BAŞKENT UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF PUBLIC HEALTH
PUBLIC HEALTH PhD PROGRAM

CONTINUUM OF CARE DURING PREGNANCY, DELIVERY, AND POSTNATAL CARE AMONG EVER-MARRIED WOMEN IN SOMALIA

PREPARED BY
ADAM ABDULKADIR MOHAMED

DOCTORAL THESIS

ANKARA-2024

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ANKARA-2024

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DEDICATION

This PhD dissertation is dedicated to the mothers and children of Somalia, whose resilience amid adversity has been a continuous source of inspiration. To the women who face daily challenges with strength, grace, and unwavering courage, this work is a tribute to you. Your stories, endurance, and love inspire my commitment to improving healthcare for you and future generations. May this research contribute to a safer, healthier journey through motherhood and honor your vital role in shaping the future of Somalia.

I am grateful to my mentors, faculty members, and colleagues at Başkent University for their guidance and support. I would also like to thank my family for their patience, encouragement, and unwavering support.

I hope this work contributes to the growing body of knowledge in public health and, more importantly, serves as a foundation for practical strategies to improve maternity care in Somalia. I am committed to continuing this journey to foster better health outcomes and equitable healthcare access for all Somali mothers and children.

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I want to express my deep gratitude to the Save the Children Somalia team for their vital role in supporting this research. Their financial backing for the qualitative component of my study made it possible to capture the voices and experiences of those directly impacted by maternal healthcare challenges in Somalia. Their support extended beyond funding, as they provided logistical and moral support that was invaluable in making this research a reality. To my colleagues at Save the Children, your unwavering dedication to improving maternal and child health in Somalia has been a constant source of inspiration. Working alongside with you has strengthened my commitment to this cause, and I am grateful for your shared passion and encouragement throughout this journey.

I am forever thankful to my family for your patience, understanding, and unwavering support. Your love and encouragement kept me going during the most challenging times. Your resilience inspires me daily and fuels my commitment to creating a healthier world for mothers and children. Finally, I dedicate this work to the mothers and children of Somalia, whose strength in the face of hardship has been my greatest motivation. I hope this research will improve maternity care and health outcomes in Somalia, a mission I am honored to pursue. Thank you all for being part of this journey.

I hope this work contributes to the growing body of knowledge in public health and, more importantly, serves as a foundation for practical strategies to improve maternity care in Somalia. I am committed to continuing this journey to foster better health outcomes and equitable healthcare access for all Somali mothers and children.

ABSTRACT

Continuum of Care During Pregnancy, Delivery, and Postnatal Care Among Ever-married Women in Somalia. Baskent University, Institute of Health Sciences, Faculty of Medicine, Department of Public Health, Doctorate Program, PhD Thesis, 2024.

Introduction: Somalia remains one of the most dangerous places for women to give birth, with a current maternal mortality ratio of 621 deaths per 100,000 live births, ranking among the highest globally. In this study, we aim to investigate the level of completion, factors associated with it, and barriers along the maternity continuum of care in Somalia.

Method: This study used secondary data from the Somalia Health and Demographic Survey 2020 and primary qualitative data. In the quantitative analysis, we restricted our analysis to ever-married women who had a live birth in the five years preceding the survey (n = 2432). In the qualitative section, we used focus group discussion with childbearing mothers purposively sampled from urban, rural, internally displaced persons, agro, and nomadic pastoralists and in-depth interviews from healthcare providers, policymakers, recently delivered and childbearing mothers, community leaders, and traditional birth attendants. Completion of the continuum of maternity care was the outcome variable and was constructed into a binary variable, with complete coded as one and incomplete coded as 0. We categorized it into three models: Antenatal Care (ANC4+) as the first model, Antenatal Care plus Skilled Birth Attendant (ANC4+ & SBA) as the second model, and Antenatal Care, Skilled Birth Attendant, and Postnatal Care (ANC4+ & SBA & PNC) as the third model.

Results: More than half of the women (53.1%) had their most recent births at ≤ 19 years old. Only 14 (0.6%) mothers received all three maternal healthcare services (ANC4+, SBA, and PNC within 48hrs). Maternal age at birth, residence, mother's education, employment, healthcare decision-making, radio exposure, and wealth quintile were variables significantly associated with Model 2 (ANC4+ and SBA) at p-value <0.05. The maternity continuum of care gaps varies across different community categories, such as urban areas, rural areas, IDPs, agro-pastoralists, and nomadic pastoralists, due to diverse reasons, including service availability, access to care (financial, distance, and transportation), socioeconomic disparities, infrastructure, climate-related, and security issues.

Conclusion: The completion of the maternity continuum of care is more skewed towards urban residents; maternal health care utilization decreases as they progress from ANC4+ to PNC utilization. The government and partners should design and implement strategies to improve maternal healthcare utilization specific to rural and nomads who are less educated, not working, low income, and have less power in decision-making.

Keywords: Continuum of care, Antenatal Care, Cultural Beliefs, Home Delivery, Somalia

ÖZET

Somali'de Daha Önce Evlenmiş Kadınlar Arasında Gebelik, Doğum ve Doğum Sonrası Bakım Sürekliliği, Başkent Üniversitesi Sağlık Bilimleri Enstitüsü, Tıp Fakültesi, Halk Sağlığı Anabilim Dalı Doktora Programı, PhD Tezi, 2024

Giriş: Somali, dünyada kadınlar için doğum yapmanın en riskli olduğu ülkelerden biridir. Her 100.000 canlı doğumda 621 olan anne ölüm oranı, küresel olarak en yüksek seviyeler arasındadır. Bu araştırma, Somali'de annelik bakımının tamamlanma düzeyini, bakım sürekliliği ile ilgili faktörleri ve süreklilik boyunca karşılaşılan engelleri değerlendirmeyi amaçlamaktadır.

Yöntem: Araştırmada, Somali Sağlık ve Demografi Araştırması 2020'den elde edilen ikincil verilerle birlikte, nitel birincil veriler kullanılmıştır. Nicel analiz için veriler, araştırmadan önceki beş yıl içinde canlı doğum yapmış ve evli olan kadınlarla sınırlanmıştır (n = 2432). Nitel analizde ise çocuk doğuran annelerden seçilen örneklerle odak grup görüşmeleri yapılmış, sağlık hizmeti sağlayıcıları, politika yapıcılar, toplum liderleri ve geleneksel doğum görevlileri ile derinlemesine görüşmeler gerçekleştirilmiştir. Annelik bakımının tamamlanması, DÖB4+, DSB, ehliyetli kişilerce gibi üç temel hizmetin alınması ile değerlendirilen ikili bir değişken olarak yapılandırılmıştır: Tamamlanmış bakım sürekliliği "1", eksik olan ise "0" olarak kodlanmıştır.

Sonuçlar: Katılımcı kadınların %53,1'i ilk doğumlarını 19 yaş ve altında yapmıştır. Araştırmaya katılan kadınların yalnızca %0,6'sı (14 kişi) tüm annelik bakım hizmetlerini (DÖB4+, DSB ve ehliyetli kişilerce) alabilmiştir. Annenin doğumdaki yaşı, ikametgah türü, eğitim durumu, istihdam durumu, sağlık hizmetlerine erişim kararı, radyo maruziyeti ve refah düzeyi Model 2'de (DÖB4+, DSB) istatistiksel olarak anlamlı ilişkili faktörlerdir ($p<0,05$). Annelik bakım sürekliliğindeki eksiklikler, hizmetlerin mevcudiyeti, finansal, mesafe ve ulaşım engelleri, sosyoekonomik eşitsizlikler, altyapı yetersizlikleri, iklim koşulları ve güvenlik sorunları gibi çeşitli nedenlerle farklı topluluklar arasında farklılık göstermektedir.

Sonuç: Annelik bakım hizmetlerinin tamamlanması genellikle kentte yaşayan kadınlar için daha yüksek orandadır. DÖB4+, hizmetinden DSB'ye kadar geçen süreçte bakım sürekliliğinde ciddi bir düşüş gözlemlenmektedir. Bu doğrultuda hükümet ve işbirliği yapılan kuruluşların, kırsal ve göçebe topluluklarda, özellikle de eğitim seviyesi düşük, çalışmayan, düşük gelirli ve sağlık hizmeti

kararlarına katılımı sınırlı olan kadınlara yönelik iyileştirici stratejiler geliştirmeleri önem arz etmektedir.

Anahtar Kelimeler: Bakım Sürekliliği, Doğum Öncesi Bakım, Kültürel İnançlar, Evde Doğum, Somali.

PREFACE

I am Adam Abdulkadir, a dedicated multidisciplinary researcher, educator, and public health advocate with more than ten years of experience focusing on health service delivery, poverty measurement, public health, and nutrition programming, evidence-based health policy-making, and mixed-method health and nutrition interventions.

This dissertation, titled "Maternity Continuum of Care in Somalia," is the culmination of my journey as a doctoral candidate in Public Health at Başkent University. My motivation for this research stems from personal and professional experiences in Somalia. I have witnessed the impact of inadequate healthcare infrastructure and cultural obstacles on the health and well-being of Somali mothers and children. Growing up in Somalia, I saw many women facing health complications that could have been prevented with better access to maternity care. This knowledge inspired me to dedicate my academic journey to understanding and addressing these critical gaps in Somalia's maternal health continuum. This topic, particularly the challenges faced by women during pregnancy, childbirth, and postpartum care, has long resonated with me due to my firsthand experiences within Somalia's healthcare landscape. These challenges, compounded by inadequate healthcare infrastructure, cultural barriers, and persistent conflicts, deeply affect maternal and child health outcomes, making this study both a personal mission and a scientific endeavor.

My work with Save the Children International provided invaluable insights into the maternal and child health sector, reinforcing the urgent need to improve maternity care in Somalia. This experience fueled my resolve to investigate the continuum of care framework, focusing on antenatal, delivery, and postnatal services. Understanding the gaps and opportunities within this continuum is crucial for developing sustainable, context-specific interventions that can meaningfully impact maternal and child health outcomes.

This dissertation is dedicated to the mothers and children of Somalia, whose resilience amid adversity has been a continuous source of inspiration. I am grateful to my mentors, faculty members, and colleagues at Başkent University for their guidance and support.

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LIST OF SYMBOLS AND ABBREVIATIONS

ANC	Antenatal care
ANC4+	Antenatal care four or more visits
BCG	Bacillus Calmette-Guérin (tuberculosis vaccine)
CoC	Continuum of Care
DHS	Demographic and Health Surveys
DPT	Diphtheria, Pertussis and Tetanus vaccine
EAs	Enumeration Areas
EPHS	Essential Package of Health Services
EPI	Expanded Programme of Immunization
FBD	Facility-Based Delivery
FGDs	Focus Group Discussions
FGM	Female Genital Mutilation
FGS	Federal Government of Somalia
FD	Facility Delivery
FMS	Federal Member States
GFR	General Fertility Rate
GIS	Geographic Information System
HC	Health Center
ID	Institutional Delivery
IDI	In-Depth Interviews
IDPs	Internally Displaced Persons
KII	Key Informant Interviews
MCH	Maternal and Child Health
MMR	Maternal Mortality Ratio
MNCH	Maternal, Newborn, and Child Health
MOH	Ministry of Health
NDP	National Development Plan
P	P-value

PESS-2014	Population Estimation Survey of Somalia-2014
PNC	Postnatal Care
PSU	Primary Sampling Units
PPS	Probability Proportional to Size
RMNCH	Reproductive, Maternal, Newborn, and Child Health
SBA	Skilled Birth Attendant
SDGs	Sustainable Development Goals
SHDS	Somali Health and Demographic Survey
SHHFA	Somalia Harmonized Health Facility Assessment
SSU	Secondary Sampling Units
SVNRR	Somalia's Voluntary National Reviews Report (SVNRR)
TB	Tuberculosis
TNS	Temporary Nomadic Settlements (TNS)
TFR	Total Fertility Rate
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USE	Ultimate Sampling Units
WASH	Water Sanitation and Hygiene
WHO	World Health Organization
>	Greater than
<	Less than
=	Equal to
%	Percentage

1. CHAPTER 1: INTRODUCTION

The healthcare systems in conflict-affected regions have faced significant challenges due to the migration of qualified medical professionals. The shortage of healthcare workers, community health workers, nurses, and doctors has severely impacted the delivery of essential healthcare services and exacerbated existing health challenges in these regions (1). The maternal mortality ratio remains a critical issue worldwide, with more than 287,000 women dying from preventable pregnancy-related causes in 2020 in low and lower-middle-income countries, including sub-Saharan Africa. Markedly, Sub-Saharan Africa and Southern Asia accounted for about 95% of these deaths, and most could have been prevented, which highlights significant regional disparities. Eastern Europe and Southern Asia achieved the most crucial overall reduction in maternal mortality ratio (MMR): a decline of 70% (for instance, an estimated maternal mortality ratio "MMR" of 38 down to 11) and 67% (from an MMR of 408 to 134) between 2000 and 2020, respectively. At the same time, between 2000 and 2020, Sub-Saharan Africa singlehandedly or alone accounted for approximately more than 70% of maternal deaths despite making progress with a 33% reduction in maternal mortality ratio (MMR) (2).

These figures and estimates emphasize the urgent need for targeted interventions in high-mortality regions to prevent avoidable deaths and improve maternal health outcomes globally. Women living in remote areas are less likely to receive adequate health care. This is especially true for countries with sparse skilled healthcare providers, such as Sub-Saharan Africa (3). This is due to health system failure, which translates to inadequate quality of care, insufficient numbers of and inadequately trained health workers, shortages of essential medical supplies, and the poor accountability of health systems. Harmful gender norms and inequalities also significantly impact the prioritization of the rights of women and girls, particularly regarding their access to safe, quality, and affordable sexual and reproductive health services (4). In Somalia, many qualified medical professionals, such as medical doctors, qualified nurses, midwives, and skilled health technicians, were either killed or migrated overseas in search of safer environments and better opportunities (5). Maternal, neonatal, and child health issues are a top priority for the federal government of Somalia.

According to the Somalia Health and Demographic Survey (8), Somalia's total fertility rate is 6.9 children. Additionally, 91 percent of women interviewed in the last Somalia Health and Demographic Survey consider six or more children as their ideal family size. Age at first marriage is an essential indicator of exposure to the risk from conception and delivery, especially in a society in which all births occur within marriage. Around 16% of the ever-married reproductive-age women are married at the age of 15 years or below, while 34% are married at the age of 18 years or below. Women who marry early are known to have a higher chance of getting pregnant and having more children during their reproductive years. Given that the fertility rate has remained high over the years, all these factors mean that Somalia will likely witness a spike in population growth over the coming years (8).

1.1. Role of the Researcher

Conducting Somalia's first maternity continuum of care using a mixed method approach by triangulating quantitative with qualitative methods requires a multi-layered understanding of Somalia's health systems and socio-economic landscape. The researchers were responsible for the problem identification and hypothesis formulation of the study, designing the study methodology, managing and analyzing the secondary data from SHDS, collecting the qualitative primary data collection, interpreting the findings, and communicating and disseminating the results.

1.2. Statement of the Problem

Many such maternal and child deaths in Somalia and other resource-limited settings are due to preventable causes related to pregnancy and childbirth. They could be prevented through timely and appropriate detection and treatment for maternal, newborn, and child (9). Mothers and their babies are at high risk during the perinatal period, and the lack of a defined postnatal care package is a significant gap, which also contributes to the discontinuity between maternal and child health programs. Somalia is also the leading country in Female Genital Mutilation or Cutting (FGM/C), marking more than 98% and the highest rate of Type III FGM (Infibulation called Pharaonic), with 79% of all Somali women having undergone the procedure. At the same time, malnutrition is chronic, early marriage is common, and most births are delivered at home without the presence of a professional or skilled birth attendant attended by Traditional Birth Attendants (TBAs).

Somalia is among the 15 countries that the World Health Organization (WHO) marked as either high or very high-alert countries for maternal, newborn, and under-5 deaths. Most of the causes are either preventable or treatable. Somalia has one of the worst maternal conditions in the world. For instance, the maternal mortality ratio is 621 per 100,000 live births. An estimated 4 in 100 Somali children die during the neonate periods (up to 28 days), 8 in 100 before their first birthday, and one in eight before they turn five (10). Furthermore, as of the last Somali Health and Demographic Survey, only 24% of women had at least four antenatal care (ANC) visits, 21% of births were delivered at a health facility, 32% of births were delivered with the assistance of skilled health care provider, only 11% of mothers and 10% of births had a postnatal check within the first 2 days after delivery. For the hindrances in accessing health care during pregnancy, 65% of mothers lack money to attend the health facility, more than 62% are distant from a health facility, and 42% need or obtain permission to access services (8).

1.3. Significance of the Study

Poor maternal healthcare delivery in rural communities results in the majority of maternal, newborn, and child deaths during pregnancy, childbirth, and after delivery in Somalia (11). This is due to the unavailability and low utilization of maternal healthcare services, including emergency obstetric care, skilled birth attendance, and postnatal care. Despite increasing and more rigorous research being conducted on maternal and child health issues in Sub-Saharan Africa, there are many gaps in the maternal health evidence in Somalia. For instance, while there is little information available on the causes of maternal and child deaths in Somalia, there is no evidence for the level and determinants of the Continuum of care for maternal, newborn, and child health (MNCH) in Somalia. The result of this study provides an opportunity to discover the critical issues affecting women's health status in Somalia. It will assist the government, policymakers, health planners, academia, and other partners in the health sectors in formulating evidence-based and contextualized interventions to improve maternal, newborn, and child health services in Somalia.

1.4. Research Questions

1. What is the level of completion along a continuum of care for maternal healthcare services? And at which stage of care do women discontinue taking maternal healthcare services?
2. What factors affect the continuation of maternal healthcare services among women in Somalia?
3. What barriers hinder women from completing the maternity continuum of care among different community domains, such as urban, rural, internally displaced peoples (IDP), and nomadic areas?

1.5. Objectives of the Study

1.5.1. General Objective

- To assess the level of completion of the maternity continuum of care & its associated factors and explore maternal healthcare utilization gaps among women in Somalia

1.5.2. Short-Term Objectives

- To conduct comprehensive data management on the Somalia health and demographic survey 2020 data and analyze the maternity continuum of care utilization level among ever-married women in Somalia.
- To identify and analyze immediate factors influencing the uptake of antenatal care, skilled birth attendance, postnatal care services, and overall maternity continuum of care among ever-married women in Somalia.
- Engage with childbearing mothers, healthcare providers, and community leaders to understand utilization gaps and perceptions regarding maternal healthcare services.

1.5.3. Long-Term Objectives

- Develop and implement targeted interventions to address identified barriers and factors affecting the utilization of maternal healthcare services.
- Collaborate with governmental and non-governmental organizations to enhance the quality and accessibility of maternal healthcare services across Somalia.
- Establish a monitoring and evaluation framework to assess the effectiveness of implemented interventions and ensure sustainable improvements in maternal health outcomes.

2. CHAPTER 2: LITERATURE REVIEW

2.1. A Brief Introduction to Somalia

Somalia is in Africa, bordered by the Gulf of Aden, the Indian Ocean, Djibouti, Ethiopia, and Kenya. It is strategically positioned in the Horn of Africa, near the southern routes to the Bab el-Mandeb and pathways through the Red Sea and Suez Canal (12). Somalia's geography consists of semidesert, mountains, and highlands. It operates as a federated parliamentary republic, with the federal president serving as the chief of state and the prime minister acting as the head of government. Its economy is more traditional, with most of the population involved in subsistence livestock raising, agriculture, and fishery (13). Fragile and conflict-affected states like Somalia often lack consistent public service provision and struggle to respond to their populations' needs due to their weak governance structure and limited financial resources. Therefore, support from external organizations in the form of humanitarian and financial aid is joint. Persistence conflicts constantly disrupt economic activities, damage infrastructure, create displacement, and initiate corruption and poor accountability, leading to inefficiency in resource allocation and service delivery (14). The collapse of the military government in Somalia in 1991, following years of clan conflicts, resulted in the breakdown and devastation of public services, including healthcare infrastructures. The civil war and clan active wars destroyed much of the healthcare infrastructure, leading to decades of instability, a lack of central governance, and limited access to essential maternal and child healthcare services.

The absence of a strong government meant that international organizations and non-governmental organizations (NGOs) provided health services. However, large parts of the country like Somaliland and Puntland, which have enjoyed more excellent political stability, have managed to set up localized but still weak healthcare systems with better slightly outcomes (15). The humanitarian crisis in Somalia is among the most complex and long-standing in the world. Armed conflict, widespread violence, recurrent climatic shocks, elevated levels of humanitarian crises, and protection concerns. The Somali population has been undergoing severe health and humanitarian issues stemming from extended local-induced conflicts, ongoing uncertainty, and climate-related events such as severe droughts, flash floods, and desert locust attacks. This situation, coupled with a damaged and strained healthcare system, especially puts women and children at high risk (16).

Marginalized groups, including female-headed households, the elderly, children, people living with disabilities, and minority clans, experience extra problems in accessing healthcare owing to the complexities of insecurity, poverty, and sexual gender-based violence. Displacement and emergency further aggravate existing inequalities, especially for those facing discrimination, marginalization, and exclusion (17).

The Figure 1 below presents the distribution of household members by age, residence (urban, rural, and nomadic), and sex according to the Somalia Health and Demographic Survey 2020. Somalia's age distribution is characterized by a youthful population, with a significant proportion under the adolescent age (under 19 years old). There are few population differences in the three categories analyzed (urban, rural, and nomadic).

Figure 1: Distribution of population by age and sex according to residence, SHDS 2020

2.2. Gender Issues in Somalia

As reported in the Somali Health and Demographic Survey (8) 2020, table 1 below provides a snapshot of critical indicators reflecting the well-being and challenges women and girls face in Somalia. About 11.9% of ever-married women and girls aged 15 and older reported experiencing physical violence by their current or former husbands in the past 12 months, while 4.2% faced psychological abuse in the same period. Approximately 16.8% of women aged 20-24 were married before age 15, and about 35.5% were married before age 18. Somalia's total fertility rate (TFR) is 6.9 children per woman. According to the SHDS report, differences can be noted in women's TFRs by their type of residence. The TFR is highest among women residing in nomadic areas, at 7.3, and lowest among those living in urban areas, at 6.4 per woman (8).

Table 1: Characteristics of Women and Girls in Somalia (Adapted from SHDS-2020)

Indicator	Categories	% (Female)
The proportion of ever-married women and girls aged 15 years and older subjected to physical, sexual, or psychological violence by a current or former husband in the previous 12 months	Physical Violence	11.9
	Psychological Violence	4.2
The proportion of women aged 20-24 years who were married before age 15 and before age 18	Before age 15	16.8
	Before age 18	35.5
The proportion of girls and women aged 15-49 years who have undergone female genital mutilation/cutting by age	All FGM/C, including Sunna type	99.2
Adolescent birth rates per 1,000 women	Women aged 15-19 years	140 per 1,000 women
Total fertility rate in Somalia	Total children per woman	6.9 per woman

2.3. Healthcare Delivery System in Somalia

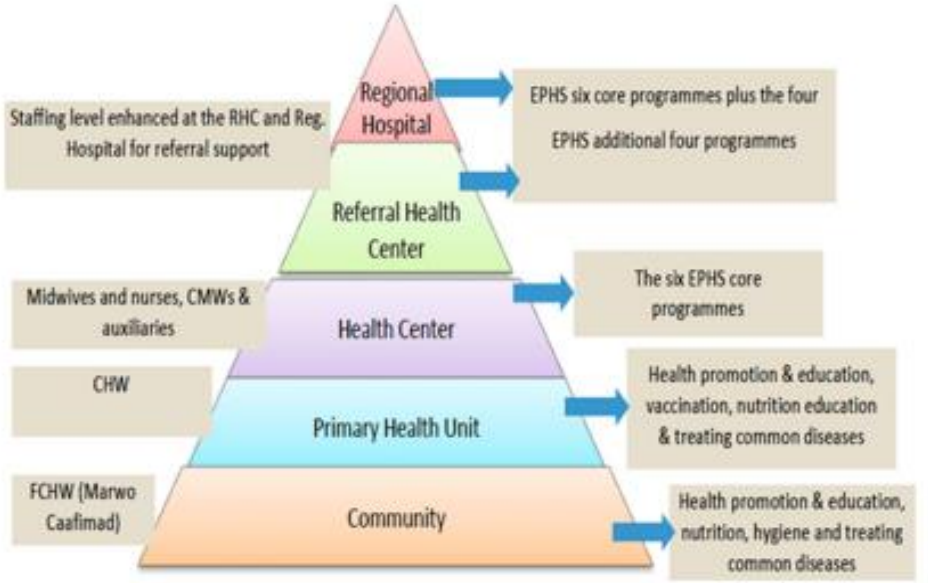
The World Health Organization (WHO) identifies six health system building blocks to evaluate and improve health outcomes effectively. These include Service delivery, Health workforce, Health information systems, Medical products, vaccines and technologies, Health financing, and Governance and leadership (18). Although Somalia has two-tier health delivery modalities, “public and private,” most of the population uses private health care. Somalia launched the Essential Package of Health Services (EPHS) in 2009 and was updated in 2020 to improve equitable access to acceptable, affordable, and quality health services. The Essential Package of Health Services (EPHS) 2009 outlines a comprehensive approach to healthcare in Somalia, addressing various health needs across different populations, Which comprised six core programs: (1) Maternal,

reproductive, and neonatal health, (2) Child health, (3) Communicable disease surveillance and control, (4) First aid and care of critically ill and injured, (5) Treatment of common illness, (6) As well as Human Immunodeficiency Virus (HIV), Sexually Transmitted Infections (STIs), and Tuberculosis (19). The four additional programs were management of chronic disease and other diseases, care of the elderly and palliative care, mental health and mental disability, dental health, and eye health.

The Essential Package of Health Services (EPHS) was established in 2009 in Somalia, and the Healthcare system was structured into five levels (tiers), as shown in the figure 2 below.

a. The lowest level is the Community Health Workers (CHW) known as Marwo Caafimaad in the local context that carry out health promotions and education, nutrition, hygiene, and treating common diseases in the remote and hard-to-reach areas where there is no healthcare unit. It is designed for one female health worker per 600-1000 population.
b. The second level is the primary healthcare unit (PHU), which encompasses two platforms: community health workers or mobile teams and healthcare service delivery at health posts. It is designed with one PHU per 1,000-10,000 population.
c. The third level of EPHS 2020 is healthcare delivery at health centers, which delivers the core EPHS programs. It is designed with one health center per 20,000-30,000 population.
d. The fourth level is the referral health centers or district hospitals, designed with one district hospital per 120,000-150,000 population.
e. The highest level of the EPHS is the regional/national hospital that carries out EPHS's six core programs plus the four EPHS additional four programs like (1) Management of Chronic Diseases and other diseases, care of the elderly and palliative care, (2) Mental health and mental disability, (3) Dental health, and (4) Eye health.

