health authorities must facilitate a system for communication between MCHs and a main referral hospital, develop the right tools, provide midwives and medical staff with training and ensure agreement regarding procedures between facilities (79, 80, 81). In addition, they require regular training on how to support women in health facilities and improve care connected with the accreditation system (82, 83).

Achieving change in the health care system is dependent on the structures of Somaliland’s political system. A crucial barrier to optimal midwifery care in Somaliland is the shortage in the midwifery workforce; thus, a strategy is needed to increase the number of midwives and improve the retention of those currently working in the midwifery system (31).
TBAs and other community health workers can support midwives and promote evidence-based practices after childbirth, such as skin-to-skin contact and breastfeeding. This finding aligns with the findings of study III in terms of suggestions made by women in Somaliland (31, 35). According to the WHO framework for working with individuals, families and communities as well as recommendations for optimising lay health workers, there is a need to specify the responsibilities of TBAs in countries where there is an SBA shortage. TBAs often assist with home-based births in unsafe conditions, especially in the eastern regions of Somaliland. The latest health demographics data from Somaliland show that home birth rates vary from 59% in Maroodi Jeex to 19% in Sanaag and 12% in Sool (31). Studies from rural Bangladesh and Indonesia highlight the importance of knowledge-sharing opportunities between TBAs and SBAs, as both can support women and their families in different capacities, which is an important factor for establishing women-centred care (17). A literature review examining the implementation of TBA partnerships and new roles for TBAs showed that TBAs can provide care when there is a gap and also serve as a link between women and maternity services (84). The WHO recommendations on health promotion interventions for maternal and newborn health emphasise the importance of creating roles and responsibilities for TBAs and lay health workers and discussing them with women and their families, especially in communities that still rely on TBAs for support during labour and delivery (85). The QMNC framework emphasises that midwives can use expectant management and allow cultural processes to empower women’s own capabilities and their trust in their body’s normal processes during labour and birth. This recommendation is consistent with the results of this thesis (study III), as the women reported that they valued home births because TBAs prayed for and stayed with them, took care of their household duties, encouraged them to listen to their body and never left them alone.

8.3 Interprofessional collaboration and communication to reduce adverse outcomes

The results of study II show that a lack of communication between health care professionals is a major problem affecting the quality of care. In study III women reported that they lacked reproductive autonomy, and in study II the relatives of women who experienced maternal death felt that health care staff outlined different management plans and did not communicate with each other appropriately. In study II women with medical issues had the highest mortality risk, indicating a lack of referrals between the interdisciplinary team due to poor collaboration and communication [59]. Study II found the use of life-saving interventions was suboptimal and indicated that the implementation of clinical guidelines was poor. Only half of the women who delivered through
caesarean sections received prophylactic antibiotics, as recommended by the WHO to prevent severe sepsis and death. In addition, study II found that staff and wards were poorly prepared for emergencies.

Training is one strategy for improving interprofessional collaboration and teamwork, the uniform use of guidelines and communication between maternal health care staff, and it is vital for health care staff responsible for providing intrapartum care. In many countries, training of this type is considered mandatory and provided at regular intervals (86, 87). It aims to educate staff about following protocols, provides opportunities for interprofessional teams to work together and ensures that everyone knows their role during an obstetric emergency. However, no such training is conducted in Somaliland, and context-specific guidelines have not been developed for MCHs or the main referral hospital. Multidisciplinary teamwork and consultations are known to reduce challenges within the health care system and improve health outcomes. Therefore, they are crucial for maximising the health and well-being of mothers and infants and for reducing or preventing adverse outcomes (56, 88). In fact, maternal death is associated with poor communication and a lack of teamwork during emergencies (89). Courses such as Advanced Life Support in Obstetrics or Practical Obstetric Multi-Professional Training may be offered to support health professionals in developing the skills necessary to manage emergencies and work collaboratively (89, 90). Randomised controlled trials and systematic reviews have identified improvements in different areas of practice after training, including knowledge, skills, confidence, use of guidelines, resuscitation skills, communication and teamwork (91, 92, 93, 94, 95, 96).

In accordance with the QMNC framework (4), all the aspects mentioned above are important for the midwifery profession and can be thought of as solutions for empowering the resilience and reproductive agency of women in Somaliland seeking normality in birthing while reducing adverse outcomes. In the Somali health system, the work environment may impede midwives from collaborating within interprofessional teams. The care providers component of the QMNC framework stresses the importance of practitioners’ ability to combine clinical skills with cultural competencies and effective interpersonal skills when caring for women. Studies II and III both showed that this ability is lacking in Somaliland. Further, the lack of communication between staff, as well as between staff and women’s relatives, leads to distrust and conflict, resulting in poor maternity care and adverse outcomes for women.
8.4 Confidential national maternal death surveillance system as tools to reduce maternal mortality and morbidity

The results of study II showed that more than two thirds of maternal deaths are caused by direct obstetric complications, such as hypertensive disorders related to pregnancy, severe obstetric haemorrhage and severe systemic infection. According to international guidelines, these complications should be managed through interventions such as a blood bank system, caesarean sections, anticonvulsants or antibiotic drugs (97). Although these interventions are all available in Somaliland, suboptimal care exists, and maternal mortality remains high (65).

Confidential enquiries on maternal deaths and audits keep patients’ details anonymous but seek to investigate the circumstances surrounding the death of patients from the point of seeking care. They also provide data on the number and causes of maternal deaths, as recommended by prior studies (62, 98). The most important aim of a confidential national maternal death surveillance system is to improve health care provision by collecting evidence on aspects of care, identifying weaknesses in the maternal health care system and developing strategies to resolve these weaknesses (99). Doing so can improve the quality of care and reduce preventable maternal deaths, as the next woman in the same situation will be given care based on the best available evidence and resources. There are many reasons why this useful practice is not more widely used in low-resource countries, including fear of blame and a lack of trust in the confidentiality of the enquiry (65). The Confidential Enquiry into Maternal Deaths (CEMD) in South Africa commenced in 1998, and it would not have been possible without a strong political will and commitment to reducing maternal mortality (100). The QMNC framework emphasises the importance of interprofessional working and establishing a good communication system between different midwifery care providers. When working as part of an interprofessional team, midwives can provide vital care for women and new-borns who develop complications (4).

In the Somaliland context, enquiries such as the CEMD have never been attempted. However, it is a priority of the Somaliland MoHD to reduce preventable maternal deaths and improve the quality of care (3). Since a country-wide confidential maternal death surveillance system may not be feasible due to the lack of resources, this thesis proposes that the MoHD could start with a routine facility-based MNM and death audit in the main referral hospital as a pilot programme. These audits would support midwives and doctors in developing joint strategies internally within the interprofessional care teams and creating
a blame-free culture. Ultimately, this would promote interprofessional learning and discussion of ways to deal with avoidable institutional challenges (99).

8.5 Financial incentives for maternity services

The results of every study included in this thesis showed that poverty and financial constraints limited women’s access to maternity services. Studies have found that, in other African countries, financial incentives have been successful in increasing access to maternity services when combined with greater recognition of such services in the community. Financial constraints may cause women and their families to either not seek maternity care or to avoid doing so as long as possible, leading to detrimental consequences upon arrival to a health facility (101).

A systematic review found that after Uganda, Madagascar and Kenya removed all fees related to the provision of maternity care, the use of maternity services increased from 17% to 84%. However, this policy also led to a loss of funding for health facilities, and there had been insufficient planning for this eventuality (102, 103). These studies showed improvement of access to maternity services, which arguably means a greater likelihood of achieving the MDGs (104). Studies in Southeast Asian countries have shown that using strategies such as vouchers and cash transfers increased access to maternity services for the poorest women and their families (105). However, solutions to maternity financial issues must be designed with equity and sustainability in mind (63, 102). On the providers’ side, studies have found that when incentives were given to health care workers, the quality of care provided in the community was improved (106).

The issue of health financing is applicable to all aspects of the health system. The organisation of the care section of the QMNC framework is specifically concerned with the accessibility of the maternity system. In Somaliland, the accessibility and acceptability of maternity care is hindered by financial restrictions. Women and their relatives (studies II and III) reported that they have to consider how they will pay for care before deciding to come to the hospital and before consenting to interventions, for example, a caesarean section.
9 METHODOLOGICAL CONSIDERATIONS

The strength of the present thesis lies in its use of multiple designs and methods: quantitative (study I), mixed-method (study II) and qualitative (studies III & IV). Each of these studies generated data sources that contribute with scientific evidence of importance to improve the quality of maternal health care in Somaliland. Below, I discuss the strengths and limitations of each study conducted as part of this thesis.

Study I: Prospective cross-sectional design

In a post-conflict context, such as Somaliland, where reliable research data are not easily available, it was important to generate valid data. Therefore, the strengths of this study are that it is prospective and that the sample size in studies I and II enabled the calculation of valid indicators, such as maternal mortality rate, MNM ratio, mortality index and maternal death ratio, which are important in measuring the quality of care at the hospital. Another important strength of this study is its use of both WHO MNM and sub-Saharan African criteria, which enabled the collection of more context-adapted and reliable data than if diagnoses had been collected from medical records only. Furthermore, we adapted and tested the WHO MNM in our pilot study (32, 33). The most important adjustments to the MNM tool were the inclusion of a female genital mutilation/cutting section, which was important for the Somaliland context. The use of the WHO MNM tool strengthens the internal validity of the quantitative studies, namely, I and II. In particular, admitting every woman allowed the identification of women with organ dysfunction through signs and symptoms, thus ensuring that all women who developed life-threatening conditions were identified. The SSA had never been used in the Somali region before this study, and using SSA criteria in studies I and II enabled us to identify more cases than would have been possible by using the WHO MNM criteria, as indicated in the result. In our studies, all women shared their demographic and socio-economic characteristics, which enabled comparison between non-MNM women, MNM women and maternal deaths. Every case in study II was assessed individually and discussed within the research team both when it was included and when it was added to the SPSS database, further strengthening the internal validity of our data.
Data collection quality assurance was put in place from the beginning of the data collection period through developing a quality assurance tool and recruiting a data collection supervisor who managed all the day-to-day data collection activities. Close contact was maintained between the PhD student and data collectors; the data collectors were frequently physically present in the wards and could point out any issue related to data collection at face-to-face fortnightly meetings. To address missing data, we double-checked questionnaires against patient files and filled in the missing data together on the ward. Data collectors who carried out the quantitative data collection in study I expressed at many of our weekly meetings that they had benefitted from participating in this study. They received training in not just the process of data collection but also the importance of monitoring and evaluation as a foundation of quality assurance at the hospital. They explained that the study had enabled them to meet colleagues from different departments at the maternity unit. Moreover, even after the data collection period was finished this contact continued, and they trusted in each other’s support and professional advice. This is an interesting finding that requires further research.

A limitation of the cross-sectional study design is that, due to the outcome and exposure being measured simultaneously, it is difficult to make causal inference generalisations (107, 108). In the Somaliland context, however, due to the poor documentation in the health facilities, data collection from patients’ medical records would have been unreliable and incomplete. Furthermore, patients’ medical notes were not stored for more than a few months, and sometimes patients took them away for future reference. Although the study had a large sample size, the findings cannot be generalised to the entire population of Somaliland, since the study was conducted in the national referral hospital, which has health care professionals with updated training.

Another limitation is that the outpatients’ department that treated many of the early pregnancy complications was not included. Another aspect worth reflecting on is that the MNM tool missed home births: cases were identified as vaginal births, but it was not specified where they had occurred, so we could not identify the number of women who had had a homebirth and presented at Hargeisa group hospital with a complication. Knowing this could have yielded interesting data on the burden of the large percentage of home births on the referral hospital.

**Study II: Mixed-method research quantitative and qualitative data sources**

A main strength of study II is that quantitative and qualitative data were collected simultaneously (109). The interviews with the relatives provided strong and valuable insights into women’s stories before hospital admission, their
home situation and the underlying circumstances in which maternal mortalities occurred. Interviews with health care professionals provided insights regarding the causes and underlying circumstances of maternal mortality beyond the numbers. Participants in this study were asked about the series of events that led to the mother’s death and its underlying circumstances regardless of her age or parity. This procedure ensured that the data were conformable to other studies and were not influenced by age, parity, knowledge or financial status. In study II, relatives were interviewed after a maternal death was confirmed at the HGH. An advantage of this procedure was that it enabled us to capture the information and the relative, since follow-up is often difficult when people have travelled a long way to reach the main referral hospital.

The main limitation of study II is that it was hospital-based and did not include data from lower levels in the health care system or from the community. Another limitation concerns the emotional and ethical aspect of discussing maternal deaths with relatives who have just been experienced this event. Their grief was respected throughout the process of the data collection; for instance, interviews were conducted in a separate room so the relatives felt safe to talk freely and show their grief privately. Emotional support was offered to all the relatives and staff included in the study, but this service was not requested by any of the participants interviewed, possibly because they did not feel comfortable with or ready for it.

Studies III & IV Qualitative studies

Trustworthiness and its criteria (credibility, dependability, transferability and confirmability/reflexivity) are used to assess the quality of qualitative studies.

To increase credibility the interview guides used in studies II, III and IV were developed and reviewed by the research team and pilot-tested to ensure the questions were suitable and asked properly, that is, in such a way as to prevent steering. To assure and further strengthen credibility, all members of the research team, who came from diverse backgrounds and had extensive local knowledge, took part in all aspects of the research process from conceptualising, planning for data collection, pilot testing of tools, analyses and interpretation of findings. Credibility was also assured by collecting data in the Somali language. Collecting data in the participants’ native language allowed us to capture everything discussed and minimised the loss of vital meaning. In studies II and III data were transcribed into English before the analysis was completed. Here, we regularly listened to voice recordings to go back to the data.
and ensure no loss of meaning. In study IV, data were translated after the coding procedure to ensure greater credibility (112). In the subsequent analyses, the English-speaking research team members were included to deal with the possible influence of researchers’ subjectivity on the findings.

**Dependability** is the concern with the stability of results in different conditions and over time. A thorough description of all steps in the research process assures the dependability and trustworthiness of the findings presented. In both studies III and IV we have ensured these details are well described. Moreover, the data sources in both studies were coded by two Somali-speaking researchers and analysed by all team members in an effort to ensure multiple views and valid interpretations of the findings (113). Content analysis and thematic analyses present systematic and objective ways to analyse and describe a phenomenon examined. To strengthen trustworthiness and dependability, a clear description of the research steps is important as it allows the reader to clearly follow the process of planning, analysis, results and conclusion (50). To ensure trustworthiness in studies III and IV, the research team extensively planned a methodology and data collection method that were suitable to the aim and research questions.

**Transferability** refers to whether the findings have applicability in other contexts, and we feel this study can be best repeated in another context similar to the Somali one. This strong potential for replicability further strengthens the dependability by showing that the findings are consistent and that the study can be repeated, with limitations. The transferability of the results in studies III and IV is high as they can be applicable to many contexts similar to Somaliland. Study III, for instance, yields result that can be applicable to women with a Somali background in both high- and low-income contexts and thus give information about women’s needs and preferences.

In regard to the sampling and recruitment of informants for studies III and IV, a purposeful sampling approach was applied (109, 114), which is the method used when the researcher aims to access informants with specific knowledge. In study III we decided to include only women who have experienced both home-based and facility-based births, which excluded primigravida women, whose voices it would nonetheless have been valuable to include. However, for the trustworthiness of our results we had to prioritise informants who would provide the study with answers appropriate to the aim of the study. For study IV, we sought to connect to TBAs working in facilities and women’s homes. Since the participants in study IV were recruited from all regions of Somaliland, the results represent experiences from throughout the country and provide reliable and transferable data that can be reproduced in a similar context. As this study only included TBAs, it provides no insights into the views of SBAs in maternity services.
In both studies III and IV this thesis project chose to conduct individual interviews, which we felt enabled deeper attention to detail and would allow participants to discuss issues and topics in detail without feeling rushed or talked over, as can happen in focus group discussions. To improve credibility, as a research team we held continuous and open discussions about planned methodologies, data collection, interpretation and analysis. In studies II, III and IV the co-authors regularly discussed codes and interpreted results together, which allowed rigour and multiple perspectives. Using individual in-depth interviews, study III gives voices to the women in Somaliland who have experienced both facility- and home-based births, who have provided true insight into what is most important for women in Somaliland with regards to place of birth.

 Reflexivity and preunderstanding are important aspects to consider when discussing methodological considerations. Reflexivity is identified as a constant process of internal critical self-reflection of a researcher’s position as this has an important impact of all aspects of research. It is important to consider the ways in which the researcher’s preconceived notions of age, gender, culture and experience affect their contribution to knowledge creation (115). Being a Somalilander, a woman, a mother and a midwife, I shared many important characteristics with the data collectors, my co-authors and the women included in all the studies that make up this thesis, which facilitated my receiving their trust as an insider. Moreover, my time as an educator at the University of Hargeisa provided me with a good understanding of the way systems work in Somaliland. However, at the same time I was raised in the Netherlands and UK, where I also trained as a nurse and midwife. My clinical experience, birthing experience and reproductive autonomy from the UK context provided me with a unique insider/outsider perspective, allowing me to ask questions few people in Somaliland would be able to raise. For instance, in Study II data collection would have been overly complicated and challenged if I had been a complete outsider. Working with a diverse research team enabled me to keep asking all the questions that needed to be asked because they would ask these of me, and this supported me and helped me reflect, rather than to assume things that are culturally generally understood.
10 CONCLUSION

The results of this thesis show that the SSA criteria are better suited to the Somaliland context as they provide an accurate picture of MNM ratio. Around 70% of women gave birth without complications at HGH instead of giving birth in MCH supported by midwives. There is a need to improve the quality of maternity care provision in health facilities through the implementation of evidence-based interventions. Moreover, continuous interprofessional training, guidelines development and the introduction of confidential maternal death discussions and audits in a non-blaming environment are required to reduce maternal deaths.

The studies included in this thesis show that women choose respect, privacy and autonomy, even when doing so places their lives at risk. Women search for normality in birth, and the midwifery profession could provide solutions by empowering women’s resilience and reproductive agency while reducing adverse pregnancy, birth and postpartum outcomes. To bring maternal health care in Somaliland into line with evidence-based practices, the health system should be redesigned. Furthermore, women call to be more involved with the care provided in health facilities and to be empowered and respected in their own reproductive agency. Efforts should be directed to improve the quality of care in MCHs by strengthening the roles of midwives and improving continuity of care by introducing midwifery home visits.
11 IMPLICATIONS FOR PRACTICE

The findings of the studies in this thesis have important implications for practice. In this section, I present recommendations that will strengthen women’s reproductive agency and autonomy and reduce maternal mortality and morbidity, as discussed previously. It is important to address the challenges in the community and its facilities to ensure improvements in the quality of maternity care. Below I present the recommendations in three sections: clinical practice, policy, and future research needs.

11.1 Clinical practice

These recommendations are applicable to the maternal and child health centres in the community and hospitals in Somaliland.

- Increased access to and utilization of antenatal care services will improve women’s knowledge of risks, enable them to make educated choices, and improve their awareness of birthing options. Antenatal care is also a vital to empowering women with information, giving them opportunities to ask questions, and providing them with channels through which to seek more information in the future.
- The provision of postnatal and follow-up services for women in their homes is essential following a complicated birth. It is also vital for women’s mental and physical health, uptake of family planning options, and future pregnancies. Women might establish rapport and trusting relationships with their local midwifery teams if they visit the women in their homes.
- Improved quality of care in health facilities through the provision of better and more respectful maternity care for women and their relatives is essential.
- The use of clinical guidelines to manage labour and birth need to be adapted to the local context and actively monitored.
- Midwives need to use the partograph to monitor contractions, vaginal progress, and foetal heart rate regularly, as per the labour and birth guidelines, to prevent obstructed labour and uterine ruptures. This requires good documentation skills and requires a medical record system.
• Audits and case discussions conducted in a blame-free environment is a possible means of reducing the number of avoidable maternal near misses and death incidents.
• Interdisciplinary collaboration between the staff working in the various obstetrics wards needs to be improved. Ensuring that there is time to prepare for interventions that require theatre staff—for instance, caesarean sections can reduce avoidable delays that cause harm to mother and child.
• Regular training in a multidisciplinary team setting can improve relationships and respect for one another’s specialist knowledge and skills.
• Healthcare staff need training on how to respectfully address family decision-making and provide relatives with detailed information that they can then relay to other relatives.