Figure 2: The Essential Package of Health Services (EPHS) 2009 structure in Somalia



These tiered structures were designed to accelerate progress toward Universal Health Coverage (UHC) in Somalia, ensuring that essential health services are accessible, equitable, and community-centered. Strengthening the basic healthcare system in Somalia is crucial for improving overall maternal health outcomes and addressing the needs of vulnerable populations, including mothers and children (20). Somalia's less active and fragile health system is shaped by various administrations like the federal and member state governments that adopt different policies, priorities, and health care service approaches, often influenced by local state administrations and international paradigms and resolutions (21). Somalia's primary health care system is currently on the agenda for ongoing health system reforms. The Country's healthcare system is decentralized with three levels of governance: federal level, state level, and locality or municipality level (22). The local communities are not sufficiently empowered to make healthy decisions and actively participate in improving their health status. At the same time, cultural and economic factors also contribute to decreased utilization of available health services (23). The availability and access of healthcare services in Somalia are critically low. Access to health and nutrition facilities remain imbalanced across Somalia, with rural, nomads and internally displaced populations having limited access to services because they are not well informed about available services and supplements (reported by 21% and 18% of households, respectively), the facilities are too far away (15%), or they struggle to register to get assistance (12%) of the households (24).

The goal of the Somalia Federal Ministry of Health is to support Somali people in attaining better health, enabling them to participate in economic and social development and contribute to alleviating poverty. (6). To attain these goals, the Ministry of Health has developed policies that are centered on the following priorities:

- Service delivery: Scaling up of essential and fundamental health and nutrition services (EPHS)
- Human resources for health: Overcoming the human resources crisis for health.
- Leadership and governance: Improving governance and leadership of the health system.
- Medicines, medical supplies, and technologies: Enhancing access to essential medicines and technologies.
- Health information system: Providing a functioning health information system.
- Health financing: Health financing for progress towards Universal Health Coverage
- Health infrastructure: Improving the physical infrastructure of the health sector.
- Emergency preparedness and response: Enhancing health emergency preparedness and response.
- Social determinants of health: Promoting action on social determinants of health and health in all policies

2.4. Healthcare Financing in Somalia

Healthcare financing in Somalia faces a range of multi-faceted challenges. The health service delivery in the country is primarily controlled by private providers, with government expenditure on healthcare remaining constrained. As a result, individuals often bear a substantial portion of healthcare costs through out-of-pocket payments. Internationally, Somalia's per capita healthcare expenditure is significantly low (25). The ground of financial risk protection in Somalia is a grave concern. With a weak taxation system in the Federal Government of Somalia, the primary sources of healthcare funding are development assistance and private spending. In contrast, public or private health insurance is non-existent (20). Currently, Somalia has three sources and streams for healthcare financing: external funding and public and private out-of-pocket spending to finance healthcare services after the collapse of the central military government of Somalia in 1991 (26).

2.5. Health Care Access and Infrastructure in Somalia

Somalia is often classified as a fragile state, a designation that reflects the ongoing challenges in its population's health and the functionality of its healthcare system. Overall, healthcare facilities are

inadequately equipped and lack the essential supplies and infrastructure for quality maternal healthcare services (27). The situation is impeded by geographical barriers and poor transportation networks, which make it challenging for women, especially in rural and remote areas, to access necessary maternal healthcare. Besides, the existing conflicts have destroyed most of the infrastructure, including roads and other essential social infrastructures, to aid transportation to the functional health facilities. This makes it difficult for pregnant women and postnatal mothers to be transported to health facilities where they can access services during an emergency. Insecurity further complicates matters, deterring healthcare workers and patients from seeking care. These factors contribute to high maternal mortality rates and underscore the urgent need for targeted interventions to rebuild the healthcare system, train healthcare professionals, and enhance access to maternal health services across the country (28).

In most rural and remote areas across the country, pregnant women and postnatal mothers' transportation to health facilities where they can access maternal and newborn services is entirely unavailable, and mothers need to walk to reach the nearest health facility. According to the recent Somalia Harmonized Health Facility Assessment (SHHFA) 2022-2023 summarized in table 2 below, the existing healthcare infrastructure in the federal states is deficient. There are significant variances in the availability of facilities among regions, suggesting uneven healthcare access that could impact health outcomes.

Table 2: Number of facilities by type and state in Somalia (adopted from SHHFA 2023 report).

	National referral Hospital	Regional Hospital	District Hospital	Health Centre	Primary Health unit	Specialist Hospital	Private clinic	TB center	Other (Health posts)	Total
Banadir	12	1	6	70	2	34	84	0	0	209
Galmudug	1	3	17	56	49	5	7	0	8	146
Hirshabelle	4	2	13	66	6	5	21	1	0	118
Jubaland	0	1	12	82	38	1	26	0	0	160
Puntland	5	8	23	141	116	6	17	0	0	316
Southwest	0	3	13	172	23	4	42	13	0	270
Total	22	18	84	587	234	55	197	14	8	1219

2.6. Human Resources for Health in Somalia to Expand Access to Maternal Healthcare

More than 30 years of conflict and instability in Somalia have severely disrupted the healthcare infrastructure, leading to a critical shortage of skilled healthcare providers, such as midwives, nurses, and obstetricians. Human resources for healthcare (HRH) play a crucial role in achieving health-related Sustainable Development Goals (SDGs) and are essential for universal health coverage (UHC). In humanitarian crisis areas such as Somalia, Health Workers play a critical role in ensuring the continuation of or increasing access to essential healthcare services, mitigating the spread and impact of infectious diseases, and improving maternal and child health services. Their integration into the existing health systems improves health outcomes and strengthens community resilience. The recent Somalia Harmonized Health Facility Assessment (SHHFA) 2022-2023 provides valuable insights into the healthcare workforce distribution across the six federal member states (29).

- **Physicians**: three per 10,000 people (equivalent to one physician for every 3,333 people)
- **Non-Physician Paramedical Practitioners**: One per 9,091 people
- **Nurses**: 3.9 per 10,000 people (equivalent to one nurse for every 2,564 people)
- **Midwives**: 1.5 per 10,000 people (equivalent to one midwife for every 6,667 people)

When combining physicians, non-physician paramedical practitioners, nurses, nurse-midwives, and midwives, there are 9.5 health workers per 10,000 people, equivalent to one health worker for every 1,053 people (29). Healthcare workers are often concentrated in urban areas, leaving rural communities underserved. This geographic inequality exacerbates health disparities, making it difficult for most mothers to access essential health services (27). The Ministry of Health in Somalia seeks to improve healthcare provision and guarantee adequate access to essential health services for all individuals, including women and children. Primary healthcare is the cornerstone of Somalia's health system, prioritizing necessary and life-saving services for disadvantaged populations and safeguarding households against financial hardship caused by healthcare expenses (30).

2.7. Maternal Mortality Globally, Sub-Saharan Africa, and Somalia

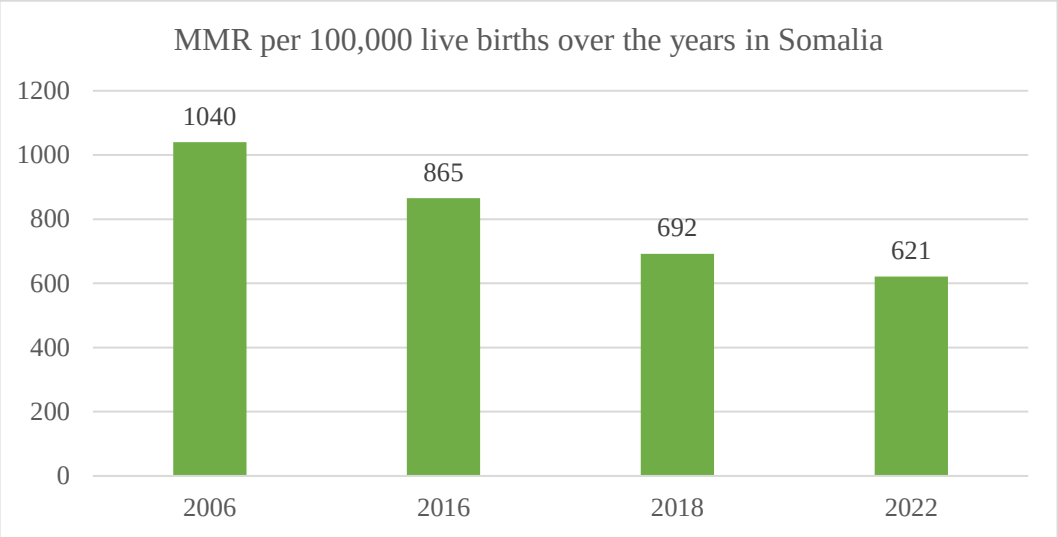
Globally, there has been significant progress in the maternal mortality ratio, and over the past two decades, the maternal mortality ratio has dropped by about 38% worldwide. In 2020, approximately

287,000 women died from preventable causes linked to pregnancy and childbirth, which is equivalent to 800 maternal deaths every day and approximately one in every two minutes, leading to a maternal mortality ratio (MMR) of 223 per 100,000 live births. However, in many low and middle-income countries, maternal mortality remains a public health problem, and almost 94% of all maternal deaths occur in low-resource settings (2, 9). The majority of maternal and child fatalities are linked to delays in obtaining care, which include the time taken to decide to seek safe delivery services, the time it takes to reach a healthcare facility, and the time taken to receive timely and appropriate care once at the facility (31). The World Health Organization (WHO) published a report in February 2023 on maternal mortality ratios between 2000 and 2020, the first report to present data reflecting the first five years of the SDGs.

Sub-Saharan Africa is the most significant global contributor to the maternal mortality burden, accounting for more than 70% of maternal deaths worldwide in 2020. The World Health Organization classified Sub-Saharan Africa as "very high alert" in maternal mortality (approximately 545 maternal deaths per 100,000 live births). Additionally, all three countries with the highest maternal mortality ratios (MMR) exceeding 1,000 maternal deaths per 100,000 live births in 2020 were in sub-Saharan Africa: 1,223 maternal deaths per 100,000 live births (South Sudan), 1,063 per 100,000 live births (Chad), and 1,047 per 100,000 live births (Nigeria) (32).

Somalia remains the most dangerous place for women to give birth, with a current maternal mortality ratio of 621 deaths per 100,000 live births, ranking among the highest globally (33). Maternal Mortality Ratio in Somalia was estimated at 1,040 per 100,000 live births in 2006, and 865 maternal deaths per 100,000 live births in 2016. In 2018, the MMR declined to an estimated 692 maternal deaths per 100,000 live births. In 2020, the MMR further decreased to an estimated 621 maternal deaths per 100,000 live births, according to the recent updates from the Government of Somalia. Since 2006, progress has been made in reducing maternal mortality in Somalia, from 1040 to 621 per 100,000 live births (40.5% reduction) as summarized in the figure 3 below (34). In addition to this, 1 in 20 mothers aged 15-49 die due to pregnancy or birth-related complications each year. The proportion of births assisted by skilled personnel has increased from 9% between 2016-2017 to 32% in 2020, which could partially explain the gradual reduction in maternal mortality over the past decade (35).

Figure 3: MMR per 100,000 live births over the years in Somalia (Adapted from WHO-2023 data).



2.8. Sub-Saharan Africa and Somalia Perspectives on Maternal Healthcare Utilization

The 2023 UN Report on Trends in Maternal Mortality from 2000 to 2020 revealed that Somalia continues to experience one of the world's highest ratios of maternal mortality, with 621 maternal deaths per 100,000 live births. This is in addition to persistently poor outcomes for newborns, with 36 newborn deaths per 1000 live births and 28 stillbirths per 1000 births (36). Maternal mortality and morbidity in Somalia are unacceptably high, with a maternal mortality rate of 621 deaths per 100,000 live births, one of the highest in the world. The 2020 Somalia Health and Demographic Survey (SHDS 2020) revealed poor ANC coverage of 31%, with only 24% of pregnant women attending at least 4 ANC visits and 21% delivering at the health facility. Moreover, care for expectant mothers throughout their pregnancy remains particularly poor, with only 32% of births attended by skilled health personnel. Husbands are the final decision makers in determining when to have children, how many children to have, the method of giving birth (C-section/Vaginal birth), and their access to family planning services (8). Cultural norms and traditional practices significantly influence access to healthcare. In many families, women often have limited control over their health decisions, with men typically making those choices. This dynamic can result in delays in seeking medical care. Furthermore, a widespread mistrust of modern medicine can impede the acceptance of specific treatments and preventive health measures.

2.9. Maternal Health Progress in Somalia

Despite ongoing humanitarian crises and health emergencies, Somalia's maternal healthcare system shows resilience. Local communities, NGOs, and international partners collaborate to deliver vital maternal healthcare services, such as mobile clinics, community health worker programs, and educational initiatives. These efforts target vulnerable groups, including internally displaced persons (IDPs) and refugees, who often encounter significant obstacles to accessing care (37). While there has been progress in some areas, Somalia still faces significant challenges in achieving universal access to quality maternal healthcare. Overcoming these issues requires continued investment in strengthening health systems, building capacity, empowering communities, and fostering multisectoral collaboration. According to a predictive analysis of the trends of maternal mortality ratio, Somalia will not meet the sustainable development goal target 3.1 of reducing the maternal mortality ratio to less than 70 per 100,000 live births. The country will not also meet the targets in reducing neonatal mortality to below 12 per 1000 live births and under-5 mortality to below 25 per 1000 live births by 2030 (38).

According to Somalia's Voluntary National Reviews Report 2022 (SVNRR) (39) On Sustainable Development Goals, especially Goal 3, Somalia still faces significant challenges in maternal mortality rates, which can be attributed to low uptake of antenatal care and postnatal care and a low number of deliveries at health facilities or with skilled health care providers. By embracing opportunities for innovation and partnership, Somalia can advance towards the Sustainable Development Goals (SDGs) related to maternal and child health, ensuring the well-being of mothers and newborns throughout the country (21). With support from international partners and donors, the Somali government has worked to enhance maternal and child health outcomes by creating and implementing national policies, strategies, and programs. These initiatives strengthen healthcare infrastructure, train professionals, encourage community involvement, and improve access to essential maternal healthcare services nationwide (25).

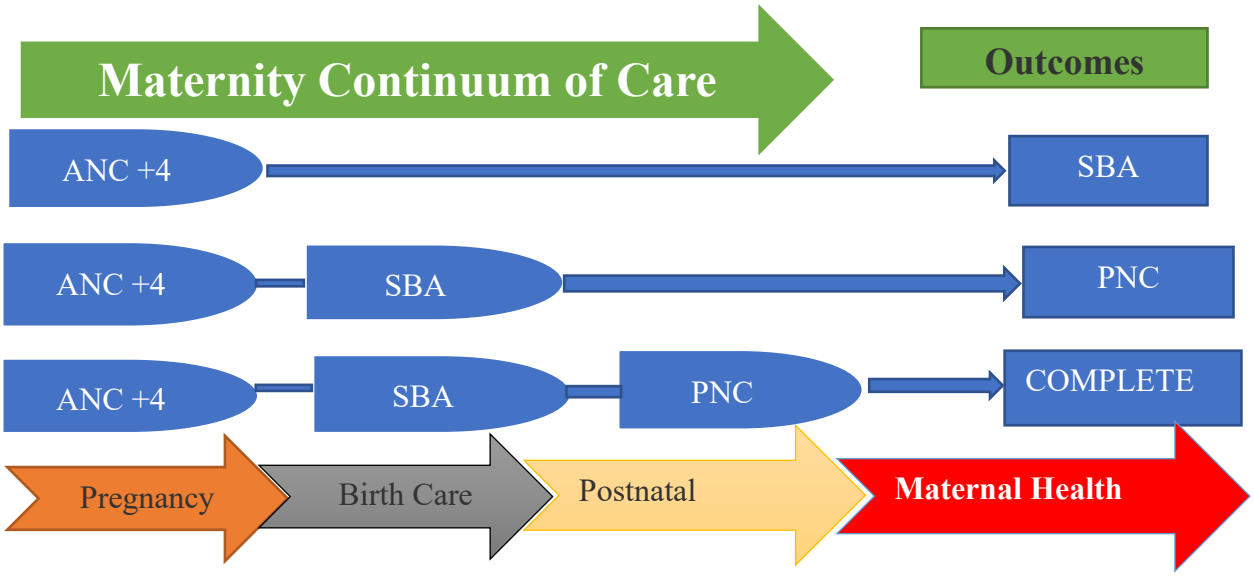
2.10. Maternity Continuum of Care Services

Despite efforts by Somali authorities to improve maternal and child health situations, maternal mortality in Somalia is still at one of the world's highest levels, and there are several reasons for this. The healthcare system in Somalia is hugely underfinanced and of inadequate quality. There is insufficient and underqualified staff, while access to roads and health centers is in short supply.

Continuum of Care (CoC) refers to the continuity of care throughout pregnancy, birth, and after delivery (i.e., antenatal care, skilled birth attendance, and postnatal care. Ensuring that continuity of care for maternal, newborn, and child health has become a key to improving the health of mothers, newborns, and children. The continuum of care has newly been emphasized as a core principle of programs for maternal, newborn, and child health and as a method to reduce the burden of maternal, newborn, and child deaths (40). Promoting access to quality healthcare services and a continuum of care plays a pivotal role in reducing maternal and child mortality rates, improving health outcomes, and achieving sustainable development goals. The primary services for the continuum of care, including antenatal care, facility delivery, and postnatal care, are recognized to reduce maternal and child mortality and morbidity in high-burden settings. Maternal and child mortality rates are indicators used globally to determine countries' health, economy, and developmental status. One of the first indicators to measure the country's health system functionality is to see the maternal and child mortality rates. Most of the low and lower-middle-income countries did not make tangible progress in reducing the maternal and child mortality rates (41).

Somalia is unlikely to achieve the SDGs given the lack of evidence-based knowledge that informs government interventions to improve maternal and newborn health (39). Maternal, newborn, and child deaths are complex issues involving the interplay of multiple actors and factors that will require various interrelated and non-linear strategies, including cultures, behaviors, perceptions, practices, geographical locations, and healthcare factors. The majority of maternal and neonatal deaths could be avoided if a Continuum of Care (CoC) is provided in a structured pathway from pregnancy to birth and to the first week of the life of the newborn child, as you can see in Figure 4 below. The maternity continuum of care refers to a spectrum of healthcare services provided to pregnant women and newborns throughout pregnancy, childbirth, and the postnatal period to ensure safe motherhood and healthy outcomes for both mother and child.

Figure 4: Hypothesis structural relationships for CoC, Adapted from Kerber (Lancet) and Ajinkya (India).



2.10.1. Antenatal Care Services

Antenatal Care (ANC) is the care that a mother receives during pregnancy and delivery. It is essential for the survival and well-being of the mother and newborn child. Antenatal care service is also vital for reducing the risks associated with morbidity and mortality for the mother and child during pregnancy and delivery. Antenatal care visits allow medical staff to identify health problems related to pregnancy as early as possible, which will facilitate early detection, diagnosis, and treatment (42). During pregnancy, quality antenatal care (ANC) involves nutritional counseling, multivitamin, and mineral supplementation, adequate visits with skilled personnel, blood and urine tests, preventive antibiotics, tetanus toxoid injections, an ultrasound scan, and health education on pregnancy and birth danger signs, and common physiological symptoms (43). An excellent antenatal care program ensures the timely detection and treatment of problems during pregnancy. Different studies related to antenatal care service utilization found that ANC received from a skilled provider reduces the risk of pregnancy complications and adverse pregnancy outcomes such as stillbirths, intrauterine growth retardation, preterm births, low-birth weight, fetal abnormalities, and other newborn complications, possibly mediated through health promotion, disease prevention, screening and treatment which increases maternal and newborn survival (44).

Antenatal care (ANC) is crucial in reducing maternal and perinatal mortality and morbidity by providing health promotion, disease prevention, and diagnosis and enhancing mothers' and newborns' health and well-being. By focusing on health promotion, disease prevention, and early diagnosis, ANC significantly lowers maternal and perinatal mortality and morbidity rates. Critical interventions during antenatal care, such as vaccinating the mother, screenings for complications for both the mother and the baby, and preventive treatments, such as pre-eclampsia and eclampsia, have a profound impact on health outcomes. For instance, screening for pre-eclampsia can reduce the risk of maternal death due to hypertension by 48% (45). For the timing of Antenatal Care visits, World Health Organization Antenatal Care model (WHO-ANC model) refers to the 1st ANC visit between 8-12 weeks of pregnancy, the 2nd visit between 24-26 weeks, the 3rd visits at 32nd week, and the 4th visit between 36-38 weeks of gestation. Furthermore, regarding the number of Antenatal Care visits, the WHO recommendation for focused ANC visits refers to 1st visit within 12 weeks, the 2nd visit at 20th week, the 3rd visit at 26th week, the 4th contact at 30th week, the 5th contact at 34th week, the 6th contact at 36th week, the 7th contact at 38th week and the 8th contact at 40th week (46).

Data from the Somalia Health and Demographic Survey 2020 showed that only 31 percent of women aged between 15-49 received antenatal care from skilled health workers during the pregnancy of their last birth (from doctors/clinical officers or nurses/midwives/auxiliary midwives at least once. Twelve percent of women received antenatal care from a doctor or clinical officer, while 19 percent received care from a midwife, nurse, or auxiliary midwife. Sixty-eight percent of women did not make antenatal care visits during their most recent pregnancy five years before the Somalia Health and Demographic Survey 2020. Antenatal care indicator is measured as the percentage of women aged 15-49 with a live birth in a given period that received antenatal care four or more times (8). Due to data limitations, it is impossible to determine the type of provider for each visit; for example, the current Somali Health and Demographic Survey did not collect information on the type of provider for each visit.

2.10.2. Birth Care

Despite efforts by the Somali government and international partners to increase access to mothers, mainly rural, the number of home deliveries is still high. Complications during pregnancy and childbirth contribute to a significant number of maternal and newborn deaths and disabilities in the world, specifically in countries like Somalia. Home deliveries are more likely to be unhygienic, conducted by an unskilled service provider, followed by complications such as prolonged/obstructed labor, hemorrhage, and sepsis, often contributing to a maternal near miss or death (47). Mothers die due to lack of access to emergency obstetric care for timely treatment of complications of childbirth such as hemorrhage, obstructed labor, eclampsia, and infection (34).

A skilled birth attendant (SBA) is a professional, such as a midwife, physician, obstetrician, nurse, or other health care professional, who provides essential and emergency health care services to women and their newborns during pregnancy, childbirth and postpartum (48). Many studies reported that maternal deaths occur due to obstructed labor, obstetric hemorrhage or sepsis, eclampsia, unsafe abortions, and prenatal and postnatal infections. Most of these deaths can be prevented if skilled professional services and adequate facilities are made available. Skilled birth attendants (SBAs) and Facility-based Delivery (FbD) are critical in reducing infant and maternal mortality globally (49). Delivery within a health facility and with the attendance of a skilled healthcare provider is critical in reducing health risks to both the mother and baby. Previous studies have shown that utilizing facility-based delivery is usually affected by socio-cultural norms, such as cultures, behaviors, perceptions, practices, and other factors like cost, long-distance, accessibility, availability, and quality of the services (50). Continuous uptake of antenatal care, skilled birth attendance, and postnatal care is necessary to improve Maternal, Newborn, and Child Health outcomes in low- and middle-income countries like Somalia.

2.10.3. Postnatal Care

Postnatal care is the care given to the mother and her newborn baby immediately after the birth and for the first six weeks of life. Attendance to maternal, newborn, and child health services during pregnancy (ANC), delivery (SBA), postnatal follow-up (PNC), and childhood vaccinations are crucial factors contributing to a healthy pregnancy, delivery, and childcare. The maternal, newborn, and child health (MNCH) services constitute the core maternal, neonatal, and infant health continuum of care. Somalia faces high maternal and child mortality rates, which are connected to the attributes of low uptake of antenatal care, a small number of deliveries at health facilities or with skilled health care providers, and postnatal care immediately after birth and for the first six weeks of life.

2.11. Maternal Healthcare Utilization Disparities Across Geographical Locations in Somalia

Different studies have reported that geographical remoteness is associated with a higher chance of disability or the possibility of dying during pregnancy and childbirth, and it has a strong relationship with cultural norms, socioeconomic status, values of the pregnant women, and also the communities they live with. Institutional delivery is one of the critical approaches that can reduce maternal deaths by approximately 16%-33%, especially in developing countries (51). Antenatal care visits, institutional delivery, and postnatal care in rural areas in Somalia have been historically very low. Studies have shown that coverage for antenatal care, institutional delivery, and postnatal care for urban women can reach at least twice that for rural women. Many studies have shown that antenatal care visits between wealth categories like rich and poor households have reported a higher average of 2.3 visits compared to 0.7 trips in the poorer families in Somaliland (52).

In Somalia, healthcare delivery disparities between urban, rural, and nomadic populations always contribute to unequal and inadequate access to fundamental health services, including maternal and child healthcare. A combination of geographical, infrastructural, socioeconomic, cultural, and other factors influences these disparities. Despite many efforts from the different layers of governments in Somalia and other stakeholders, geographical disparities persist. Geographical isolation and poor physical access to health facilities in remote and hard-to-reach rural and nomadic areas are significant barriers to utilization. Lower levels of institutional maternity care and unavailability of essential MNCH services have been reported among Somalia's nomadic and rural populations.

Furthermore, maternal care-seeking also creates a high disparity between Somalia's nomadic, rural, and urban populations. The shortage and unequal distribution of health workforce, coupled with uneven availabilities of health facilities, have greatly harmed the delivery of MNCH services, especially the nomadic and hard-to-reach populations.

2.12. The Somali Health and Demographic Survey (SHDS 2020)

The Somali Health and Demographic Survey (SHDS 2020) was designed to collect, analyze, and disseminate demographic data on reproductive health, maternal and child mortality, family planning and fertility, nutrition, and health care utilization in Somalia. The main objective of the Somali Health and Demographic Survey was to provide evidence on the health and demographic characteristics of the Somali population that will guide the development of programs and formulation of effective policies. This survey has five specific objectives: (1) Examine fundamental indicators of maternal and child health (2) Measure fertility and birth spacing (3) Describe patterns of knowledge and awareness of the Human Immunodeficiency Virus (HIV) and other sexually transmitted infections (4) Estimate infant and child mortality (5) Understand the extent and patterns of gender-based violence and Female Genital Mutilation/Cutting.

The Somalia Health and Demographic Survey identified urban, rural, and nomadic sampling strata from 16 regions out of the 18 pre-civil war Somalia regions. With the exception of the Banadir region, which is considered entirely urban, each region was stratified into urban, rural, and nomadic areas, yielding a total of 55 sampling strata. All three strata of Lower Shabelle and Middle Juba regions and the rural and nomadic strata of the Bay region were excluded entirely from the survey due to security reasons. A final total of 47 sampling strata formed the sampling frame. This nationally representative survey used a multistage cluster sampling design to collect data on reproductive health, maternal and child mortality, family planning and fertility, nutrition, and health utilization in Somalia.

2.13. Limitations of the Somali Health and Demographic Survey

While DHS provides some of the most reliable and frequent population-based data for many developing countries and includes rigorous training and built-in and random data checks, the surveys have limitations due to sampling error, reporting, and recall bias. The questionnaires collect information based on women's recollections of events during the previous five years. The longer the event occurred in the past, the less likely the woman is to remember whether or not care took

place. DHS does not include the health or aging populations and has fewer data on the prevalence and outcomes of broader communicable and non-communicable diseases. It is also carried out at five-year intervals, which limits the ability to carry out contemporary cross-sectional comparative analysis. Approximately 2.6 million Somalis are currently displaced within their own country, and the SHDS 2020 did not include the internally displaced people (IDP) domain. According to the 2020 Somalia Health and Demographic Survey (SHDS), several variables were dropped due to the quality of data collection processes.

3. CHAPTER 3: METHODS AND MATERIALS

3.1. Introduction

This study employed a mixed-method study first to describe the level of completion and assess the factors affecting the continuum of care for maternal healthcare service utilization using the Somalia Health and Demographic Survey conducted in 2020 in the quantitative section. Then, the study explored the barriers to the maternity continuum of care hindering the utilization of maternal healthcare services using qualitative primary data to triangulate the quantitative results. This mixed-method research combined the generalizable, easily replicable, and statistically quantifiable method (quantitative study), specific, detailed insights, and exploratory qualitative study. A mixed-method approach usually requires skills to bring two methods of datasets or findings together appropriately. This study aimed to provide a better and deeper understanding of the continuum of care for maternal healthcare services. This will provide a strong inference about the continuity of maternal, newborn, and child health (MNCH) services. In this study, the two methods addressed different types of questions, collected various kinds of data (both secondary and primary), and delivered different results that complemented each other. Furthermore, the quantitative section assessed the coverage of maternity continuum of care services and its associated factors. In contrast, the qualitative section explored the barriers to receiving maternal healthcare services among women of reproductive age.

3.2. Quantitative Section (Secondary data)

3.2.1. Data Source

The quantitative section of this study used secondary data from the 2020 Somali Health and Demographic Survey (SHDS 2020) that was carried out by the Somalia National Bureau of Statistics (39). The 2020 SHDS is a nationally representative, large-scale, cross-sectional survey. Four types of questionnaires were used in the SHDS 2020: the Maternal Mortality Questionnaire, the Household Questionnaire, and two individual questionnaires: the Ever-married Woman's Questionnaire and the Never-married Woman's Questionnaire. The ever-married woman's questionnaire collected information from all women aged 15 to 49 years who were currently married, divorced, or widowed. In all households, eligible women were asked questions on (a) Background characteristics, such as age, education, literacy, and media exposure, (b) Birth history and child mortality (c) Knowledge and use of family planning methods (d) Antenatal care, delivery, and postnatal care (e) Breastfeeding and infant feeding practices (f) Vaccinations and children's

illnesses (g) Marriage and sexual activity (h) Fertility preferences, and other characteristics. Computer-Assisted Personal Interviewing (CAPI) was used, and interviewers used smartphones to record responses during interviews.

3.2.2. Sampling and Recruitment

The sample for the Somali health and demographic survey (SHDS 2020) was designed to provide a national estimate of maternal mortality and estimates for fertility, child mortality, and other relevant indicators at the national level, as well as for each of the 18 pre-war geographical regions, and separately for urban, rural, and nomadic residences. The target population was women of reproductive age (15 to 49 years of age) and children under five who resided in households in the country when the survey was conducted. This nationally representative survey used a multistage cluster sampling design to collect data on reproductive health, maternal and child mortality, family planning and fertility, nutrition, and health utilization in Somalia. This study used the information on selected maternal and child health indicators from the SHDS 2020. The data was collected from women of reproductive age (15–49 years) who were administered a standard questionnaire. The quantitative section of this thesis adopted the sample size framework used by the Somali Health and Demographic Survey 2020.

The sample for the SHDS was designed to provide estimates of key indicators for the country as a whole, for each of the eighteen pre-war geographical regions, which are the country's first-level administrative divisions, and separately for urban, rural, and nomadic areas. With the exception of the Banadir region, which is considered entirely urban, each region was stratified into urban, rural, and nomadic areas, yielding a total of 55 sampling strata. All three strata of Lower Shabelle and Middle Juba regions and the rural and nomadic strata of the Bay region were completely excluded from the survey due to security reasons. A final total of 47 sampling strata formed the sampling frame. Using up-to-date, high-resolution satellite imagery and on-the-ground knowledge of staff from the respective ministries of planning, all dwelling structures were digitized in urban and rural areas.

Enumeration Areas (EA) were formed on screen through a spatial count of dwelling structures in a Geographic Information System (GIS) software. After that, a sample ground verification of the digitized structures was carried out for large urban and rural areas, and necessary adjustments

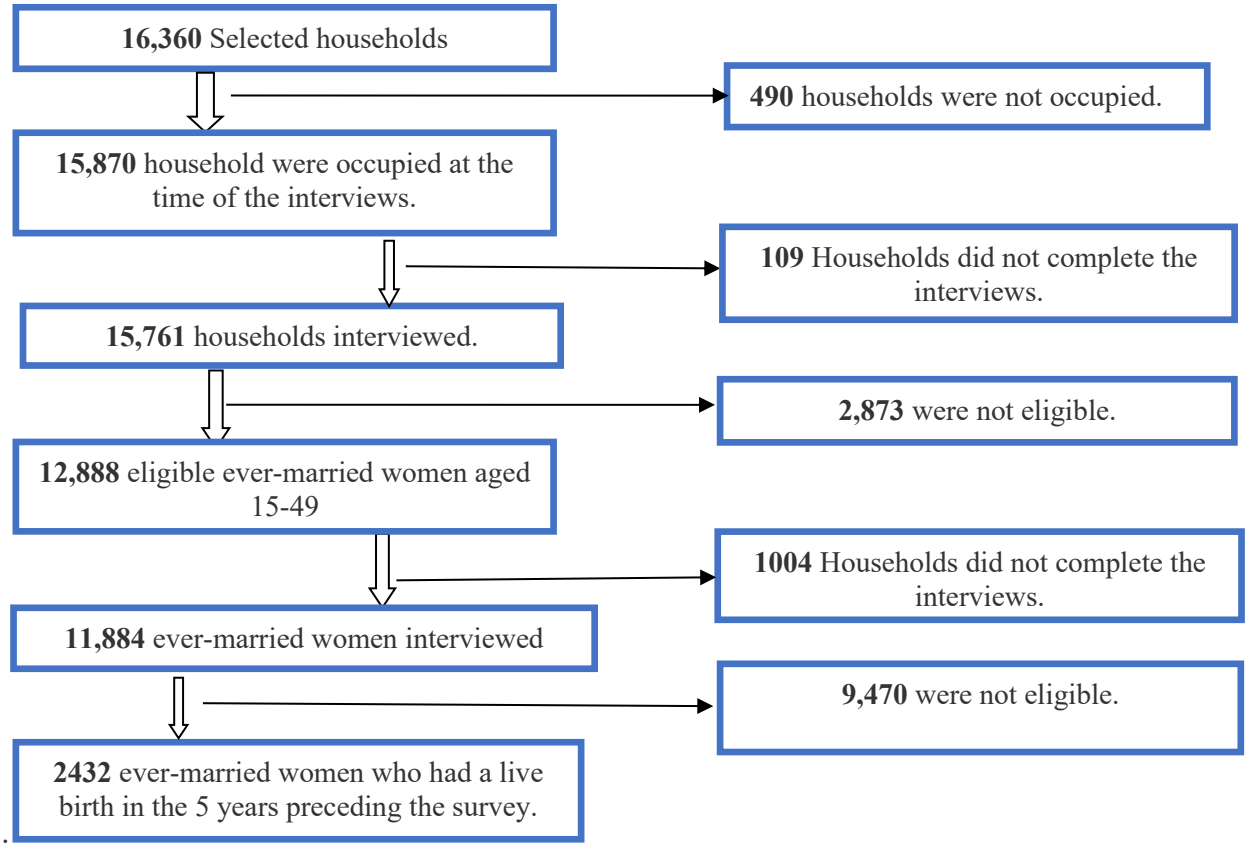
were made to the frame. Each EA created had a minimum of 50 and a maximum of 149 dwelling structures. A total of 10,525 EAs were digitized: 7,488 in urban areas and 3,037 in rural areas. However, because of security and accessibility constraints, not all digitized regions were included in the final sampling frame. 9,136 EAs (7,308 in urban and 1,828 in rural) formed the final frame. The nomadic frame comprised an updated list of temporary nomadic settlements (TNS) obtained from the nomadic link workers tied to these settlements. A total of 2,521 TNS formed the SHDS nomadic sampling frame.

The Somalia Health and Demographic Survey (SHDS) followed a three-stage stratified cluster sample design in urban and rural strata with a probability proportional to size for the sampling of Primary Sampling Units (PSU) and Secondary Sampling Units (SSU) (respectively at the first and second stage) and systematic sampling of households at the third stage. For the nomadic stratum, a two-stage stratified cluster sample design was applied with a probability proportional to size for sampling PSUs at the first stage and systematic sampling of households at the second stage. To ensure that the survey precision is comparable across regions, PSUs were allocated equally to all areas, with slight adjustments in two places. Within each stratum, a sample of 35 EAs was selected independently, with probability proportional to the number of digitized dwelling structures. In this first stage, 1,433 EAs were allocated (to urban - 770 EAs, rural - 488 EAs, and nomadic - 175 EAs), representing about 16 percent of the total frame of EAs. All households were listed in the urban and rural selected EAs, and information on births and deaths was recorded through the maternal mortality questionnaire. The ultimate sampling units (USUs) for rural, urban, and nomadic areas were systematically selected from listed households in the cluster.

3.2.3. Data Management and Analysis

About 11,884 ever-married women of reproductive age (15-49 completed the interviews. Our study focused on ever-married women who had a live birth in the five years preceding the survey (n=2432), as you can see in Figure 5 below. The survey further restricted the women's most recent live births in the recall period. Nine thousand four hundred seventy were not eligible due to either not having children under 5 years, incomplete data in the maternal and child health questions, or not fitting the targets, and the analysis removed them. Marriage is associated with childbearing; a woman can have a child only if married, as accepted in the community. That is why we restricted our study to only the ever-married women.

Figure 5: Selection process of eligible women aged 15-49 years old using Somalia Health and Demographic Survey 2020



To calculate the completion of all three essential maternal health interventions in the continuum of care (ANC4+, SBA, and PNC), we used 0 to 1, where 0 indicates no intervention completed and 1 indicates completion of the interventions or services. The study used and constructed three different outcome models reflecting the continuum of care from (1) care during pregnancy (ANC), (2) birth care (Skilled Birth Attendant "SBA" or Facility Delivery "FD"), and (3) postnatal care (PNC). The first model assessed ANC4+ as an outcome in which women receiving at least four ANC from skilled providers were coded as "1" and "0" for those women who did not receive ANC from skilled providers. In the second model, receiving ANC and SBA or Facility Delivery (FD) from skilled providers was the outcome. We coded "1" for women who received ANC and SBA from experienced providers and "0" for women without ANC and SBA. In the third model, the outcome was that women who received ANC, SBA, and PNC from skilled providers were considered to have a continuum of care. The chi-square test is used for bivariate analysis to assess the association between the independent variables and the four outcome Models. We used multivariable logistic regression in all three models to identify correlates of the continuity of care from ANC to SBA

and then to PNC analysis. We used STATA (version 18) and assessed complex survey analysis reflecting sample weight, enumeration areas as a primary sampling unit, and place of residence (urban, rural, and nomadic) as strata for descriptive and regression analysis.

3.2.4. Outcome (Dependent) Variables

This study's maternity continuum of care comprises three dummy variables as dependent variables: ANC4+, SBA, and PNC within 48 hours. We defined the maternity continuum of care as the completion and continuity of care throughout pregnancy, birth, and after delivery (i.e., antenatal care, skilled birth attendance, and postnatal care) (53). We defined ANC4+ percentage of women with a live birth who received WHO-recommended antenatal care visits throughout their pregnancy at least four times. We defined Skilled Birth Attendant (SBA) as births attended by skilled health personnel such as a midwife, doctor, nurse, or other health care professional in a given period. We defined postnatal care as the care women and their newborn babies received immediately after birth, and we limited our continuum of care to two days or 48 hours after childbirth. We constructed each of the three dependent variables into binary variables, with complete coded as one and incomplete coded as 0. Continuum of Maternity care was assumed complete if the mother utilized all three services, like receiving at least four ANC services, delivered by a skilled birth attendant, and receiving a postnatal check within 48 hours after delivery during the most recent pregnancy. For this study, CoC was classified as complete when the mother gets the following three levels of services (antenatal care, institutional delivery, and post-natal care):

- At least 4 ANC visits during pregnancy for healthcare check-ups.
- Skilled birth attendants attend deliveries, e.g., doctors, nurses, midwives, etc..
- Postnatal Care check-ups of the mother and newborn within 2 hours, 48 hours, or 41 days after childbirth.

This was measured according to the World Health Organization (WHO) definitions. The table 4 below summarizes the three services for mothers to analyze in the maternity continuum of care, categorized into stages per the service uptake.

Table 3: Outcome variables

Pregnancy	-	Four or more visits to ANC (ANC4+)
Birth Care	-	Skilled Birth Attendance (SBA)
Postnatal Care	-	PNC within 48 hours after childbirth (at least once after discharge from health facilities or within 48 hours after childbirth at their home

3.2.5. Explanatory (Independent) Variables

Four categories of correlates influencing the maternity continuum of care were extracted from the SHDS 2020: family and individual characteristics, community characteristics, socio-economic status, and interactions with the healthcare system as referred in the table 5 below.

Table 4: Independent variables

Determinants	Variables (Examples)
Family & Individuals	Women's age, whether the last child's pregnancy was intended, women's autonomy in decision-making of her healthcare, and so on.
Community	Women's geographical location — whether urban or rural—and whether the distance to health facilities is a big problem.
Socioeconomic	Women's educational attainment, husband's/partner's educational attainment, wealth quintile, and media exposure at least once a week.
Healthcare interaction	Timing of the first antenatal check and whether the women were told about Signs of pregnancy complications at the time of the last antenatal visit.

We included three predictors in the models: (1) socio-demographic factors, (2) socio-economic factors, and (3) cultural factors, which were all found in the previous literature. Socio-demographic factors included maternal age at the recent births, women's level of education, marital status, birth order of the most recent child, and number of children. Socio-economic factors included place of residence (urban, rural, or nomadic), women's employment (working or not working, and household wealth quintile (poorest, poorer, middle, richer, or richest). Cultural factors included exposure to mass media (listing to radio as yes or no). We categorized a woman as having access to mass media if she had access to the radio at least once a week and no access if she did not listen to the radio at least once a week. We assessed women's empowerment or decision-making power in determining their healthcare, and we scored full empowerment for decisions involving the woman or jointly with her husband (full power) and decisions taken without the woman's involvement (no power) (54).

3.2.6. Modelling and Maternity Continuum of Care calculations

Different approaches were used since no representative measurements were used to express the coverage level of the continuum of care for maternal, newborn, and child health (MNCH) services. For instance, previous studies (55-60). They have mainly used three or four primary CoC services (antenatal care, institutional delivery, post-natal care, and complete immunization of their child). In this study, we assessed the level of completion and determinants of CoC using three outcome

variables for the mothers instead of focusing on all the continuum of care service utilization outcome variables. This study used a population-level maternity continuum of care framework based on integrated service delivery by using three significant packages for maternal healthcare: Antenatal Care four times (ANC4+), Skilled Birth Attendant (SBA), and mother's Post-natal Care (PNC). Antenatal Care (ANC) is the care that pregnant women receive from skilled healthcare providers more than 4 times during pregnancy.

The information regarding ANC4+ was obtained from the "number of ANC visits during pregnancy or how many times the mother received antenatal care during pregnancy?". Facility-based delivery is the delivery of pregnant women at a health facility attended by healthcare professionals (doctors, midwives, and nurses). The information regarding skilled birth attendant or institutional delivery (ID) was obtained from the question: "Place of delivery or where did you give birth to the last child?" and women were considered to have institutional delivery if they had a delivery at a hospital, clinic, or any other health facility or if a skilled birth attendant assisted their delivery. Furthermore, information on the PNC of the mother was obtained from the question: "Respondent's health checked before discharge, or did anyone check on your health while you were still in the facility?" as you can see in table 6 below.

Table 5: Percentage distribution of the four MNCH services received by women and children.

Pathway	ANC4+	SBA	PNC within 48hrs	Frequency	Percentage
1	–	–	–		
2	+	–	–		
3	+	+	–		
4	–	–	+		
5	–	+	–		
6	–	+	+		
7	+	–	+		
8	+	+	+		
Total					**100%**

+ Received the service; - Did not receive the service.

The table above shows the combination of maternal healthcare services (three primary services) that women received. It summarizes this study's three major outcome variables: antenatal care, institutional delivery, and postnatal care.

3.3. Qualitative Section

3.3.1. Research Setting and Design

Somalia has a population of 17 million, with 44 percent living in urban areas, 23 percent living in rural areas, 26 percent in nomadic areas, and 9 percent living in internally displaced settings (IDPs). The country has one of the weakest healthcare systems in Sub-Saharan Africa, hence, some of the lowest health indicators in the world (61). The qualitative study was carried out in six regions of Somalia based on the representation of different socio-geographical contexts, such as urban, rural, IDPs, agro-pastoralist, and nomadic-pastoralist. The six areas included in this study were categorized according to their socio-geographical domains. These regions and the interviewed domains include Togdher (IDPs and urban), Bari (nomadic-pastoralist), Mudug (rural and urban), Galdugud (urban and IDPs), Banadir (IDPs), and the Lower Juba region (agro-pastoralist). The study adopted two main data collection methods: focus group discussion (FGD) and an in-depth interview guide, followed by field notes. Five FGDs (44 participants) from childbearing and recently delivered mothers in five different regions of Somalia were conducted.

3.3.2. Sampling Techniques and Recruitment

This section employed a qualitative descriptive approach that investigated the experiences of childbearing mothers in MNCH service utilization. This qualitative descriptive approach used Focus Group Discussions and In-depth Interviews. Focus group discussion (FGD) is a simple and effective way that requires a small number of participants (usually 8-12) and can be completed quickly. Focus Group Discussion can explore people's feelings and deep thinking; when one person explains one outcome, another participant can complement it. FGD can be used to analyze the outcomes that cannot be quantified or explained statistically. The results of the FGD are broad and open-ended, with various in-depth discussed explanations that each participant adds their concerns openly. Apart from the above-explained strengths, some of the weaknesses of the FGD include some of the participants not voicing their opinions freely, some of them being shy about sensitive topics, results bias, and others (62). To explore barriers in maternal healthcare service utilization, we organized five focus group discussions of childbearing mothers from different segments of society, such as nomadic pastoralists, agricultural pastoralists, urban settings, etc.

3.3.3. Data Collection Method

3.3.3.1. Focus Group Discussion

Interview guide for the FGDs (Childbearing mothers): The principal investigator and data collectors conducted face-to-face open discussions with the selected childbearing mothers. Before starting the in-depth discussion as a group, the mothers were asked to complete a short personal profile questionnaire to capture the following information: - age, residence, marital status, literacy, number of children, occupation, income, and other demographics. Childbearing mothers participating in the FGDs were also asked to discuss an open-ended question about their life experience of healthcare service utilization. To describe and explore barriers to the maternity continuum of care, probing questions related to factors negatively affecting the continuation of MNCH services, barrier factors, and promotors for the continuation of MNCH services were asked. To clarify the questions, the childbearing mothers' interview guide was pre-tested. Five FGDs (44 participants) from childbearing and recently delivered mothers in five different regions of Somalia were conducted. The communities were categorized into urban, rural, IDPs, agro-pastoralists (beeraley-baadiye), and nomadic-pastoralists (reer-guuraa), as described in Table 7. The FGD discussions lasted between 45 minutes and 1 hour. Seventeen in-depth interviews (IDIs) involving four policymakers, six healthcare providers, three community leaders, two traditional birth attendants, and two recently delivered mothers across Somalia were conducted.

Table 6: Characteristics of the Focus Group Discussion Participants

FGD Participants (Mothers with a child less than two years)			
FGD No.	**Category**	**Region**	**No of Participants**
FGD-1	Nomadic pastoralists (reer-guuraa)	Bari	9
FGD-2	IDPs	Togdher (Burco)	10
FGD-3	Rural	Mudug	8
FGD-4	Urban	Galgadud (Adado)	10
FGD-5	Agro-pastoralists (beeraley-baadiye)	Lower Juba (Kismayo)	7
	Total		44

3.3.3.2. In-Depth Interviews

In-depth Interview (IDI) is a qualitative approach that usually involves conducting intensive individual interviews to explore an outcome or idea. It is useful when the investigator wants to get detailed information about individual thoughts or behaviors and when exploring an issue deeply. Face-to-face individual interviews were conducted based on the interview guide. The interview

guide contained participants' profile questionnaires, such as age, residence, provision, occupation, and current position, as well as unstructured questions related to barriers to the continuum of care for MNCH services. Participants in this section were healthcare policymakers from the respective Ministry of Health at the federal and state levels and implementing partners, healthcare providers and professionals, traditional birth attendants, community leaders and gatekeepers, and childbearing and recently delivered mothers as described in table 8 below.

Table 7: Summary of the study participants, data sources, and method used.

Method	Description	Sample
FGDs with mothers	Five FGDs with mothers of children less than two years in different geographical locations	5 FGDs (44 mothers) Sampled from Urban, Rural, IDPs, agro, and nomadic pastoralists in 5 regions of Somalia.
IDI with healthcare providers	Qualitative interviews with MCH and community Healthcare providers (Midwives, nurses, doctors, community health workers, etc.	6 healthcare providers in six different regions were interviewed.
IDI with health policymakers	Qualitative interviews with the Ministry of Health at federal and state level staff	4 policymakers from the federal and state governments were interviewed
IDI with TBAs	Qualitative interviews with traditional birth attendants	2 Traditional Birth Attendants were interviewed
IDI with caretakers	Qualitative interviews with recently delivered mothers	2 recently delivered mothers were interviewed
IDI with community leaders	Qualitative interviews with community gatekeepers and leaders	3 community gatekeepers and leaders were interviewed

3.3.4. Data Management and Analysis

The study used a qualitative thematic analysis approach according to Braun and Clarke's qualitative data analysis frameworks (63). The principal study investigator and the research assistants (enumerators) audio-taped all of the interviews and discussions after providing consent from the study participants—the first step involved transcribing the audio tapes and field notes in the Somali language. Then, three qualified people fluent in both languages translated the transcripts into English. The study's principal investigator cross-checked the accuracy and completeness of the translations several times. The study investigator listened to the audio records and read the transcripts repeatedly for data consistency and reliability. In the initial phase of the study data analysis, we adopted deductive coding by starting with predefined codes from the existing research literature, followed by inductive coding to identify additional themes and categories that emerged

directly from the data. We developed predefined initial codes (open coding) throughout the study's data analysis.

After data collection, each code was further analyzed and disaggregated into themes and sub-themes (deductive axial coding). Throughout the primary data analysis, additional codes were added while reading the data, themes, and sub-themes that had not been identified previously (inductive method) to identify areas of divergence, convergence, and overlap. A final coding framework was constructed using deductive and inductive coding approaches. To improve the trustworthiness of the qualitative data analysis, the codes and concepts that emerged from the different interview categories and discussions were verified by consistently linking the emerging themes with the data received from the other groups. Participants' own words (quotes) were used to enhance the credibility of the data.

3.3.5. Ethical Consideration

Study details and guidelines were explained to participants before the interviews began. Informed consent to participate in the study was obtained from all participants. Our ethical approach follows the Declaration of Helsinki and will comply with all its guidelines. Ethical approval was obtained from the Ministry of Health and Human Services (Reference number: MOH&HS/DGO/1605/02/2024). All participants provided informed consent before participating after it was explained to them that their participation was voluntary and that the information obtained would only be used for this research and the publication of anonymized responses. The participants were notified that their involvement in interviews was voluntary and that they could decline to answer any questions. Participants were assured that their identities would remain anonymous and no compensation would be given.

3.3.6. Data Storage and Handling

Data storage and handling procedures, such as ensuring confidentiality, data security, and integrity, are paramount throughout the study process. This study used both secondary and primary data sources. Access to the Somalia Health and Demographic Survey (SHDS 2020) was obtained through official permissions from the Somalia National Bureau of Statistics (39), and we confirm that ethical adherence and respect for intellectual property are ensured. All secondary data files were securely stored on a password-protected external hard drive and within encrypted folders on a cloud-based storage platform. Regular backups were created to ensure data redundancy and prevent potential data loss.

We have also collected primary data through qualitative methods, including in-depth interviews and focus group discussions. During data collection, field notes and audio recordings were made with participants' voluntary consent. All participants were informed of the data handling procedures to protect their privacy, confidentiality, and anonymity. All data were anonymized, with personal identifiers removed or replaced with unique codes. The audio recordings and transcriptions were stored on a password-protected computer accessible only to the researcher. The data files were checked for accuracy and consistency, with attention given to avoid manipulation or misinterpretation.