11.2 Policy level implications
All the recommendations in this thesis require a strong policy-level commitment. Below are specific recommendations that are based on the findings of this thesis.

• The use of financial incentives might encourage health facilities to provide maternity carefree of charge. This should be done for admission, life-saving interventions, and medications. This will be vital to lessening the worries and shame of women and their families when they seek care, transport, and reduced medication costs while in the health facilities.
• Improve referral pathways. This recommendation requires policy makers’ and leaders’ commitment and planning.
• Increase the number of midwives, as this is vital to improving the quality of maternity care in the community and hospitals.
• Reform how midwives work. This is necessary for them to connect with women in their homes. A great deal can be accomplished by using trained support staff to assist the midwives.
• Design roles and responsibilities for traditional birth attendants (TBAs) and other lay health workers more widely to support midwives.
11.3 Future research needs

Research is essential to producing context-specific data that are used to improve quality of care in Somaliland. The findings in this thesis are merely the tip of the proverbial iceberg; to improve maternity care in Somaliland, more investment in research is vital. The results of Studies I and II showed that interprofessional collaboration was poor in Somaliland’s main referral hospital. Further research is needed to identify the barriers to interprofessional collaboration and how it can be implemented effectively. Although maternal near-miss incidents were identified in Study I, neonatal near-miss incidents and follow-up on the actual number of infant deaths in maternal near-miss incidents require further research. Additionally, post-discharge follow-up of mothers involved in near-miss incidents to investigate the long-term effects of these events on the women and their families can provide insightful results.

The data show poor adherence to obstetric guidelines at the main referral hospital in Somaliland: the Hargeisa Group Hospital. Further research is needed to identify barriers to guidelines adherence by both leadership and management, as well as to the accountability of healthcare workers.

In Study II, relatives and healthcare professionals were interviewed after every maternal death in the hospital. We recommend further studies to investigate the incidence of maternal deaths in maternal and child health centres and women’s homes. The recommended commencement of Confidential Enquiry into Maternal Deaths is important to establish. However, further research is vital to designing such enquiries and assessing their implementation in the Somaliland context.

Low-quality midwifery care and disrespectful and abusive treatment from skilled birth attendants at mother and child health centres were identified as factors that cause women to self-refer directly to the hospital. Further research is needed to identify the challenges that midwives face in providing quality women-centred care and how these stumbling blocks can be addressed in the future. Research on the continuous professional development needs of midwives in Somaliland and how these can be facilitated is also vital to ensuring that midwives are providing evidence-based care and are up to date in their practice.

Research studies need to be designed to assess how TBAs can be included into the Somaliland maternity care system in a meaningful way and how this might affect the quality of maternity care in Somaliland. Although this thesis examined the role of TBAs from their perspective, further research is needed to understand the views of skilled birth attendants and solicit their suggestions.
regarding how TBAs might be beneficial to maternity care services in Somaliland. Such information would be important for successful implementation of TBAs into the maternity care in Somaliland.
Cilmibaaristani waa mid aan ku soo bandhigay baahiyaha kala duwan ee haysta dumarka ururka leh ee ku dhaqan Jamhuuriyada Somaliland, waxaanan ku iftiimineyaa dhibaatooyinka iyo baahiyaha jira. Si taasi loo ogaado waxaan xogo badan kasoo uruuriyey bulsho badan oo aan waraysiyo iyo su’aalo badan ka weydiiyey. Taasi oo daaha ka rogtay in aan helo xog badan oo markii hore dahsoonaan uma baahan in si cilmiyeysan oo ay xirfadi ku dheehan tahay aynu uga faa’iidaysano xogaha kala duwan ee qoraalkan baaxada leh ku husan. 

Dumarku waxay baadigoobayaan in ay si caadiya u dhalan xalka awood siinta adkaysiga iyo qaybaha taranka marka layareynayo, waxyeelaynta u imanysa dumarka Somaliland waxay ka mid tahay meelaha ugu badan ee dumarka ugu tirada badani ay ku umul arooran caalamkan aynu ku noolnahay. U jeedada ugu weyn aan ka leeyahay cilmibaaristan waa sidii loo gaadhi lahaa qorshaha ama habka ay Qaramada midoobay ugu yeedhay hiigsiga horumar waara ee 2030ka (Sustainable Development Goals by 2030) 

Dawlada Somaliland waxay guul weyn ka gaadhay in ay hormariso qaybaha kala duwan ee caafimadaak, iyada oo xoogaysatay Wasaarada Caafimadaaku taas oo ay diirada ku saaray in ay galiso dadaal badan tobankii sano ee ugu dambaysay, sida oo kale waxay dib u dhis ku samaysay qaabka daryeelka Caafimadaakka iyo kobcintooda dhanka kale waxay diirada saartay kobcinta iyo horumarinta dadyawga ka shaqeeya iyo siyaasada lagu hagaayo.

Inkasta oo uu hoos u dhacday umul aroorku, hadana wuxuu marayaa meel sare sababta loo aanaynayo oo ah dumar farabadan ayaa ku dhala guryahooda, halka ay kaga dhali lahaa daba ah oo goobaha daryeelka caafimadaak.

Taasi oo waxyeelo weyn u keenta uguuna sii darta xaalada oo markii horeba adkayd. Qoraalkan aan soo bandhigay ujeedasiisu waa in la ogaado baahsanaanta ay sababto xaalada adag ee ay ku sugan yihiin dumarka ururka leh, taasi sababbi karta diimasho. Si aan u ogaano waxaana sameeynay cilmiibaaris afar xog ka kooban anaga oo isticmaalayna hab la fahmi karo, waxaanu fursad siinay dumarkaay la soo gudboonaatay xaaladahaasi ee goobaha adeega umulisooyinka, ugu dambayntii hadafaygagu waa inuu noqdo sidii loo yarayn
lahaa dhibaatadaas najiitana looga gaadhi lahaa dumarkaas Somaliland ee waxyeeladu soo gaadho.

Xogta cilmibarista waxaan kusoo ururuuryay anigoo isticmaalaya su’aalo sahmin iyo wareysiyo. Xogta I & II waxaan isticmaalay Cusbitaalka guud ee Hargeysa, dumarka ku dhalaya dhakhtarka xogta aan ka ururinay dumarka uurka leh. Waxaa kale oo diirada lagu saaray habka umul arorka, waxaa loo baahan yahay in kor loo qaado tayeynta adeega Caafimaadka ee umulisooyinka, iyadoo la dhaqan galiyo cadaymihii kala duwanaa ee aynu ku muujinayno, habka dhalmada iyada oo si xirfadaysan loo gudo galayo hab socodiinta shaqooyinka iyo tababarada lana siinayo hawl wadeenada caafimaadka ee kala duwan, laguna siinayo Cusbitaalada iyo goobaha kale ee adeega bulshada.

Gabagabadii baadhitaankan dhalmada dumarka si looga faa’iidaysato waa in xidhiidh wanaagsan lala yeeshaa xirfadleyda xirfada u leh, iyada oo baahida jirta si xeeldaysan oo aqoon ku dhisan loo wajaho lana sameeyo hab qaabeed Qaranku wada leeyahay una adeega dadka, lana kor joogo oo laga warhayo dhimashada umul arorka sida ugu haboon ee loo dhaqan galinayaana waa in la isticmaalo oo xidhiidh wanaagsan la la sameeyo umulisooyinka dhaqanka, kuwa u adeega bulshada sida xanaanooyinka iyaga oo si xirfad aqoonedd leh loo hawgaliyo. Waxa haboon in la taageero dibna loo eego adeega caafimaadka ee bulshada, waana in xidhiidh toos ah la sameeyo qoysaska. Waana in la abuuro jawi ay shaqaalaha umulisooyinku booqan karaan guryahooda si ay xogo dheeraad ah uga helaan taasi oo wax badan ka tari karta dhibaatooyinka jira.
13 ACKNOWLEDGEMENTS

Writing this part of the thesis was the most challenging as I acknowledge that there are many wonderful people that were put on my path to support me through this journey. I thank you all and appreciate all your support and encouragements throughout the years.

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My deepest gratitude goes out to my amazing supervisors. Thank you for allowing me on this journey with you and for supporting me from the application to today. You believed in Somaliland and the contribution of this thesis to Somaliland women. You have invested and believed in me and my abilities beyond my wildest expectations. I am truly changed for life because of you. Thank you from the depths of my soul.

Marie Klingberg- Allvin, my main supervisor. I thank you for all your support and patience with me. It has been such an honour to be supervised by you. Your knowledge and humble approach will be the foundation of my future work. I hope to continue working with you.

Fatumo Osman, my co-supervisor, I thank you from the bottom of my heart for your guidance, understanding and for challenging me to aim for better and dig deeper than ever. You have been an inspiration to me from the day we met.
Kerstin Erlandsson, my co-supervisor, I thank you for your immense knowledge and encouragement. Your work ethics have motivated me immensely.

To my wonderful family, you are a true inspiration to me, and I sincerely hope to make you proud.

My mother, Deeqa M Noor. You have done what no one else can do. You raise me as a lone parent in a foreign country and are still supporting me today. Thank you for always being there and never giving up on me. I truly appreciate you. To my baby sister Muna Egal, thank you for the late-night calls to encourage me to continue and all the days you made me laugh. Cabane Egal, without your master plan and empowerment, I would not have become a Nurse and Midwife. To Sahal and Wacays Egal, you are the most amazing bothers, drivers, babysitters, and sandwich makers. Thank you for all the times you postponed your commitments to support me with mine.

To my wonderful husband Ahmed Cabdi Hussein, you are the love of my life and my best friend. Thank you for believing in me, flighting for me and sacrificing so much to see me finalise this thesis. Finally, my children. Agil, as the oldest there has been many times you encouraged me to continue and told me you are proud of your mother, which meant the world to me, thank you for this and your patience. I look forward to traveling with you soon. Umar, you have always been the driving force of my life and your love gives me courage and strength, I ask Allah to increase your health and wellbeing. Warsan, my only daughter. Thank you for your kisses and hugs when I was writing, and you woke up early in the morning. Raage, my youngest, you have been my PhD baby and you have been affected the most by my absence the first few years of your life. I am truly looking forward to spending more time with all of you.
14 REFERENCES


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85. recommendations: W. Optimizing health worker roles to improve access to key maternal and new born health interventions through task shifting 2012.


<table>
<thead>
<tr>
<th>A</th>
<th>Socio-Demographic Data</th>
<th>Fill</th>
<th>G</th>
<th>Regarding the vital status of the infant, please specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Maternal Age…………………Years Old</td>
<td>Dead at birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>Residence</td>
<td>Alive at birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A3</td>
<td>Marital Status</td>
<td>Tick</td>
<td>Date of Delivery (ddmmyyyy)</td>
<td>Date of Hospital Discharge or Death</td>
</tr>
<tr>
<td>A4</td>
<td>Level of Education</td>
<td>Tick</td>
<td>Screening Questions for Near Miss</td>
<td></td>
</tr>
</tbody>
</table>

**B** Obstetric History

<table>
<thead>
<tr>
<th>Tick</th>
<th>Severe maternal complications/potentially life threatening complications (More than one option possible)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Severe antepartum hemorrhage</td>
</tr>
<tr>
<td></td>
<td>Pulmonary oedema</td>
</tr>
<tr>
<td></td>
<td>Severe abortion complications</td>
</tr>
<tr>
<td></td>
<td>Cardiovascular dysfunction (shock, use of continuous vasoactive drugs, cardiac arrest, cardio-pulmonary resuscitation)</td>
</tr>
</tbody>
</table>

**C** Referral Chain

<table>
<thead>
<tr>
<th>Tick</th>
<th>Critical Interventions or intensive care unit admission</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use of blood products (plasma &amp; thrombocytes)</td>
</tr>
<tr>
<td></td>
<td>Blood transfusion with 1 unit</td>
</tr>
<tr>
<td></td>
<td>Blood transfusion with 2-3 units</td>
</tr>
<tr>
<td></td>
<td>Laparatomy (Other than Caesarean Section)</td>
</tr>
<tr>
<td></td>
<td>Admission to Intensive Care unit</td>
</tr>
</tbody>
</table>

**C.1** Who referred the patient to the health facility

<table>
<thead>
<tr>
<th>Tick</th>
<th>Other referrals namely:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**C.2** Indicate how long it took for the patient to receive appropriate intervention in hours or days

<table>
<thead>
<tr>
<th>Tick</th>
<th>Organ Dysfunction/Life Threatening Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cardiovascular dysfunction (shock, use of continuous vasoactive drugs, cardiac arrest, cardio-pulmonary resuscitation)</td>
</tr>
</tbody>
</table>
# Female Genital Cutting

<table>
<thead>
<tr>
<th>D.1 Can a per vaginal examination be done?</th>
<th>Tick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes..................................</td>
<td></td>
</tr>
<tr>
<td>No....................................</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D.2 Mother Undergone FGC?</th>
<th>Tick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes..................................</td>
<td></td>
</tr>
<tr>
<td>No....................................</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D.3 Type of FGC performed</th>
<th>Tick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharaonic</td>
<td></td>
</tr>
<tr>
<td>Sunna with stitches</td>
<td>BB</td>
</tr>
<tr>
<td>Sunna without stitches</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D.4 Method used to confirm the type of FGC performed</th>
<th>Tick</th>
</tr>
</thead>
<tbody>
<tr>
<td>History Taking</td>
<td></td>
</tr>
<tr>
<td>Physical Examination, inspection</td>
<td></td>
</tr>
</tbody>
</table>

### Respiratory dysfunction
- (acute cyanosis, gasping, severe tachypnea (respiratory rate>40 bpm), severe bradypnea (respiratory rate<6 bpm))

### Renal dysfunction
- (oliguria non responsive to fluids or diuretics, dialysis for acute renal failure)

### Coagulation dysfunction
- (failure to form clots, massive transfusion of blood or red cells (≥5 units) or severe acute thrombocytopenia (≤50,000 platelets/ml))

### Hepatic dysfunction
- (jaundice in the presence of pre-eclampsia, severe acute hyperbilirubinemia)

### Neurologic dysfunction
- (prolonged unconsciousness / coma (lasting >12 hours), stroke, status epilepticus / uncontrollable fits, total paralysis)

### Uterine dysfunction/hysterectomy
- (hemorrhage or infection leading to hysterectomy)

### Maternal Deaths
- Death during pregnancy or within 42 days of termination of pregnancy

### History Taking

#### CC. 1 About conditions at arrival in the facility and the referral process, specify:
- Delivery or abortion occurred before arrival at any health facility
- Delivery within 3 hours of arrival in the health facility
- Laparotomy within 3 hours of hospital arrival or in other hospital
- Woman referred from other health facility
- Woman referred to private hospital
- Women died still pregnant
- Anticonvulsant among women with hypertensive disorders
- Magnesium sulfate
- Other anticonvulsant

#### CC. 2 Process Indicators

#### CC. 3 Antibiotics
- Prophylactic antibiotic during caesarean section (One Dose)
- Parenteral, therapeutic antibiotics (Multiple Doses)
- Parenteral antibiotic for septic abortion (Multiple Doses)
- Fetal lung maturation for preterm deliveries under 34 weeks
- Corticosteroids (betamethasone or dexamethasone)

#### CC. 4 Delay of Obtaining Consent for Caesarean Section
- No (less than 15 minutes)............................................
- Yes (15 minutes to 59 minutes)....................................
- Yes (1 hour to 2 hours and 59 minutes).........................
- Yes (3 hours and above)............................................
<table>
<thead>
<tr>
<th>About the use of interventions, please specify whether the woman received any of the following</th>
<th>Tick</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CC.5</strong> Treatment of post abortion hemorrhage</td>
<td></td>
</tr>
<tr>
<td>Oxytocin</td>
<td></td>
</tr>
<tr>
<td>Ergometrine</td>
<td></td>
</tr>
<tr>
<td>Misoprostol</td>
<td></td>
</tr>
<tr>
<td>Tranexamic acid</td>
<td></td>
</tr>
<tr>
<td>Removal of retained products</td>
<td></td>
</tr>
<tr>
<td>Abdominal packing</td>
<td></td>
</tr>
<tr>
<td>Balloon or condom tamponade</td>
<td></td>
</tr>
<tr>
<td>Artery ligation (uterine/hypogastric)</td>
<td></td>
</tr>
<tr>
<td>Other uterotonic</td>
<td></td>
</tr>
<tr>
<td>Hysterectomy</td>
<td></td>
</tr>
<tr>
<td><strong>CC.6</strong> Prevention of postpartum haemorrhage</td>
<td></td>
</tr>
<tr>
<td>Oxytocin</td>
<td></td>
</tr>
<tr>
<td>Other uterotonic</td>
<td></td>
</tr>
<tr>
<td><strong>CC.7</strong> Treatment of postpartum hemorrhage (More than one option possible)</td>
<td></td>
</tr>
<tr>
<td>Oxytocin</td>
<td></td>
</tr>
<tr>
<td>Ergometrine</td>
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<tr>
<td>Misoprostol</td>
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<tr>
<td>Tranexamic acid</td>
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<tr>
<td>Removal of retained products</td>
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<td>Abdominal packing</td>
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<td>Balloon or condom tamponade</td>
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<td>Other uterotonic</td>
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</tr>
<tr>
<td>Hysterectomy</td>
<td></td>
</tr>
<tr>
<td><strong>CC.8</strong> UNDERLYING CAUSES OF DEATH / NEARMISS</td>
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</tr>
<tr>
<td>Please specify:</td>
<td></td>
</tr>
<tr>
<td>Abortion (induced or spontaneous) with haemorrhage</td>
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<tr>
<td>Abortion (induced or spontaneous) with infection</td>
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</tr>
<tr>
<td>Ectopic pregnancy</td>
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<tr>
<td>Obstetric hemorrhage</td>
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<tr>
<td>Hypertensive disorders</td>
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</tr>
<tr>
<td>Pregnancy related infection</td>
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</tr>
<tr>
<td>Other obstetric disease or complication</td>
<td></td>
</tr>
<tr>
<td>Medical/surgical/mental disease or complication</td>
<td></td>
</tr>
<tr>
<td>Unanticipated complications of management</td>
<td></td>
</tr>
<tr>
<td>Coincidental conditions</td>
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</tr>
<tr>
<td>Unknown</td>
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</tr>
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</table>
### CONTRIBUTORY / ASSOCIATED CONDITIONS

Please specify:

<table>
<thead>
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<th>Condition</th>
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</thead>
<tbody>
<tr>
<td>Anemia</td>
</tr>
<tr>
<td>HIV infection</td>
</tr>
<tr>
<td>Previous caesarean section</td>
</tr>
<tr>
<td>Prolonged labor</td>
</tr>
<tr>
<td>Obstructed labor</td>
</tr>
<tr>
<td>Other condition</td>
</tr>
</tbody>
</table>
**Maternal Near Miss (MNM)**

refers to a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy.

**Maternal death (MD)**

Refers to the death of a woman while pregnant or within 42 days of termination of pregnancy.

**Live birth (LB)**

Is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life. Each product of such a birth is considered live born.