4. CHAPTER 4: STUDY FINDINGS (RESULTS)

4.1. Quantitative Findings

4.1.1. Characteristics of the Study Participants

Table 9 summarizes the background characteristics of ever-married mothers included in this study. The mean age of the women in the study was 22.8 years (SD = 4.2), with more than half of the women (53.1%) had their most recent births at the age of ≤19 years, while 90.2% of the women in the study were married during the survey period.

Table 8: Socio-demographic characteristics of ever-married women who had at least one live birth in the five years preceding the survey (Weighted sample size = 2432 & unweighted sample size = 2414)

Variable	Categories	Weighted Number (2432)	Percentage (%)
Maternal age at birth (years)	<20	1,291	53.1
	20-34	1,125	46.3
	35-49	16	0.6
Birth Order	1	906	37.3
	2	908	37.3
	3	525	21.6
	Four or more	93	3.8
Residence	Urban	1,475	60.6
	Rural	653	26.9
	Nomadic	304	12.5
Marital Status	Married	2,193	90.2
	Divorced/widowed	239	9.8
Mother's Education	No Education	1,872	77.0
	Primary	370	15.2
	Secondary & above	190	7.8
Mother's Employment	Working	96	3.9
	Not working	2,336	96.1
Number of Children	1-2	1,813	74.5
	3-4	598	24.6
	>=5	21	0.9
Decision-making power in determining one's healthcare	Women or jointly	1,285	52.8
	Husband or others	1,147	47.2
Exposure to Radio	Yes	229	9.4
	No	2,203	90.6
Wealth Quintile	Poorest	621	25.5
	Poorer	486	20.0
	Middle	406	16.7
	Richer	454	18.7
	Richest	465	19.1

Above sixty percent of the women lived in urban areas, and seventy-seven had no education. 96.1% of the women were not working, 74.5% had 1-2 children, and 90.6% had not accessed mass media (radio exposure). Wealth quintile distribution among the households was almost homogenous, with the highest being the poorest (25.5%) and the lowest being the middle group (16.7%).

4.1.2. The Overall Use of Maternal Health Services in Somalia

Table 10 shows the descriptive analysis indicating that Somalia did not achieve good antenatal care, institutional delivery, and postnatal care coverage. Around **two-thirds** of the study participants (66.2%) did not receive antenatal care visits, and only 24.2% received ANC between 1-3 trips, whereas 9.7% of the women in the study attended the recommended four or more antenatal care (ANC4+) visits. Skilled providers attended less than 14% of the deliveries. For postnatal care, only 2.7% of the women had a PNC check within 48 hours after delivery, regardless of their place.

Table 9: Number and Percentage of mothers and their use of maternal health services

Characteristics	Categories	Weighted Number (2432)	Percentage (%)
ANC visits	No ANC	1,608	66.2
	1-3ANC	589	24.2
	ANC4+	235	9.7
Delivered by SBA	Skilled provider	327	13.4
	Unskilled provider	1,478	60.8
	No one	47	1.9
	Don't know/missing	580	23.8
PNC visits	First 48hrs	67	2.7
	More than 48hrs	2	0.1
	No PNC/Don't know	2,363	97.2

Maternity Continuum of Care: of all the mothers (n=2432), only 235 (9.7%) had at least four or more of the recommended antenatal care (ANC4+) visits during their recent pregnancy. Among these, only nine mothers live in nomadic settings. Out of the women who have received four or more ANC care, only 68 (2.8%) of them utilized skilled birth attendants in their most recent pregnancies. Regarding the continuum of maternal health services, only 14 (0.6%) of women had received all three maternal healthcare services i.e., Antenatal care four times, delivery attended by skilled birth attendants, and postnatal care within 48 hours after delivery (ANC4+, SBA, and PNC within 48 hours) as described in Figure 6 and 7, respectively.

Figure 6: Maternity Continuum of Care

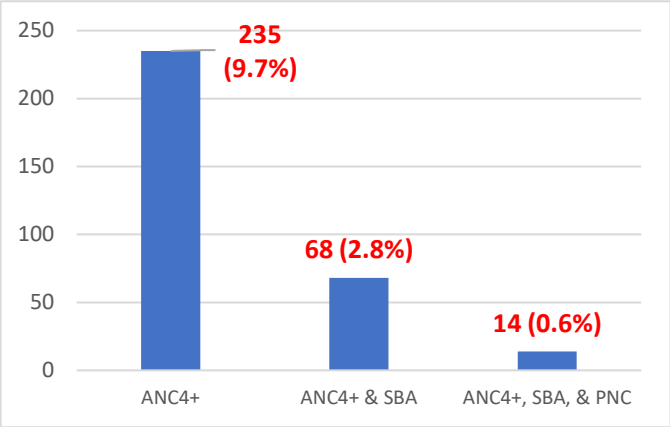
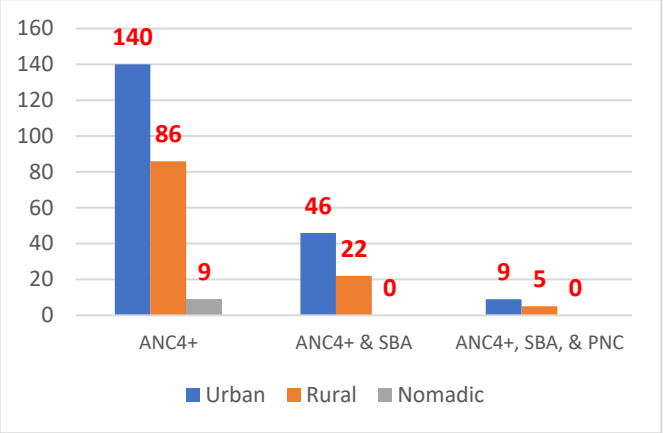


Figure 7: Maternity Continuum of Care by residence



4.1.3. Pathways of Maternal Healthcare Use

Considering the study's three main outcomes (ANC4+, SBA, and PNC), we created eight different pathways or combinations of maternal health service utilization, i.e., from not receiving any of the three maternal health services to completing the use of all three maternal health services (Table 11). More than two-thirds of the mothers in the study (78.1%) did not receive any of the three maternal health services as shown in pathway 1. Only 14 mothers (0.6%) received all three maternal health services along the continuum (pathway 8). Three groups that attended any two of the three maternal health services (pathways 3, 6, and 7) accounted for 2.2%, 0.5%, and 0.1%, respectively. Lastly, the three groups that utilized only one of the three maternal services (pathways 2, 4, and 5) accounted for 6.7%, 1.6%, and 10.2%, respectively.

Table 10: Percentage distribution of the three maternal health services received by women. (+ Received the service; - Did not receive the service).

Pathway	ANC4+	SBA	PNC within 48hrs	Frequency (Weighted Number)	Percentage
1	–	–	–	1,899	78.1
2	+	–	–	164	6.7
3	+	+	–	54	2.2
4	–	–	+	39	1.6
5	–	+	–	248	10.2
6	–	+	+	11	0.5
7	+	–	+	3	0.1
8	+	+	+	14	0.6
Total				**2,432**	**100%**

Table 11 above shows the combination of maternal health services (three major services) that mothers either received or did not receive. It summarizes the three major outcome variables of the

study: antenatal care of four times or above, skilled birth attendant, and postnatal care within 48 hours after delivery.

4.1.4. Factors Associated with Maternal Healthcare Utilization

4.1.4.1. Antenatal Care (ANC4+)

Table 12 below shows the crude odd ratio of the factors associated with the antenatal care of four or more (ANC4+) visits. Maternal age at birth, residence, mother's education, mother's employment, healthcare decision-making, radio exposure, and wealth quintile were variables that had a significant association with the antenatal care of four or more (ANC4+) at p-value <0.05. Women between 20 and 34 years old (OR=3.01, 95% CI=2.24-4.03) are more likely to have four or more ANC visits than those below 20. Women who live in rural (OR=0.69, 95% CI=0.52-0.92) and nomadic (OR=0.05, 95% CI=0.02-0.09) were less likely to use four or more ANC visits than women living in urban settings. Women who completed primary education (OR=3.36, 95%CI=2.41-4.68) and secondary or higher education (OR=7.35, 95% CI=5.12-10.55) were more likely to have four or more ANC visits compared to women who have no education. Women with employment (OR=4.26, 95% CI=2.68-6.77) and decision-making power in determining their healthcare (OR=1.99, 95% CI=1.5-2.63) have greater odds of having four or more ANC visits. Women who were not exposed to the radio (OR=0.39, 95% CI=0.27-0.56) were less likely to use four or more ANC care, and women from wealthier households used four or more ANC care at a higher rate than their counterparts.

Table 11: Factors associated with four or more ANC utilization in the bivariable analysis.

Variable	Categories	ANC4+		
		Yes	No	OR (95% CI)
Maternal age at birth (years)	<20	69	1222	1
	20-34	164	961	3.01 (2.24--4.03)
	35-49	2	14	1.94 (0.36--10.51)
Birth Order	1	95	811	1
	2	76	832	0.78 (0.57--1.07)
	3	59	466	1.08 (0.77--1.53)
	4 or more	5	88	0.44 (0.17--1.15)
Residence	Urban	140	675	1
	Rural	85	594	0.69 (0.52--0.92)
	Nomadic	9	928	0.05 (0.02--0.09)
Marital Status	Married	212	1980	1
	Divorced/widowed	22	217	0.96 (0.6--1.51)
Mother's Education	No Education	110	1762	1
	Primary	64	305	3.36 (2.41--4.68)
	Secondary & above	60	130	7.35 (5.12--10.55)
Mother's Employment	Working	28	68	4.26 (2.68—6.77)
	Not working	207	2129	1
Number of Children	1-2	172	1641	1
	3-4	63	535	1.13 (0.84--1.54)
	>=5	0	21	empty
Decision-making power in determining own healthcare	Women or jointly	164	1121	1.99 (1.5--2.63)
	Husband or others	71	1076	1
Exposure to Radio	Yes	45	184	1
	No	190	2013	0.39 (0.27--0.56)
Wealth Quintile	Poorest	10	610	1
	Poorer	13	474	1.58 (0.69--3.62)
	Middle	42	364	6.79 (3.39--13.57)
	Richer	55	399	8.06 (4.09--15.850
	Richest	115	350	19.42 (10.14--37.18)

4.1.4.2. Skilled Birth Attendant (SBA)

Women aged 35 and above at birth (OR=3.93, 95% CI=1.37-11.28) had higher odds of skilled birth attendants than their counterparts. Women who live in rural (OR=0.53, 95%CI=0.40-0.69) and nomadic (OR=0.14, 95% CI=0.09-0.20) were less likely to receive SBA care than those in urban settings. The odds of using SBA are almost two and three times higher for women with primary (OR=2.13, 95% CI=1.59-2.86) education and secondary (OR=3.7, 95% CI=2.62-5.21) education. In addition, decision-making power in determining own healthcare, exposure to radio, and wealth quintile were also variables that had a significant association with the skilled birth attendant at p-value <0.05 in the bivariable analysis, as shown in Table 13 below.

Table 12: Factors associated with skilled birth attendants in the bivariable analysis.

Variable	Categories	Skilled Birth Attendant		
		Yes	No	OR (95% CI)
Maternal age at birth (years)	<20	162	1130	1
	20-34	159	966	1.15 (0.91--1.42)
	35-49	6	10	3.93 (1.37--11.28)
Birth Order	1	128	779	1
	2	125	783	0.97 (0.74--1.26)
	3	65	460	0.86 (0.63--1.19)
	4 or more	9	83	0.67 (0.33--1.36)
Residence	Urban	193	622	1
	Rural	96	584	0.53 (0.40--0.69)
	Nomadic	38	899	0.14 (0.09--0.20)
Marital Status	Married	283	1909	1
	Divorced/widowed	44	196	1.49 (1.04--2.11)
Mother's Education	No Education	196	1676	1
	Primary	74	296	2.13 (1.59--2.86)
	Secondary & above	57	133	3.70 (2.62--5.21)
Mother's Employment	Working	12	84	1
	Not working	315	2021	1.07 (0.58--1.98)
Number of Children	1-2	251	1562	1
	3-4	74	524	0.87 (0.66--1.15)
	>=5	2	19	0.68 (0.16--2.85)
Decision-making power in determining own healthcare	Women or jointly	214	1071	1.62 (1.29--2.04)
	Husband or others	113	1034	1
Exposure to Radio	Yes	45	184	1
	No	282	1921	0.60 (0.42--0.85)
Wealth Quintile	Poorest	39	582	1
	Poorer	18	468	0.59 (0.33--1.05)
	Middle	53	353	2.24 (1.45--3.47)
	Richer	102	352	4.39 (2.96--6.51)
	Richest	115	350	4.96 (3.37--7.32)

4.1.4.3. Postnatal Care within 48 hours (PNC 48 hours)

The results from postnatal care use analysis indicate that place of residence, mother's education, mother's employment, exposure to radio, and wealth quintile were variables that had a significant association with postnatal care within 48 hours after delivery, as described in Table 14. Compared to women living in urban settings, the odds of receiving PNC within 48 hours were lower for women living in rural (OR=0.5, 95% CI=0.26-0.94) and nomadic settings (OR=0.25, 95% CI=0.11-0.11). Women who had primary education (OR=2.23, 95% CI=1.16-4.29) and secondary education (OR=5.25, 95% CI=2.82-9.76) were more likely to use PNC care within 48 hours after delivery compared to women with no education. Women who are working (OR=3.82, 95% CI=1.72-8.47)

exposed to radio (OR=3.58, 95% CI=2.00--6.42) were more likely to use PNC care within 48 hours after delivery compared to women who do not work and are not exposed to radio respectively.

Table 13: Factors associated with postnatal care in the bivariable analysis.

Variable	Categories	Postnatal Care within 48hrs		
		Yes	No	OR (95% CI)
Maternal age at birth (years)	<20	19	1272	1
	20-34	47	1078	0.58 (0.04--1.11)
	35-49	1	15	1.48 (0.22--3.20)
Birth Order	1	24	882	1
	2	25	883	1.22 (0.69--2.18)
	3	16	509	0.94 (0.44--1.97)
	4 or more	2	91	0.59 (0.11--3.14)
Residence	Urban	33	783	1
	Rural	19	660	0.50 (0.26--0.94)
	Nomadic	15	922	0.25 (0.11--0.55)
Marital Status	Married	62	2131	1
	Divorced/widowed	5	234	1.36 (0.65--2.84)
Mother's Education	No Education	31	1840	1
	Primary	24	346	2.23 (1.16--4.29)
	Secondary & above	12	179	5.25 (2.82--9.76)
Mother's Employment	Working	11	85	3.82 (1.72--8.47)
	Not working	56	2280	1
Number of Children	1-2	49	1764	1
	3-4	18	580	0.70 (0.36--1.37)
	>=5	0	21	1.11 (0.06--18.89)
Decision-making power in determining own healthcare	Women or jointly	36	1249	1.13 (0.67--1.9)
	Husband or others	31	1116	1
Exposure to Radio	Yes	15	213	3.58 (2.00--6.42)
	No	52	2152	1
Wealth Quintile	Poorest	18	603	0.26 (0.11--0.59)
	Poorer	7	479	0.21 (0.09--0.50)
	Middle	2	404	0.30 (0.13--0.68)
	Richer	10	444	0.42 (0.21--0.85)
	Richest	30	435	1

4.1.5. Factors Associated with Achieving the Complete Continuum of Maternal Healthcare

We tried to fit three regression models to identify factors associated with the maternal continuum of care. (86) **Model 1** assessed the determinants of receiving full antenatal care (ANC4+) among the ever-married women with a live birth in the last five years, (2) **Model 2** assessed the determinants of receiving ANC4+ and skilled birth attendant (SBA) as continuation, (3) **Model 3** assessed the determinants of utilizing all of the three primary outcomes or services (ANC4+, SBA, and PNC within 48 hours) as maternity continuum of care. Unfortunately, we could not run the

associations of the third model due to the small number of participants who utilized all three services (n=14). Maternal age at birth, residence, mother's education, mother's employment, healthcare decision-making, radio exposure, and wealth quintile were variables significantly associated with Model 2 (ANC4+ and SBA) at p-value <0.05, as described in Table 15 below.

Table 14: Result from multivariate logistic regression (p-value: * < 0.05).

Variables and categories	Model 1: ANC4+ (N=235)		Model 2: ANC4+ & SBA (N= 68)		Model 3: ANC4+ & SBA & PNC (N=14)	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
Maternal age at birth						
<20	1		1			
20-34	2.45*	1.79--3.37	2.19*	1.28—3.76		
35-49	1.57	0.26--9.64	3.46	0.57—20.73		
Residence						
Urban	1		1			
Rural	1.03	0.74--1.43	0.71	0.38—1.32		
Nomadic	0.15*	0.06-0.35	0.02*	0.01—0.56		
Marital Status						
Married	1					
Divorced/widowed	0.84	0.51--1.37				
Mother's Education						
No Education	1		1			
Primary	1.74*	1.22--2.50	2.99*	1.66—5.36		
Secondary & above	2.19*	1.45—3.31	2.09*	1.01—4.33		
Mother's Employment						
Working	1					
Not working	0.43*	0.25—0.75				
Decision-making power in determining own healthcare						
Women or jointly	1.56*	1.14—2.14	1.89*	1.02—3.18		
Husband or others	1		1			
Exposure to Radio						
Yes	1.16	0.77—1.74	1.89*	1.04—3.42		
No	1		1			
Wealth Quintile						
Poorest	1		1			
Poorer	0.81	0.33—1.95	0.033*	0.00—0.59		
Middle	1.68	0.74—3.82	0.37	0.12—1.15		
Richer	1.68	0.74—3.80	0.26*	0.08—0.82		
Richest	3.02*	1.34—6.8	0.43	0.14—1.35		

4.2. Qualitative Findings

4.2.1. Identified Themes

As stated in Table 16, five key themes and twelve sub-themes emerged from the study data set, the result of a thematic analysis exploring the maternity continuum of care gaps.

Table 15: Categories of Themes and Sub-themes

Themes	Subthemes
Service availability	Service availability in some areas
Access to care	Distance and Transportation
	Financial barriers
	Unassisted childbirth due to geographical constraints
Decision and awareness to seek care	Lack of knowledge of pregnancy risks
	Late antenatal care booking
	Mother's awareness of the importance of seeking care
Socio-cultural practices and beliefs	Husbands' dominance in decision-making about mother's health
	TBA Trust and Readiness
	Normality of homebirths
Quality of care	Perceived poor quality of care
	Lack of scheduled PNC service at health facilities
	Fragmentation of care across the maternity continuum of care

4.2.1.1. Theme 1: Service availability

The availability of health facilities plays an important role in the increase in and utilization of skilled delivery in developing countries such as Somalia.

Sub-theme 1.1 - Service availability in some areas

Participants highlighted that the areas in which they live do not have essential health services nearby. The non-availability of nearby health facilities forces mothers to travel long distances to access medical services, creating significant barriers to maternal and child healthcare access.

> *"There are no health services available nearby. Services are provided at extremely distant centers, and they are not accessible to us. We would visit the health facility if it were near. We desperately need a health facility where we can receive medications and medical services."* (FGD-1, childbearing mother)

Residents express a strong desire for the presence of a local health facility that would provide essential medical services within their community. The absence of such a facility creates a sense of desperation and urgency among community members who recognize the importance of timely access to healthcare for their well-being and the well-being of their families. A health policymaker articulated the quote below.

"Some of the remote and rural areas in Somalia do not have well-equipped health facilities. The country has both a limited number of health facilities and sufficient quality of care. The reality of mothers delivering at health facilities in Somalia is incredibly difficult." (IDI-Health policymaker)

It is difficult for mothers to discuss the quality of care and the completion of all services at this time because many villages and communities do not have health infrastructure. How can we talk about quality and continuation of care while all communities do not have health facilities in their locations." (IDI-Community leader)

4.2.1.2. Theme 2: Access to care

Healthcare services in Somalia face many accessibility challenges, including distance, transportation, finances, and fragmentation of care across the maternity continuum of care. There is inadequate coordination and linkage between antenatal, intrapartum, and postnatal care providers.

Sub-theme 2.1 - Distance and transportation

Many communities in Somalia, specifically those living in rural or remote and hard-to-reach domains, face excessive challenges accessing healthcare services and are usually located far away from health facilities or through climate shocks such as flooding.

"Some roads are out of service because of floods. Currently, people travel by boat. A boat costs 5 USD to cross the river. Those who cannot afford the boats should cross the water by themselves. Therefore, pregnant mothers cannot reach the health facilities for ANC, facility delivery, or PNC services because of these bad roads." (FGD-5, childbearing mother)

Participants emphasized the challenges of distance, geography, and transportation to access healthcare services in their localities.

"It is difficult to reach the city to obtain ANC, facility delivery, and PNC services because of the extremely bad route. Bosaso is the closest big city, yet it is quite a distance away from our area." (FGD-1, childbearing mother)

Furthermore, health policymakers have indicated that long distances and the absence of reliable modes of transportation are other barriers that prevent mothers from utilizing available MCH services.

"The pregnant mother may give birth at home if the health center is far and distant from her house, which is a big factor for healthcare inaccessibility in Somalia." (IDI-Health policymaker)

A health policymaker illustrated that some of the rural and nomadic locations do not have health facilities due to the sparsity of inhabitants.

"If the mother lacks money for transportation and the health facility is distant, these could act as barriers to ANC services. The population and its demands determine the number of health centers and services that can be offered. Not every location can have a health facility established. The only way we can improve service accessibility is through transportation." (IDI-Health policymaker)

Another childbearing mother explained:

"We live in a mountainous area, so there are no roads in this area. We walk on feet. There are no roads here where we can stand and hail a ride on a car." (FGD-1, childbearing mother)

Sub-theme 2.2 - Financial barriers

Childbearing and recently delivered mothers acknowledged that they do not have enough money to afford transportation and medical costs, if any. They explained that financial limitations prevent them from traveling to health facilities and paying medical costs; as a result, they tend to deliver their babies at home.

"Because we lack enough money to get a car and drive to the city, women deliver in their homes. We are far away from the health facilities, so we often undergo labor in our homes." (FGD-1, childbearing mother)

A community leader explained that most of the families in their community cannot avoid paying medical costs if they are referred to large hospitals, which can hinder the continuation of the maternal continuum of care.

"The mother is referred to another hospital when her condition worsens, but we lack the money to pay for her care, which presents a challenge. The diagnosis and medical costs are beyond what these mothers can afford." (IDI-community leader)

Participants discussed that some areas are geographically isolated, incredibly remote, or rural, with limited access to healthcare institutions. Pregnant mothers cannot attend the recommended maternity continuum of care because of the nomadic lifestyle that moves from one place to another, which often entails living in remote areas from urban centers.

"We inhabit this remote area as nomads. We must go to a city to get healthcare. We cannot afford the cost of transportation and medical costs. We do not have cash. Our only source of money is from the goats and sheep, but they do not have a decent market these days". (FDG-1, Childbearing Mother).

Sub-theme 2.3 - Unassisted childbirth due to geographical constraints

In remote nomadic areas with limited access to healthcare facilities or skilled birth attendants, women may find themselves in situations where they have no choice but to deliver their baby without assistance.

"I get nauseous in the morning during pregnancy. I go through a harrowing delivery as well. I gave birth in a rural area, and I have never received assistance from medical professionals. I delivered by myself without the assistance of a midwife or any other person." (FGD-1, Childbearing mother)

The participants explained that sometimes mothers deliver alone without any support. Deliveries without medical assistance can be dangerous, especially if health complications arise. Mothers discussed the existence of free birth in some areas. This refers to the practice of giving birth without the assistance of both medical professionals and traditional birth attendants.

"In the remote rural nomads, sometimes labor may progress so rapidly while the mother is alone, and she cannot reach the health facility or find the TBAs nearby her home sometimes. Unexpected labor may strike, and the mother may end up delivering her baby without assistance, "free birth." (FGD-3, childbearing mother)

Unassisted childbirth or free birth is not a choice or deliberate decision in the Somali community, but it occurs due to access to care. This event carries the highest risk and can cause unpredictable health complications, such as maternal or child mortality or morbidity.

"In rural areas, women lack access to medical care due to geographical constraints. They do not attend antenatal care visits, skilled birth attendants, or postnatal care check-ups. A herdswoman cannot seek ANC, facility delivery, or PNC services from health centers that are far away. She needs to maintain the animals she keeps, support the family, and take care of the other children." (IDI-healthcare provider)

4.2.1.3. Theme 3: Decision and awareness to seek care

Sub-theme 3.1 - Lack of knowledge of pregnancy risks and danger signs

Throughout the interviews, participants acknowledged that women's awareness and knowledge of pregnancy risks and childbirth varied. The signs of danger related to pregnancy are warning signs that women face during pregnancy, childbirth, and the postpartum period. It is common that communities with low socioeconomic status are not aware of health danger signs, especially pregnant and childbirth-related dangers. A mother from the agro-pastoralist community in FGD-5 discussed the following:

"Usually, pregnancy is natural, and we do not face complications, so why do we need to walk and visit the health facility? We did not have a history of severe problems during pregnancy. Pregnancy is not a disease to fear of." (FGD-5, childbearing mother)

Some participants reported that limited health education and awareness of maternal health risks put mothers at risk of pregnancy. An in-depth interview participant said:

"Most mothers do not understand the risks related to their pregnancy if they do not attend ANC. They remain in their homes while they do not know the status and

conditions of their pregnancy. They are not educated enough to seek medical care in advance." (IDI-Healthcare provider)

Sub-theme 3.2 - Late antenatal care booking

A healthcare provider illustrated that mothers usually arrive at the first ANC visit in their third trimester.

"Mothers usually arrive late for the first antenatal care (ANC) visits, often between the 8th and 9th month of pregnancy. This delay stems from a lack of awareness about the crucial benefits of early ANC visits for the mother and her baby." (IDI-Healthcare provider)

Similarly, qualified midwives and other healthcare providers explained that due to limited awareness, mothers are reluctant to book ANC as early as possible. The following conclusions were drawn from the midwives and nurses at some of the health facilities:

"Most of the mothers are hesitant to come to the health facility as early as possible to have their pregnancy checked (ANC). A lack of ANC visits is usually associated with premature birth, a greater risk of complications, stillbirth, low birth weight, and other adverse health outcomes." (IDI-Midwife)

"If mothers do not attend early ANC visits and complete all the necessary ANC visits, they will probably not deliver at health facilities, which can be a barrier to the continuation of maternal health services." (IDI-Qualified nurse)

Sub-theme 3.3 - Mothers' awareness of the importance of seeking care

Pregnant mothers may not always be aware of the benefits of receiving antenatal care, facility-based delivery, and postnatal care. One participant explained:

"Due to limited knowledge and education, mothers do not come to the health facility to complete all of the available health services. If mothers attend the first ANC, then they discontinue attending the second ANC and subsequent facility delivery and postnatal care. They are not fully aware of the benefits of attending all of the stages of maternal and child health services." (IDI-Healthcare provider)

A health policymaker illustrated that women do not complete existing maternal and child health services due to their low literacy and limited awareness of seeking medical care.