**Women with life-threatening conditions (WLTC)**

Are all women who either qualified as having maternal near miss or who died. It is the sum of maternal near miss and maternal deaths \( (WLTC = MNM + MD) \)

**MNM incidence ratio**

Is the number of maternal near miss cases per 1,000 live births. \( [MNM\ IR = MNM/LB] \)

**Severe Maternal Outcome Ratio (SMOR)**

refers to the number of women with life-threatening conditions per 1,000 live births (LB). This indicator gives an estimation of the amount of care that would be needed in an area.

\( [SMOR = (MNM+MD)/LB] \)

**Maternal near miss: mortality ratio**

Refers to the proportion between maternal near miss cases and maternal deaths. Higher ratios indicate better care. \( [MNM: 1 \ MD] \)

**Mortality index (MI)**

Refers to the number of maternal deaths divided by the number of women with life threatening conditions, expressed as a percentage. The higher the index the more women with life-threatening conditions die (low quality of care), whereas the lower the index the fewer women with life-threatening conditions die (better quality of care). \( [MI = MD/(MNM+MD)] \)
Three approaches used to identify maternal near miss.

| Clinical criteria related to a specific disease entity | Specific diseases are used as the starting points and then for each disease, morbidity is defined. For example pre-eclampsia is the disease entity, and complications such as renal failure, eclampsia and pulmonary oedema are used to define severe morbidity.

| Intervention based criteria | In this system an intervention such as admission to an Intensive Care Unit (ICU), the need for an emergency hysterectomy, the need for a blood transfusion, caesarean section are used as the marker of maternal near miss.

| Organ system dysfunction based criteria | This system is based on the concept that there is a sequence of events leading from good health to death. The sequence is clinical insult, followed by a systemic inflammatory response syndrome, organ dysfunction, organ failure and finally death. Maternal near miss cases would be those women with organ dysfunction and organ failure who survive. The criteria for defining a maternal near miss are defined per organ system. Markers for organ system dysfunction or failure are specified. |
Paper I
Incidence and causes of severe maternal outcomes in Somaliland using the sub-Saharan Africa maternal near-miss criteria: A prospective cross-sectional study in a national referral hospital

Jama Ali Egal1,2 | Jonah Kiruja1,2 | Helena Litörp3,4 | Fatumo Osman2,5 | Kerstin Erlandsson2 | Marie Klingberg-Allvin3

1College of Medicine and Health Science, University of Hargeisa, Hargeisa, Somaliland
2Institution of Health and Welfare, Dalarna University, Dalarna, Sweden
3Department of Women’s and Children’s Health, Uppsala University, Uppsala, Sweden
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5Department of Public Health and Caring Science, Uppsala University, Uppsala, Sweden

Correspondence
Email: jaa@du.se

Abstract
Objective: To describe the incidence and causes of severe maternal outcomes and the unmet need for life-saving obstetric interventions among women admitted for delivery in a referral hospital in Somaliland.

Methods: A prospective cross-sectional study was conducted from April 15, 2019 to March 31, 2020, with women admitted during pregnancy or childbirth or within 42 days after delivery. Data were collected using the World Health Organization (WHO) and sub-Saharan Africa (SSA) maternal near-miss (MNM) tools. Descriptive analysis was performed by computing frequencies, proportions, and ratios.

Results: The MNM ratios were 56 (SSA criteria) and 13 (WHO criteria) per 1000 live births. The mortality index was highest among women with medical complications (63%), followed by obstetric hemorrhage (13%), pregnancy-related infection (10%), and hypertensive disorders (7.9%) according to the SSA MNM criteria. Most women giving birth received prophylactic oxytocin for postpartum hemorrhage prevention (97%), and most laparotomies (60%) for ruptured uterus were conducted after 3 h.

Conclusion: There is a need to improve the quality of maternal health services through implementation of evidence-based obstetric interventions and continuous in-service training for healthcare providers. Using the SSA MNM criteria could facilitate such preventive measures in this setting as well as similar low-resource contexts.

KEYWORDS
low-income country, maternal death, Sub-Saharan Africa criteria, WHO maternal near-miss
1 | INTRODUCTION

Reducing maternal morbidity and mortality remains one of the greatest challenges in low-resource settings, such as Somaliland. Despite progress made through programmes implemented by government ministries and private and non-governmental organizations to reduce maternal mortality ratios (MMRs) and achieve the United Nations’ Sustainable Development Goal of fewer than 70 deaths per 100,000 live births by 2030, the MMR remains relatively high in sub-Saharan Africa (SSA). ¹ In Somaliland, an estimated 732 maternal deaths occur per 100,000 live births, resulting in one of the highest MMRs in the world. ²,³

Women who fulfill the World Health Organization (WHO) and SSA maternal near-miss (MNM) criteria—that is, they develop severe complications during pregnancy or childbirth or within 42 days after the termination of pregnancy and nearly die—share many pathologic and circumstantial factors. ⁴,⁵ Hence, much can be learned from them about the care of pregnant women. Consequently, WHO developed the MNM approach, a guide for monitoring the implementation of critical interventions in maternal health care and systematically assessing the quality of care. ⁶ Studies conducted in Bolivia, Tanzania, and Ethiopia have shown that it is useful for identifying shortfalls in clinical practice and the referral system and can be used to improve quality of care and maternal and newborn outcomes. ⁷–⁹

A pilot study conducted in 2015 using a modified MNM approach showed that most of the women with severe complications were diagnosed with preventable and treatable conditions; however, a large proportion (one out of eight) of cases resulted in maternal death. ¹⁰ The WHO MNM criteria have since been adapted for use in SSA, ¹¹ increasing their applicability in settings with low availability of blood transfusions, intensive care units (ICUs), and laboratory-testing equipment. These SSA criteria are used to accurately record near-miss cases and create comparable data sets in the region, especially in the fragile Somaliland context. ¹² Using both the WHO and SSA MNM criteria, the present study aimed to describe the incidence and causes of severe maternal outcomes and measure the unmet need for life-saving obstetric interventions among women admitted for delivery in a referral hospital in Somaliland.

2 | MATERIALS AND METHODS

A prospective cross-sectional study was conducted at the National referral hospital in Somaliland Hargeisa Group Hospital (HGH) from April 15, 2019 to March 31, 2020. HGH is located in Hargeisa, the capital of Somaliland, and serves as the main tertiary and referral hospital for all Somaliland regions. The majority of the 3.5 million inhabitants have a low socioeconomic background. Around 48% of women receive antenatal care from a trained healthcare provider, ¹³ but only 33% of deliveries are conducted by skilled birth attendants. Most women giving birth are supported at home by traditional birth attendants, who lack the competencies of formally trained maternity care providers. ¹⁴ HGH provides delivery services to approximately 6000 mothers annually. ¹⁵ The hospital has anesthetists, a blood transfusion center, a clinical laboratory, and an ICU. However, blood availability is insufficient, and family members are often requested to donate blood. ¹⁶

All women admitted to the hospital’s maternity wards during pregnancy or childbirth or within 42 days after delivery were included in the study. Women were screened using the SSA MNM criteria, which include cardiovascular, respiratory, renal, coagulation, hepatic, neurologic, and uterine dysfunction criteria as defined by WHO. ³ They were also screened for severe pre-eclampsia upon ICU admission, eclampsia, sepsis, or severe systemic infections, pulmonary edema, transfusion of two or more units of red blood cells, uterine rupture, severe abortion complications, and laparotomy other than cesarean section. ⁶ Moreover, women were included who had severe maternal outcomes, which is an extensive category of clinical conditions that includes diseases that can threaten a woman’s life during pregnancy and labor and after the termination of pregnancy. ⁴ All maternal deaths during the study period, as defined by WHO, ⁵ were also included.

Women were recruited at the HGH labor ward, ICU, operating rooms, and two gynecology wards. The data collection tool was attached to each woman’s medical file upon admission, the assigned midwife commenced documentation in the tool, and data were extracted from the medical file to the paper-based tool. At every stage of the woman’s stay, a trained data collector updated the tool. J.E. and J.K. regularly reviewed all the completed tools and medical records to ensure completeness. Data collectors visited the wards at the start of every shift, checked that there were sufficient tools available, collected the completed tools, and double-checked them against the admission and discharge information in the hospital system. Data were entered into SPSS version 22 software (IBM) daily by J.E. and J.K., who were assisted by trained data entry persons. Interim analysis of entered data was performed on a quarterly basis. This provided opportunities to identify missing data and variables and to discuss with the data collector’s ways to improve data quality.

Each medical record was assessed by an obstetrician/gynecologist and the data collectors to determine whether the woman fulfilled the WHO and/or SSA MNM criteria. The variables studied were sociodemographic characteristics, obstetric history, screening questions, process indicators on proportion of women receiving recommended evidence-based interventions, and underlying causes of MNM and death. The women were classified into the following categories: (1) women with complications (diagnosed with any disease or condition irrespective of its severity), (2) women with potentially life-threatening conditions (diagnosed with severe maternal complications that can threaten a woman’s life during pregnancy, birth, and after the termination of pregnancy), (3) women with MNM (including both WHO and SSA criteria), and (4) maternal death.

Data were cleaned, checked for completeness and analyzed using descriptive statistics. The following MNM and mortality indicators were calculated as described by WHO: ⁶ MNM ratio (MMR/1000 live births), maternal death ratio (maternal deaths/100,000 live births), severe maternal outcomes (MMN+maternal deaths), severe...
maternal outcome ratio (MNM+maternal deaths/1000 live births), MNM/maternal death ratio (MNM:1 maternal death), and mortality index (maternal deaths/(MNM+maternal death). The underlying causes of MNM and maternal mortality and the use of evidence-based interventions among women with severe maternal complications are described using percentages.

Permission to conduct the study was obtained from the Somaliland Ministry of Health Development. Ethical clearance was provided by the research ethics committee of the University of Hargeisa (Dr: CS/41105/18).

3 | RESULTS

A total of 6658 women were admitted to the obstetrics unit from April 15, 2019 to March 31, 2020. During the follow up from admission to discharge, 1864 women had complications and 923 women had potentially severe maternal complications. The WHO MNM criteria identified 79 women with MNM, and the SSA criteria identified 342 women with MNM (Figure 1). There were 28 maternal deaths, after excluding one maternal death that was the result of a road traffic accident.

The participants' sociodemographic and obstetric characteristics are presented in Table 1. With a total of 6055 live births during the study period, the MNM ratios were 56.5/1000 live births (SSA MNM criteria) and 13/1000 live births (WHO MNM criteria) (Table 2). The MMR was 462/100,000 live births. Figure 2 illustrates the distribution of women who met the SSA and WHO MNM criteria. Blood transfusion of two or more units (n=221), eclampsia (n=54), and cardiovascular dysfunction (n=44) were the most common SSA MNM criteria fulfilled, while transfusion of more than five units (n=36) of blood, cardiovascular dysfunction (n=44), and neurologic dysfunction (n=23) were the most common WHO MNM criteria fulfilled.

The mortality index according to the SSA MNM criteria was highest among those with medical complications (8; 63%) considered indirect obstetric causes, such as pneumonia and severe hypothyroidism, followed by obstetric hemorrhage (104; 13%), pregnancy-related infections (79; 10%), and hypertensive disorders (89; 7.9%) (Table 3). The use of evidence-based obstetric interventions varied depending on the type of intervention (Table 4). Almost all women giving birth received prophylactic oxytocin for prevention of postpartum hemorrhage (62568; 97%), but only half of the women who underwent cesarean section received prophylactic antibiotics within the recommended time. Likewise, all women with eclampsia received magnesium sulfate, but the majority of laparotomies (12; 60%) for ruptured uterus were conducted after 3 h of hospital stay.

4 | DISCUSSION

This is the first study in the Somali region that has assessed and shown that the SSA MNM criteria identify more MNM cases than the WHO MNM criteria. In an international comparison, we found a high incidence of severe maternal outcomes and a high MMR and maternal mortality index. The findings showed high use of evidence-based interventions, such as the use of oxytocin for the prevention of postpartum hemorrhage and magnesium sulfate in eclampsia, which was optimal. However, immediate laparotomies were not performed in cases of ruptured uterus because of delays.

The SSA MNM ratio reported here is similar to those reported in Namibia, Tanzania, and Ethiopia; however, it is higher than in studies conducted in Kenya, Nigeria and Suriname. The variation could be the result of differences in study populations or the types of healthcare facilities in which the studies were conducted.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No maternal near-miss or death (n = 6287)</th>
<th>Sub-Saharan Africa maternal near-miss (n = 342)</th>
<th>Maternal death (n = 28)</th>
<th>Total cohort (n = 6657)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age, years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>1151 (18.3)</td>
<td>69 (20.2)</td>
<td>2 (7.1)</td>
<td>1222 (18.4)</td>
</tr>
<tr>
<td>20–34</td>
<td>3976 (63.2)</td>
<td>206 (60.2)</td>
<td>19 (67.9)</td>
<td>4201 (63.1)</td>
</tr>
<tr>
<td>≥35</td>
<td>1160 (18.5)</td>
<td>67 (19.6)</td>
<td>7 (25.0)</td>
<td>1234 (18.5)</td>
</tr>
<tr>
<td>Missing</td>
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<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>3816 (60.7)</td>
<td>246 (71.9)</td>
<td>21 (75.0)</td>
<td>4083 (61.3)</td>
</tr>
<tr>
<td>Primary and secondary school</td>
<td>2233 (35.5)</td>
<td>89 (26.0)</td>
<td>7 (25.0)</td>
<td>2329 (35.0)</td>
</tr>
<tr>
<td>University</td>
<td>238 (3.8)</td>
<td>7 (2.1)</td>
<td>0 (0.0)</td>
<td>245 (3.7)</td>
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<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural area</td>
<td>428 (6.8)</td>
<td>58 (17.0)</td>
<td>6 (21.4)</td>
<td>492 (7.4)</td>
</tr>
<tr>
<td>Urban area</td>
<td>5859 (93.2)</td>
<td>284 (83.0)</td>
<td>22 (78.6)</td>
<td>6165 (92.6)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td><strong>Gestational age at delivery, week</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;22</td>
<td>174 (2.8)</td>
<td>39 (11.4)</td>
<td>0 (0.0)</td>
<td>213 (3.2)</td>
</tr>
<tr>
<td>22–36</td>
<td>284 (4.5)</td>
<td>57 (16.7)</td>
<td>8 (28.6)</td>
<td>349 (5.2)</td>
</tr>
<tr>
<td>37–42</td>
<td>5828 (92.7)</td>
<td>246 (72.9)</td>
<td>20 (71.4)</td>
<td>6094 (91.6)</td>
</tr>
<tr>
<td>&gt;42</td>
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<td>0 (0.0)</td>
<td>0 (0.0)</td>
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<tr>
<td>Missing</td>
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<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td><strong>Parity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–para</td>
<td>1035 (16.5)</td>
<td>54 (15.8)</td>
<td>6 (21.4)</td>
<td>1095 (16.3)</td>
</tr>
<tr>
<td>1–4</td>
<td>3750 (59.6)</td>
<td>184 (53.8)</td>
<td>12 (42.9)</td>
<td>3946 (59.4)</td>
</tr>
<tr>
<td>&gt;4</td>
<td>1502 (23.9)</td>
<td>104 (30.4)</td>
<td>10 (35.7)</td>
<td>1616 (24.3)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td><strong>Previous cesarean section (among multipara)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>669 (11.2)</td>
<td>72 (25.0)</td>
<td>4 (18.1)</td>
<td>745 (13.4)</td>
</tr>
<tr>
<td>No</td>
<td>4583 (88.8)</td>
<td>216 (75.0)</td>
<td>18 (81.8)</td>
<td>4817 (86.6)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td><strong>Female genital cutting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharaonic</td>
<td>2948 (46.9)</td>
<td>229 (67.0)</td>
<td>23 (82.1)</td>
<td>3200 (47.9)</td>
</tr>
<tr>
<td>Sunna and other types and no female genital cutting</td>
<td>3339 (53.1)</td>
<td>113 (33.0)</td>
<td>5 (17.9)</td>
<td>3457 (52.1)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td><strong>Referral</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional birth attendant</td>
<td>11 (0.2)</td>
<td>10 (2.9)</td>
<td>1 (3.6)</td>
<td>22 (0.3)</td>
</tr>
<tr>
<td>Healthcare providers at maternal and child health centers</td>
<td>106 (1.7)</td>
<td>38 (11.1)</td>
<td>5 (17.9)</td>
<td>149 (2.2)</td>
</tr>
<tr>
<td>Self-referred</td>
<td>6170 (98.1)</td>
<td>294 (86.0)</td>
<td>22 (88.6)</td>
<td>6486 (97.5)</td>
</tr>
<tr>
<td>Missing</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td><strong>Mode of delivery</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal delivery</td>
<td>4914 (78.1)</td>
<td>121 (35.6)</td>
<td>13 (46.4)</td>
<td>5048 (76.0)</td>
</tr>
</tbody>
</table>

(Continues)
In our study setting, the SSA MNM criteria identified more MNM cases than the WHO MNM criteria. The major reasons for this disparity are the different thresholds for blood transfusion units and the additional criteria of eclampsia and sepsis. This finding is in line with that of a previous study conducted in Ethiopia.\(^7\) Using a lower threshold for blood transfusion units is appropriate in low-resource settings, given the blood shortages often reported in such contexts.\(^\text{18}\) The SSA criteria were developed to address the WHO’s inclusion of criteria that require sophisticated laboratory equipment and management, which are unfeasible factors in many low-resource settings in SSA. As such, the SSA MNM criteria allow identification of prognostic factors as a foundation to intervene earlier and prevent severe morbidity and mortality\(^\text{4}\) in settings such as Somalia. Arguably, using the SSA MNM criteria as a tool for analyzing maternal near-miss cases identifies a larger proportion of women with life-threatening conditions and so captures a more accurate picture of maternal morbidity in this setting than using the WHO criteria.\(^\text{13}\) As such, this higher ratio of MNM should be used for identifying MNM cases and implementing preventive measures to improve quality of care in a low-resource setting such as Somalia. For example, the present study reports more women with eclampsia and hemorrhage using the SSA MNM criteria, which calls for hospital management to allocate resources for the implementation of evidence-based obstetric interventions through reviewing and updating care guidelines and continuous in-service training for healthcare providers.\(^\text{18}\)

In terms of intrahospital evidence-based interventions for preventing maternal morbidity and mortality, we found that the use of oxytocin to prevent obstetric hemorrhage was remarkably high: 97% of women giving birth at the health facility received oxytocin prophylaxis. Moreover, all women with eclampsia received magnesium sulfate as an anticonvulsant. The Somali Ministry of Health Development has been scaling up evidence-based interventions through training of health care providers through review of and updating care guidelines and continuous in-service training for healthcare providers.\(^\text{18}\)

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**TABLE 1** (Continued)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No maternal near-miss or death (n = 6287)</th>
<th>Sub-Saharan Africa maternal near-miss (n = 342)</th>
<th>Maternal death (n = 28)</th>
<th>Total cohort (n = 6657)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cesarean section</td>
<td>1088 (17.3)</td>
<td>158 (46.2)</td>
<td>9 (32.2)</td>
<td>1255 (18.8)</td>
</tr>
<tr>
<td>Discharged/died while still pregnant(^a)</td>
<td>139 (2.2)</td>
<td>24 (7.0)</td>
<td>6 (21.4)</td>
<td>169 (2.5)</td>
</tr>
<tr>
<td>Laparotomy for ectopic pregnancy</td>
<td>0 (0.0)</td>
<td>7 (2.0)</td>
<td>0 (0.0)</td>
<td>7 (0.1)</td>
</tr>
<tr>
<td>Dilatation and curettage</td>
<td>32 (0.5)</td>
<td>20 (5.8)</td>
<td>0 (0.0)</td>
<td>52 (0.8)</td>
</tr>
<tr>
<td>Complete spontaneous abortion</td>
<td>114 (1.8)</td>
<td>126 (3.5)</td>
<td>0 (0.0)</td>
<td>240 (1.9)</td>
</tr>
</tbody>
</table>

\(^a\)Data are presented as number (percentage).

\(^\text{b}\)Nulliparous not included in the analysis.

\(^\text{c}\)These women recovered and were sent home.

**TABLE 2** Maternal near-miss and maternal death indicators\(^a\)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Incidence according to sub-Saharan Africa maternal near-miss criteria</th>
<th>Incidence according to World Health Organization maternal near-miss criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live births</td>
<td>6055</td>
<td>6055</td>
</tr>
<tr>
<td>Maternal near-misses</td>
<td>342</td>
<td>79</td>
</tr>
<tr>
<td>Maternal near-miss ratio</td>
<td>56.5 per 1000 live births (95% CI 50.8–62.8)</td>
<td>13 per 1000 live births (95% CI 10.3–16.2)</td>
</tr>
<tr>
<td>Maternal deaths</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Maternal death ratio(^a)</td>
<td>462 per 100000 live births (95% CI 310–670)</td>
<td>462 per 100000 live births (95% CI 310–670)</td>
</tr>
<tr>
<td>Severe maternal outcomes (maternal near-misses and maternal deaths)</td>
<td>370</td>
<td>107</td>
</tr>
<tr>
<td>Severe maternal outcome ratio</td>
<td>61.1 per 1000 live births (95% CI 55.2–67.4)</td>
<td>17.7 per 1000 live births (95% CI 14.5–21.3)</td>
</tr>
<tr>
<td>Maternal near-miss/maternal death ratio</td>
<td>12:2:1</td>
<td>2.8:1</td>
</tr>
<tr>
<td>Mortality index(^b)</td>
<td>7.6% (95% CI 5.1–10.7)</td>
<td>26% (95% CI 18.4–35.6)</td>
</tr>
</tbody>
</table>

Abbreviation: CI, confidence interval.

Note. Data are presented as number (percentage).

\(^a\)There were 29 maternal deaths; however, one maternal death was excluded (cause of death was road traffic accident).

\(^b\)Mortality index = Maternal death/maternal near-miss + maternal death.
of obstetric hemorrhage and hypertensive disorders is evidenced by lower mortality indexes from these direct obstetric causes of maternal death.

FIGURE 2. Maternal near-miss criteria fulfilled according to the sub-Saharan Africa (SSA) and World Health Organization (WHO) criteria. Inclusion criteria were according to the SSA* and WHO criteria. *Total number of SSA maternal near-miss events exceeds 342 because some women fulfilled more than one criterion; number of women with maternal near-miss (n = 342) and number of maternal near-miss events (n = 483); number of women with WHO maternal near-miss (n = 79) and number of maternal near-miss events (n = 191).

TABLE 3 Causes of maternal near-miss and death and mortality index

<table>
<thead>
<tr>
<th>Cause of maternal near-miss and mortality</th>
<th>Sub-Saharan Africa criteria</th>
<th></th>
<th>World Health Organization criteria</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maternal near-miss (n = 342)</td>
<td>Maternal death (n = 28)</td>
<td>Mortality index^b</td>
<td>Maternal near-miss (n = 79)</td>
</tr>
<tr>
<td>Direct obstetric causes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstetric hemorrhage</td>
<td>91 (26.6)</td>
<td>13 (46.4)</td>
<td>12.5%</td>
<td>30 (38)</td>
</tr>
<tr>
<td>Hypertensive disorders in pregnancy, childbirth, and the puerperium</td>
<td>82 (24)</td>
<td>7 (25)</td>
<td>7.9%</td>
<td>40 (51)</td>
</tr>
<tr>
<td>Preganacies with abortive outcome</td>
<td>32 (9.4)</td>
<td>0 (0)</td>
<td>0.0%</td>
<td>3 (4)</td>
</tr>
<tr>
<td>Pregnancy-related infection</td>
<td>26 (7.6)</td>
<td>3 (10.7)</td>
<td>10.3%</td>
<td>3 (4)</td>
</tr>
<tr>
<td>Indirect obstetric causes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe anemia</td>
<td>108 (31.6)</td>
<td>3 (10.7)</td>
<td>0.0%</td>
<td>3 (4)</td>
</tr>
<tr>
<td>Medical complications^c</td>
<td>3 (0.9)</td>
<td>5 (17.9)</td>
<td>62.5%</td>
<td>3 (4)</td>
</tr>
</tbody>
</table>

^aData are presented as number (percentage).

^bMortality index = ([Maternal death/[Maternal near-miss + Maternal death]) expressed as a percentage.

^cMedical complications diagnosis for maternal near-miss = pneumonia (2) and severe hypothyroidism, medical complications for maternal deaths = pulmonary embolism, postpartum psychosis, acute pyelonephritis, human immunodeficiency virus infection, and pneumonia.
TABLE 4 Process and outcome indicators associated with specific conditions

<table>
<thead>
<tr>
<th>Indicator</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prevention of postpartum hemorrhage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target population: women giving birth in healthcare facilities (22 weeks of pregnancy or more)</td>
<td>6442</td>
<td>100</td>
</tr>
<tr>
<td>Oxytocin use</td>
<td>6268</td>
<td>97.3</td>
</tr>
<tr>
<td>Use of any uterotonic (including oxytocin)</td>
<td>6442</td>
<td>100</td>
</tr>
<tr>
<td>2. Treatment of severe postpartum hemorrhage</td>
<td>98</td>
<td>100</td>
</tr>
<tr>
<td>Target population: women with severe postpartum hemorrhage</td>
<td>57</td>
<td>100.0%</td>
</tr>
<tr>
<td>Magnesium sulfate</td>
<td>57</td>
<td>100.0%</td>
</tr>
<tr>
<td>Other anticonvulsant</td>
<td>17</td>
<td>29.8%</td>
</tr>
<tr>
<td>Use of any anticonvulsant</td>
<td>57</td>
<td>100.0%</td>
</tr>
<tr>
<td>Proportion of cases with severe maternal outcome</td>
<td>57</td>
<td>100.0%</td>
</tr>
<tr>
<td>Mortality</td>
<td>3</td>
<td>5.3%</td>
</tr>
<tr>
<td>3. Anticonvulsants for eclampsia</td>
<td>57</td>
<td>100.0%</td>
</tr>
<tr>
<td>Target population: women with eclampsia</td>
<td>57</td>
<td>100.0%</td>
</tr>
<tr>
<td>Magnesium sulfate</td>
<td>57</td>
<td>100.0%</td>
</tr>
<tr>
<td>Other anticonvulsant</td>
<td>17</td>
<td>29.8%</td>
</tr>
<tr>
<td>Use of any anticonvulsant</td>
<td>57</td>
<td>100.0%</td>
</tr>
<tr>
<td>Proportion of cases with severe maternal outcome</td>
<td>57</td>
<td>100.0%</td>
</tr>
<tr>
<td>4. Prevention of cesarean section-related infection</td>
<td>1246</td>
<td>100.0%</td>
</tr>
<tr>
<td>Target population: women undergoing cesarean section</td>
<td>628</td>
<td>50.4%</td>
</tr>
<tr>
<td>Prophylactic antibiotic during cesarean section</td>
<td>618</td>
<td>49.6%</td>
</tr>
<tr>
<td>5. Treatment for sepsis</td>
<td>35</td>
<td>100.0%</td>
</tr>
<tr>
<td>Target population: women with sepsis</td>
<td>35</td>
<td>100.0%</td>
</tr>
<tr>
<td>Parenteral therapeutic antibiotics</td>
<td>29</td>
<td>82.9%</td>
</tr>
<tr>
<td>Proportion of cases with severe maternal outcome</td>
<td>3</td>
<td>8.6%</td>
</tr>
<tr>
<td>6. Ruptured uterus</td>
<td>20</td>
<td>100.0%</td>
</tr>
<tr>
<td>Target population: women with ruptured uterus</td>
<td>19</td>
<td>95.0%</td>
</tr>
<tr>
<td>Laparotomy after 3 h of hospital stay</td>
<td>12</td>
<td>60.0%</td>
</tr>
<tr>
<td>Proportion of cases with severe maternal outcome</td>
<td>20</td>
<td>100.0%</td>
</tr>
<tr>
<td>Mortality</td>
<td>6</td>
<td>30.0%</td>
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</tbody>
</table>

*aPrimary indicator, based on the first option evidence-based intervention for the target population.

*bInclusion criteria of the cases as per the definition of severe maternal outcome = maternal near-miss plus maternal death.

surgical-site infections that can lead to severe sepsis and death. This finding shows the need for healthcare providers to be trained on the importance of administering prophylactic antibiotics in cesarean section and following guidelines as part of regular care.

Moreover, most women with ruptured uteruses underwent laparotomy after 3 or more hours of hospital stay, which is in contrast to the findings of an Iraqi study. The delay in service provision, which poses a threat to women’s health, may be associated with the consent process. In Somaliland, consent for interventions, such as laparotomy and cesarean section, must be obtained from both the woman’s husband and father. This can delay the provision of medical care according to healthcare providers at the referral hospital (J. Kiruja, B. Essén, K. Erlandsson, M. Klingberg-Alvin, & F. Osman, unpublished data).

The present study has shown that at HGH, around 70% of women gave birth without complications and that most women bypassed the primary healthcare level (self-referred) during the study period. In Somaliland, most women (80%) deliver at home supported by a traditional birth attendant and the rest deliver at a healthcare facility. This indicates that a considerable proportion of women with normal pregnancies and uncomplicated deliveries attend the referral hospital instead of a primary healthcare center, resulting in overcrowding and suboptimal care. A recent qualitative study among multiparous women in Somaliland found that a lack of reproductive agency in facility-based births makes home births their first choice, regardless of medical need. Inadequate quality of care for women and neonates in low- and middle-income countries is evident, and different solutions have been proposed, such as scaling up access to hospital care.

However, to meet women’s needs and preferences in Somaliland, further investments are needed to strengthen the midwifery profession and to define and test a scalable, context-specific, midwife-led continuity of care model. A model that integrates women’s needs and continuity of care through pregnancy and delivery led by midwives working in interprofessional teams is a cost-effective solution.

The strengths of the present study include its large sample size. The present study applied a quality data control mechanism during data collection, and the prospective approach enabled any vital data not captured in the MNM tool to be included by the time of discharge. However, a limitation of the present study is that the findings might not be generalizable to the population of Somaliland, as the study was conducted in the national referral hospital, which has highly trained healthcare professionals. As such, interpretation of the findings might be limited to facilities managing high-risk patients in Somaliland. Moreover, given that the country has a low rate of hospital deliveries (33%) and home births were not included in this analysis, the indicators of maternal health (e.g. the MMR and MNM ratio) are not representative at the population level.

In the present study, the SSA MNM criteria identified more MNM cases than the WHO MNM criteria. Hence, they are an appropriate tool for accurate figures, analyzing near-misses and identifying new preventive measures. Progress has been made in the provision of intrahospital evidence-based obstetric interventions;
however, there is still a need to improve the overall quality of care to reduce maternal morbidity and mortality. The health authorities need to consider redesigning the healthcare system to increase antenatal care uptake and facility-based deliveries at primary health-care centers with a functional referral system to higher-level care when needed. Evidence-based obstetric interventions provided by interprofessional teams are vital for reducing maternal mortality and morbidity, and the present study shows the need for continuous in-service training and a review of guidelines used at referral hospitals.

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CONFLICT OF INTEREST
The authors have no conflicts of interest.

AUTHOR CONTRIBUTIONS
All the authors, JE, JK, HL, FO, KE, and MK, participated in the conception and design of the present study. JE and JK were responsible for training the data collectors, supervising the data collection, the initial data analysis, and the writing of the manuscript under supervision. All authors contributed to the interpretation of the results, to the revision of the manuscript and approval of the final manuscript.

DATA AVAILABILITY STATEMENT
Research data are not shared.

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Paper II
Title: Facility-based Maternal Deaths: their Prevalence, Causes and Underlying Circumstances. 
A Mixed Method study from the National Referral Hospital of Somaliland

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Keywords: Maternal deaths, Maternal Near Miss, Mixed Method, Low-income country, Somaliland

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ABSTRACT

Objective: Somaliland has one of the highest rates of maternal deaths in the world. An estimated 732 women die for every 100,000 live births. This study aims to identify the prevalence of facility-based maternal deaths, the causes and their underlying circumstances by interviewing relatives and health care providers at the main referral hospital in Somaliland.

Method: A hospital-based mixed method study using a convergent design was conducted. The prospective cross-sectional design of the WHO Maternal Near Miss tool was combined with narrative interviews with 28 relatives and 28 health care providers in direct contact with maternal mortality. The quantitative data was analysed with descriptive statistics using SPSS and the qualitative part of the study was analysed with content analysis using NVivo.

Results: From a total of 6658 women who gave birth and were included into the study of which 28 women were maternal death. The highest direct cause of maternal death was severe obstetric haemorrhage (46.4%), followed by hypertensive disorders (25%) and severe sepsis (10.7%). An indirect obstetric cause of death was medical complications (17.9%). None of the mortalities were caused by severe anaemia. Twenty-five per cent of these cases were admitted to the ICU and 89% had referred themselves to the hospital for treatment. The qualitative data identifies two categories of missed opportunities that could have prevented these maternal mortalities: poor risk awareness in the community and inadequate interprofessional collaboration at the hospital.

Conclusion: The referral system needs to be strengthened by utilizing Traditional Birth Attendants as a community resource supporting the community facilities. The communication skills and interprofessional collaboration of the health care providers at the hospital needs to be addressed and a national maternal death surveillance system needs to be commenced.

Keywords: Maternal deaths, Maternal Near Miss, Mixed Methods, Low-income country, Somaliland

Abstract: 284 Words
INTRODUCTION

Maternal mortality remains one of the greatest challenges for low-income countries. More than 300,000 maternal deaths occur each year in sub-Saharan Africa each year due to severe maternal complications during pregnancy, birth and the six-week period directly after birth (1). Despite the progress made through programmes implemented by different actors such as government ministries, private organizations, and non-governmental organizations to reduce the Maternal Mortality Rate (MMR) and achieve the Sustainable Development Goal (SDG) of less than 70 deaths per 100,000 live births, the MMR in low-income countries remains persistently high (2). Identifying strategies to reduce avoidable maternal deaths in these settings is, therefore, an urgent global priority if the aspirations in Agenda 2030 are to be achieved (1). Research has suggested that maternal mortality causes high rates of depression among surviving family members, especially other children, and decreases the infants’ chances of survival. It also places enormous economic pressure on families and the surrounding culture and economy (3).

Global approaches for reducing maternal mortality have focused on encouraging skilled birth attendants to attend every birth and ensuring there is a good referral system in place for the transfer of complicated cases to hospitals where emergency obstetric care (EmOC) can be provided (4, 5). The MMR in Somaliland, however, is estimated at 732 deaths per 100,000 live births, making it a country with one of the worst MMRs in the world (4, 6). Most of these deaths are caused by direct obstetric complications such as hypertensive disorders, severe obstetric haemorrhage and severe systemic infections (7). International guidelines state that these complications should be managed within a health care system that includes access to a blood bank system, and the provision of lifesaving interventions such as caesarean sections and anticonvulsant and antibiotic drugs (1). Scientific evidence from the sub-Saharan region shows that many deaths are the result of women’s lack of trust in facility-based births and their preference for homebirths with traditional Birth attendants (TBAs), which in complicated cases can lead to a delay in preventive care and treatment (8).

In order to intervene and provide timely care and treatment of emergencies in pregnancy and childbirth and reduce maternal mortality in Somaliland, their causes and underlying circumstances at the main
referral hospital need to be uncovered. The only other study of maternal mortality in this region focuses on the Bossaso district Puntland and has a community focus (9). With this background, the aim of this study is to identify the prevalence of facility-based maternal deaths, the causes and their underlying circumstances by interviewing relatives and health care providers at the main referral hospital in Somaliland.

METHODS

Study design

This study adopts a mixed method approach using convergent design (10). A mixed method approach enables the statistical analyses of maternal mortality to be combined with the qualitative knowledge and experiences that can be gained from personal interviews. In this study, the quantitative and qualitative data will be integrated in the discussion section (11-13). The study was planned and conducted in accordance with the Declaration of Helsinki and its statement of the ethical principles for medical research involving human subjects (14). The study was approved by the Somaliland Ministry of Health Development (MOHD) and the Ethics Committee at the University of Hargeisa (UOH) Dr: CS/41105/18.

Setting

The study was conducted at the Hargeisa Group Hospital (HGH), the largest governmental referral hospital in Somaliland. The hospital employs doctors, nurses, midwives, anaesthetists, and run a clinical laboratory. The HGH has one labour ward, two gynaecology wards, an outpatient’s department, Intensive Care Unit (ICU) and operating rooms with blood transfusion services.

Data collection and participants

The data was collected at HGH between April 2019 to March 2020 as part of a research programme investigating Maternal Near Misses using a WHO tool, presented elsewhere (15), but adapted for this setting. The current study focuses exclusively on the maternal deaths identified during that period of
data collection. Women who had experienced a ‘near miss’ while giving birth were identified on the wards and their medical records, including admission information, past obstetric history, care received during hospital stay and their follow-up plan, was reviewed. Independent variables also noted were age, gestation, parity, maternal age, educational level, area of residence, referral, mode of delivery, birth outcome, and underlying cause of death and diagnosis. With this information, the health care providers involved with the care of the woman were approached together with the midwife in charge. A discussion about the care provided for the woman from admission until death was held with the health care provider and documented by JE. With the midwife in charge, the family of the woman was also approached and, after obtaining consent, a discussion was held with the family member who was present during the woman’s admission and care in hospital. With the questions intended for family members the focus was on the situation at home before coming to the hospital, what happened that required transfer to hospital, their perception of the care received in hospital and the issues they have experienced throughout this experience. During the study period there were a total of 29 maternal deaths. Maternal mortality in this case has been defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not including deaths from accidental or incidental causes (15).

In parallel with the quantitative data collection, narratives were collected from relatives and health care providers at HGH that related to the maternal death cases. The first and second authors (JE, AE) made daily visits to the labour ward, Gynaecology I and II, the Intensive Care Unit (ICU), and the operating theatre. After identifying each maternal death, the woman’s relatives and the health care providers who cared for her were individually approached and asked for an interview. After a sensitive and informative introduction, oral consent was obtained from the relatives and health care providers for an interview. For the relatives and health care providers it was strongly emphasized that they could withdraw at any time from participation in the study. Extra time and personal counselling were offered in case the interview led to an emotional state of grief that needed to be handled by a professional midwife. The staff and family members talked freely about the events leading up to the hospital
admission, the transport of their loved one to the hospital and the care she received while in hospital. as the interviewees generally stated that it was a relief to express themselves about this event and to be able to talk about the events that led to their female relatives’ death. None of the relatives or health care providers involved in this study asked for a separate counselling session with a midwife (14). In total, 28 relatives and 28 health care providers were interviewed (see Table 1).

ANALYSIS

The quantitative data was generated using SPSS descriptive statistics by computing frequencies, percentage and ratio. It was then analysed to determine the maternal death ratio using a 95% Confidence Interval CI and the mortality index ratio. The interview narratives (n=56) were transcribed and analysed inductively using qualitative content analysis according to Elo and Kyngas (2014), with NVivo 12 used for coding. In the organization phase, the transcripts were read and re-read to get a sense of the complete data set. The interview data from the relatives and the health care providers was combined into one file per maternal death case. Through joint discussions within the research team, the first author analysed the original data. Text parts with the same meaning were allocated open codes, then the codes were organized into their similarities and differences. This has led to identifying subcategories, categories and one overarching category.