"I think it is not possible for a low-literacy mother to complete all of the maternal and child health services that are available in the health facility. Many mothers do not understand the importance of attending all of the stages of maternal and child health services." (IDI-Policymaker)

4.2.1.4. Theme 4: Socio-cultural practices and beliefs

Traditional beliefs regarding pregnancy and childbirth remain a choice for Somali women. Trust in traditional birth attendants (TBAs) is frequent in rural and remote areas where access to primary and comprehensive healthcare services may be limited. TBAs are sometimes highly respected community members and have been providing home deliveries for generations in Somali society.

Some of the reasons that TBAs are trusted and that home deliveries are normalized include the inaccessibility of maternal healthcare in rural and hard-to-reach areas, cultural beliefs and practices, the proximity of TBAs to the community, low cost and affordability, respect for the privacy of the mother and cultural sensitivities, etc.

Sub-theme 4.1 - Husbands' dominance in decision-making about mother's health

Men are the overall decision-makers on all household matters, including resource allocations and where and how to live. A childbearing mother had the views below.

> *"The father is the overall head of the family, controls all the family resources, and determines the expenses for healthcare utilization. He also makes decisions and allocations of resources like purchases and monthly expenses. Women are just housekeepers and care for the kids."* (FGD-3, childbearing mother)

There is available evidence that suggests women in Sub-Saharan Africa often have limited autonomy and control over decisions to go to the health facility.

> *"One of the reasons that women do not deliver health facilities is because of their powerlessness. One in Somalia is submissive to her Sheikh (husband). Sometimes the couples negotiate, but mostly, the husband has the overall decisions and power."* (IDI-Midwife)

Sub-theme 4.2 - TBA Trust and Readiness

> *"Yes, I believe the skills and experience of the TBA in our village. They are available and ready every time, and they are part of our family. The TBAs have a lot of experience and know how to deal with pregnancy, delivery, and even delivery advice."* (FGD-5, childbearing mother)

A few childbearing mothers mentioned the challenges to reach the existing health facilities.

> *"We live in a very remote area that healthcare providers cannot reach. The only attendant available in our villages is a traditional birth attendant from neighboring families; sometimes, you cannot even get those neighboring traditional attendants."* (FGD-1, childbearing mother)

> *"During my pregnancy, I had low hemoglobin, heartburn, and terrible morning sickness. In labor, the pain doubles since there are no healthcare providers. The TBA is the only accessible birth attendant. After giving birth, I started bleeding excessively."* (FGD-3, childbearing mother)

Acknowledging the availability of the TBA and the flexibility of payments, the study participants indicated the following:

> *"The traditional birth attendants (TBA, Umuliso-dhaqameed in the Somali language) are always available even during the night and usually do not charge fare before delivery. They usually come to help the mother first, and then you give what you have, and they are very respected within the community." (FGD-2, childbearing mother)*

"Yes, there are many traditional practices and beliefs; for instance, the pregnant woman says I need to see my previous TBA that managed my last delivery. I do not want to go to an unfamiliar environment." (IDI-community gatekeeper)

Sub-theme 4.3 - Normality of homebirths

Women who normalize to deliver at home are still prevalent in many parts of Somalia. Several factors can help women normalize their delivery at home, including cultural and personal preferences, as many women still feel more comfortable delivering at home, limited knowledge and awareness, intergenerational precedent, as women inherit home delivery normalization from their parents and grandparents, and limited access to professional midwifery care.

"Yes, I feel comfortable delivering at home because we are surrounded by our loved ones, and I feel like a normal process to deliver at home." (FGD-5, recently delivered mother)

Some mothers considered home delivery to be normal. A childbearing mother from FGD-3 explained:

"I grow up while our mothers give birth at home. Home delivery is normal, and it allows us to labor and deliver on our own terms. It feels like the most natural choice for us." (FGD-3, childbearing mother)

Participants also cited that their previous delivery occurred at home and believed that it was an easy and natural process. In one of the in-depth interviews, a childbearing mother stated the following:

"I gave birth all my children at home (3 kids), and they are all good (Praise be to God). Nothing happened to me. The old woman is very experienced and can manage all pregnancy-related issues." (IDI-Childbearing mother)

There are a wide range of reasons why mothers choose to deliver at home; for instance, some of the reasons reported by participants included familiarity with the environment where they are surrounded by their loved ones, the avoidance of unwanted restrictions, and the inability to leave their other kids. A midwife at the health facility indicated that some mothers cannot leave their kids to visit the health facility for ANC or delivery.

"Some mothers do not come to the health facility to deliver; instead, they prefer to deliver at home because they are familiar with that environment. They do not have someone who can stay with the other kids even if they decide to visit the health facility. Yes, this can present a significant challenge in accessing healthcare services." (IDI-Midwife)

4.2.1.5. Theme 5: Quality of care

Somalia's healthcare system has been characterized by strong private and NGO-led components. The quality of healthcare services has become an increasingly predominant question for both

beneficiaries and care providers. Although the quality of healthcare is a complex, multidimensional, and subjective concept, local beneficiaries' views can be associated with their healthcare utilization.

Sub-theme 5.1 - Perceived poor quality of care

Fragile countries fail to improve the quality of healthcare in their population by accepting low-quality health services to continue. Many mothers question the skills and experience of healthcare providers at health facilities.

> *"The reason women do not go to health facilities and prefer to be at home when delivering is that many of them are scared to meet unskilled workers or fresh students doing their practical sessions at the hospital; many women come to me because they have problems and health issues on their previous delivery at hospitals. They will say it's not safe to give birth at the hospitals because of the low-quality services the MCH offers."* (IDI-Healthcare provider)

Compared to qualified nurses or midwives at nearby health facilities, study participants, especially childbearing mothers, believe that traditional birth attendants in their locality have better experience and skills. They also feel that health facilities lack the necessary privacy infrastructures, such as designated rooms.

> *"The old mother is more experienced and skillful than nurses/midwives at MCH. I feel, I am not treated carefully at a health facility. I am afraid of my privacy during delivery because of the young nurse in the MCH."* (FGD-5, childbearing mother)

It is normal for clients to seek alternative care options if they feel dissatisfied with the available care provided at health facilities. A community leader reported that when beneficiaries are not satisfied with the only available care, they will seek care from their traditional birth attendants.

> *"Low service quality could also be a hindrance. If mothers are not satisfied with the service quality provided in the health center, they are more likely not to seek health services frequently. How health workers welcome care-seeking mothers influences mothers' acceptance and willingness to seek ANC, facility delivery, and PNC services."* (IDI-Community leader)

Sub-theme 5.2 - Lack of scheduled PNC services at health facilities

Despite some pregnant mothers' attendance at antenatal care and childbirth at health facilities, postnatal care checkups before they leave the facility are limited. The uptake and utilization of PNC services lies in service providers' appointments and mothers' understanding of the importance and relevance of PNC services. A recently delivered mother discussed the lack of PNC scheduling from the care providers who were managing her delivery.

> *"I do not know if I was checked before my discharge. I was okay in the morning, and the nurses did not mention any clearance or check-ups before I left the MCH.*

She did not give me a plan to come back for follow-up PNC checkups." (FGD-4, recently delivered mother)

The maternal and child health continuum of care package ensures that all women and children receive timely and quality care from pregnancy to full child immunization. A qualified nurse explained the disconnection of the available maternal and child health services at the health facility level.

We do not have a PNC retention plan within 48 hours, 7 days, or 41 days. Maternal and child health service providers do not schedule PNC service return. There is no continuum of care packages connected from one service to another." (IDI-Qualified Nurse)

Sub-theme 5.3 - Fragmentation of care across the maternity continuum of care

The in-depth interview participants highlighted that there is disjointed service availability in some areas, especially in remote and hard-to-reach areas. For instance, a primary health unit (PHU), which is a basic healthcare facility located near rural communities, provides basic services such as outpatient treatment and cannot cover maternity delivery and postnatal care services, leaving the community to disjoint the service provisions.

"I think only mothers living in urban cities who have all the necessary medical care can complete the entire maternity continuum of care, such as proper antenatal care, institutional delivery, and postnatal care. Communities living in rural or remote areas cannot complete because of the transition points between the different maternity continuum of care stages." (IDI-Health policymaker)

Pregnant mothers feel that their unique health preferences and needs are not being considered by healthcare providers and do not receive appointments for the next visit. Failing to manage follow-ups and register appointments will result in incomplete or discontinued maternal healthcare.

"If I attend the check-up during pregnancy, I will not receive an appointment for delivery in the health facility. It depends on me if I need to come to the facility. There is no information system or referral mechanism that ensures that pregnant women go through various levels of care throughout the continuum of care." (IDI-Childbearing mother)

5. CHAPTER 5: DISCUSSION

5.1. Quantitative

Somalia faces a severe crisis in maternal and child health, with staggering mortality rates that far exceed global targets. The maternal mortality ratio stands at 621 deaths per 100,000 live births, which is much higher than (more than eight times) the sustainable development goal (SDG) target of less than 70 per 100,000 live births. Furthermore, 1 in 20 women of reproductive age (15-49) die due to pregnancy or birth-related complications every year in Somalia (111). Humanitarian, conflict, and post-conflict settings hinder progress in reducing the burden of maternal mortality in Somalia (112). According to the Fragile States Index and the WHO, nine countries were marked as extremely high alert on maternal mortality, including Afghanistan, Sudan, Chad, the Central African Republic, the Democratic Republic of Congo, Syria, South Sudan, Somalia, and Yemen. In 2020, the average maternal mortality ratio (MMR) for these extremely high and high-alert fragile states was 551 per 100,000 live births, more than twice the global average (113).

Maternal and Child health is particularly important in Somalia, where health outcomes for women and children remain among the worst globally due to several interrelated complex factors ranging from recurrent natural disasters such as droughts and flooding, limited access to health services, and prolonged conflict and insecurity. Increasing access to health services, strengthening healthcare infrastructure, and providing health promotion and education to support communities can help to mitigate the adverse effects of these complex interrelated factors (114). Inadequate supplies and equipment, lack of skilled health workers, and lack of infrastructure to aid the transportation of pregnant women and postnatal mothers to access health services at the health facilities further compound the problems for mothers and newborns. These have caused an increased demand for harmful traditional practices or forms of seeking care, resulting in more complications for pregnant women and newborns, further worsening newborn outcomes. Low-skilled health workers in Somalia are a significant concern that has affected pregnant women and newborns, and addressing the issue will help address poor ANC and PNC attendance for mothers and newborns to improve health outcomes (39).

There is a big difference across countries and scholars in the definition of the maternity continuum of care. For instance, some studies used the completion of maternity continuum of care if the mother

had at least one ANC visit, had a skilled birth attendant, and a PNC within 42 days after delivery (78, 87), whereas other studies defined it as ANC4+, either institutional delivery or skilled birth attendant, and PNC within 48 hours after delivery (19, 54, 88, 89). Our study used the latter definition. Our study states that 53% of women gave birth to their first child at the age of ≤ 19, while the completion of ANC4 was only 9.7%. This rate is much higher than the completion of ANC4, which is 59.9% in Uganda (115), and that of Ethiopia, which is 33% (116). Our study found that the percentage of mothers who had antenatal care four times or more visits, had skilled birth attendants, and received a postnatal care check-up within 48 hours were 9.7%, 13.4%, and 2.7%, respectively. Moreover, the overall maternity continuum of care findings in Somalia (0.6%) is very low compared to the studies carried out in Kenya (18%) (90), Arba Minch Ethiopia (9.7%) (91), in emerging regions of Ethiopia (9.5%) (89), a multilevel analysis in Ethiopia (9.1%) (92), Ghana (8%) (93), Tanzania (10%) (94), and a high CoC findings in Southern Benin (30%) (95).

Some of the community interviewed preferred the use of traditional birth attendants and home deliveries because of economic preferences since they perceive the costs with a midwife or healthcare professional as unaffordable, which is also consistent with a study conducted in Indonesia (109). Another qualitative study conducted in Ethiopia found that most women who give birth at home are assisted by untrained women (TBAs), and our study came to the same conclusion (105). In common with the current study findings, a recent study conducted in Malawi revealed that the lack of scheduled postnatal care appointments is hindering the continuation of the maternity continuum of care and decreases the mothers' check-ups and appointments before they leave the health facility (110).

5.2. Qualitative

Fragile and conflict-affected states often lack consistent service delivery and struggle to respond to their populations' needs. Despite considerable progress in expanding and improving maternal, Newborn, and Child Health (MNCH) globally, gaps still remain in Low- and Middle-Income Countries (LMICs), particularly in Sub-Saharan African countries, including Somalia. External organizations support healthcare service delivery in Somalia (37). The Somalia healthcare system is structured into three tiers: primary, secondary, and tertiary level care, and each care unit has its own level of service provision, infrastructure, and capacity. The primary level care is typically

delivered through a network of health centers, health posts, community health workers, and maternal and child health clinics (MCH) that are mostly located in urban and rural areas and are very limited in nomadic areas. The secondary level care serves as a referral center for patients requiring more specialized medical care and services that are not available in primary care, such as in district or regional hospitals. The tertiary level of care represents the highest level of medical care available in the country, including highly specialized and complex medical services (25).

This study explores the multifaceted barriers to the completion of the maternity continuum of care and the reasons for discontinuation among different community domains, including urban, rural, IDPs, and nomads in Somalia. The maternity continuum of care gaps varies across different community categories, such as urban, rural, IDPs, Agro-pastoralists (beeraley-baadiye in Somali), and Nomadic pastoralists (reer-guuraa in Somali), due to a combination of factors like service availability, access to care like financial, distance, and transportation, socio-economic disparities, infrastructure, climate-related, and security issues. A similar qualitative study conducted in Ethiopia found that the lack of existence and availability of health facilities in some areas is why women do not complete the recommended maternity continuum of care, which is consistent with our findings (106). One of the primary challenges for maternal healthcare access in Somalia is access barriers with geographical remoteness, limited healthcare facilities, and inadequate infrastructure, exacerbating disparities in maternal, newborn, and child health access. A study conducted in Somalia focusing on constraints in maternal healthcare utilization among pastoral communities also found gaps in Healthcare access, including limited resources, distance, and transportation (4). The maternal decision-making process regarding care-seeking is influenced by different factors like education and awareness level, cultural beliefs, socio-economic status, and access to healthcare facilities. Previous studies also documented the decision and awareness to seek care by pregnant and delivering mothers, such as knowledge of pregnancy risks, appropriate time to book antenatal care, and maternal awareness regarding the importance of care seeking (106).

Access to skilled births during delivery is critical for reducing maternal and newborn deaths; however, limited trained birth attendants, especially in remote regions, can pose significant challenges (107). Although traditional birth attendants are widely utilized, they often lack the necessary skills and knowledge to manage obstetric emergencies safely and refer obstetric

complications when needed. Homebirth can be acceptable if it is attended by a health professional (usually a qualified midwife), but in communities living in remote, rural, or IDP areas, their home delivery is attended by unqualified traditional birth attendants, and our study came to the same conclusion (108). Some of the community interviewed preferred the use of traditional birth attendants and home deliveries because of economic preferences since they perceive the costs with a midwife or healthcare professional as unaffordable, which is also consistent with a study conducted in Indonesia *(*109*)*. Another study conducted in Ethiopia found that most women who give birth at home are assisted by untrained women (TBAs), and our study came to the same conclusion (105). The quality of maternity care services in Somalia is often compromised by complex factors such as resource constraints, understaffing, and inadequate training of the existing staff, which will cause substandard care. Many women and newborns do not receive timely postnatal care check-ups or essential postpartum services in Somalia, which increases the risk of both maternal and newborn complications and deaths. In common with the current study findings, a recent study conducted in Malawi revealed that the lack of scheduled postnatal care appointments is hindering the continuation of the maternity continuum of care and decreases the mother's check-ups and appointments before they leave the health facility (110).

While most of the urban locations in Somalia have access to quality healthcare facilities, most of the nomads and IDPs have limited access to quality healthcare services due to their socio-economic vulnerability, mobility, and inaccessibility to healthcare facilities. Similarly, vulnerable communities like IDPs and hard-to-reach areas have difficulties reaching the existing health facilities due to financial, distance, or transportation challenges. In conclusion, mothers do not have enough autonomy and decision-making power, they are economically dependent on their husbands, their level of education is low, health awareness and knowledge on pregnancy risks are limited, health professionals are not trusted more, they normalized the home deliveries, household living conditions is harsh, and there were service availability and access challenges.

5.3. Conclusion

Maternal, newborn, and child deaths are complex issues involving the interplay of multiple actors and factors that will require multiple interrelated and non-linear strategies, including cultures, behaviors, perceptions, practices, geographical locations, and healthcare factors. The majority of maternal and neonatal deaths could be avoided if a Continuum of Care (CoC) is provided in a

structured pathway from pregnancy to birth and to the first week of life of the newborn child. The research presented in this mixed method study shows that the maternal health service utilization across the continuum from pregnancy to the postpartum period in Somalia was extremely low. Less than one percentage (0.6%) of the mothers received all the recommended services across the continuum of care from pregnancy to childbirth and postpartum (ANC4+, SBA, and PNC). The maternity continuum of care gaps from the qualitative study varies across different community categories, such as urban, rural, IDPs, agro-pastoralists (beeraley-baadiye), and nomadic pastoralists (reer-guuraa), due to a combination of diverse reasons, such as service availability; access to care, including financial, distance, and transportation; socioeconomic disparities; infrastructure; climate-related issues; and security issues. To improve maternal and child health outcomes in Somalia, the maternity continuum of care is paramount and critical in ensuring that Somali women receive the necessary care at all stages of preconception, pregnancy, childbirth, and postpartum.

The prevalence of completion of the maternity continuum of care was found to be lower than in any country in Africa. Maternal health care utilization decreases as they progress from ANC4+ to PNC utilization. Inequity in the continuum of care is a chronic problem in Somalia, where pastoralist women, who constitute 26% of the population, have zero completion of the continuum of care. Health inequalities are avoidable because they are rooted in political and social decisions. Political and economic commitment is required to improve access to maternal health care in the country. The findings of our study indicate that if the government does not target the rural and pastoralist communities, women's retention of health services if existing, would be minimal. To reduce health inequalities between urban and pastoralists in Somalia, we need to act across a range of health-policy areas, including policies to improve access to maternal health care in pastoralist settings in the country. The government and partners should design and implement strategies to improve maternal healthcare utilization specific to rural and nomads, less educated, not working, low income, and have less power in decision-making. The government of Somalia should invest in and increase the number of certified skilled birth attendants, i.e., nurses, midwives, and obstetricians, to provide safe and competent care during childbirth.

To attract and retain skilled birth attendants in remote and rural areas, the government and its partners should implement incentive programs designed for professional and certified midwives and obstetricians and should train and deploy community health extension workers in rural areas to provide basic maternal health education, identify pregnant women, and support and encourage them to seek health care. In collaboration with local and international stakeholders, the Somali government should implement community-based education and awareness programs targeting women, particularly in rural and underserved areas. These programs can include (1) promoting the importance of maternal health services through culturally sensitive campaigns (2) providing basic health education to women with no formal education, emphasizing antenatal care, skilled birth attendance, and postnatal care, (3) engaging community and religious leaders, and male family members to address cultural and social barriers that prevent women from accessing maternal health services.

5.4. Recommendations

1. Addressing accessibility challenges such as distance, transportation, time constraints, and financial burdens requires a multifaceted strategy, including bringing health facilities close to communities, improving transportation infrastructure, establishing mobile health clinics or outreach programs, and implementing telemedicine initiatives to provide remote healthcare services in those communities if it is feasible to obtain affordable internet.
2. On-time antenatal care visits should be encouraged and advised to all communities through health education and awareness raising. All mothers should be educated to attend all levels of the continuum of care, including ANC four or more times, delivery at health facilities, and postnatal care attendance. This can be motivated by providing incentives or subsidies to encourage pregnant women to attend antenatal care appointments.
3. Mothers should be educated on essential services such as blood groups and tests, malaria prophylaxis, and tetanus toxoid prophylaxis. They should also receive specially designed health education related to birth preparedness, early and exclusive breastfeeding, postnatal care within 41 days, etc.
4. To improve geographical accessibilities, mobile health innovations can provide remote communities with access to maternal health information and services. Mobile applications such as text messaging and social media platforms can be explored to disseminate maternal health information, promote healthy behaviors, and provide counseling among pregnant mothers.

5. Targeted interventions, such as user fee exemptions, cash transfer programs, and community health insurance schemes, can be implemented to address socio-economic barriers to pregnant women.
6. Interventions to empower women, such as economic opportunities, education, and participation in decision-making processes related to their own healthcare and well-being, should be implemented.
7. Maternal health services should be linked to child health programs, such as immunization and nutrition, to ensure holistic care.
8. Implement subsidies or remove fees for maternity services, as the cost is a significant barrier for many Somali women.
9. Explore innovative strategies to reach underserved populations, such as mobile clinics, M-health, or telehealth for maternal care.
10. Conduct cost-effectiveness analyses of interventions to guide policymakers in resource allocation.

5.5. Contribution of this Thesis to the Field

Continuum of care for maternal and child health is defined as the continuity of care throughout pregnancy, birth, and after delivery. This includes antenatal care, skilled birth attendance, postnatal care, full immunization, and modern family planning use. The continuity of care in maternal and child health is used as a key program strategy by most of the global nations to improve the health of mothers and newborns. Ensuring service delivery that provides a continuum of care will allow us to understand the gaps in seeking care along the continuum and what factors contribute to these gaps. Nonetheless, we do not have such knowledge in Somalia. The results of this study will provide an opportunity to discover the critical issues affecting women's and children's health status in Somalia. It will assist the government, policymakers, health planners, academia, and other partners in the health sectors to formulate evidence-based, theory-driven, and contextualized interventions to improve maternal, newborn, and child health services in Somalia.

5.6. Strengths and Limitations of the Research

This study is subject to several limitations, both in using the secondary data and analyzing the outcome variables. Due to limitations of the secondary data, we used only decisions determining own healthcare as women's decision-making power. We excluded the other two recommended decisions (decisions regarding purchases and decisions regarding family or relative visits). Due to

data limitations, it is impossible to determine the type of provider for each visit, i.e., the current Somali Health and Demographic Survey did not collect information on the type of provider for each visit. Due to the data quality, the Somalia Health and Demographic Survey (SHDS-2020) data did not capture the women's accessibility to health facilities, which would include (a) getting permission to go for treatment, (b) getting money for treatment, (c) distance to a health facility, and (d) not wanting to go alone. Approximately 2.6 million Somalis are currently displaced within their own country, and the SHDS 2020 did not include the IDP domain separately but was merged with the urban domain. We could not do the test on the study model 3 (ANC4+ & SBA & PNC) because only 14 mothers completed the continuum of care. Finally, our analysis's three study outcome variables were self-reported, which could have a potential misreporting of care received several years before the survey.

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APPENDICES

APPENDIX 1: Study 1

LEVEL OF COMPLETION OF MATERNITY CONTINUUM OF CARE AMONG EVER-MARRIED WOMEN: AN ANALYSIS OF SOMALIA HEALTH AND DEMOGRAPHIC SURVEY

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Abstract

Introduction: Somalia is continuing its retrieval from three decades of underdevelopment, political instability, civil unrest, and protracted humanitarian crises. Somalia has one of the worst maternal conditions in the world. For instance, the maternal mortality ratio is 621 per 100,000 live births. Extra efforts are needed to improve maternal health. In this study, we aim to investigate the level of completion and coverage along the maternity continuum of care in Somalia.

Method: The study used data from the Somalia Health and Demographic Survey 2020. We restricted our analysis to ever-married women who had a live birth in the five years preceding the survey (n = 2432). Completion of the continuum of maternity care was the outcome variable for this study. It was constructed into a binary variable with complete coded as one and incomplete coded as 0. We categorized it into three models: ANC4+ as the first model, ANC4+ & SBA as the second model, and ANC4+ & SBA & PNC as the third model.

Results: More than half of the women (53.1%) had their most recent births at ≤ 19 years old. Of all the mothers (n=2432), only 235 (9.7%) had at least four or more of the recommended antenatal care (ANC4+), and 68 (2.8%) of them utilized skilled birth attendants. Only 14 (0.6%) women received all three maternal healthcare services (ANC4+, SBA, and PNC within 48 hours). About 78.1% of the mothers did not attend any of the three CoC services.

Conclusion: Maternal health care utilization decreases as they progress from ANC4+ to PNC utilization. The government and partners should design and implement strategies to improve

maternal healthcare utilization specific to rural and nomads, less educated, not working, low income, and have less power in decision-making.

Keywords: Continuum of care, Antenatal Care, Skilled birth attendant, Postnatal care, Somalia

Background

Sub-Saharan Africa (SSA) has the highest rates of maternal mortality in the world, accounting for almost 90% of the global burden of maternal mortalities (64, 65). This high burden of maternal mortality in the region has been attributed to preventable factors such as low antenatal care (ANC) utilization, low uptake of skilled attendant delivery and postnatal care (PNC) (66). In 2020, the MMR in the African Region was 531 deaths per 100 000 live births, accounting for 69% of global maternal deaths in 2020 (67). From 2000 to 2020, the maternal mortality ratio dropped by about 34% worldwide. However, in many low- and middle-income countries, maternal mortality remains a significant public health problem, with nearly 94% of all maternal deaths occurring in low-resource settings to date (2). Somalia is recovering from three decades of underdevelopment, political instability, civil unrest, and protracted humanitarian crises. The country has suffered multiple emergencies, including flooding, drought, famine, locust attacks, and other climate change shocks, which resulted in many deaths and large-scale population displacements (61).

Somalia has a population of 17 million, with 44 percent living in urban areas, 23 percent living in rural areas, 26 percent living in nomadic areas, and 9 percent living in Internally Displaced settings (IDPs). Due to limited state capacity, poverty-related deprivation, corruption, and longstanding armed conflicts, the country has one of the weakest healthcare systems in Sub-Saharan Africa. Therefore, Somalia has some of the lowest health indicators in the world (61). The fragile health system in Somalia is shaped by various administrations that adopt different policies, priorities, and health care service approaches, often influenced by local state administrations and international paradigms and resolutions (21).