RESULTS

This section presents the results of the qualitative and quantitative analysis separately. The total number of women admitted to hospital to give birth during the study period was 6658, with 6055 live births and 29 maternal deaths. One of these deaths was excluded from this study because was the result of a road traffic accident and so the total of 28 maternal deaths was used for the analysis here. The maternal death ratio was 462 per 100,000 live births (95% Confidence Interval CI, 310- 670) and the mortality index ratio was 7.6% (95% CI, 5.1- 10.7). Furthermore, 68% of the maternal deaths were between 20-34 years old, 75% did not have access to any formal education, and 82% of these women had undergone the pharaonic type of female genital mutilation (FGM). Twenty-one per cent were 0
para, 43% para 1-4, 36% had more than 4 children and the majority (89%) self-referred from home directly to the referral hospital (see Table 2).

The most common direct cause of these maternal deaths was severe obstetric haemorrhage (46.4%), followed by severe hypertensive disorders (25%) and severe sepsis (10.7%). Of the indirect obstetric causes of these maternal deaths, 17.9% were caused by medical complications. None of them were the result of severe anaemia (see Table 3).

Table 4 shows the use of critical interventions provided to maternal mortality. With regards to blood transfusions, 21% of the women received 1 unit of blood, the same 21% received 2-3 units of blood, only 7% received 4 and more units of blood transfusion. Twenty-five per cent of the women who entered hospital during the study period were later admitted to the ICU. Of the organ dysfunctions which the women exhibited, the most common was cardiovascular dysfunction (35%), followed by neurological dysfunction (32%), renal and respiratory dysfunction (both 25%), hepatic dysfunction (11%) and coagulation dysfunction (4%) (see Table 4).

Qualitative findings

The overarching category derived from the qualitative analysis was: A series of missed opportunities to provide lifesaving treatment and prevent maternal mortalities. This broad theme encompassed two generic categories: Poor risk awareness at the community level and Inadequate inter-professional collaboration at the hospital (see Table 5).

Poor risk awareness at community level

This generic category highlights the evidence gathered from the qualitative interviews which pointed to the causes of the maternal deaths in this study as the result of the missed opportunities to help these women in time. These missed opportunities can be further categorized as circumstances that took place at home and the challenges facing the timely referral of women from community to hospital.
Circumstances at home

The relatives in this study made it clear that they wished they would have come to hospital much sooner because the last thing they intended was to put the mother or child at risk at any point. They explained that they were excited and full of hope for the mother and the coming baby. However, the relatives said that they were unaware of the severity of the situation for their female relative, and regretted their lack of knowledge and insight about the health risks for women when giving birth. Relatives stated the belief that it is normal for women to bleed more postnatally the more babies they have had. This accounts for the general attitude that it was safe to keep a woman at home, even if she started to haemorrhage postnatally or infection postnatally.

Many relatives and healthcare providers agreed that misconceptions about the severity of a women’s postpartum health was also caused by misconceptions about the signs and symptoms of emergencies during pregnancy, birth and the postnatal period. Family members explained that had understood their female relatives’ problems as a result of the “evil eye” or evil spirits, not of a serious medical condition. Even though their female relative had sometimes been unconscious for several hours, the family members had focused on finding a spiritual healer or obtaining a herbal remedy instead of seeking to transfer her immediately to the nearest health facility. One relative said:

My sister [the woman giving birth] was told and believed that she suffered from evil spirits from jealous people, causing her to have health issues during this pregnancy. (Sister, Case 26).

When asked about the events at home that had led to the maternal death, many of the relatives mentioned a Traditional Birth Attendant (TBAs). They explained that TBAs are trusted and respected in the community and that their advice is followed. However, some relatives said that the TBA had left them soon after the birth and it was at that point that complications developed. Other stated that TBAs kept women at home, despite their signs of distress, and sought to apply self-made remedies and herbs instead of referring them to the health facilities.
We called the TBA after the delivery, and she gave the patient a drink to stop the bleeding which worked for a little but then the bleeding increased again. After three days of more home remedies, the patient’s sister took her to the hospital and paid for the taxi. (Mother of woman, Case 9).

The health care providers painted a similar picture. Many of the maternal deaths they witnessed during this period started out as a home delivery with a trusted TBA, which, because of a lack of knowledge and understanding of the signs and symptoms of birth abnormality, delayed referring the woman to hospital by giving her remedies which they believed would stop the bleeding. Their efforts to treat women’s episiotomies caused them to arrive at the referral hospital weak, deteriorated, and unprepared for the severity of their situation. One health care provider said:

Patient was admitted after normal vaginal delivery with the TBA. Baby was alive at birth, but woman developed postpartum bleeding at home and the TBA advised patient to rest and drink lots of warm soup to get her strength up. (Midwife, Case 3).

Challenges to timely referral from the community to the referral hospital

Of the relatives interviewed in this study, many spoke about the financial implications of taking their female relative to hospital. The costs associated with treatment had to be considered before they could decide to go to the health facility. They knew that if they spoke to the community healthcare services that they would have referred them to hospital, but that this would have cost them money that was difficult to come by. One relative explained:

Our biggest issue is money for transport, who is going with her and the medicines and also, we were embarrassed to ask our family and so we tried to avoid that as long as possible but obviously we wanted what was best for my sister. (Sister, Case 11)
When asked about the events leading to the maternal death family members said that they had asked for support from the community health services before coming to the hospital. They said that these local services advised them to go back home after a few tests and with some medications. This reduced the confidence family members had in the knowledge and abilities of local health providers and raised their concerns about the costs of purchasing medicine. They suggested that this might have caused a further deterioration of the obstetric situation and thus contributed to the greater likelihood of maternal mortality. One relative stated:

*My daughter never attended antenatal care because she believed that if you go to antenatal care or you don’t it is all the same because the midwives do not tell you anything and they just try to sell you medication.* (Mother of the woman, Case 12).

The health care providers in this study were aware of this attitude. They said that it was a shame that the families who did seek care in the community when their female relative started to experience difficulties were met with disrespect and indifference, and were sent home with wrong information and inadequate care. One health care provider said:

*During admission the patient explained that she attended antenatal care at 34 weeks pregnant because her legs were swollen, and she had headaches. The maternal and child health centre (MCH) midwife told her that she had gastric problems and gave the patient gastric tablets to buy.* (Midwife, Case 13).

**Inadequate interprofessional collaboration and unsatisfactory communication with relatives at the referral hospital level**

This category shows that maternal deaths could also result from the inadequate teamwork that exists between health care providers and extends outwards to include communication with the patient’s relatives and family members. This shortfall in care provision has, of course, an enormous impact on the quality of care and slows wider efforts to reduce maternal mortality.
Ineffective communication for management of life-threatening conditions

The family members who were interviewed in this study believed that there was gap in the communication between them and the health care providers. They believed that they did not receive adequate information about the medical situation of their female relative. They did not understand the medical terminology that the health care providers used. The family members were thankful for the skills and knowledge that the medical staff had, and they expressed their understanding of the situation the staff found themselves in. However, they were very disappointed with the disrespectful way some health care providers had responded to their questions about procedures.

One participant explained:

*These doctors and midwives do not talk to us in a respectful way.... this is important to us as a family because we love our daughter, and we want to make sure she will be fine.* (Mother-in-Law, case 23).

The relatives explained that they felt there was a lack of communication between professionals at the hospital. They felt the professionals seemed confused and said that they had received mixed messages from different staff members. This made it seem that staff were not communicating the same messages and advice to them. They wished that staff had been able to communicate better with one another, both within and between different departments. Professionals had expressed different courses of treatment and given conflicting advice regarding their female relative’s care. This had caused confusion and an increased lack of trust in the medical diagnosis among the family members who, in Somali culture, are all involved in agreeing the care decisions taken about their female relative. This uncertainty only promoted greater discussion among family members about treatment options and further lengthened the collective decision-making time. Thus delaying adequate treatment and increasing the likelihood of a maternal death.

Health care providers complained that one of the most important ways for healthcare professionals to communicate is through documentation. When discussing maternal mortality cases with health care providers it was very difficult to trace the series of event and the findings of investigations that underpinned the medical plan due to lack of documentation. A health care provider explained:
When we are busy and patients are critical, we do not have time for writing and our patients tend to be very sick and critical, so we have all the information in our head, but we do not write it down. (Midwife, case 19).

Also, referrals documented in the medical notes were not followed up and not prioritized. One healthcare provider said:

‘The doctors documented the patient to be transferred to Operation Theatres as they suspected a uterine rupture or cervical laceration, but this was not done and two hours later the patient passed away (Midwife, Case 14).

The health care providers described a scenario where a woman could spend many days in labour at a different hospital before eventually an obstructed labour was diagnosed and it was agreed with her relatives to move her to the referral hospital. However, when she arrived, often with no record of her previous care, her family would claim that she had been in labour for only a few hours. There was no way that the health care professionals could verify anything with certainty.

When the woman came in, we managed to stop the bleeding. She was in labour for several days at home, and we identified that there was an obstructed labour using the partograph. Later we found that a private hospital had already advised a Caesarean section four days ago. (Midwife, Case 13).

Institutional challenges to manage life-threatening conditions

Both health care professionals and relatives believed that there were institutional challenges that hindered the management of obstetric emergencies at the hospital. These led to missed opportunities, to maternal deaths that, according to the participants, could have been prevented. The health care professionals said there was in the hospital no clear set of obstetric emergency guidelines which should be used to support the management of obstetric emergencies. Doctors and midwives mentioned that in the hospital there was no bell to call everyone to the emergency, no trolley standing ready with
emergency resuscitation equipment on the wards and the absence of any specialized team with experience of working to save maternal lives. Health care professionals explained:

*The midwives supported the delivery, which was very quickly...They transferred the woman to the gynaecology ward for resuscitation, but the woman died. Resuscitation should be possible on all wards and health care providers need group training on emergency preparedness.*  
(Midwife, Case 20)

The health care professionals stated that although the families were aware that their female relative was now in an emergency situation, it was difficult for them to really grasp this fact. When they did, the presence of medical staff gave them the false hope that the situation was now under control and their relative could be saved. This false sense of safety and security is one of the main factors behind the missed opportunities to provide timely emergency care. The health care also noted there were other practices that they felt could have improved women’s care provision. They explained that there was an excessive amount of time wasted on sending patients (with their family members) have blood taken and wait for the test results. One health care provider explained:

*We tend to send ill patients to take bloods from the investigations department and women complain about this a lot.*  
(Midwife, case 19).

In addition, the health care professionals believed that women presenting with an obstetric emergency, especially those which looked life-threatening, could have benefitted from more specialized care in the ICU. This is because most midwives do not have ICU experience and aren’t trained to work in ICU.

Other medical personnel suggested that deaths could be prevented if the maternity department had a small ICU. This was because many births with complications can become critical within a very short period of time. One health care professional said:

*I think the maternity department should have their own ICU to improve the care or there should be midwives working with us in the ICU.*  
(ICU Nurse, Case 20).

Another vital issue affecting the sense of emergency, according to the health care professionals, was the requirement to obtain consent for any lifesaving treatment. For a variety of reasons, obtaining
consent for treatment can take anything from a few hours to up to several days. This was frustrating for health care professionals. The fact that the hospital requires consent often gives relatives the (false) sense that there is no real emergency that requires immediate decision making. Obtaining consent could be delayed, not just because of the need to consult with relatives but also because of the women themselves, who often refused medical intervention because they genuinely believed that it was not good for their future health. Many women believed medical intervention would be painful, lead to possible infection and could limit their ability to have children in the future. One health care professional recalled:

This patient was severely eclamptic, with oedema of the legs, swelling and hallucinations many days before admission. She had antepartum haemorrhage and hepatic problems identified after admission. The patient and the family were advised to authorize a caesarean section, but the patient refused for five days before death (Doctor, case 15).

Husbands and fathers of a patient are the main parties expected to sign a consent form. They therefore experience huge pressure from within their community not to take this responsibility too lightly not to authorise potentially expensive treatment too quickly, treatment that the whole community will have to pay. In addition, there is the impression that the more people whose advice is taken into consideration, the more reliable and responsible the husband or father will be viewed after the emergency regardless of the outcome for mother and baby. This is because the community sees his actions as measured and not taken alone. One relative explained:

They said that if he [the husband] signs too quickly, he will be regarded as irresponsible, it will seem like he does not love the woman and baby at all. Therefore, he should consult with as many people as possible to ensure a balanced decision that will give him and the relatives peace. (Sister, case 17).
DISCUSSION

This study has identified a series of instances where the opportunity to provide lifesaving treatment for women who had developed serious complications while giving birth were missed, resulting in maternal mortalities at the main referral hospital in Somaliland. The main results from this study show that there was poor risk awareness at the community level which led to a delay in seeking care and poor intra-hospital health care which included a lack of interprofessional collaboration and a failure to communicate with and involve patient family members.

Poor risk awareness at the community level can be understood as a lack of knowledge about the warning signs in pregnancy and labour and a failure to recognize which signs are potentially life threatening. These misconceptions meant that TBAs and family members, anxious to avoid expensive and unnecessary medical treatment, allowed women to stay at home when they should have been transferring the woman to a health facility so that she could receive the necessary treatment in a more timely fashion and thus avoid maternal mortality. This situation is consistent with the Paul et al study in Odisha (16). The latest demographic survey data to emerge from Somaliland shows that only 47% of women who give birth receive any form of antepartum care, suggesting there is little by way of trained health care input which might increase understanding of the danger signs a woman might display after giving birth. Data collected for this study shows that XX% of the women who died were under the age of YY and 74% had no formal primary education, contributing still more evidence to the argument advanced in other studies that women’s vulnerability to maternal death decreases in line with their age, education and parity. The older a woman is and the more education and children she has, the more she and her partner can control her birth choices and pregnancy outcomes (17, 18).

Referral of women to the regional hospital from the community health centres was low. The fact that 89% of women were self-referrals indicates a weak referral system and the need for improving community maternal and child health centres (19). A recent study from the same area showed that women preferred to rely on TBAs because they were trusted in the community (8). While this might be one way to prevent maternal deaths, TBAs need to be better trained so they can recognize when women need to be directed to health facilities instead of using home remedies to keep seriously sick
women at home longer than is safe for them. The data from this study shows that only 1% of the referrals to hospital in this study came from TBAs. According to the family members interviewed here, they had taken their female relative to their local health centre when she started to present with problems, but they were sent back home. These experiences led them to display a lack of trust in the ability of health care providers to help. These experiences point to the critical importance of providing local health centre staff adequate training in respectful maternity care and risk assessment so that women and their families are not discouraged from visiting health facilities.

Another measure for reducing maternal deaths is to improve the referral system itself. This will ensure that women get the care they need in the community much faster and that only the most critical cases come to the main referral hospital which will reduce the burden on the hospital system and staff. This suggests that efforts should be directed towards improving the quality of care at the community health facilities because they are closer to the community people should feel welcomed and supported. Local health facilities should be able to provide high quality care that can offer trained midwives able to manage antenatal and postnatal care in women’s homes with the support of community workers. The new global target for 2025 to accelerate ending preventable newborn deaths and stillbirths by 2030 target one focuses on at least four antenatal visits and up to three postnatal visits within 2 days of delivery in order to reduce maternal mortality, a recommendation which our conclusions support. In addition, 32% of the women in this study died before they were able to give birth, which represents another missed opportunity to save these mothers and their babies. The deaths examined in this study could have been prevented if the institutional challenges identified in the qualitative data could have been addressed, especially the delays around consent shown in this study, and in others which have examined the influential cultural practices which surround birth in Somaliland. Even though the highest cause of maternal mortality was obstetric haemorrhage, only 7% had a blood transfusion of more than 4 units which indicates a sub-optimal level of care. Haemorrhaging is often caused by a ruptured uterus as the result of prolonged labour. In Somaliland there is the suggestion that this is the result of a cultural resistance to life saving treatment, in the form of a caesarean section, although this conclusion requires further research. Another factor in
the reduction of maternal mortality is the hospital treatment women with critical maternal complications receive. In this study, only 25% of women who presented to hospital and have developed serious complications leading to maternal mortalities were referred to the ICU, thus suggesting sub optimal care. (26) In addition, collaboration between obstetricians and the other hospital maternity staff and the ICU staff could be improved. This relationship has elsewhere been seen as a vital component for the reduction of maternal mortality (27).

The health care that the women received in this study suffered from a lack of good communication. There was a lack of communication with family members and poor follow-up from diagnosis to treatment. Interprofessional working and communication between staff of the same and different wards was identified as poor in this study. An observational study conducted in South Africa has shown there was a 29.3% reduction in maternal deaths after the implementation of a skills-drills educational programme in maternity wards called Essential Steps in Managing Obstetric Emergencies (ESMOE). Over a period of two and half years 80% of the midwives in 12 districts were trained at EmOC centres and hospitals in confidence-building and supportive team-work in the work environment, skills enhancement which is missing at present in Somaliland (21, 28). Institutional barriers to new approaches can be tackled through case discussions within the team and, as such, open people up to the possibility that maternal deaths are preventable and that they have the skills to prevent them. It is a shame that fears of blame and a lack of trust in confidentiality, amongst other reasons, means that this important practice is not more widely used in low resource countries. A review of maternal deaths that take place within the community and a health facility should be combined to ensure the capture of the total number of maternal deaths in Somaliland. This has never yet been attempted, but the Somaliland Ministry of Health and Development (MOHD) has made it a priority to reduce preventable maternal deaths and improve the quality of maternal health care (29).

**Strengths and limitations**

This is the first of study of its kind in the Somali region, and as such provides vital insights into the number of maternal deaths, the causes of those deaths and the underlying circumstances which have accompanied them. The data collection process carried out for this study has ensured the existence of
reliable statistics, particularly in a context where documentation and storage of medical notes is underdeveloped. Interviewing both family members and health care professionals has provided insights regarding the causes of maternal mortality that have gone beyond the numbers. Participants in this study were asked about the series of events that led to the mother’s death and its underlying circumstances regardless of her age or parity. This ensures that the data is transferable to other studies and has not been influenced by age, parity, knowledge, or financial status. This study can offer only limited perspectives on maternal mortality in the community because it was hospital-based study.

CONCLUSION AND CLINICAL IMPLICATIONS

Poor risk awareness in the community and inadequate interprofessional collaboration at the hospital must be addressed if fewer women are going to die from giving birth in Somaliland. The referral system needs to be improved and TBAs and other community health workers need to be better trained so they can act as more effective links between women and the hospital services. The ministry of health needs to consider ways it can help women and their families to access the health services more readily and more quickly. It could, for example, provide women with hospital transport vouchers and thus remove financial cost as an obstacle to seeking medical treatment. At the community and hospital level in-service and pre-service education for midwives, nurses and doctors can be a way to promote improved communication and teamwork amongst hospital professionals. Using a simulation lab for training in obstetric emergencies is another way to promote teamwork, together with community sensitization. In addition, we recommend the commencement of a national maternal death surveillance system starting in medical facilities and then extending out to the country as a whole. Having a better grasp of the total number of maternal deaths can only lead to still greater initiatives that, taken together, will improve the quality of care for pregnant women and reduce the likelihood of maternal mortality and morbidity.
Ethical Approval

Ethical clearance to conduct this study was obtained from the Somaliland Ministry of Health and Development. The research ethics committee at the University of Hargeisa also approved this study. Approval number Dr: CS/41105/18

Author contribution

All of the authors made substantial contributions to the early design stages of this study, the acquisition, analysis, and interpretation of the data, and the writing and revising of the manuscript.

Declaration of competing interests

The authors have no conflicts of interest.

Acknowledgement and Disclosures

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REFERENCES


Paper III
A lack of reproductive agency in facility-based births makes home births a first choice regardless of potential risks and medical needs—a qualitative study among multiparous women in Somaliland

Jama Ali Egal, Amina Essa, Rahma Yusuf, Fatumo Osman, Derie Ereg, Marie Klingberg-Allvin and Kerstin Erlandsson

ABSTRACT

Background: Around 20% of births in Somaliland take place at health facilities staffed by trained healthcare professionals; 80% take place at home assisted by Traditional Birth Attendants (TBAs) with no formal training. There has been no research into women's choice of place of birth.

Objective: In this study, we explore multipara women’s needs and preferences when choosing the place of birth.

Method: An explorative qualitative study using individual in-depth interviews analysed inductively using content analysis. The interviews were conducted in Somaliland with 25 multiparous women who had experience of giving birth both at home and at a health facility within the past three years.

Results: The results provide a description of how, for women in Somaliland, a lack of reproductive agency in facility-based births makes home births a first choice regardless of potential risks and medical need. The women in this study desired intentionality in their role as mothers and sought some measure of control over the environment where they planned to give birth, depending on the circumstances of that particular birth. The results describe what quality care means for multipara women in Somaliland and how women choose birthplace based on previous experiences of care. The expectation of respectful care was a vital part for women when choosing a place of birth.

Conclusion: To meet women’s needs and preferences in Somaliland, further investments are needed to strengthen the midwifery profession and to define and test a context specific midwife-led continuity of care model to be scaled up. A dialogue to create new roles and responsibilities for the TBAs who attend most home births is further needed to link them to the formal healthcare system and assure timely healthcare seeking during pregnancy and birth.

Background

It is well established that it can be difficult for women in fragile contexts to access adequate maternal healthcare. The idea that maternal mortality could be lowered if women had better access to maternal healthcare services is one that has not been properly examined [1,2]. The WHO has estimated that 830 women die every day globally because of preventable obstetric complications. Ninety-nine per cent of these deaths occur in low- and middle-income countries of which more than half take place in sub-Saharan Africa [3]. To achieve a reduction in maternal mortality, women need to be able to access health facilities run by trained healthcare professionals that deliver evidence-based practice and uphold quality and respect in every aspect of the care provision [4].

A healthcare professional in this article is defined as an accredited and skilled birth attendant with the potential to make a positive intervention if an emergency takes place in the birth process. These Skilled Birth Attendants (SBAs), the collective term for midwives, nurses or physicians who have received formal education and training, have a tested proficiency in the skills needed to manage both normal and complicated pregnancies, births and follow-ups through the identification, management and timely referral of women and newborns for specialist treatment [5–7].

Home-based birth is common around the world [8–12]. In low- and middle-income countries, the home birth rate is often more than 50% whilst in high-income countries, the home birth rate is no more than 1–3%. In low- and middle-income countries, home births are often assisted by Traditional Birth Attendants (TBAs), local women who have developed an expertise in assisting with births but have no formal medical training. While there is
growing interest in the role of the non-medical doula in some Western circles, in most high-income countries, women who choose a home birth are supported by trained midwives [13–15].

The Lancet’s series of articles on midwifery care (2014) focused on childbearing women’s rights and needs and the evidence-based intervention needed to secure safe births. The conclusions were presented in a framework for quality maternal and newborn care (QMNCE) [16] and as having the potential to avert 83% of all maternal deaths globally [17]. Further evidence shows that women who receive models of midwife-led continuity of care are less likely to experience intervention and more likely to be satisfied with their care compared with women who receive other models of care [18]. Around 20% of the births in Somaliland take place at health facilities staffed by skilled healthcare professionals; 80% take place at home, assisted by TBAs with no formal training. In Somaliland, midwives based in health facilities do not carry out antenatal or postnatal visits. Thus, there is no link between the community and the maternity services [19]. At present, home births are attended by untrained TBAs. Their involvement can delay the referral of complicated cases and thus, by extension, can contribute to high maternal morbidity. TBAs act in contravention of the recommendations of the Somaliland health authorities and UN agencies [19,20]. The Somaliland government has invested in educating midwives [19,21]. Despite these efforts the mortality rate is still high, with 396 maternal deaths per 100,000 live births [3,21]. This figure is largely attributable to the shortage of midwives, equipment, and transport infrastructure within the maternity services when complications occur [15,21]. Innovative approaches are required to save the lives of women and newborns, educate healthcare professionals, particularly midwives, and strengthen their capacity [22,23]. The first step in addressing this challenge is to understand women’s choice of place of birth in a subsequent pregnancy. There is no previous research on women’s choices in relation to place of birth in Somaliland.

In this study, we explore the needs and preferences of multipara women in Somaliland when choosing place of birth.

Methodology

Design

This study is an exploratory qualitative study using individual in-depth interviews of multipara women (n = 25) that were then analysed inductively using qualitative content analysis according to Elo et al. [24]. Ethical approval was obtained from the Somaliland MOHD and the research ethics committee at the University of Hargeisa. Dr: CS/41105/18.

Participants

In the preparation phase [24], eligible multipara women from Ahmed Dhagah community with experience of giving birth were identified as meeting the inclusion criteria for participation in this study. The criteria for inclusion was a multiparous woman who had experienced giving birth at home and at a health facility within the last three years. Twenty-six women voluntarily agreed to take part in the study. One woman with experience of home birth was excluded when she refused to be audio recorded. The interviews were conducted with 25 women between January 2015 and September 2019. For the socio-demographic details of the participants, see Table 1.

At the time, the participants lived in the Ahmed Dhagah district of Hargeisa, the capital city of Somaliland. The district contains eight small villages with an estimated population of 23,000 inhabitants. Healthcare is managed from one large hospital and four health facilities where, at the latter, the care is free of charge. Many of the women in this district were originally Internally Displaced People who had moved to the area as a result of the civil war in the 1990s. Many of them have a low socio-economic status and are considered vulnerable [19].

Data collection

Using a purposeful sampling approach [25], women who had experienced both types of birth setting and were able to reflect on their previous experiences, were approached by midwives employed at Ahmed Dhagah Mother and Child Health Clinic (MCH) and Hargeisa Group Hospital. The healthcare professionals asked the women to participate in the study when leaving the health facility after birth. In addition, local TBAs working in the area identified and

| Table 1. Participants’ sociodemographic information. |
|---------------------------------|------|
| Female participants N = 25     |      |
| Age 22–38 (M = 31)             |      |
| Marital status                 |      |
| Married                        | 24   |
| Separated                      | 1    |
| Educational level              |      |
| Illiterate                     | 12   |
| Primary school                 | 2    |
| Intermediate                   | 4    |
| Lower secondary                | 3    |
| Quran school                   | 4    |
| Occupation                     |      |
| Housewife                      | 23   |
| Employed                       | 2    |

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approached women who they felt met the study criteria. These women were invited to take part in the study and were provided with verbal and written information about it. Participation was voluntary and the women were informed they could withdraw from the study without explanation. After giving their informed consent, participants signed a consent form with a thumbprint signature. An appointment for an interview to be held in the woman’s home was then arranged.

The interviews were conducted by the first three authors using a semi-structured interview guide. The questions focused on the aim of the study, which was to collect data on women’s choice of place of birth and to explore their experiences of these places. The questions were developed in English and then translated into Somali. They were then pilot tested on two of the participants which resulted in some minor clarifications to the guide before being used for the rest of the study. The questions included: Please tell me about your pregnancy and birth experiences. Please tell me why you decided on a home birth. How was your experience of antenatal care? Why did you decide on a facility birth? How was your experience of your home birth/facility-based birth? Who delivered your baby? The questions enabled the interviewees to speak freely about their experiences and the prompt to ‘please tell me more’ was used to encourage the informant to continue to tell their stories. The interviews were held in Somali, took about 45–60 minutes, were audio recorded and transcribed verbatim into Somali and then translated into English by the first two authors and double-checked by local University of Hargeisa staff.

Analysis

The transcribed interviews (n = 25) were analysed inductively using qualitative content analysis [24]. In the organization phase, the transcripts were read and re-read to get a sense of the data as a whole. At this stage, two content areas were identified: Care experiences in facility-based birth and TBA supported home birth. Through a series of collaborative discussions within the team, the authors analyzed the original 123 pages of data. Text parts, sentences, or small paragraphs with the same meaning were labelled with a code and grouped together, based on similarities and differences in the texts, initially, at the hierarchical level closest to the original content, into sub-categories. These sub-categories were then grouped into more generic categories at a higher level of abstraction. What emerged from this process, the overarching main category, has been described in one sentence as: A lack of reproductive agency in facility-based births makes home births a first choice regardless of potential risks and medical needs. Examples of this analytical process are provided in Table 2. The outcome of the analysis was based on the contrast between women’s experience of facility-based births facilitated by healthcare professionals and home births facilitated by TBAs [24].

Results

The main category

The main category that emerged from the findings was that a lack of reproductive agency in facility-based births makes home births a first choice regardless of potential risks and medical needs. Women wish to exercise intentionality in their roles as wife and mother by choosing the environment when giving birth which best suits their needs and preferences as illustrated below. The organization of the results is presented in Table 3. A detailed description of the results is given under the headings and subheadings of the content areas and the generic categories.

Facility-based birth and care

Searching for safety

Needing specific medical competence. The women who had had a facility-based birth had chosen this process because they knew that healthcare

Table 2. Example of the analytical process.

<table>
<thead>
<tr>
<th>Content areas</th>
<th>Text parts, sentences, or small paragraphs</th>
<th>Codes</th>
<th>Sub-categories</th>
<th>Generic categories</th>
<th>Main category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility-based birth and care</td>
<td>‘The young healthcare professional spoke to me in bad words.’ (Case 4)</td>
<td>Disrespectful care</td>
<td>Experiencing verbal abuse</td>
<td>Being met with disrespect</td>
<td>A lack of reproductive agency in facility-based births makes home births a first choice regardless of potential risks and medical needs</td>
</tr>
<tr>
<td>TBA supported home-delivery</td>
<td>‘Xalimo [her TBA] was very caring for me and my children. She checked on me regularly and encouraged me to listen to my body and to let her know how I feel whenever I needed something.’ (Case 1)</td>
<td>TBA referring complications to health facilities</td>
<td>Being a constant presence</td>
<td>Preferring a trusting environment</td>
<td></td>
</tr>
</tbody>
</table>
professionals were competent and skilled at obstetric emergencies. The women in this study were aware of the local maternity services available to them and appreciated the difference in function, competency, and capability between a healthcare professional at a health facility and a TBA. A facility-based birth, however, was only ever a second choice, selected when a TBA was not easily accessible, busy, or away when the woman went into labor:

I delivered in the health facility. I started labor pains one day when I was alone, so I tried to seek a TBA as the first choice for a home birth, but she was not present at that time, so as a second choice I saw a taxi driver that I knew, and I went to the health facility to give birth and, soon after I arrived at the health facility, I gave birth. All my family came to the health facility later. (Case 5)

Several women described how their experiences of care at a health facility had led them to decide to have their subsequent birth at home rather than at a facility. Choosing a facility-based birth was based on the desire to have an experienced midwife present while giving birth. Experiences of care at a health facility, however, prompted women decision to intentionally choose a home birth as their subsequent place of birth:

I attended antenatal care, and they told me that I am normal and that my blood is fine . . . So, I thought if the baby is in a normal position, I could have the baby at home. That was why I decided to give birth at home. (Case 18)

However, even women who had had previous high-risk pregnancies that suggested they should be returnees to facility-based care, were still intentionally planning for a home birth, despite the evidence from their assessments and advice from healthcare professionals. Their strategy was that if they experienced abnormalities or emergencies at a home birth, they would then decide to utilize the maternity services at the health facility. One participant said: ‘The health facility is better when you face complications. There are trained healthcare professionals who manage your condition. There is care available that you cannot get at home.’ (Case 5)

Even though the women knew they might encounter a rushed environment, a lack of privacy, and possibly disrespectful and abusive behavior in a birthing process potentially fraught with medical interventions, they knew that a health facility-based birth was the safest option for them. One woman explained her experience of a facility-based birth: ‘I did not have any health problems, but still, I went to the health facility to give birth, but the healthcare professional slapped me.’ (Case 3)

### Table 3. Content areas, categories and sub-categories, and overarching main category of the results.

<table>
<thead>
<tr>
<th>Content areas</th>
<th>Generic categories &amp; sub-categories</th>
<th>Main category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility-based birth and care</td>
<td>Searching for safety</td>
<td>A lack of reproductive agency in facility-based births makes home births a first choice regardless of potential risks and medical needs</td>
</tr>
<tr>
<td></td>
<td>- Needing specific medical competence</td>
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<tr>
<td></td>
<td>- Using health education and examination results for guidance</td>
<td></td>
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<tr>
<td></td>
<td>Being met with disrespect</td>
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<tr>
<td></td>
<td>- Experiencing verbal abuse</td>
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<tr>
<td></td>
<td>- Having it told, not explained</td>
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<tr>
<td>TBA supported home birth</td>
<td>Preferring a trusting environment</td>
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<td></td>
<td>- Being a constant presence</td>
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<tr>
<td></td>
<td>- Sharing values and cultural understanding</td>
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<tr>
<td></td>
<td>- Relying on TBAs to make referrals if needed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feeling empowered and valued</td>
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<tr>
<td></td>
<td>- Being encouraged to take responsibility</td>
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</tr>
<tr>
<td></td>
<td>- Appreciating the TBA’s ‘background’ role</td>
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</table>

**Using health education and examination results for guidance.** Most of the women in this study had some form of antenatal care at a health facility, as part of the general measures in place in Somaliland designed to protect women’s health during pregnancy. The women described how most of the healthcare professionals working at the health facilities provided them with general health messages, explained some dietary requirements, and encouraged them to take medicine that would protect their health. The antenatal health-care professionals provided them with assessments and a screening service. Based on the results of these tests, although it was not verbalized at the appointment with the health care professional, the women considered their specific circumstances and planned their place of birth:

I was in a very serious condition when I gave birth in the health facility, and the young healthcare professional spoke to me in bad words. The elderly woman that welcomed me and hoped to deliver me already her shift finished. That elderly woman made prayer and asked Allah to facilitate my birth. I was very happy to get support from that woman, but the younger healthcare professional, she assisted my birth, and I hated that. (Case 4)

**Being met with disrespect**

**Experiencing verbal abuse.** One woman who had experienced a complicated birth in a health facility said she felt medically safe although she was verbally abused:

I attended antenatal care, and they told me that I am normal and that my blood is fine . . . So, I thought if the baby is in a normal position, I could have the baby at home. That was why I decided to give birth at home. (Case 18)
**Having it told, not explained.** The women expressed disappointment with the quality of the health education, information, and advice they received from the healthcare professionals at the health facility. For example, pre-eclampsia was a prominent condition which the women in this study knew was one of the leading causes of maternal deaths. They found it careless of the healthcare professionals to simply diagnose high blood pressure and then fail to advise and explain the effects pre-eclampsia could have on labor if left untreated:

The healthcare professionals did not give me any health education or advice on how to manage my high blood pressure, but they measured my blood pressure and prescribed medication, and I bought my medication and used it regularly. (Case 3)

**TBA supported home-delivery**

**Preferring a trusting environment**

**Being a constant presence.** According to the interviewees, TBAs supported women emotionally throughout their labor. The women valued this support a great deal and it motivated them to choose a home birth. One of the study participants recalled:

My TBA was always my supporter and although I delivered at home, she has always been available to me every minute of the birth she was with me. She never left my side and always asked me what I needed. She read something and stayed by my bedside all night. I felt her efforts to care for me the best she could. (Case 10)

TBAs providing accessible, individualized and respectful care, often lived nearby, either on the same street or in the same village.

**Sharing values and cultural understanding.** The participants felt that their TBAs shared the same values as they did and thus recognized the importance of dignity and understanding during the birthing process. The TBAs understood that they were a guest in the woman’s own home and that, above all else, their dignity and understanding during the birthing process. The women thought that the healthcare professionals understood this, but often they were present, but in the background, watching the labor process, but allowing it to proceed on its own terms. The woman felt their TBA made them feel relaxed and empowered and did not rush or force the birthing process. The women thought that the healthcare professionals and TBAs had complementary roles and expertise. They felt greater collaboration between healthcare providers and TBAs could possibly improve maternity services in Somaliland. According to the women in this study, facility-based births disrupt family life because it forces them to be away from their children and the supportive and familiar environment of their home. Home births make all these concerns easy to manage:

It was my home and not a hospital. I slept in my warm bed at home but in the health facility, it is possible you feel cold and moist after childbirth. I slept with my baby, I got relaxed, and I had all the other children with me in my home. (Case 4)

**Relying on TBAs to make referrals if needed.** TBAs were, according to the participants, eager to avoid the complications associated with a ‘high risk pregnancy’. The women in this study who had had complicated pregnancies reported their TBAs constantly advising them to seek facility-based care so they would not be blamed if complications arose. One participant recalled:

The TBA encouraged me to go to the health facility and consult with the healthcare professionals. Whenever she visits us, she kept asking me if I went to the health facility this morning, if I check my blood pressure level. So, when I say yes, she always says all right, do not stop going to the health facility. Also, later I developed high blood pressure that is why I was very pleased that I was going to the health facility regularly. (Case 3)

**Feeling empowered and valued**

**Being encouraged to take responsibility.** The participants stated that during their home birth the TBAs encouraged them to listen and trust their bodies. This made the women feel empowered and in control of the events during their labor. They also appreciated the privacy of being in labor at home where they were able to take care of their other children. This expression of responsibility greatly reduced their anxiety and stress levels. One woman explained:

Xalimo [her TBA] was very caring for me and my children. She checked on me regularly and encouraged me to listen to my body and to let her know how I feel whenever I needed something. (Case 1)

**Appreciating the TBA’s ‘background’ role.** TBAs were able to practice ‘expectant management’. They were present, but in the background, watching the labor process, but allowing it to proceed on its own terms. The woman felt their TBA made them feel relaxed and empowered and did not rush or force the birthing process. The women thought that the healthcare professionals and TBAs had complementary roles and expertise. They felt greater collaboration between healthcare providers and TBAs could possibly improve maternity services in Somaliland. According to the women in this study, facility-based births disrupt family life because it forces them to be away from their children and the supportive and familiar environment of their home. Home births make all these concerns easy to manage:

It was my home and not a hospital. I slept in my warm bed at home but in the health facility, it is possible you feel cold and moist after childbirth. I slept with my baby, I got relaxed, and I had all the other children with me in my home. (Case 4)

Home births were described as a first choice because of the knowledge the women had from their previous experiences of care, and their ability to compare and
rank those experiences according to their own values and intentions.

**Discussion**

The results show that women perceived a lack of reproductive agency in facility-based births makes home births a first choice regardless of potential risks and medical needs. The fact that women felt empowered and in control in a home birth setting needs to be acknowledged, and these factors are important moving forward to improve the quality of maternal and newborn care in health facilities in accordance with WHO standards [26] and the QMNC framework [16].

A heavy workload for trained healthcare professionals with only minimal pay and the obligation to introduce complex and unfamiliar professional standards has the potential to create a culture and environment which are not always able to support a positive attitude towards women and their babies [27, 28]. In this study, women simultaneously acknowledged the important work healthcare professionals did when treating maternal health emergencies at the health facility, yet consistently stated their preference for the caring values of a TBA for a normal labor and birth. As suggested by the QMNC framework, engaging with community, in this case through TBAs, in a midwife-led continuity of care model is an important element of an ideal care philosophy [16]. Altering maternal and child health clinics into midwife-led continuity of care models has been suggested as a component of birth preparedness and complication readiness for women in hard-to-reach areas [29]. For this philosophy to be realized, the number of midwives educated to global standards with the ability to provide holistic care within their local communities needs to be increased [30]. Our findings from Somaliland are supported by a growing literature that describes TBAs as a vital link between women and the healthcare professionals in their local maternity services [31]. A recent WHO report has shown that using shared values about birth, such as those expressed by women and TBAs, has been identified as a way to improve maternal and newborn health [32]. The WHO has also emphasized the importance of creating new roles and responsibilities for TBAs that link them to the formal healthcare system [33]. This is supported by a study that suggests TBAs could use their competence as a doula to provide cultural and psychosocial support during pregnancy and childbirth in Somaliland [34].