Somalia is among the 15 countries that WHO marked as very high alert countries for maternal, newborn, and under-5 deaths. Most of the causes are either preventable or treatable. Somalia has one of the worst maternal conditions in the world. For instance, the maternal mortality ratio is 621

per 100,000 live births. Poor maternal health care delivery in rural communities results in the majority of maternal, newborn, and child deaths during pregnancy, childbirth, and after delivery in Somalia (11). This is due to the unavailability and low utilization of maternal healthcare services, including skilled birth attendance, emergency obstetric care, postnatal care, and family planning. According to a predictive analysis of the trends of maternal mortality ratio, Somalia will not meet the sustainable development goal target 3.1 of reducing the maternal mortality ratio to less than 70 per 100,000 live births. The country will not meet the targets of reducing neonatal mortality to below 12 per 1000 live births and under-5 mortality to below 25 per 1000 live births by 2030 (38). According to Somalia's Voluntary National Reviews Report 2022 and voluntary national reviews in East African countries on Sustainable Development Goals, especially goal 3, Somalia still faces significant challenges in maternal mortality rates, which can be attributed to low uptake of antenatal care and postnatal care and a low number of deliveries at health facilities or with skilled health care providers. Somalia is unlikely to achieve the SDGs given the lack of evidence-based knowledge that informs government interventions to improve maternal and newborn health (68).

Continuum of Care (CoC) refers to the continuity of care throughout pregnancy, birth, and after delivery (i.e., antenatal care, skilled birth attendance, and postnatal care). Ensuring that continuity of care for maternal, newborn, and child health has become a key to improving the health of mothers, newborns, and children. The continuum of care has newly been emphasized as a core principle of programs for maternal, newborn, and child health and as a method to reduce the burden of maternal, newborn, and child deaths (40). Primary services for a continuum of care, like antenatal care, facility delivery, and postnatal care, are recognized to reduce maternal and child mortality and morbidity in high-burden settings. Maternal and child mortality rates are indicators used globally to determine countries' health, economy, and developmental status. Although the Somali government has taken a significant step to increase the availability and access to maternal care, still a low proportion of mothers utilize the services, especially in urban areas (4). Improving the utilization of the maternity continuum of care relies on a better understanding of the barriers and gaps affecting the uptake of each service, i.e., ANC4+, SBA, and PNC. In this study, we aim to investigate the level of completion and coverage along the maternity continuum of care in Somalia.

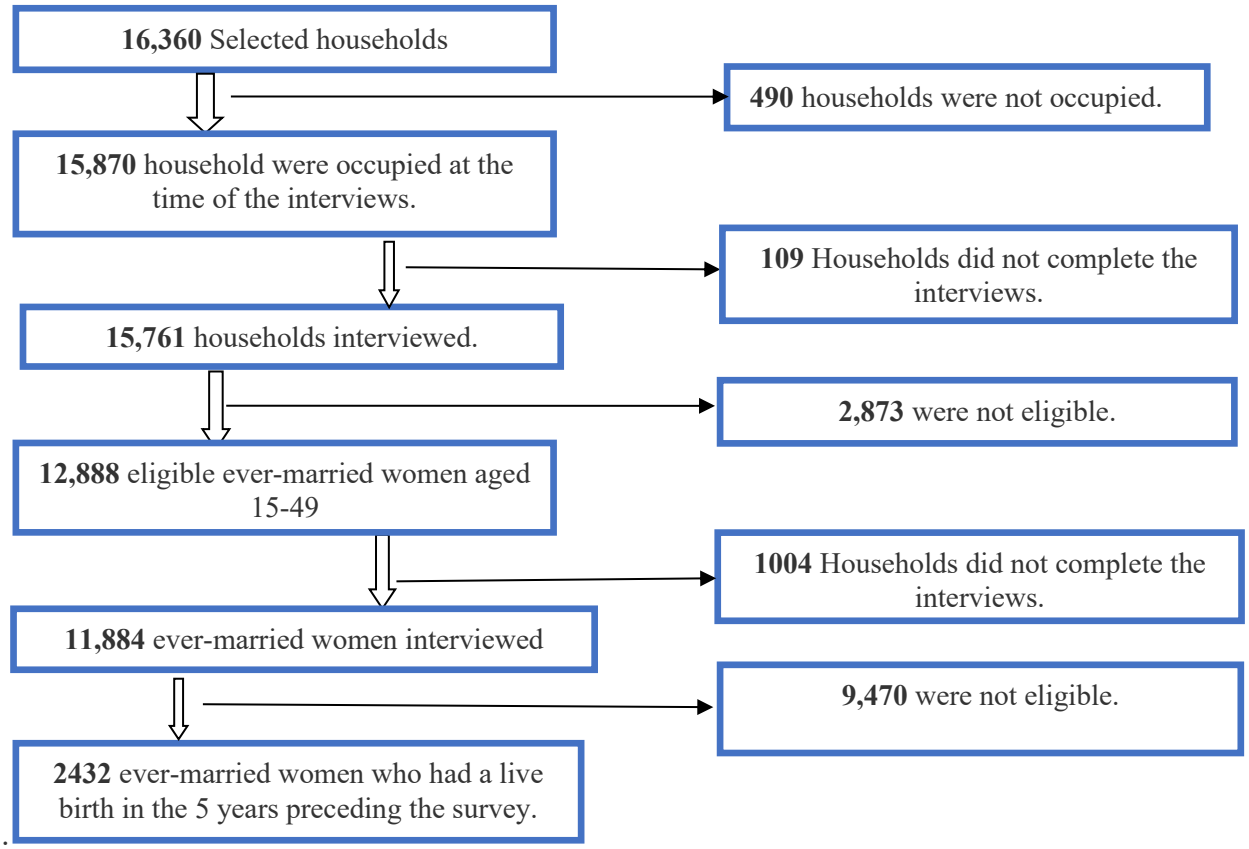
Methods

Data source and study participants

This study used data from the 2020 Somalia Health and Demographic Survey, a nationally representative household survey designed to collect, analyze, and disseminate demographic data on reproductive health, maternal and child mortality, family planning and fertility, nutrition, and health care utilization in Somalia. The main objective of the Somali Health and Demographic Survey was to provide evidence on the health and demographic characteristics of the Somali population that will guide the development of programs and formulation of effective policies. This nationally representative survey used a multistage cluster sampling design to collect data on reproductive health, maternal and child mortality, family planning and fertility, nutrition, and health utilization in Somalia.

About 11,884 ever-married women of reproductive age (15-49 completed the interviews. Our study focused on ever-married women who had a live birth in the five years preceding the survey (n=2432), as you can see in Figure 8 below. The survey further restricted the women's most recent live births in the recall period. Nine thousand four hundred seventy were not eligible due to either not having children under 5 years, incomplete data in the maternal and child health questions, or not fitting the targets, and the analysis removed them. Marriage is associated with childbearing; a woman can have a child only if she is married as accepted in the community. That is why we restricted our study to only the ever-married women.

Figure 8:: Selection process of eligible women aged 15-49 years old using Somalia Health and Demographic Survey 2020



Data analysis

We used STATA software (version 18) and sampling weight for all analyses with the survey data analysis command (say) to account for the cluster survey design and missing responses. The study did not proportionally sample urban, rural, and nomadic domains; hence, urban overrepresentation may occur. Many of the population refused to finalize the questionnaires, especially the maternal and child health section, causing incomplete interviews. The SHDS data are missing because some aspects of the population were not covered. The SHDS data in Somalia was not meant to track detailed elements of maternity care, which makes it challenging to analyze the maternity continuum of care. We checked the data for completeness and then cleared it. We then conducted a descriptive analysis (number, frequency, and percentage) to summarize the characteristics of the study population and each variable. We assessed the level of coverage for each maternal health service (ANC, SBA, and PNC) separately and then together as a combined continuum of maternity care. Variance Inflation Factor was used to test the presence of collinearity between the independent variables using STATA 18.

Results

Characteristics of the study participants

Table 16 summarizes the background characteristics of ever-married mothers included in this study. The mean age of the women in the study was 22.8 years (SD = 4.2), with more than half of the women (53.1%) had their most recent births at the age of ≤19 years, while 90.2% of the women in the study were married during the survey period. Above sixty percent of the women lived in urban areas, and seventy-seven had no education. 96.1% of the women were not working, 74.5% had 1-2 children, and 90.6% had not accessed mass media (radio exposure).

***Table 16**: Socio-demographic characteristics of ever-married women who had at least one live birth in the five years preceding the survey (Weighted sample size = 2432 & unweighted sample size = 2414)*

Variable	Categories	Weighted Number (2432)	Percentage (%)
Maternal age at birth (years)	<20	1,291	53.1
	20-34	1,125	46.3
	35-49	16	0.6
Birth Order	1	906	37.3
	2	908	37.3
	3	525	21.6
	Four or more	93	3.8
Residence	Urban	1,475	60.6
	Rural	653	26.9
	Nomadic	304	12.5
Marital Status	Married	2,193	90.2
	Divorced/widowed	239	9.8
Mother's Education	No Education	1,872	77.0
	Primary	370	15.2
	Secondary & above	190	7.8
Mother's Employment	Working	96	3.9
	Not working	2,336	96.1
Number of Children	1-2	1,813	74.5
	3-4	598	24.6
	>=5	21	0.9
Decision-making power in determining one's healthcare	Women or jointly	1,285	52.8
	Husband or others	1,147	47.2
Exposure to Radio	Yes	229	9.4
	No	2,203	90.6
Wealth Quintile	Poorest	621	25.5
	Poorer	486	20.0
	Middle	406	16.7
	Richer	454	18.7
	Richest	465	19.1

Wealth quintile distribution among the households was almost homogenous, with the highest being the poorest (25.5%) and the lowest being the middle group (16.7%).

The overall use of maternal health services in Somalia

Table 17 shows the descriptive analysis indicating that Somalia did not achieve good antenatal care, institutional delivery, and postnatal care coverage. Around **two-thirds** of the study participants (66.2%) did not receive antenatal care visits, and only 24.2% received ANC between 1-3 trips, whereas 9.7% of the women in the study attended the recommended four or more antenatal care (ANC4+) visits. Skilled providers attended less than 14% of the deliveries. For postnatal care, only 2.7% of the women had a PNC check within 48 hours after delivery, regardless of their place.

Table 17: Number and Percentage of mothers and their use of maternal health services

Characteristics	Categories	Weighted Number (2432)	Percentage (%)
ANC visits	No ANC	1,608	66.2
	1-3ANC	589	24.2
	ANC4+	235	9.7
Delivered by SBA	Skilled provider	327	13.4
	Unskilled provider	1,478	60.8
	No one	47	1.9
	Don't know/missing	580	23.8
PNC visits	First 48hrs	67	2.7
	More than 48hrs	2	0.1
	No PNC/Don't know	2,363	97.2

Maternity Continuum of Care: of all the mothers (n=2432), only 235 (9.7%) had at least four or more of the recommended antenatal care (ANC4+) visits during their recent pregnancy. Among these, only nine mothers live in nomadic settings. Out of the women who have received four or more ANC care, only 68 (2.8%) of them utilized skilled birth attendants in their most recent pregnancies. Regarding the continuum of maternal health services, only 14 (0.6%) of women had received all three maternal healthcare services i.e., Antenatal care four times, delivery attended by skilled birth attendants, and postnatal care within 48 hours after delivery (ANC4+, SBA, and PNC within 48 hours) as described in Figure 9 and 10, respectively.

Figure 9: *Maternity Continuum of Care*

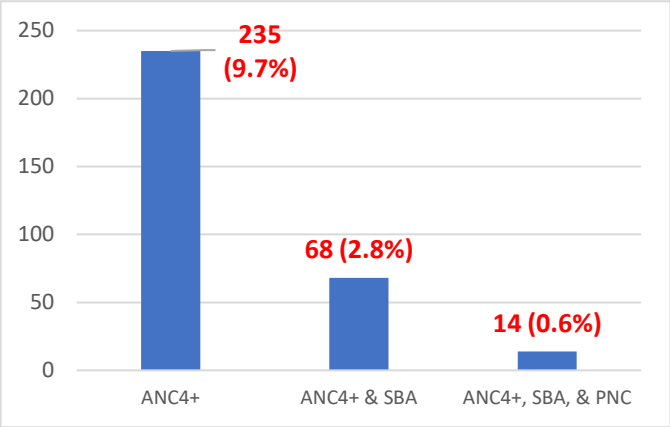
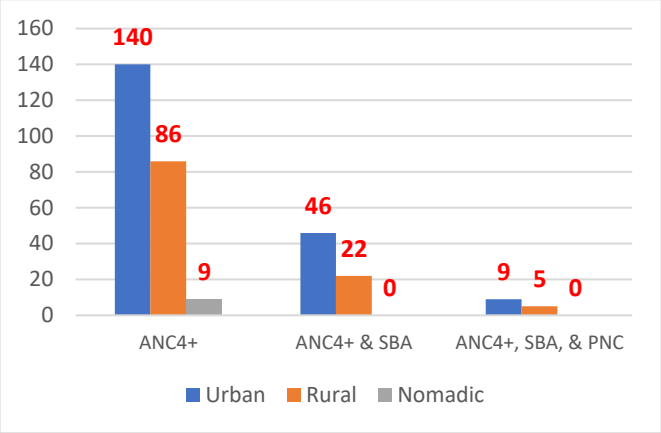


Figure 10: *Maternity Continuum of Care by residence*



5.6.1. Pathways of maternal healthcare use

Considering the study's three main outcomes (ANC4+, SBA, and PNC), we created eight different pathways or combinations of maternal health service utilization, i.e., from not receiving any of the three maternal health services to completing the use of all three maternal health services (Table 18). More than two-thirds of the mothers in the study (78.1%) did not receive any of the three maternal health services as shown in pathway 1. Only 14 mothers (0.6%) received all three maternal health services along the continuum (pathway 8). Three groups that attended any two of the three maternal health services (pathways 3, 6, and 7) accounted for 2.2%, 0.5%, and 0.1%, respectively. Lastly, the three groups that utilized only one of the three maternal services (pathways 2, 4, and 5) accounted for 6.7%, 1.6%, and 10.2%, respectively.

Table 18: Percentage distribution of the three maternal health services received by women. (+ Received the service; - Did not receive the service).

Pathway	ANC4+	SBA	PNC within 48hrs	Frequency (Weighted Number)	Percentage
1	–	–	–	1,899	78.1
2	+	–	–	164	6.7
3	+	+	–	54	2.2
4	–	–	+	39	1.6
5	–	+	–	248	10.2
6	–	+	+	11	0.5
7	+	–	+	3	0.1
8	+	+	+	14	0.6
Total				**2,432**	**100%**

Table 18 above shows the combination of maternal health services (three major services) that mothers either received or did not receive. It summarizes the three major outcome variables of the

study: antenatal care of four times or above, skilled birth attendant, and postnatal care within 48 hours after delivery.

Discussion

This study assessed maternity continuum of care for the first time in Somalia. Access and use of maternity care services during pregnancy, childbirth, and the postnatal period from skilled providers are essential for the survival and wellbeing of the mother and newborn. It is particularly critical in setting where teenage pregnancy is common such as Somalia. Our study states that 53% of women gave birth their first child at the age of ≤ 19, while the completion of ANC4 was only 9.7%. This rate is much higher than the completion of ANC4 which is 59.9% in Uganda (69) and that of Ethiopia which is 33% (70). Protracted conflicts and instability may explain why women in Somalia have low prevalence of ANC4. Armed conflict has been described as an important contributor to persistent excess maternal and child deaths while it can severely reduce access to maternal health services and thus lead to poor maternal health outcomes (71). The effect of the three decades of conflict on the access to health care in Somalia is exacerbated by the pervasive corruption in the health sector, given the fact that systemic corruption and the large-scale misappropriation of state funds is the norm in Somalia (72). Somalia, like many other countries, corruption at the health sector range from smaller-scale acts by doctors and nurses who charge "informal payments" to larger-scale acts at the ministerial level, when people in power employ incompetent relatives or redirect resources away from those who need it for their own benefit (73). Hence, countries with high levels of corruption spend less on health care (74). In addition, high levels of corruption correlate with higher infant and child mortality rates (75). To improve maternal health care in Somalia, requires political and economic commitment, and genuine leadership is critical in achieving this agenda.

Our study shows that only 13.4% of women in Somalia gave birth with the help of skilled health provider. A prior study on 29 Sub-Saharan African countries found an average proportion of women who had skilled assistance during delivery was 75.3%, ranging from 38.4% in Chad to 93.7% in Rwanda (66). Skilled attendants have positive contribution in the reduction of maternal and newborn mortality and morbidity. A 40% decline in maternal deaths in SSA occurred between 2000 and 2017 was attributed, by WHO, to utilizing skilled birth attendant at delivery (76). The fact that only 13.4% of women in Somalia are using the services of skilled birth attendant, indicated that

although utilization of the services of SBAs in SSA appears high, it is extremely low in Somalia. The SBA prevalence in Somalia can be improved by adopting prevailing successful interventions of countries with SBA successes such as Rwanda, whilst considering of contextual variations (77). Our study finds that the overall completion of maternity continuum of care is less than 1%. This is much lower than that reported in Gondor Ethiopia 47% (78). This could be due to the efforts made by the Ethiopian government to in the recent years to strengthen maternity health care access.

Our study found that only 2.8% of Somali women have received postnatal care. Receiving postnatal care after delivery is vital for women and the baby due to the fact that over 65% of maternal and neonatal deaths occur during the first 42 days of postpartum and during the first 7 days of life respectively. A study on postnatal care utilization in 36 sub-Saharan Africa countries found a prevalence of PNC of 52.48% [95% CI: 52.33, 52.63], ranging from 73.51% in Central Africa region to 31.71% in Eastern Africa Region (79). A prior study found an association of armed conflicts with an increase of 36.9 maternal deaths per 100,000 live births, an increase of 2.8 infant (under 1 year old) deaths per 1,000 live births (71).

The continuity of maternity health care services is the care that a woman uses the three recommended cares of antenatal care (ANC), skill birth attendant (SBA), and postnatal care (PNC). Our study shows that only 0.6% of the women in Somalia have completed the three services; ANC4, SBA and PNC, while only 2.8% have completed ANC4 and SBA. The prevalence of maternal continuum of care in Somalia which is stated by our study (0.6%), is far much lower than the frequence of continuum of care in Ethiopia (47%) (78) and is even over 15 times lower than the continuum of care of rural women in Ethiopia (13%) (80). Further, our study shows a significant inequity in continuum of care by residence with zero continuum of care among women in pastoral communities that constitute 26% of total population in Somalia. A recent study in Somalia stated that pastoralist women have limited access to maternal health care which supports our findings (4). The inequity between urban and rural women, in utilizing maternal health care services, is prevalent across Africa. A prior study of 27 African countries showed a prevalence of ANC utilization of 34.7% among urban women and 22.4% among in rural areas, while SBA prevalence was nearly 90% and 69% in urban women and rural women respectively (81).

This study has both strength and limitations. The main strength of this study is the use of weighted nationally representative data with a large sample, which makes it representative at national level. The SHDS data used a multi-stage cluster sampling design, and some groups or demographic categories might be over sampled hence, we weighed the SHDS data during analysis.

The current SDHS did not collect information on type of provider for each visit, therefore, we couldn't determine the type of provider for each visit. Further, approximately 2.6 million Somalis are currently displaced within their own country and the SHDS 2020 did not include the IDP domain in the data.

Conclusion

The prevalence of completion of the maternity continuum of care was found to be lower than any country in Africa. Maternal health care utilization decreases as they progress from ANC4+ to PNC utilization. Inequity in the continuum of care is a chronic problem in Somalia where pastoralist women who constitute 26% of the population have zero completion of continuum of care. Health inequalities are avoidable because they are rooted in political and social decisions. Political and economic commitment is required in improving the access to maternal health care in the country. The findings of our study indicate that if the government does not target the rural and pastoralist communities, women's retention to the health services if existing would be minimum.

To reduce health inequalities between urban and pastoralists in Somalia, we need to act across a range of health-policy areas including policies to improve access to maternal health care in pastoralists setting in the country. The government and partners should design and implement strategies to improve maternal healthcare utilization specific to rural and nomads, less educated, not working, low income, and less power to decision-making. The government of Somalia should invest and increase the number of certified skilled birth attendants i.e., nurses, midwives, and obstetricians to provide safe and competent care during childbirth. To attract and retain skilled birth attendants in remote and rural areas, the government and its partners should implement incentive programs designed to the professional and certified midwives and obstetricians and should train and deploy community health extension workers in rural areas to provide basic maternal health educations, identify pregnant women, and support and encourage them to seek health care.

Data Availability Statement: All relevant data are within the manuscript and its supporting information files.

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APPENDIX 2: Study 2

CORRELATES OF MATERNITY CONTINUUM OF CARE AMONG SOMALI WOMEN: EVIDENCE FROM SOMALIA HEALTH AND DEMOGRAPHIC SURVEY

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Abstract

Background: Somalia is characterized by political instability, protracted humanitarian crises, fragile civil unrest, fragile health systems, and underdevelopment. Every human being has the right to access quality and affordable health services. However, mothers living in developing countries have lower access to healthcare and higher maternal mortality rates than those in developed countries. In this study, we aim to identify determinants associated with mother's continuation of service use along the continuum of care in Somalia.

Methods: The study employed a representative data from Somalia Health and Demographic Survey 2020. We analyzed the ever-married women who had a live birth in the five years preceding the survey (weighed n = 2432). Bivariable and multivariable logistic regression modelling were performed to find factors correlated with the completion of the continuum of maternity care using STATA version 18. An adjusted survey design like weight, stratification, and clustering was made (ANC4+, SBA, PNC within 48 hours).

Result: Two-thirds of the women (66.1%) did not receive antenatal care services, 9.7% of the women attended the recommended four or more antenatal care (ANC4+) visits, whereas only 13.4% of the deliveries were attended by skilled providers and only 2.7% of the women had a PNC check within 48 hours after delivery. Maternal age at birth, residence, mother's education, mother's employment, healthcare decision-making, radio exposure, and wealth quintile were variables significantly associated with Model 2 (ANC4+ and SBA) at p-value <0.05.

Conclusion: The completion of the maternity continuum of care is more skewed towards urban residents, maternal health care utilization decreases as they progress from ANC4+ to PNC utilization. The government and partners should design and implement a tailored strategy to improve access and utilization of maternal healthcare services with special attention to rural and nomadic populations.

Keywords: Continuum of care, Antenatal Care, Skilled birth attendant, Postnatal care, Somalia

Background

Global maternal mortality remains a significant public health challenge, particularly in low and middle-income countries (82), where almost 95% of all maternal deaths occur. And the majority of them could have been prevented. Sub-Saharan African countries account for the highest maternal mortality rates within LMIC countries. The high number of maternal deaths in the world reflects inequalities in access to quality maternal health services and highlights the gap between developed and underdeveloped countries. For instance, the maternal mortality ratio in high-income countries in 2020 was 13 per 100,000 live births compared to the 430 per 100,000 live births in low-income countries (2). Somalia is characterized by political instability, protracted humanitarian crises, fragile civil unrest, fragile health systems, and underdevelopment. It has also suffered multiple emergencies, including recurrent droughts, flooding in some areas, continued locust attacks, and other climate shocks. These resulted in large-scale displacement, many deaths, and continued rural-to-urban population migration.

It is estimated that the Somali population is 17 million, with 39 percent of the population living in urban areas, 23 percent living in rural areas, 24 percent in nomadic areas, and 14 percent living in Internally Displaced settings (IDPs) (83). Furthermore, as of the last Somali Health and Demographic Survey, only 24% of women had at least four ANC visits, 21% of births were delivered at the health facility, 32% of births were delivered with the assistance of skilled health care provider, only 11% of mothers and 10% of births had a postnatal check within the first two days after delivery. For the hindrances in accessing health care during pregnancy, 65% of mothers lack money to attend the health facility, more than 62% are distant from a health facility, and 42% need or obtain permission to access services (8). According to Somalia's Voluntary National Reviews Report 2022 on Sustainable Development Goals, especially goal 3 (health and wellbeing), Somalia has one of the highest maternal mortality ratios in the world and faces a significant challenge in reducing it. One of the major obstacles is the lack of evidence-based knowledge that informs government interventions to improve maternal and newborn health (39). The effectiveness of sequential giving of maternal, newborn, and child health packages was established in the literature (84).

Although evidence suggests that increased continuity of maternal, newborn, and child health services are linked to different determining factors like women's autonomy in decision-making of her own healthcare, higher educational attainment, receiving the first antenatal care within the first trimester, having been informed of signs of pregnancy complications, urban residence, household wealth, and other factors but this was not tested in Somalia (85). In this study, we aim to identify determinants associated with mother's continuation of service use along the continuum of care in Somalia.

Methods

Data source and study participants

We used the Somalia Health and Demographic Survey 2020, a nationally representative household survey designed to collect, analyze, and disseminate demographic data on reproductive health, maternal and child mortality, family planning and fertility, nutrition, and health care utilization in Somalia. The main objective of the Somali Health and Demographic Survey was to provide evidence on the health and demographic characteristics of the Somali population that will guide the development of programs and formulation of effective policies. This nationally representative survey used a multistage cluster sampling design. The survey further restricted the women's most recent live births in the recall period. About 11,884 ever-married women of reproductive age (15-49) completed the interviews. Our study focused on women who had a live birth in the five years preceding the survey (n=2432). The survey further restricted the women's most recent live births in the recall period.

Sampling

The Somalia Health and Demographic Survey identified urban, rural, and nomadic sampling strata from 16 regions out of the 18 pre-civil war Somalia regions. With the exception of the Banadir region, which is considered entirely urban, each region was stratified into urban, rural, and nomadic areas, yielding a total of 55 sampling strata. All three strata of Lower Shabelle and Middle Juba regions and the rural and nomadic strata of the Bay region were excluded entirely from the survey due to security reasons. A final total of 47 sampling strata formed the sampling frame. This nationally representative survey used a multistage cluster sampling design to collect data on reproductive health, maternal and child mortality, family planning and fertility, nutrition, and health utilization in Somalia.