Another intervention, one supporting the results of this study, would be to provide healthcare professionals with training in respectful maternity care. This has been suggested in a review reporting that the maternity care healthcare professionals provide should be communicated to women and their families in a way that allows for planning, gives women the opportunity to choose, encourages them to ask questions, and is willing to disclose treatment results appropriately [35].

This study showed that healthcare professionals could have provided better health education and information to women at their antenatal check-ups, better informed them of the risks involved in pregnancy and birth, and offered them a better discussion of their birthing options. Such advice is especially important in fragile contexts like Somaliland. Women, like those in this study, are frequently obliged to carry out their own risk assessments and determine their own intentions during pregnancy. They are expected to interpret their own antenatal care assessments and, as a result, to determine for themselves their place of birth. Advice from trained health professionals communicated to them in a sensitive and collaborative way is crucial to achieve quality of care and to meet the need for a caring and convenient birth experience [26].

Midwives educated and trained according to ICM global standards, working in functional health systems and enabling environments can help reduce and prevent a majority of maternal and new-born deaths, and provide over 80% of essential sexual, reproductive, maternal, and new-born health services [17]. However, there is a lack of midwives in many low-resource settings, and important investments are needed to educate midwives, build their capacity to do research within their field, and take on leadership roles. They are the group with whom TBAs should work most closely in order to close the gap between home and facility-based births and assure responsive, relational, cost-effective, and patient-centred care [16]. Midwives are the key to establish and assure that midwife-led continuity of care models are implemented and scaled up [18]. It would be beneficial to further understand the roles of midwives in the Somaliland health systems to identify the core contextual factors within political and health systems that act as barriers or facilitators [36] in order to scale up access to high quality and acceptable maternal and new-born health care for women. Midwives competencies and capacity should be utilized at all levels in the health system using a multipronged approach improving leadership and management to develop and sustain midwife-led continuity of care models [37]. According to Yu et al. [30], the well-functioning midwife-led birthing centers studied in Australia result in significantly lower intervention rates, greater feelings of reproductive agency, and lower health system costs than carrying out normal births in hospitals, while avoiding some of the risks inherent in home births. Australia and Somaliland
are obviously very different [38], but a similar study examining the specific circumstances of introducing midwife-led continuity of care in public health facilities in Somaliland would be informative, especially if carried out in combination with an investigation of the different functions and roles midwives and TBAs occupy, and how they could use their respective abilities to provide quality care for women and newborns. Addressing these challenges could encourage women to more willingly consider facility-based births, which would reduce adverse maternal and newborn health outcomes locally and globally.

**Strengths and limitations**

This study captures the preferences of women in Somaliland when choosing their place of birth and why they chose to give birth at a health facility assisted by a healthcare professional or at home assisted by a TBA. Our preconceptions as midwives may have shaped our understanding in the analysis. By using the content analysis method with all authors involved in the analysis process, we aimed to provide confidence to the reader of the reliability of the findings [24,38]. The key strength of this study was therefore the research process and the personal interviews which gave voice to some of Somaliland’s women. It is the first study of its kind in the Somali region and provides vital insights into women’s choice of place of birth.

Despite the high credibility of its findings [24,37], this study has a series of limitations that affect its transferability. Transferability refers to whether the findings have applicability in other contexts [24,39]. The findings in this study have been confirmed in other studies in the field. This strengthens dependability [24,39], showing that the findings are consistent. The main limitation of this study is that multipara women might, because of their age and experience, be more intentional than younger and less experienced primipara women when choosing their place of birth. This is evident in a previous health survey [40] that shows how agency with regards to women’s sexual and reproductive health decisions seem to increase with age and childbirth. Women’s choices of place of birth are influenced by many personal, social, and healthcare service factors. The findings of this study might thus be shaped by the participants’ age, parity, knowledge, and experience. In addition, the financial status of the women might have influenced their choices [41]. Because women in our study were from a relatively poor socio-demographic background, they might have been more inclined to choose a home birth because of financial considerations. The findings outlined here, therefore, should be transferred with caution to primipara women or women from secure economic backgrounds. Further research is needed to define and test a context specific midwife-led continuity of care model to be scaled up at public health facilities. The function and role of TBAs and the possibility of linking TBAs more closely to the healthcare system, and possible barriers to such a development, are further suggested. Above all else, this research should be carried out within the framework of a long-term sustainable plan to assure quality and equal access to maternal healthcare in Somaliland based on the WHO standards for improving maternal and newborn quality of care in health facilities [26]. Even if there is existing literature examining women’s choice of place for delivery [7,10,11,14], this is one of the few studies coming from a fragile post-conflict setting.

**Conclusion and implications**

To meet women’s needs and preferences in Somaliland, further investments are needed to strengthen the midwifery profession and to define and test a context specific midwife-led continuity of care model to be scaled up at public health facilities. A dialogue to create new roles and responsibilities for the TBAs who attend most home births is further needed to link them to the formal healthcare system and assure timely healthcare seeking during pregnancy and birth.

The implications of this study are to:

- **Increase the number of midwives, strengthen their role in midwife-led continuity of care models, and better organize and integrate them into the maternity care system at all levels.**
- **Create new roles and responsibilities for TBAs that link them to the formal healthcare system, and assure connections to the community.**
- **Provide healthcare professionals with a training package on respectful maternity care that would help to end the mistreatment of women in maternity services.**
- **Use context specific, scientific evidence as a foundation to develop a policy on quality maternity care for the Somaliland maternity services to be used in political decision making and investments.**

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away in the COVID 19 pandemic, in 2021, and was not able to see this publication come to life.

Author contributions

All authors have made substantial contributions to the conception and design of this study. All authors have participated in the work to such a degree as to be willing to be responsible and accountable for all aspects of the study, and for ensuring that questions related to the accuracy of any part of the work are appropriately investigated and described.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Ethics and consent

Ethics and consent procedure details are documented in the manuscript. Ethical clearance to conduct the study was obtained first from the Somaliland Ministry of Health and Development and second from the research ethics committee of the University of Hargeisa. Approval number Dr: CS/41105/18.

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Paper context

Women in low resource settings choose home births with untrained, traditional birth attendants in preference to trained midwives in low-resource settings choose a home birth.

To meet women’s needs and preferences in Somaliland, further investments are needed to strengthen the midwifery profession and to define and test a context specific midwife-led continuity of care model to be scaled up at public health facilities. A dialogue to create new roles and responsibilities for the TBAs who attend most home births is further needed to link them to the formal healthcare system and assure timely healthcare seeking during pregnancy and birth.

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References


Traditional birth attendants: A poorly utilised bridge between the community and the formal healthcare system

- A qualitative study with TBAs in six regions of Somaliland

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ABSTRACT

Objective: To achieve the UN’s Sustainable Development Goals by 2030, maternal mortality rates need to be reduced in sub-Saharan African countries, such as Somaliland, which has one of the highest maternal mortality rates in the world. The roles and functions of Traditional Birth Attendants (TBAs) in the community and in relation to the formal healthcare system have not previously been explored. This study aimed to explore the past and current roles and practices of TBAs in Somaliland from the TBAs’ perspective.

Design: An exploratory qualitative study design was applied in which individual in-depth interviews were conducted with TBAs from all six regions of Somaliland. Using purposive sampling, we conducted 24 semi-structured interviews. Interviews were conducted in Somali, transcribed and then translated into English. Thematic analysis inspired by Braun and Clarke was used to analyse the data.

Results: The TBAs emphasised that they paved the way for midwives and thus demanded respect and appreciation for this. TBAs had a broad role in pregnancy, delivery and performing female genital mutilation/cutting since the civil war. However, more recently, their function and role have changed as they transition into being a link between the community and the formal healthcare system in the western regions of the country. The TBAs explained that they have established trust in the community over the years and that their engagement was a response to an urgent need in the community.

Conclusion: TBAs are an available and efficient resource if acknowledged and compensated appropriately. The potential new roles of TBAs need to be clearly defined to maximise their benefits from their changing roles. Health authorities need to establish continuity of care by connecting health facilities with women and their families and establish home visits for skilled birth attendants to connect with women unable to come to health facilities for antenatal, postnatal and newborn care.

Keywords: traditional birth attendants, skilled birth attendants, assisted home-based birth, low-income country, Somaliland.
INTRODUCTION

According to the World Health Organization (WHO), women’s reproductive health problems account for more than one-third of the total burden of disease. The WHO also estimates that 287,000 women die every year from pregnancy and abortion-related complications, and 99% of these deaths occur in low-income countries (1-3). The MMR needs to be reduced in sub-Saharan African (SSA) countries, such as Somaliland, to accomplish a reduction in maternal mortality rates (MMRs) and to achieve the United Nations’ Sustainable Development Goal by 2030 (4). Between the 1970s and 1990s, to reduce maternal deaths, the WHO invested in training traditional birth attendants (TBAs) to improve their skills when supporting women; this was successful in reducing still births and perinatal and neonatal deaths, but unfortunately unsuccessful in reducing maternal deaths (5, 6). According to the United Nations (UN), TBAs are persons who acquire their skills in assisting childbirth by apprenticeship to other TBAs and, in turn, assisting mothers during childbirth. In contrast, SBAs have professional proficiency in the skills needed to manage both normal and complicated pregnancies, births and follow-ups through the identification, management and timely referral of women and new-borns for specialist treatment (10, 11). Therefore, the global strategy changed the aim to focus on the use of skilled birth attendants (SBAs) to reduce maternal mortality in developing countries. However, when there is a severe shortage of SBAs in a post-conflict setting, such as that in Somaliland, TBAs continue to conduct home deliveries (7). Most deliveries across the globe, particularly in low-resource settings, are predominantly done by TBAs (8). In a 2014 joint statement from the World Health Organisation (WHO), the International Confederation of Midwives (ICM) and the International Federation of Gynaecology and Obstetrics (FIGO), they defined ‘skilled birth attendants’ and acknowledged that TBAs were unsuccessful in reducing maternal deaths due to failure to connect them with an ‘enabling environment’ with teamwork, training and effective supervision (9).

Midwives trained and regulated according to ICM global standards are defined as SBAs, can provide 87% of the total sexual reproductive health needs of the population and are associated with improved health outcomes (12, 13).

Somaliland setting

Somaliland self-declared independence from the Republic of Somalia after a civil war in 1991. Nevertheless, Somaliland remains unrecognised by the international community. According to the most recent health demographic report (2020), maternal mortality is high, at 396 deaths per
100,000 live births. The main causes of maternal deaths are postpartum haemorrhage, pre-eclampsia, eclampsia, prolonged labour and infection. In addition, limited access to sexual and reproductive health services and contraceptives and harmful cultural practices, such as female genital mutilation/cutting (FGM/C), further increase the risks of maternal and neonatal mortality and morbidity. FGM/C include practices that involve the partial or total removal of the external female genital organ or other harm to the female genitalia performed for nonmedical purposes (14). A high level of illiteracy, estimated at 39%, impedes women’s access to health information (5). Somaliland deals with an extreme shortage of midwives who can provide complete health coverage for maternity care. As a result, 67% of women have a homebirth supported by a TBA (15-20). During the civil war, TBAs became involved in practices targeting women and young girls in villages, ranging from performing FGM/C, fertility treatment, pregnancy basic support and home deliveries (21). In Somaliland, midwives, being SBAs, provide most of the care for women in pregnancy, labour and postnatally, both in community and health facilities. (15). However, the actual number of midwives regulated is low, and the scarce resources to educate adequate numbers is challenging for the country. Despite this critical shortage, midwifery education institutions in Somaliland follow ICM standards for midwifery education to improve the quality of maternity care (22, 23).

A recent qualitative study with women in Somaliland showed that a lack of reproductive agency in facility-based births makes women choose home births with TBAs, regardless of the risks or the women’s medical needs (13). Women further recommend that TBAs be included in maternity care supporting SBAs in healthcare facilities, as they are resources that should be used (17). Considering that TBAs are currently conducting most of the deliveries in Somaliland (15-17), there is no scientific evidence focusing on TBAs’ functions and roles in the community or in relation to the formal healthcare system in Somaliland. Hence, the aim of the current study is to explore the past and current roles and practices of TBAs from TBAs’ perspectives, which is vital for successful resource planning and improvement of the quality of maternity care in Somaliland.

**METHODOLOGY**

**Study design**

This study used an exploratory qualitative study design (24), in which individual in-depth interviews were conducted with TBAs from all six regions in Somaliland. The study was planned and conducted in accordance with the Helsinki Declaration of research ethical
principles involving human subjects. The Somaliland Ministry of Health Development approved the study, and the Ethics Committee of the University of Hargeisa gave ethical approval (Dr: CS/41105/18).

**Setting**
This study was conducted in the following six regions of Somaliland, from west to east: Awdal, Marodijeex, Saaxil, Togdheer, Sool and Sanaag Region. All health services are managed by the Ministry of Health and Development (MoHD), and midwives are the main providers of maternity care in hospitals and the communities’ mother and child health centres (MCHs). In this study, we aimed to provide voices from TBAs from all the regions to illustrate their various experiences and roles, considering that different regions may utilise TBAs differently.

**Data collection and participants**
A purposive sampling technique was used in this study to ensure the inclusion of participants from all the different socio-geographical backgrounds of TBAs in Somaliland (24). In addition, we requested that the MoHD write us a letter to facilitate a visit to the regional health officers of the ministry in all the regions.

Every region has a health medical officer who oversees the MoHD activities and facilities of that region. These have facilitated a meeting with their community midwives, urging them to support connecting the research team with TBAs in that region. The study sought to connect with four TBAs per region, and the health facility midwives identified one TBA. After the interview with that TBA, we requested to connect the research team with three other TBAs also working in the region. This was to ensure a mixture of TBAs still working in the region, connected to the health facilities and those working independently.

Twenty-four interviews were conducted using semi-structured interviews. The interview guide was constructed and piloted by the first author. These pilot interviews were transcribed and checked for completeness and depth of results to the aim of the study. Invitation letters were handed out to all respondents by the first author (JE), and the content and aim were orally described. Those who agreed to participate were given an introduction to what to expect during the interviews. An appointment for an interview was agreed upon, and they were informed that they were free to withdraw from participation at any time without any consequences. The interviews were conducted in the respondent’s homes. None of the TBAs who had given their
oral and written consent dropped out of the study. The TBAs were asked about their experiences during home births, transition to the MCHs and their relationships with SBA. Interviews were conducted in Somali, lasted for approximately 55–65 minutes and were tape recorded. Data were collected until no new information was available to collect.

Analysis
The interviews were transcribed verbatim and translated from Somali to English according to WHO guidelines (25). A qualitative thematic analysis inspired by Braun and Clarke was conducted to analyse the data (26). The first step of the analysis was familiarisation. The transcripts were read several times to make sense of the content and to become immersed in the data. Second, all transcripts referring to the aim were extracted and condensed. In step three, the condensed texts were given individual headings (codes). In step four, similar codes were grouped into subthemes. The subthemes were further divided based on their different contents. Subthemes with similar content were grouped together to formulate a main theme. To verify the interpretation of data, JE, FO and AE read through the original transcripts to ensure credibility (27, 28). The themes and subthemes were discussed between the authors to reach a consensus.

RESULTS

Being a bridge between the community and the healthcare system
The overarching theme of this study shows that TBAs have the capacity and status to bridge between the community and healthcare system in hard-to-reach areas, especially in rural settings, for timely referral of women to health facilities. Three main themes emerged from the data of this study. The first theme showed TBAs’ roles in pregnancy, delivery and FGM/C. The second theme was TBAs’ transition to community mobilisers. The third theme that emerged was TBAs in transitioning to become the link between the community and the healthcare system.

TBAs being the backbone that paved the way for midwives.

TBAs’ role in pregnancy, delivery and FGM
The TBAs explained how they started their work as traditional midwives in their communities during the 1980s. They shared that they never planned to become traditional birth attendants. Instead, it was a response to the urgent need to attend to and support women in their community. A TBA reported that after the civil war in Somaliland, everyone had to flee the
cities and ended up in settlements over the Ethiopian border, mostly in the mountainous areas. The respondents stated that women arrived at these settlements with some already pregnant and experienced adverse delivery outcomes and newborn mortalities due to the extreme stress they experienced from leaving their homes, excessive walking and the following to find safety:

One TBA said, “I started in 1988 when we were fleeing, I delivered the first woman. I don’t know how I supported her, it was for the sake of Allah, I said my God please support me and he did! I had never delivered a baby before, it caught me off guard, there was no one with us, we were on the run trying to escape being killed and I still remember, she cried don’t leave me alone please.” (TBA Berbera)

The TBAs explained how they were presented with the difficult situation of assisting births when there was no one else around. They expressed the stress they felt and the sense of courage and duty to support women with whatever they could remember from their birth situation or any close woman they witnessed during labour. Although they had no medical training, the TBAs expressed that they had tried to copy what the midwife did for them before the war. One TBA said, “During the civil war, I fled to Ethiopia, so I resided in the refugee camp and one day, the women who lived in the shelter next to me laboured and other neighbours said please come and support her, I never perform delivery before but I kept in mind how I was supported during my birth so it was less difficult.” (TBA, Burco)

The TBAs explained that they were trying to save women’s lives without any qualified midwives being around and that they did not understand at all how they managed to do that. One TBA said, “Somehow, the civil war made us a lot more courageous than we thought we were, only that way we were able to do what we did when we supported women” (TBA, Erigabo).

The respondents explained that they do not have the knowledge and experience to compete with the midwives who are graduating based on a medical training programme and who are certified midwives. They believe that these graduated midwives have further knowledge they gained through the intensive training they received from the institutions and the government. They explained that they view trained midwives as their daughters and sisters and have never felt that there is competition, but it is important to them that people do not forget all the work TBAs have done for women and their communities over the years during and after the conflict.
They explained the importance of being respected for the difficult times they bravely worked hard for women and their families in Somaliland.

One TBA said: “I never thought I had enough knowledge; we had the trainings but because we lack many other things, we will never feel we can compete with trained midwives, yet we have saved women’s lives and never complained so now we deserve to be respected.” (TBA, Erigabo)

TBAs conducting FGM and assisting with home-based deliveries.

When asked about home-based births and women’s decision to give birth at home in Somaliland, the TBAs said that although women know that trained midwives can save their lives through their knowledge of hygiene, prevention of infection and medications, they still appreciated the TBAs for giving them privacy and care that is nonintrusive to their wishes. TBAs stated that Somaliland women want to choose for themselves and accept the consequences of their choices. TBAs felt that one aspect was the home environment, and given that midwives do not come to women’s homes, this gives TBAs an advantage over trained midwives. One TBA said, “Women prefer us just because we have personal knowledge with them, and we give them respect and kindness. I am not saying we don’t care about hygiene; we do, without it nothing can be done. But women appreciate and recognize our work because we come to them.” (TBA, Sanaag)

In addition, the TBAs stated that poverty is another reason for women to avoid health facility delivery. Women and their families cannot afford the cost of transport, treatment and medications. A TBA in Berbera said, “One of the main reasons a lot of mothers choose to give birth at home is financial reasons. A lot of these families can’t afford to go to a hospital, but we take whatever they can give.” (TBA, Saxil)

Some TBAs explained that they were still assisting home-based births, as they were neither responsible nor paid for referrals permanently, and that after connecting with health facilities, some mothers still preferred to deliver at home. Hence, TBAs choose to support and assist these women. Another TBA said, “Most pregnant women are now connected to their local health care facilities, so the community’s need for TBAs has diminished rapidly in the capital city. But if I meet a mother who is in need of urgent care to deliver a baby, I will deliver the baby myself.” (TBA, MJeex)
Even when TBAs transfer women to the MCH, they do so after having delivered the woman at her home, and they explained that these women have planned home births and that it is difficult to change the woman’s mind during labour. The TBAs explained that when they assist a home-based birth, they pray for the best, yet the outcome is often adverse. One informant shared, “I referred a woman after a home delivery with severe bleeding. I took her to the hospital in a car. Unfortunately, the doctor did not manage to stop the bleeding. She passed away with postpartum haemorrhage.” (TBA, Saxil)

The TBAs repeatedly explained that they did not have any knowledge about assessing progress in labour and hence recognised that a deviation from the normal progress of labour is also difficult for them. They said that all they could do was wait for the woman to want to push, and if this was her first child and she had FGM/C pharaonic type, they had an even bigger problem. They spoke of many instances where they performed defibulation too early and could not stop the bleeding and the woman died. Hence, they learned to wait until they felt the baby’s hair with one finger. Furthermore, they use herbal remedies to support women with most types of complications at home. However, they learned that this is a barrier to timely treatment and healthcare. One main reason for this was that women prefer to try herbal remedies before going to the healthcare facility.