Study Variables

Dependent Variables

The maternity continuum of care in this study composed of three dummy variables as dependent variables in the study: ANC4+, SBA, and PNC within 48hours. We defined the maternity continuum of care as the completion and continuity of care throughout pregnancy, birth, and after delivery (i.e., use of antenatal care, skilled birth attendance, and postnatal care). We defined ANC4+ percentage of women with a live birth who received WHO-recommended at least four times antenatal care visits over the course of their pregnancy. We defined Skilled Birth Attendant (SBA) as births attended by skilled health personnel such as midwife, doctor, nurse, or other health care professional in a given period. We defined postnatal care as the care women and her newborn baby received immediately after the birth and we limited to our continuum of care within two days or 48 hours after childbirth. We constructed into binary variables to each of the three dependent variables with complete coded as 1 and incomplete coded as 0. Continuum of Maternity care was assumed complete if the mother utilized all of the three services like receiving at least four ANC services, delivered by a skilled birth attendant, and received postnatal check within 48 hours after delivery during the most recent pregnancy.

Independent Variables

We included three predictors in the models such (1) socio-demographic factors (2) socio-economic factors and (3) cultural factors which were all found in the previous literatures. Socio-demographic factors included maternal age at the recent births, women's level of education, marital status, birth order of the most recent child, and number of children. Socio-economic factors included place of residence (urban, rural, or nomadic), women's employment (working, or not working, household wealth quintile (poorest, poorer, middle, richer, or richest). Cultural factors included exposure to mass media (listing to radio as yes or no). We categorized a woman as having access to mass media if she had access to radio at least once a week and no access if she did not listen to a radio at least once a week. We assessed women's empowerment or decision-making power in determining own healthcare and we scored full empowerment for decisions involving the woman or jointly with her husband (full power) and decision taken without the woman's involvement (no power) (54).

Data analysis

We used STATA software (version 18) and sampling weight for all analyses with the survey data analysis command (svy) to account for the cluster survey design and missing responses. We then summarized the study population's characteristics and each variable to account for completeness.

We checked the maternity continuum of care using three primary services (ANC, SBA, and PNC). The bivariate relationship between the independent variable and each dependent variable was examined using chi-square. Logistic regression was performed to estimate the associations between the outcome and independent variables of interest. Crude Odds Ratio (OR) and adjusted Odds Ratio (AOR) with 95% confidence interval (CI) and p-value were calculated to measure and test the strength of associations between the independent variables and dependent variables using simple logistic regression. This was conducted in three models: -

1. **Model 1** assessed the determinants of receiving full antenatal care (ANC4+) among the ever-married women with a live birth in the last five years that were coded 1 if a woman received ANC four times or more and 0 if the woman did not receive ANC for times or more.
2. **Model 2** assessed the determinants of receiving skilled birth attendants (SBA) among women who utilized ANC4+ and SBA.
3. **Model 3** assessed the determinants of utilizing all three main outcomes or services (ANC4+, SBA, and PNC within 48 hours).

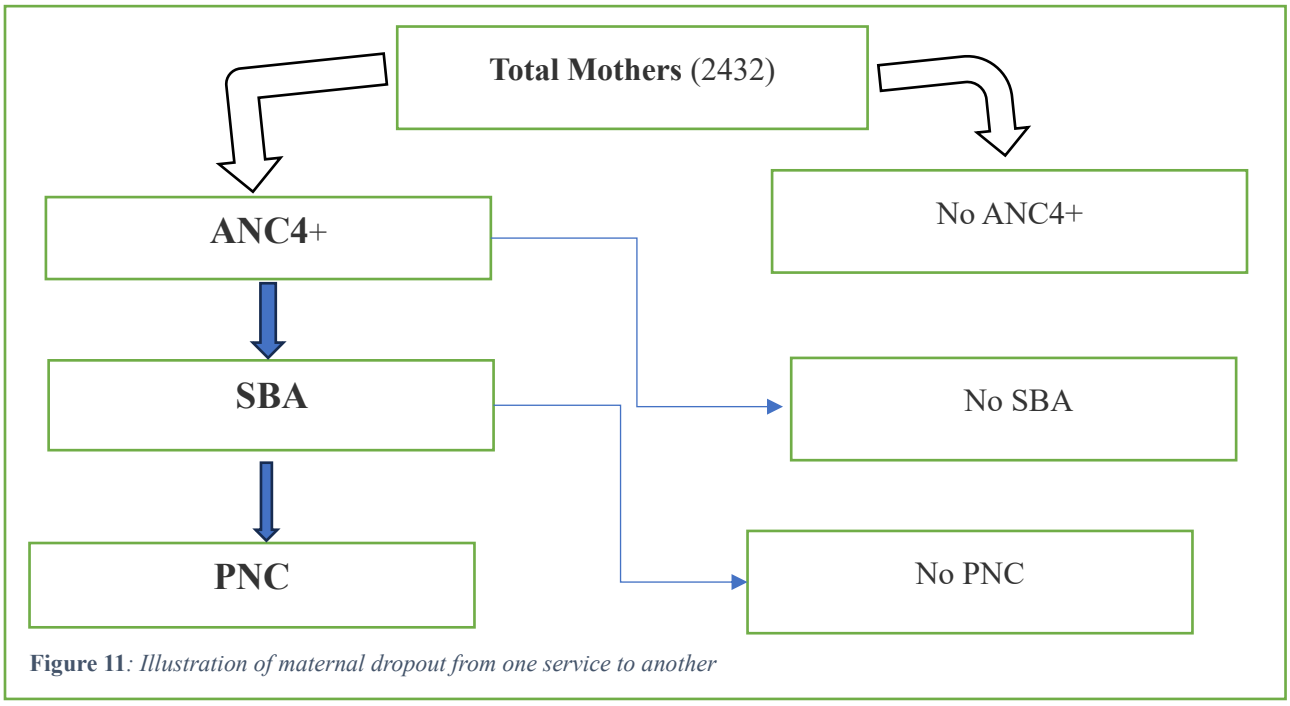


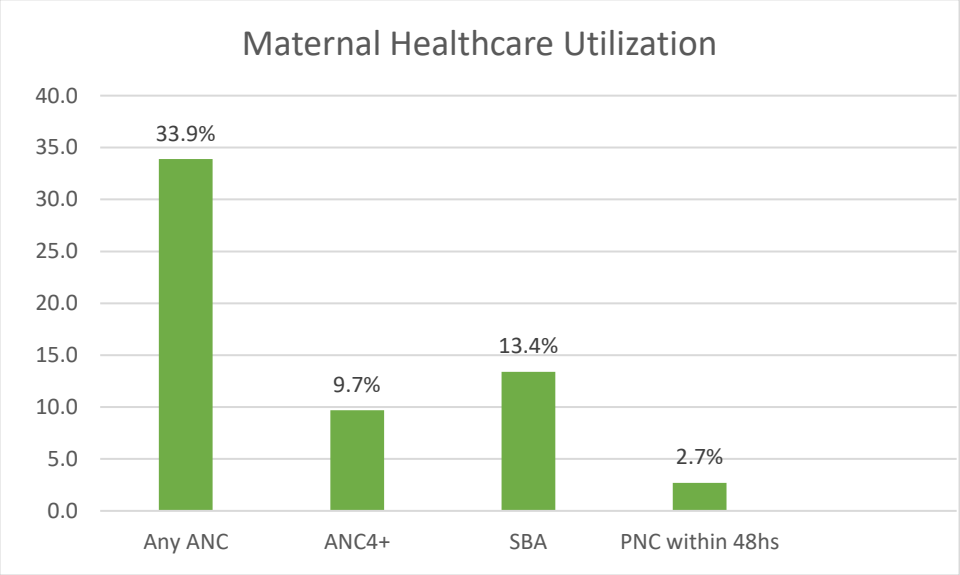
Figure 11: *Illustration of maternal dropout from one service to another*

Results

The overall use of maternal health services in Somalia

Table 12 below describes maternal healthcare utilization across the continuum dimensions (antenatal care, skilled birth attendant, and postnatal care), which is very low. Two-thirds of the women (66.1%) did not receive antenatal care services, and only 33.9% received antenatal care services, whereas 9.7% of the women in the study attended the recommended four or more antenatal care (ANC4+) visits. Only 13.4% of the deliveries were attended by skilled providers. Only 2.7% of the women had a PNC check within 48 hours after delivery, regardless of their delivery place. About 97% of the mothers did not attend or didn't know if they were given a postnatal care check-up after delivery.

Figure 12: Maternal health service use



Maternal healthcare use pathways

Considering the study's three main outcome variables (ANC4+, SBA, and PNC), we developed eight maternal health service utilization pathways, from not receiving any of the three maternal health services to complete use of all three. More than two-thirds of the mothers in the study (78.1%) did not receive any of the three maternal health services for their most recent pregnancy, delivery, and postnatal care, as shown in pathway 1 (all No lines). Three groups that attended any two of the three maternal health services, i.e., pathways 3, 6, and 7, described 2.2%, 0.5%, and 0.1%, respectively. Notably, only 14 mothers (0.6%) received all three maternal health services along the continuum (pathway 8). Lastly, the three groups that received only one of the three

maternal services, i.e., pathways 2, 4, and 5, accounted for 6.7%, 1.6%, and 10.2%, respectively, as shown in Table 19.

***Table 19**: Distribution of the three maternal health services. Yes = Received the service; No = did not receive the service.*

Pathway	ANC4+	SBA	PNC within 48hrs	Frequency (Weighted Number)	Percentage
1	No	No	No	1,899	78.1%
2	Yes	No	No	164	6.7%
3	Yes	Yes	No	54	2.2%
4	No	No	Yes	39	1.6%
5	No	Yes	No	248	10.2%
6	No	Yes	Yes	11	0.5%
7	Yes	No	Yes	3	0.1%
8	**Yes**	**Yes**	**Yes**	**14**	**0.6%**
Total				**2,432**	**100%**

Factors associated with maternal healthcare utilization

Antenatal Care (ANC4+)

Table 20 below shows the crude odd ratio of the factors associated with the antenatal care of four or more (ANC4+) visits. Maternal age at birth, residence, mother's education, mother's employment, healthcare decision-making, radio exposure, and wealth quintile were variables that had a significant association with the antenatal care of four or more (ANC4+) at p-value <0.05. Women between 20 and 34 years old (OR=3.01, 95% CI=2.24-4.03) are more likely to have four or more ANC visits than those below 20. Women who live in rural (OR=0.69, 95% CI=0.52-0.92) and nomadic (OR=0.05, 95% CI=0.02-0.09) were less likely to use four or more ANC visits than women living in urban settings. Women who completed primary education (OR=3.36, 95%CI=2.41-4.68) and secondary or higher education (OR=7.35, 95% CI=5.12-10.55) were more likely to have four or more ANC visits compared to women who have no education. Women with employment (OR=4.26, 95% CI=2.68-6.77) and decision-making power in determining their healthcare (OR=1.99, 95% CI=1.5-2.63) have greater odds of having four or more ANC visits. Women who were not exposed to the radio (OR=0.39, 95% CI=0.27-0.56) were less likely to use four or more ANC care, and women from wealthier households used four or more ANC care at a higher rate than their counterparts.

Table 20: Factors associated with four or more ANC utilization in the bivariable analysis.

Variable	Categories	ANC4+		
		Yes	No	OR (95% CI)
Maternal age at birth (years)	<20	69	1222	1
	20-34	164	961	3.01 (2.24--4.03)
	35-49	2	14	1.94 (0.36--10.51)
Birth Order	1	95	811	1
	2	76	832	0.78 (0.57--1.07)
	3	59	466	1.08 (0.77--1.53)
	4 or more	5	88	0.44 (0.17--1.15)
Residence	Urban	140	675	1
	Rural	85	594	0.69 (0.52--0.92)
	Nomadic	9	928	0.05 (0.02--0.09)
Marital Status	Married	212	1980	1
	Divorced/widowed	22	217	0.96 (0.6--1.51)
Mother's Education	No Education	110	1762	1
	Primary	64	305	3.36 (2.41--4.68)
	Secondary & above	60	130	7.35 (5.12--10.55)
Mother's Employment	Working	28	68	4.26 (2.68—6.77)
	Not working	207	2129	1
Number of Children	1-2	172	1641	1
	3-4	63	535	1.13 (0.84--1.54)
	>=5	0	21	empty
Decision-making power in determining own healthcare	Women or jointly	164	1121	1.99 (1.5--2.63)
	Husband or others	71	1076	1
Exposure to Radio	Yes	45	184	1
	No	190	2013	0.39 (0.27--0.56)
Wealth Quintile	Poorest	10	610	1
	Poorer	13	474	1.58 (0.69--3.62)
	Middle	42	364	6.79 (3.39--13.57)
	Richer	55	399	8.06 (4.09--15.850
	Richest	115	350	19.42 (10.14--37.18)

Skilled Birth Attendant (SBA)

Women aged 35 and above at birth (OR=3.93, 95% CI=1.37-11.28) had higher odds of skilled birth attendants than their counterparts. Women who live in rural (OR=0.53, 95%CI=0.40-0.69) and nomadic (OR=0.14, 95% CI=0.09-0.20) were less likely to receive SBA care than those in urban settings. The odds of using SBA are almost two and three times higher for women with primary (OR=2.13, 95% CI=1.59-2.86) education and secondary (OR=3.7, 95% CI=2.62-5.21) education. In addition, decision-making power in determining own healthcare, exposure to radio, and wealth quintile were also variables that had a significant association with the skilled birth attendant at p-value <0.05 in the bivariable analysis, as shown in Table 21 below.

Table 21: Factors associated with skilled birth attendants in the bivariable analysis.

Variable	Categories	Skilled Birth Attendant		
		Yes	No	OR (95% CI)
Maternal age at birth (years)	<20	162	1130	1
	20-34	159	966	1.15 (0.91--1.42)
	35-49	6	10	3.93 (1.37--11.28)
Birth Order	1	128	779	1
	2	125	783	0.97 (0.74--1.26)
	3	65	460	0.86 (0.63--1.19)
	4 or more	9	83	0.67 (0.33--1.36)
Residence	Urban	193	622	1
	Rural	96	584	0.53 (0.40--0.69)
	Nomadic	38	899	0.14 (0.09--0.20)
Marital Status	Married	283	1909	1
	Divorced/widowed	44	196	1.49 (1.04--2.11)
Mother's Education	No Education	196	1676	1
	Primary	74	296	2.13 (1.59--2.86)
	Secondary & above	57	133	3.70 (2.62--5.21)
Mother's Employment	Working	12	84	1
	Not working	315	2021	1.07 (0.58--1.98)
Number of Children	1-2	251	1562	1
	3-4	74	524	0.87 (0.66--1.15)
	>=5	2	19	0.68 (0.16--2.85)
Decision-making power in determining own healthcare	Women or jointly	214	1071	1.62 (1.29--2.04)
	Husband or others	113	1034	1
Exposure to Radio	Yes	45	184	1
	No	282	1921	0.60 (0.42--0.85)
Wealth Quintile	Poorest	39	582	1
	Poorer	18	468	0.59 (0.33--1.05)
	Middle	53	353	2.24 (1.45--3.47)
	Richer	102	352	4.39 (2.96--6.51)
	Richest	115	350	4.96 (3.37--7.32)

Postnatal Care within 48 hours (PNC 48 hours)

The results from postnatal care use analysis indicate that place of residence, mother's education, mother's employment, exposure to radio, and wealth quintile were variables that had a significant association with postnatal care within 48 hours after delivery, as described in Table 22. Compared to women living in urban settings, the odds of receiving PNC within 48 hours were lower for women living in rural (OR=0.5, 95% CI=0.26-0.94) and nomadic settings (OR=0.25, 95% CI=0.11-0.11). Women who had primary education (OR=2.23, 95% CI=1.16-4.29) and secondary education (OR=5.25, 95% CI=2.82-9.76) were more likely to use PNC care within 48 hours after delivery compared to women with no education. Women who are working (OR=3.82, 95% CI=1.72-8.47)

exposed to radio (OR=3.58, 95% CI=2.00--6.42) were more likely to use PNC care within 48 hours after delivery compared to women who do not work and are not exposed to radio respectively.

Table 22: Factors associated with postnatal care in the bivariable analysis.

Variable	Categories	Postnatal Care within 48hrs		
		Yes	No	OR (95% CI)
Maternal age at birth (years)	<20	19	1272	1
	20-34	47	1078	0.58 (0.04--1.11)
	35-49	1	15	1.48 (0.22--3.20)
Birth Order	1	24	882	1
	2	25	883	1.22 (0.69--2.18)
	3	16	509	0.94 (0.44--1.97)
	4 or more	2	91	0.59 (0.11--3.14)
Residence	Urban	33	783	1
	Rural	19	660	0.50 (0.26--0.94)
	Nomadic	15	922	0.25 (0.11--0.55)
Marital Status	Married	62	2131	1
	Divorced/widowed	5	234	1.36 (0.65--2.84)
Mother's Education	No Education	31	1840	1
	Primary	24	346	2.23 (1.16--4.29)
	Secondary & above	12	179	5.25 (2.82--9.76)
Mother's Employment	Working	11	85	3.82 (1.72--8.47)
	Not working	56	2280	1
Number of Children	1-2	49	1764	1
	3-4	18	580	0.70 (0.36--1.37)
	>=5	0	21	1.11 (0.06--18.89)
Decision-making power in determining own healthcare	Women or jointly	36	1249	1.13 (0.67--1.9)
	Husband or others	31	1116	1
Exposure to Radio	Yes	15	213	3.58 (2.00--6.42)
	No	52	2152	1
Wealth Quintile	Poorest	18	603	0.26 (0.11--0.59)
	Poorer	7	479	0.21 (0.09--0.50)
	Middle	2	404	0.30 (0.13--0.68)
	Richer	10	444	0.42 (0.21--0.85)
	Richest	30	435	1

Factors associated with achieving the complete continuum of maternal healthcare

We tried to fit three regression models to identify factors associated with the maternal continuum of care. (86) **Model 1** assessed the determinants of receiving full antenatal care (ANC4+) among the ever-married women with a live birth in the last five years, (2) **Model 2** assessed the determinants of receiving ANC4+ and skilled birth attendant (SBA) as continuation, (3) **Model 3** assessed the determinants of utilizing all of the three primary outcomes or services (ANC4+, SBA, and PNC within 48 hours) as maternity continuum of care. Unfortunately, we could not run the associations of the third model due to the small number of participants who utilized all three

services (n=14). Maternal age at birth, residence, mother's education, mother's employment, healthcare decision-making, radio exposure, and wealth quintile were variables significantly associated with Model 2 (ANC4+ and SBA) at p-value <0.05, as described in Table 23 below.

Table 23: Result from multivariate logistic regression (p-value: * < 0.05).

Variables and categories	Model 1: ANC4+ (N=235)		Model 2: ANC4+ & SBA (N= 68)		Model 3: ANC4+ & SBA & PNC (N=14)	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
Maternal age at birth						
<20	1		1			
20-34	2.45*	1.79--3.37	2.19*	1.28—3.76		
35-49	1.57	0.26--9.64	3.46	0.57—20.73		
Residence						
Urban	1		1			
Rural	1.03	0.74--1.43	0.71	0.38—1.32		
Nomadic	0.15*	0.06-0.35	0.02*	0.01—0.56		
Marital Status						
Married	1					
Divorced/widowed	0.84	0.51--1.37				
Mother's Education						
No Education	1		1			
Primary	1.74*	1.22--2.50	2.99*	1.66—5.36		
Secondary & above	2.19*	1.45—3.31	2.09*	1.01—4.33		
Mother's Employment						
Working	1					
Not working	0.43*	0.25—0.75				
Decision-making power in determining own healthcare						
Women or jointly	1.56*	1.14—2.14	1.89*	1.02—3.18		
Husband or others	1		1			
Exposure to Radio						
Yes	1.16	0.77—1.74	1.89*	1.04—3.42		
No	1		1			
Wealth Quintile						
Poorest	1		1			
Poorer	0.81	0.33—1.95	0.033*	0.00—0.59		
Middle	1.68	0.74—3.82	0.37	0.12—1.15		
Richer	1.68	0.74—3.80	0.26*	0.08—0.82		
Richest	3.02*	1.34—6.8	0.43	0.14—1.35		

Discussion

Our study found that the percentage of mothers who had antenatal care four times or more visits, had skilled birth attendants, and received a postnatal care check-up within 48 hours were 9.7%, 13.4%, and 2.7%, respectively. Moreover, the overall maternity continuum of care (ANC4+, SBA, and PNC within 48 hours) was just 0.6%. Our findings indicated that more than two-thirds of the women did not get maternal healthcare services, either ANC4+, SBA, or PNC. The study found more women dropping out from the maternity continuum of care between skilled birth attendants

and postnatal care than between focused antenatal care and skilled birth attendants. This reflects the poor maternal healthcare utilization across the country. Extra efforts and urgent intervention from the government, local and international donors, NGOs, and other stakeholders are needed to accelerate the maternity continuum of care by connecting the three primary CoC services (ANC4+, SBA, and PNC).

There is a big difference across countries and scholars in the definition of the maternity continuum of care. For instance, some studies used the completion of maternity continuum of care if the mother had at least one ANC visit, had a skilled birth attendant, and a PNC within 42 days after delivery (78, 87), whereas other studies defined it as ANC4+, either institutional delivery or skilled birth attendant, and PNC within 48 hours after delivery (19, 54, 88, 89). Our study used the latter definition. Our overall maternity continuum of care findings in Somalia (0.6%) is very low compared to the studies carried out in Kenya (18%) (90), Arba Minch Ethiopia (9.7%) (91), in emerging regions of Ethiopia (9.5%) (89), a multilevel analysis in Ethiopia (9.1%) (92), Ghana (8%) (93), Tanzania (10%) (94), and a high CoC findings in Southern Benin (30%) (95). The most possible explanation for this difference is Somalia's challenges regarding maternal health service availability and access. Because of the conflict, post-conflict, and humanitarian setting in Somalia, the country is part of the 9 countries that Fragile States Index and WHO marked as very high or high alert for maternal mortality ratio (32). The other reason can be the differences in socio-economic and urban-rural discrepancies among households in Somalia.

We found that there was a consistently significant association in the bivariate analysis between the study outcome variables, i.e., ANC4+, SBA, & at least one PNC within 48 hours after delivery and place of residence, mother's education, exposure to radio, and wealth quintile which was consistent with the previous studies (96) in Uganda, (89, 97) in Ethiopia, and some developing countries (98). For our analysis, decision-making power in determining one's healthcare was associated with antenatal care four or more times (ANC4+) and skilled birth attendants (SBA) but had no association with PNC within 48 hours after delivery (99). Moreover, the completion of the continuum of maternity care was slightly skewed toward women who have secondary or higher education and is similar to a study conducted in Ethiopia (97).

Limitations

This study is subject to several limitations, both in using the secondary data and analyzing the outcome variables. Due to limitations of the secondary data, we used only decisions determining own healthcare as women's decision-making power. We excluded the other two recommended decisions (decisions regarding purchases and decisions regarding family or relative visits). Due to data limitations, it is impossible to determine the type of provider for each visit, i.e., the current Somali Health and Demographic Survey did not collect information on the type of provider for each visit. Due to the data quality, the Somalia Health and Demographic Survey (SHDS-2020) data did not capture the women's accessibility to health facilities, which would include (a) getting permission to go for treatment, (b) getting money for treatment, (c) distance to a health facility, and (d) not wanting to go alone. Approximately 2.6 million Somalis are currently displaced within their own country, and the SHDS 2020 did not include the IDP domain separately but was merged with the urban domain. We could not do the test on the study model 3 (ANC4+ & SBA & PNC) because only 14 mothers completed the continuum of care. Finally, our analysis's three study outcome variables were self-reported, which could have a potential misreporting of care received several years before the survey.

Conclusions

While the country faces significant challenges, the concerted efforts from local and international donors, NGOs, and other stakeholders, coupled with targeted policies and interventions, can enhance basic and comprehensive care provision. Addressing barriers like infrastructure, human resources, and socio-economic and cultural beliefs is essential through a multifaceted approach and strategies. Less than one percentage (0.6%) of women in our study received the full maternity continuum of care. To improve maternal and child health outcomes in Somalia, the maternity continuum of care is paramount and critical in ensuring that Somali women receive the necessary care at all stages of preconception, pregnancy, childbirth, and postpartum. Despite significant progress in reducing maternal mortality from 732 in 2015 to 692 in 2018, and 621 in 2022 expanding maternal, newborn, and child health services in Somalia, gaps still remain. Maternity continuum of care (CoC) throughout pregnancy, childbirth, and the postnatal period is essential for the health and survival of mothers and their babies. Ensuring service availability and access to the maternity continuum of care is critical to Somalia's national strategy to improve the health of mothers, newborns, and children (6).

APPENDIX 3: Study 3

WHERE AND WHY MOTHERS DISCONTINUE HEALTHCARE SERVICES: A QUALITATIVE STUDY EXPLORING THE MATERNITY CONTINUUM OF CARE GAPS IN SOMALIA

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Abstract

Background: Despite considerable progress in expanding and improving maternal, newborn, and child health (MNCH) globally, gaps remain in low- and middle-income countries (LMICs), particularly in sub-Saharan African countries, including Somalia. Somalia is among the 15 countries that the WHO marked as very high alert countries for maternal, newborn, and under deaths. The maternity continuum of care (CoC) throughout pregnancy, childbirth, and the postnatal period is essential for the health and survival of mothers and their babies. This study aimed to explore the gaps in Somalia's maternity continuum of care. **Methods:** This qualitative study included 5 FGDs (44 childbearing mothers) purposively sampled from urban, rural, IDPs, agro, and nomadic pastoralists and 19 in-depth interviews (IDIs) from healthcare providers, policymakers, recently delivered and childbearing mothers, community leaders, and traditional birth attendants in 6 regions of Somalia in January 2024. We used thematic analysis to analyze the data. **Results:** Five key themes and twelve subthemes emerged from the analysis: service availability, access to care, decision-making, quality of care, and traditional beliefs. The maternity continuum of care gaps varies across different community categories, such as urban areas, rural areas, IDPs, agro-pastoralists (beeraley-baadiye), and nomadic pastoralists (reer-guuraa), due to diverse reasons, including service availability, access to care (financial, distance, and transportation), socioeconomic disparities, infrastructure, climate-related, and security issues.

Conclusion: The maternity continuum of care gaps varies across different community categories, such as urban, rural, IDPs, agro-pastoralists (beeraley-baadiye), and nomadic pastoralists (reer-guuraa), due to a combination of diverse reasons, such as service availability; access to care, including financial, distance, and transportation; socioeconomic disparities; infrastructure; climate-related issues; and security issues.