Through TBAs’ closeness with women in the community, they were also informed about any women who experienced early pregnancy complications. In some instances, it was possible for them to transfer a woman to a healthcare facility and receive treatment. One TBA shared: “One day, a woman told me that there is a girl lying at home who had a miscarriage, and she has been sick for a while, and her husband didn’t come they had a fight and he refused to come; and when she asked him money to go to a doctor, he refused to give her any money. We transferred her to the nearest health facility; the doctor gave her fluids and the bleeding stopped.” (TBA, Sool)

Informants shared that they not only provided healthcare-related services in the community, but also talked extensively about being a resource in the social system of their community: “We often raise and collect money and food if there are families that need it. For example, if there is a mother who just gave birth and is in need, we bring her food and other people help her with the house chores until she gets better that is the only thing. We are great when we stand together in time of need.” (TBA, Sanaag)
The informants shared how they have long had a function and role in being circumcisers in Somaliland. They explained that this was the norm and expectations of the community. Their reason for being circumcisers was that FGM/C is a strong cultural practice very connected with religion. They said that they, as young girls, have endured it, and given that they are dealing with women’s defibulation during delivery, they were also thought to be the best person to circumcise girls. One TBA said, “I’ve been a circumciser for 17 years. At first, I started with ‘gudniinka fircooninga’ infibulation and my daily routine still involves both conducting homebirths and circumcision.”

The TBAs also explained that being circumcisers meant another form of income for them. Families celebrated their daughter’s circumcision, and it was also an important social group event in the community. Therefore, every few weeks, they would perform circumcision on a group of girls. One TBA said, “‘gudniinka fircooninga’ infibulation is my source of income and when something is your source of income you can never say something bad about it” (TBA, Awdal).

When the public healthcare authorities introduced TBAs into the health facilities to work with the midwives, an unintended consequence was that their function as circumcisers was also transferred to the healthcare facilities. The informants referred to this medicalisation of FGM/C. One TBA explained, “Thank God (circumcision) ‘gudniinka fircooninga’ infibulation isn’t the norm anymore, that horrible procedure is decreasing, the collective conscience is much better in the city than it’s in the countryside because they know the consequences of it. Women in the city are much more aware. They’ll ask you to do it in the health facility and we do it.” (TBA, Burco)

**TBAs transition to community mobilisers**

*TBAs’ functions and roles in the community*

The TBAs explained how they had been travelling to villages beyond the mountain area with their water and food on foot to perform circumcision for those communities for the last thirty years. While doing these outreach activities, they also respond to women’s needs for support during childbirth, assist in any early pregnancy complications, and advised provide people with issues related to fertility. In rural and hard-to-reach areas, people grew up with TBAs being central in giving health advice and performing healthcare-related services. The respondents explained how they are the perfect agents to reach out to the community, understand their needs
and deliver health messages that will be accepted by their communities: “As a TBA, the most important thing for my work is that the community trusts me. It’s easier for me to do my job and fulfil my obligations, as I have already built a trust.” (TBA, Togdheer)

The TBAs shared that the MoHD and NGOs have focused on educating TBAs as community health workers. Sometimes, they are also called lay/community health workers. They were trained in health messages in line with the MoHD and then went back to their communities and villages to reach out and give health advice to the local people in their homes. These health messages target information to eradicate FGM/C and promote healthy eating for pregnant mothers, advise on child spacing, and encourage pregnant women to deliver at healthcare facilities. They explained that these topics are sensitive and require time and trust, and TBAs have the time and are trusted by the community related to health matters. According to the TBAs, they have built trusting relationships with fathers and religious leaders. They have organised outreach activities with the fathers and religious leaders in villages to talk to families about ending FGM/C and the use of family planning methods to space out pregnancies. They explained that they knew how to convey the message best due to the already established trust. However, they are not paid permanently for their work, as these activities depend on donor funding.

One TBA explained, “Recently we were eight traditional midwives and worked together to raise awareness of the community for a few weeks against ‘gudniinka fircooninga’ infibulation and discussed with young girls and gave them advice about family planning and how to take care of their babies. We were mobile and had a great time talking and starting discussions with the homes. Also, if we saw anyone that needed medical help, we referred them to the nearest health facilities.” (TBA, Sool)

**TBAs in transitioning to become the link between the community and the healthcare system.**

*TBA transition from home-based function to facility-based function*

TBAs were connected to the MCH throughout the country wherever possible by health authorities without regulation or clearly documented rules and responsibilities. The biggest limitation for this, according to the TBAs, was the lack of funding because Western regions received more opportunities for this than Eastern regions. TBAs allocated to MCHs were trained by midwives on risk signs during pregnancy and how to assist midwives in the MCHs
with basic midwifery care procedures and newborn care. Other groups of TBAs were linked with the MCHs and compensated economically when they referred women from the communities to the MCHs depending on NGO funding. The informants living in the rural area far from the healthcare facility were only referrers, whereas those living near the MCHs were included in the staff of the MCH. The TBAs said, “A midwife who was the head of MCH assisted me and twenty other women with training and practical skills. We learned a lot during our time with MCH. We found out that it is good for mothers to give birth in a health facility where they have access to all necessary resources and medical equipment.” (TBA, MJeex)

According to the TBAs, most midwives were very respectful of the TBAs and welcomed them into the MCH working environment and supported this transition. When asked about the relationship between TBAs and midwives, one TBA explained, “Yes, midwives recognize our work, support us frequently, we work together. I come to work early and before any of them do so, they appreciate my dedication, experience, and often ask me for advice but without payment. I appreciate and respect them for everything they do.” (TBA, Saxil)

Some TBAs explained that not all relationships with midwives were positive, given that some TBAs did not feel welcome into the healthcare facilities. They explained that sometimes, this was due to age differences, with the much younger midwives not respecting the TBAs’ long experience and the TBAs not accepting being directed in the health facility by a younger midwife.

One TBA stated, “Well, the midwife is more educated than I am but other than that I don’t think she is better than me with anything else as I said some of the midwives are welcoming and accepting... and other they don’t like us. I tell them first I know that you are educated, but I have skills that Allah taught me and Allah is supporting this mother and her child. The most important thing for you and me is to save the mother and her child.” (TBA MJeex)

Some TBAs who wanted to work at the MCH with midwives also continued into further education and became trained midwives, as they have grown to respect the knowledge and skills trained midwives have acquired through formal education. One TBA said: “I was a TBA first, but now I'm a midwife student at Golis University to gain more knowledge, improve my skills and certify myself as a qualified midwife”. (TBA, MJeex)
The respondents who received training from MoHD to support the midwives at the healthcare facilities explained that training and expertise gave them confidence to conduct deliveries and circumcision activities to secure income. The TBAs explained that they would receive discrete payments while using unauthorised medications from the healthcare facility to circumcise because mothers would come to the health facilities, given that the TBA would be there.

A TBA stated, “The Ministry of Health recruited me to the hospital, especially maternity ward as cleaner because I was an active worker and to help the two midwives who were working at that ward, after a while I learnt how they were doing everything, how to deliver and how to inject then I started my journey circumcising at the facility for payment.” (TBA, MJeex)

TBAs’ future needs and preferences in relation to their functions and roles
The TBAs in this study expressed that they demand respect and for health authorities and the community to recognise that they are a resource base with no opportunity for career progression while being left to work in women’s homes.

One TBA expressed, “I would like to add that the Ministry of Health needs to recognize TBA women. We supported Somaliland’s community from a very difficult time; we deserve respect for that. We need the chance to improve our knowledge and become part of health workers.” (TBA, Sool)

The TBAs explained that they have worked hard to ensure that they are not just left behind. They said that they advised their daughters to enter midwifery education and that they tried to work within private and public healthcare facilities to ensure their survival.

The TBAs also clarified that there are still regions where TBAs conduct the majority of the deliveries and that they were struggling with providing these services without knowledge, medication and equipment. They suggested that those TBAs require training and support until more midwives are available in the eastern region.

One TBA explained, “As women, we TBAs have proven our worth and now we are very active in the community providing health awareness and support for the poor communities in the rural areas. We are very proud of this and wish to continue being near our people.” (TBA, Togdheer)
DISCUSSION

The main findings from this study show that TBAs could form a bridge between women in their homes and SBAs at healthcare facilities. The data first-hand from TBAs show how they have established trust in the community over the years, and their engagement was a response to an urgent need in the community. More recently, their function and role have changed as they transition into being a link between the community and the formal healthcare system and the services provided. We intend to further discuss how the results can guide important stakeholders in this setting to improve access to quality healthcare and timely treatment to reduce maternal and neonatal morbidity and mortality.

Our findings show that TBAs have an extensive function and role in the past and the present. They assist with home deliveries, postnatal support and FGM/C and support poor families by gathering food and clothes from the community. They admitted to gaps and limited knowledge in maternal and neonatal care, which ultimately caused negative consequences for women and their new-borns. A study that identified the absence of or late referral and the use of herbal remedies by TBAs as causing maternal mortalities and morbidities (29). TBAs in Somaliland have also revealed that they continue conducting harmful practices as circumcisers and that this is mainly based on their financial constraints. Alölk (2016) reported a prevalence of FGM/C as 99%, of which 80% of women had suffered infibulation in Somaliland (30). A recent study found that 47.9% of women had undergone the pharaonic type of FGM/C (31).

The TBAs identified that FGM/C is changing due to awareness raising in urban areas and larger cities. Unfortunately, TBAs find it difficult to abandon the practice when they are paid for it, and with their new roles in health facilities, they introduced circumcision to the health professionals, which then resulted in the medicalisation of FGM/C. This is supported by an integrated review of the medicalisation of FGM/C and a study conducted with healthcare workers in Somaliland that concluded that SBAs have expressed that FGM/C has shifted to the health facilities conducted by nurses and midwives. This is partly because mothers of young girls heard that as birth is safer in health facilities, circumcision should also be safer using sterile conditions and medication when needed by trained nurses and midwives (32, 33). Currently, the MoHD is developing a policy that is still a draft against the medicalisation of FGM/C. Further research is necessary to examine how this practice has moved with the TBAs from the homes to the health facilities, resulting in the medicalisation of FGM/C, and its current effects on women’s sexual and reproductive health.
The TBAs emphasised in this study that they paved the way for midwives and thus demanded respect and appreciation for the work they provided for women during and after the Civil War. Earlier research found that TBAs knew that referring women to healthcare facilities would limit their function and role in the community and, most importantly, reduce their pay (27). However, the TBAs embraced connecting with the midwives and adjusted to being part of the healthcare system. Generally, when TBAs’ and SBAs’ minds are open about their future together, it has better results for everyone than apart (34).

The WHO, ICM and FIGO’s 2014 joint statement defining ‘skilled birth attendants’ encouraged countries to define new roles for TBAs and assist collaborations between SBAs, TBAs and staff in referral facilities (9). In addition, both the WHO’s framework for working with individuals, families and communities and recommendations on optimising lay health workers’ roles both recognise and call for identifying specific roles and responsibilities for TBA in countries where they are an important source due to SBA shortage (35, 36). Furthermore, the WHO recommends task shifting as a strategy that allows countries with a shortage of SBAs to improve access to healthcare by training community-level and lay health workers within short periods (34, 37). This can reduce the gap between SBAs and TBAs and allow TBAs to be integrated into the healthcare system as promoters of facility-based birth and act as companions for women, while also providing them with health messages. A study in Somaliland introduced the training of TBAs and linked them to five MCHs in the Maroodi Jeex district. This study recorded a 300% increase in facility births within the five centres included in the study and noted that TBAs were respected and welcomed by SBAs (34). For a successful change of TBAs’ roles in Somaliland, there needs to be better planning and they should be more efficiently utilised to improve quality of care. TBAs have perceived competence through their skills in the conduct of childbirth and years of practice. Women in rural areas without education and trust or understanding of modern maternity practices have understandably a very positive preference for TBAs. Hence, TBAs are great community awareness agents if managed well and given appropriate financial compensation to lead these efforts (20, 30, 31).

Currently, training for TBA in Somaliland is ongoing, although unorganised and unstructured among various organisations, NGOs, cities and regions, wasting resources that could have been geared towards linking more TBAs with health facilities and providing them with appropriate compensation to ensure that they feel officially part of the team (2). TBAs have identified that some received training and skills by working in the health facilities as assistants and cleaners and then took these skills and unauthorised medications from the health facilities to conduct
TBA services at homes. We suggest that TBAs should be given specific roles and that, as members of maternity services, those working at health facilities should be trained on ethical and professional conduct to reduce such behaviours (38).

Unfortunately, the results of this study have shown that TBAs in eastern regions still face challenges in making this transition and are still conducting home births and FGM/C. Funding needs to be established or redirected to strengthen TBA in the eastern regions of Somaliland to ensure that TBAs facilitate women’s referrals to increase facility-based delivery and reduce maternal mortalities (20, 30, 31).

The study results show that through the voices of TBAs, women need to be connected within their homes and that this is one of TBAs’ strengths. In the future, health authorities managing SBAs should try to introduce home visits in areas around the MCH and internally displaced people to increase their reach and establish rapport with the women living in those communities to improve antenatal and postnatal care and further connect them to health facilities. This will also support the new global target for 2025 to accelerate ending preventable newborn deaths and stillbirths by 2030. Target one focuses on achieving at least four antenatal visits and up to three postnatal visits within 2 days of delivery to reduce maternal mortality, which, for most women in Somaliland, can only be achieved through home visits (3). Antenatal and postnatal care services need to be improved for all women in Somaliland to ensure early risk assessment and prompt referral when issues develop in the postnatal period with mother or baby. Previous studies have shown that linking TBAs to the healthcare system can increase not only health facility delivery but also antenatal and postnatal visits (3, 20).

TBAs’ roles in the Somaliland healthcare system transitioned from working alone in women’s homes conducting home births and FGM/C in communities to working as supporters and advocates of the use of SBAs in health facilities, abandonment of FGM/C and accompanying women to the health facilities (39). Using their established trusting relationships with communities, TBAs can help improve facility uptake and women’s access to skilled birth attendants when effectively placed. Using their established trusting relationships with communities, they can help improve facility uptake and women’s access to SBAs. They can play an important role in helping women feel supported and retain reproductive autonomy while in the hospital. For TBAs to assume this role, they need specific training for those employed at health facilities, utilising them to promote evidence-based practices after childbirth, such as skin-to-skin contact and breastfeeding (5, 38). We recommend further
research with support from health authorities to map TBAs’ transition process and stakeholder experiences in more detail to support planning for eastern regions and find detailed ways and longer-term monitoring of existing interventions.

STRENGTHS AND LIMITATIONS
This is the first study to identify the role of TBAs from their own unique perspectives, providing depth and a specific scientific contribution. Conducting this study in the native language with native researchers increases the reliability of the findings, as the first author could navigate between insider/outsider perspectives of the data. This study is transferable in similar contexts. Given that the participants in this study have been recruited from the entire country to represent experiences from the whole country and are as such providing reliable and transferable data that can be reproduced in any similar country or setting. As this study only included TBAs, it provides no insights into the views of SBAs in maternity services. However, to avoid introducing bias, we did not include SBAs, given that they would have a completely different perspective on TBAs’ roles. With 24 participants, this study provides unique, reliable, rich data that present the views of TBAs. This study did not focus on TBAs’ skills. This study focused on their roles. However, these should be further investigated to design appropriate training materials for TBAs who are transferred into health facilities.

CONCLUSION
TBAs are an important and efficient resource for meeting the SDG’s agenda in a low-resource setting, such as Somaliland, if managed and compensated appropriately. The new roles of TBAs need to be clearly defined to gain maximum benefit from their changing roles. SBAs need clarification regarding these roles to encourage the acceptance of TBAs into the maternity system. The TBAs explained that, as long as women choose a home birth, they will continue assisting home-based births because women need to be consulted and convinced in pregnancy about the best place of birth for them using antenatal care services.

Health authorities need to establish continuity of care by connecting health facilities with women and their families and establish home visits for SBAs to connect with women unable to come to the health facilities for antenatal, postnatal and newborn care. With SBAs and TBAs working in collaboration, maternal morbidity and mortality can be reduced in Somaliland in the future.
ETHICAL APPROVAL
Ethical clearance to conduct this study was obtained from the Somaliland Ministry of Health and Development (Approval Number: MOHD/DG:2/86/2021). The research ethics committee at the University of Hargeisa also approved this study (Approval Number: DRCS/65/05/2021).

AUTHOR CONTRIBUTIONS
All of the authors made substantial contributions to the early design stages of this study, the acquisition, analysis and interpretation of the data; and the writing and revising of the manuscript.

DECLARATION OF COMPETING INTERESTS
The authors have no conflicts of interest.

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REFERENCES


Traditional Birth Attendants: A poorly utilised bridge between the community and the formal healthcare system - A qualitative study with TBAs in six regions of Somaliland

Table 1. Demographic characteristics of the participants.

<table>
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<th>Participant Characteristics</th>
<th>FRGN = 24</th>
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## Table 2. Themes and subthemes of the study data

<table>
<thead>
<tr>
<th>Themes</th>
<th>Sub-themes</th>
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| **TBAs role in pregnancy, delivery and FGM**                           | **TBAs being the backbone that paved the way for midwives.**  
- TBAs’ views about how they started and their role in midwifery services today  
- TBAs were women’s only hope since the war and deserve respect as they make way for qualified midwives  
- TBAs are decreasing in the western parts of the country due to increased midwifery education  

**TBAs conducting FGM and assisting home-based births.**  
- TBAs and being with women and how they support them  
- Women want to be respected  
**Expectant management because it is the only thing that they can do**  
- TBAs’ roles in FGM  
- TBAs report that they feel a lack of skills and competence in signs of emergency early pregnancy complications  
- TBAs collect food clothing and money from the community for women in need  
- The use of herbal remedies uses at home  

**TBAs’ transition to community mobilisers**  
- TBAs’ functions and roles in the community  
  - TBAs are very respected by the community  
  - TBAs receive regular training and updates from non-governmental organisations  
  - Training for young parents on parenting  
  - Educating women/families in the community about healthy eating  
**TBAs are a critical part of the community health mobilisers used by the MOHD and NGOs**  
  - Talking to mothers about child spacing  
  - Anti-FGM training from NGOs  
  - TBAs perform outreach activities with fathers and religious leaders  
  - TBAs advise families on aspects based on their training by midwives  

**TBAs in transitioning to become the link between the community and the healthcare system**  
- TBAs’ transition from homes to mother and child health centres  
  - TBAs working closely with midwives in the MCH  
  - TBAs’ relationships with qualified midwives  
  - TBAs transfer women for ANC and delivery  
- Many TBAs have continued into midwifery training  
- TBAs refer women to MCH during pregnancy and birth  
- Many TBAs currently work in MCHs  
- Some TBAs benefit skills and medications from MCHs  

**TBAs’ wishes for the future**  
- More training to build their capacity  
- More support and payments for TBAs still working in the eastern parts of the country, who are still filling a gap in maternity services  
- SL should never forget the difficult times TBAs have provided lifesaving services for women and their babies