Key terms: Maternal health, continuum of care, cultural beliefs, home delivery, Somalia

Background

Countries around the world aim to achieve Universal Health Coverage (UHC) by removing all forms of barriers, including financial barriers, to improve access to healthcare and reduce maternal and child deaths by 2030. Sub-Saharan Africa faces a wide range of health problems, many of which are interconnected and influenced by social, economic, and environmental factors. Examples of health problems include high infectious disease rates, maternal and child deaths, malnutrition, limited access to healthcare, weak healthcare systems, poor access to clean water and sanitation facilities, environmental health risks, and noncommunicable diseases such as cancer (100). Sub-Saharan Africa alone constituted approximately 70% of maternal deaths despite making progress with a 33% reduction in maternal mortality ratio (MMR) (2). Maternal deaths remain a significant public health challenge in low- and middle-income countries (LMICs), with more than a quarter of maternal deaths occurring during or within 24 hours after childbirth and nearly 40% occurring between 24 hours and 42 days postpartum (95). Somalia has been ravaged by serious civil wars, armed conflicts, and terrorism counterattacks for the last three decades. The country is among the countries in sub-Saharan Africa with one of the weakest Healthcare systems and the lowest health indicators in the world (61).

The healthcare system in Somalia is more fragmented, with various actors, including the government, nongovernmental organizations (NGOs), and the private sector, playing roles, which leads to not only gaps in health coverage and uptake but also unnecessary overlaps. The capacity of the federal government of Somalia and member states' capacity to finance healthcare is very restricted, followed by limited existing infrastructure, shortage of skilled healthcare professionals, poor access to healthcare, high disease burden, and inconsistency of service delivery due to geographical barriers and insecurity (5). The country has launched many programmes related to community health workers (CHWs) and health extension workers to provide basic health services for people underserved in rural and remote areas where the majority of the Somali population lives. Somalia is among the 15 countries for which the WHO marked as very high alert countries for maternal, newborn, and under5 deaths. Most of the causes are either preventable or treatable. The country has one of the worst maternal conditions in the world. For instance, the maternal mortality

ratio is 692 per 100,000 live births (8). Four in 100 Somali children die during the first month of life, eight in 100 die before their first birthday, and 1 in 8 die before they turn five (10).

Maternity continuum of care refers to the continuation of various stages of care that the mother goes through before, during, and after pregnancy to ensure a healthy outcome for both the mother and the child. The continuum of care includes pre-pregnancy care, such as screening, pregnancy care (ANC), delivery care (skilled birth attendance), postnatal care, and interpregnancy care (101). The maternal and child continuum of care (CoC) throughout pregnancy, childbirth, and the postnatal period is essential for the health and survival of mothers and their babies. Antenatal care visits allow medical staff to identify health problems related to pregnancy as early as possible, which will facilitate early detection, diagnosis, and treatment (42). A good antenatal care program ensures the timely detection and treatment of problems during pregnancy. Skilled birth attendants (SBAs) and facility-based delivery (FbD) play critical roles in reducing infant and maternal mortality globally. Delivery within a health facility and with the attendance of a skilled healthcare provider is key in reducing health risks to both the mother and baby (49). Postnatal care (PNC) is the care given to the mother and her newborn baby immediately after birth and for the first six weeks of life. Attendance to maternal, newborn, and child health services during pregnancy (ANC), delivery (SBA), postnatal follow-up (PNC), and childhood vaccinations are crucial factors contributing to a healthy pregnancy, delivery, and childcare. Gender inequality has a direct association with mother's service utilization. Several studies in sub-Saharan Africa found the limited mother's autonomy and decision-making power in determining own healthcare and husband's control our family resources (102). Limited evidence exists on the maternity continuum of care gaps in Somalia. This study aimed to critically examine the multifaceted barriers to completing the maternity continuum of care among different community domains, such as urban, rural, IDPs, and nomadic areas.

Methods

This paper used both deductive and inductive descriptive qualitative studies aligned with the consolidated criteria for reporting qualitative research (COREQ) checklist (103).

Study Settings

The study was conducted in six regions of Somalia based on the representation of different socio-geographical contexts, such as urban, rural, IDPs, agro-pastoralist, and nomadic-pastoralist. The six

regions included in this study were categorized according to their socio-geographical domains. These regions and the interviewed domains include Togdher (IDPs and urban), Bari (nomadic-pastoralist), Mudug (rural and urban), Galdugud (urban and IDPs), Banadir (IDPs), and the Lower Juba region (agro-pastoralist). Togdher region is one of the administrative regions in Somaliland. The region hosts many IDPs that flee from their habitual residences, primarily due to droughts and conflicts (104). Banadir region or Mogadishu, hosts the largest estimated protracted internally displaced population in Somalia, mainly living in informal IDP sites across the city. Internally displaced persons (IDPs) are individuals or families who have been forced or obliged to flee or leave their homes or places of habitual residence due to armed conflicts, situations of generalized violence, persecution, or natural disasters but remain within the borders of their own country. IDPs in Somalia often live in makeshift camps in urban areas, usually face precarious living conditions, and rely on humanitarian assistance.

The Bari region is the largest region in Somalia in terms of geographical landmass. The region has predominantly nomadic pastoralists in its subdistricts and villages. Nomadic pastoralists usually rely on extensive rangelands for grazing livestock herds, including camels, cattle, sheep, and goats. They move with their livestock herds in search of pasture and water. The Mudug region is the most centrally located region in Somalia and contains two federal member states (Puntland in the north and Galmudug in the south). Lower Juba is an administrative region in the Jubaland state of Somalia. The communities living in this region practice both agro-pastoralism and nomadic pastoralism. Agro-pastoralists usually rely on arable land for crop cultivation and production. They utilize a combination of crop farming in small areas and livestock rearing, which provides them with slightly stronger resilience in food production than do the nomadic pastoralists.

Study Design and Population

The study used purposive sampling methods to initially identify participants who had substantial expertise in maternal and child healthcare delivery and utilization in Somalia. The target population for this study was healthcare policymakers from the respective Ministry of Health at the federal and state levels, as well as implementing partners, healthcare providers and professionals, traditional birth attendants, community leaders, childbearing, and recently delivered mothers.

Sampling and Recruitment Procedures

This study used a maximum variation sampling scheme to yield a wider perspective from various community categories and other stakeholders. Six of the eighteen pre-civil war Somalia regions were purposively selected based on the representation of different socio-geographical contexts, such as urban, rural, IDPs, agro-pastoralist, and nomadic-pastoralist. The sample size was based on information needs and data saturation.

Data collection and research participants

The study adopted two main data collection methods: focus group discussion (FGD) and an in-depth interview guide, followed by field notes. Five FGDs (44 participants) from childbearing and recently delivered mothers in five different regions of Somalia were conducted. The communities were categorized into urban, rural, IDPs, agro-pastoralist (beeraley-baadiye), and nomadic-pastoralists (reer-guuraa), as described in Table 1. The FGD discussions lasted between 45 minutes and 1 hour. Seventeen in-depth interviews (IDIs) involving four policymakers, six healthcare providers, three community leaders, two traditional birth attendants, and two recently delivered mothers across Somalia were conducted, as described in Table 24.

Table 24: Characteristics of the Focus Group Discussion Participants

FGD Participants (Mothers with a child less than two years)			
FGD No.	**Category**	**Region**	**No of Participants**
FGD-1	Nomadic pastoralists (reer-guuraa)	Bari	9
FGD-2	IDPs	Togdher (Burco)	10
FGD-3	Rural	Mudug	8
FGD-4	Urban	Galgadud (Adado)	10
FGD-5	Agro-pastoralists (beeraley-baadiye)	Lower Juba (Kismayo)	7
	Total		44

Research Instruments

This study used two interview guides, "Focus Group Discussion (FGD) and In-depth Interview guide," adopted from the validated tools of SB Kitila et al. (105). **Interview guide for the FGDs (Recently delivered and Childbearing mothers):** Face-to-face open discussions with purposively selected childbearing mothers were conducted by the principal investigator and data collectors. Before starting the in-depth discussion as a group, the mothers were asked to complete a short personal profile questionnaire to capture the following information: age, residence, marital status, literacy, number of children, occupation, income, and other demographic information. The childbearing mothers who participated in the FGDs were also asked to discuss an open-ended

question about their life experience with healthcare service utilization. Probing questions related to factors negatively affecting the continuation of MNCH services, barrier factors, and promotors for the continuation of MNCH services were asked. To clarify the questions, the childbearing mothers' interview guide was pretested with one other FGD recruited from a different region and not included in the study sample.

Interview guide for In-depth Interviews: Face-to-face individual interviews were conducted based on the interview guide. The interview guide contained participants' profile questionnaires, such as age, residence, provision, occupation, and current position, as well as unstructured questions related to barriers to the continuum of care for MNCH services. Participants in this section were healthcare policymakers from the respective Ministry of Health at the federal and state levels and implementing partners, healthcare providers and professionals, traditional birth attendants, community leaders and gatekeepers, and childbearing and recently delivered mothers.

Data Management and Analysis

The study used a qualitative thematic analysis approach according to Braun and Clarke's qualitative data analysis frameworks (63). The principal study investigator and the research assistants (enumerators) audio-taped all of the interviews and discussions after providing consent from the study participants—the first step involved transcribing the audio tapes and field notes in the Somali language. Then, the transcripts were translated into English by three qualified people fluent in both languages. The study's principal investigator cross-checked the accuracy and completeness of the translations several times. The study investigator listened to the audio records and read the transcripts repeatedly for data consistency and reliability.

In the initial phase of the study data analysis, we adopted deductive coding by starting with predefined codes from the existing research literature, followed by inductive coding to identify additional themes and categories that emerged directly from the data. We developed predefined initial codes (open coding) throughout the study's data analysis. After data collection, each code was further analyzed and disaggregated into themes and sub-themes (deductive axial coding). Throughout the primary data analysis, additional codes were added while reading the data, themes, and sub-themes that had not been identified previously (inductive method) to identify areas of divergence, convergence, and overlap. A final coding framework was constructed using deductive and inductive coding approaches. To improve the trustworthiness of the qualitative data analysis,

the codes and concepts that emerged from the different interview categories and discussions were verified by consistently linking the emerging themes with the data received from the other groups. Participants' own words (quotes) were used to enhance the credibility of the data as described in the below table 25.

Table 25: Summary of the study participants using maximum variation sampling, data sources, and methods

Method	Description	Sample
FGDs with mothers	Five FGDs with mothers of children less than two years in different geographical locations	5 FGDs (44 mothers) Sampled from Urban, Rural, IDPs, agro, and nomadic pastoralists in 5 regions of Somalia.
IDI with healthcare providers	Qualitative interviews with MCH and community Healthcare providers (Midwives, nurses, doctors, community health workers, etc.	6 healthcare providers in six different regions were interviewed.
IDI with health policymakers	Qualitative interviews with the Ministry of Health at federal and state level staff	4 policymakers from the federal and state governments were interviewed
IDI with TBAs	Qualitative interviews with traditional birth attendants	2 Traditional Birth Attendants were interviewed
IDI with caretakers	Qualitative interviews with recently delivered mothers	2 recently delivered mothers were interviewed
IDI with community leaders	Qualitative interviews with community gatekeepers and leaders	3 community gatekeepers and leaders were interviewed

Ethical Approval and Consent to Participate

Study details and guidelines were explained to participants before the interviews began. All participants gave informed consent to participate in the study, which the National Institute for Health, Somalia, approved. The Participants were notified that their involvement in interviews was voluntary and that they could decline to answer any questions. They were assured that their identities would remain anonymous and that no compensation would be given to them. The National Institute for Health, Somalia, approved this study ethically.

Results

Identified Themes

Five key themes and twelve sub-themes emerged from the study data set, as stated in Table 26, the result of a thematic analysis exploring the maternity continuum of care gaps.

Table 26: Categories of Themes and Sub-themes

Themes	Subthemes
Service availability	Service availability in some areas
Access to care	Distance and Transportation
	Financial barriers
	Unassisted childbirth due to geographical constraints
Decision and awareness to seek care	Lack of knowledge of pregnancy risks
	Late antenatal care booking
	Mother's awareness of the importance of seeking care
Socio-cultural practices and beliefs	Husbands' dominance in decision-making about mother's health
	TBA Trust and Readiness
	Normality of homebirths
Quality of care	Perceived poor quality of care
	Lack of scheduled PNC service at health facilities
	Fragmentation of care across the maternity continuum of care

Theme 1: Service availability

The availability of health facilities plays an important role in the increase in and utilization of skilled delivery in developing countries such as Somalia.

Sub-theme 1.1 - Service availability in some areas

Participants highlighted that the areas in which they live do not have essential health services nearby. The non-availability of nearby health facilities forces mothers to travel long distances to access medical services, creating significant barriers to maternal and child healthcare access.

> *"There are no health services available nearby. Services are provided at extremely distant centers, and they are not accessible to us. We would visit the health facility if it were near. We desperately need a health facility where we can receive medications and medical services."* (FGD-1, childbearing mother)

Residents express a strong desire for the presence of a local health facility that would provide essential medical services within their community. The absence of such a facility creates a sense of desperation and urgency among community members who recognize the importance of timely access to healthcare for their well-being and the well-being of their families. A health policymaker articulated the quote below.

> *"Some of the remote and rural areas in Somalia do not have well-equipped health facilities. The country has both a limited number of health facilities and sufficient quality of care. The reality of mothers delivering at health facilities in Somalia is incredibly difficult."* (IDI-Health policymaker)

It is difficult for mothers to discuss the quality of care and the completion of all services at this time because many villages and communities do not have health infrastructure. How can we talk about quality and continuation of care while all communities do not have health facilities in their locations." (IDI-Community leader)

Theme 2: Access to care

Healthcare services in Somalia face many accessibility challenges, including distance, transportation, finances, and fragmentation of care across the maternity continuum of care. There is inadequate coordination and linkage between antenatal, intrapartum, and postnatal care providers.

Sub-theme 2.1 - Distance and transportation

Many communities in Somalia, specifically those living in rural or remote and hard-to-reach domains, face excessive challenges accessing healthcare services and are usually located far away from health facilities or through climate shocks such as flooding.

"Some roads are out of service because of floods. Currently, people travel by boat. A boat costs 5 USD to cross the river. Those who cannot afford the boats should cross the water by themselves. Therefore, pregnant mothers cannot reach the health facilities for ANC, facility delivery, or PNC services because of these bad roads." (FGD-5, childbearing mother)

Participants emphasized the challenges of distance, geography, and transportation to access healthcare services in their localities.

"It is difficult to reach the city to obtain ANC, facility delivery, and PNC services because of the extremely bad route. Bosaso is the closest big city, yet it is quite a distance away from our area." (FGD-1, childbearing mother)

Furthermore, health policymakers have indicated that long distances and the absence of reliable modes of transportation are other barriers that prevent mothers from utilizing available MCH services.

"The pregnant mother may give birth at home if the health center is far and distant from her house, which is a big factor for healthcare inaccessibility in Somalia." (IDI-Health policymaker)

A health policymaker illustrated that some of the rural and nomadic locations do not have health facilities due to the sparsity of inhabitants.

"If the mother lacks money for transportation and the health facility is distant, these could act as barriers to ANC services. The population and its demands determine the number of health centers and services that can be offered. Not every

location can have a health facility established. The only way we can improve service accessibility is through transportation." (IDI-Health policymaker)

Another childbearing mother explained:

"We live in a mountainous area, so there are no roads in this area. We walk on feet. There are no roads here where we can stand and hail a ride on a car." (FGD-1, childbearing mother)

Sub-theme 2.2 - Financial barriers

Childbearing and recently delivered mothers acknowledged that they do not have enough money to afford transportation and medical costs, if any. They explained that financial limitations prevent them from traveling to health facilities and paying medical costs; as a result, they tend to deliver their babies at home.

"Because we lack enough money to get a car and drive to the city, women deliver in their homes. We are far away from the health facilities, so we often undergo labor in our homes." (FGD-1, childbearing mother)

A community leader explained that most of the families in their community cannot avoid paying medical costs if they are referred to large hospitals, which can hinder the continuation of the maternal continuum of care.

"The mother is referred to another hospital when her condition worsens, but we lack the money to pay for her care, which presents a challenge. The diagnosis and medical costs are beyond what these mothers can afford." (IDI-community leader)

Participants discussed that some areas are geographically isolated, incredibly remote, or rural, with limited access to healthcare institutions. Pregnant mothers cannot attend the recommended maternity continuum of care because of the nomadic lifestyle that moves from one place to another, which often entails living in remote areas from urban centers.

"We inhabit this remote area as nomads. We must go to a city to get healthcare. We cannot afford the cost of transportation and medical costs. We do not have cash. Our only source of money is from the goats and sheep, but they do not have a decent market these days". (FDG-1, Childbearing Mother).

Sub-theme 2.3 - Unassisted childbirth due to geographical constraints

In remote nomadic areas with limited access to healthcare facilities or skilled birth attendants, women may find themselves in situations where they have no choice but to deliver their baby without assistance.

"I get nauseous in the morning during pregnancy. I go through a harrowing delivery as well. I gave birth in a rural area, and I have never received assistance from medical professionals. I delivered by myself without the assistance of a midwife or any other person." (FGD-1, Childbearing mother)

The participants explained that sometimes mothers deliver alone without any support. Deliveries without medical assistance can be dangerous, especially if health complications arise. Mothers discussed the existence of free birth in some areas. This refers to the practice of giving birth without the assistance of both medical professionals and traditional birth attendants.

"In the remote rural nomads, sometimes labor may progress so rapidly while the mother is alone, and she cannot reach the health facility or find the TBAs nearby her home sometimes. Unexpected labor may strike, and the mother may end up delivering her baby without assistance, "free birth." (FGD-3, childbearing mother)

Unassisted childbirth or free birth is not a choice or deliberate decision in the Somali community, but it occurs due to access to care. This event carries the highest risk and can cause unpredictable health complications, such as maternal or child mortality or morbidity.

"In rural areas, women lack access to medical care due to geographical constraints. They do not attend antenatal care visits, skilled birth attendants, or postnatal care check-ups. A herdswoman cannot seek ANC, facility delivery, or PNC services from health centers that are far away. She needs to maintain the animals she keeps, support the family, and take care of the other children." (IDI-healthcare provider)

Theme 3: Decision and awareness to seek care

Sub-theme 3.1 - Lack of knowledge of pregnancy risks and danger signs

Throughout the interviews, participants acknowledged that women's awareness and knowledge of pregnancy risks and childbirth varied. The signs of danger related to pregnancy are warning signs that women face during pregnancy, childbirth, and the postpartum period. It is common that communities with low socioeconomic status are not aware of health danger signs, especially pregnant and childbirth-related dangers. A mother from the agro-pastoralist community in FGD-5 discussed the following:

"Usually, pregnancy is natural, and we do not face complications, so why do we need to walk and visit the health facility? We did not have a history of severe problems during pregnancy. Pregnancy is not a disease to fear of." (FGD-5, childbearing mother)

Some participants reported that limited health education and awareness of maternal health risks put mothers at risk of pregnancy. An in-depth interview participant said:

"Most mothers do not understand the risks related to their pregnancy if they do not attend ANC. They remain in their homes while they do not know the status and

conditions of their pregnancy. They are not educated enough to seek medical care in advance." (IDI-Healthcare provider)

Sub-theme 3.2 - Late antenatal care booking

A healthcare provider illustrated that mothers usually arrive at the first ANC visit in their third trimester.

"Mothers usually arrive late for the first antenatal care (ANC) visits, often between the 8th and 9th month of pregnancy. This delay stems from a lack of awareness about the crucial benefits of early ANC visits for the mother and her baby." (IDI-Healthcare provider)

Similarly, qualified midwives and other healthcare providers explained that due to limited awareness, mothers are reluctant to book ANC as early as possible. The following conclusions were drawn from the midwives and nurses at some of the health facilities:

"Most of the mothers are hesitant to come to the health facility as early as possible to have their pregnancy checked (ANC). A lack of ANC visits is usually associated with premature birth, a greater risk of complications, stillbirth, low birth weight, and other adverse health outcomes." (IDI-Midwife)

"If mothers do not attend early ANC visits and complete all the necessary ANC visits, they will probably not deliver at health facilities, which can be a barrier to the continuation of maternal health services." (IDI-Qualified nurse)

Sub-theme 3.3 - Mothers' awareness of the importance of seeking care

Pregnant mothers may not always be aware of the benefits of receiving antenatal care, facility-based delivery, and postnatal care. One participant explained:

"Due to limited knowledge and education, mothers do not come to the health facility to complete all of the available health services. If mothers attend the first ANC, then they discontinue attending the second ANC and subsequent facility delivery and postnatal care. They are not fully aware of the benefits of attending all of the stages of maternal and child health services." (IDI-Healthcare provider)

A health policymaker illustrated that women do not complete existing maternal and child health services due to their low literacy and limited awareness of seeking medical care.

"I think it is not possible for a low-literacy mother to complete all of the maternal and child health services that are available in the health facility. Many mothers do not understand the importance of attending all of the stages of maternal and child health services." (IDI-Policymaker)

Theme 4: Socio-cultural practices and beliefs

Traditional beliefs regarding pregnancy and childbirth remain a choice for Somali women. Trust in traditional birth attendants (TBAs) is frequent in rural and remote areas where access to primary and comprehensive healthcare services may be limited. TBAs are sometimes highly respected community members and have been providing home deliveries for generations in Somali society.

Some of the reasons that TBAs are trusted and that home deliveries are normalized include the inaccessibility of maternal healthcare in rural and hard-to-reach areas, cultural beliefs and practices, the proximity of TBAs to the community, low cost and affordability, respect for the privacy of the mother and cultural sensitivities, etc.

Sub-theme 4.1 - Husbands' dominance in decision-making about mother's health

Men are the overall decision-makers on all household matters, including resource allocations and where and how to live. A childbearing mother had the views below.

> *"The father is the overall head of the family, controls all the family resources, and determines the expenses for healthcare utilization. He also makes decisions and allocations of resources like purchases and monthly expenses. Women are just housekeepers and care for the kids."* (FGD-3, childbearing mother)

There is available evidence that suggests women in Sub-Saharan Africa often have limited autonomy and control over decisions to go to the health facility.

> *"One of the reasons that women do not deliver health facilities is because of their powerlessness. One in Somalia is submissive to her Sheikh (husband). Sometimes the couples negotiate, but mostly, the husband has the overall decisions and power."* (IDI-Midwife)

Sub-theme 4.2 - TBA Trust and Readiness

> *"Yes, I believe the skills and experience of the TBA in our village. They are available and ready every time, and they are part of our family. The TBAs have a lot of experience and know how to deal with pregnancy, delivery, and even delivery advice."* (FGD-5, childbearing mother)

A few childbearing mothers mentioned the challenges to reach the existing health facilities.

> *"We live in a very remote area that healthcare providers cannot reach. The only attendant available in our villages is a traditional birth attendant from neighboring families; sometimes, you cannot even get those neighboring traditional attendants."* (FGD-1, childbearing mother)

> *"During my pregnancy, I had low hemoglobin, heartburn, and terrible morning sickness. In labor, the pain doubles since there are no healthcare providers. The TBA is the only accessible birth attendant. After giving birth, I started bleeding excessively."* (FGD-3, childbearing mother)

Acknowledging the availability of the TBA and the flexibility of payments, the study participants indicated the following:

> *"The traditional birth attendants (TBA, Umuliso-dhaqameed in the Somali language) are always available even during the night and usually do not charge fare before delivery. They usually come to help the mother first, and then you give what you have, and they are very respected within the community." (FGD-2, childbearing mother)*

"Yes, there are many traditional practices and beliefs; for instance, the pregnant woman says I need to see my previous TBA that managed my last delivery. I do not want to go to an unfamiliar environment." (IDI-community gatekeeper)

Sub-theme 4.3 - Normality of homebirths

Women who normalize to deliver at home are still prevalent in many parts of Somalia. Several factors can help women normalize their delivery at home, including cultural and personal preferences, as many women still feel more comfortable delivering at home, limited knowledge and awareness, intergenerational precedent, as women inherit home delivery normalization from their parents and grandparents, and limited access to professional midwifery care.

"Yes, I feel comfortable delivering at home because we are surrounded by our loved ones, and I feel like a normal process to deliver at home." (FGD-5, recently delivered mother)

Some mothers considered home delivery to be normal. A childbearing mother from FGD-3 explained:

"I grow up while our mothers give birth at home. Home delivery is normal, and it allows us to labor and deliver on our own terms. It feels like the most natural choice for us." (FGD-3, childbearing mother)

Participants also cited that their previous delivery occurred at home and believed that it was an easy and natural process. In one of the in-depth interviews, a childbearing mother stated the following:

"I gave birth all my children at home (3 kids), and they are all good (Praise be to God). Nothing happened to me. The old woman is very experienced and can manage all pregnancy-related issues." (IDI-Childbearing mother)

There are a wide range of reasons why mothers choose to deliver at home; for instance, some of the reasons reported by participants included familiarity with the environment where they are surrounded by their loved ones, the avoidance of unwanted restrictions, and the inability to leave their other kids. A midwife at the health facility indicated that some mothers cannot leave their kids to visit the health facility for ANC or delivery.

"Some mothers do not come to the health facility to deliver; instead, they prefer to deliver at home because they are familiar with that environment. They do not have someone who can stay with the other kids even if they decide to visit the health facility. Yes, this can present a significant challenge in accessing healthcare services." (IDI-Midwife)

Theme 5: Quality of care

Somalia's healthcare system has been characterized by strong private and NGO-led components. The quality of healthcare services has become an increasingly predominant question for both

beneficiaries and care providers. Although the quality of healthcare is a complex, multidimensional, and subjective concept, local beneficiaries' views can be associated with their healthcare utilization.

Sub-theme 5.1 - Perceived poor quality of care

Fragile countries fail to improve the quality of healthcare in their population by accepting low-quality health services to continue. Many mothers question the skills and experience of healthcare providers at health facilities.

> *"The reason women do not go to health facilities and prefer to be at home when delivering is that many of them are scared to meet unskilled workers or fresh students doing their practical sessions at the hospital; many women come to me because they have problems and health issues on their previous delivery at hospitals. They will say it's not safe to give birth at the hospitals because of the low-quality services the MCH offers."* (IDI-Healthcare provider)

Compared to qualified nurses or midwives at nearby health facilities, study participants, especially childbearing mothers, believe that traditional birth attendants in their locality have better experience and skills. They also feel that health facilities lack the necessary privacy infrastructures, such as designated rooms.

> *"The old mother is more experienced and skillful than nurses/midwives at MCH. I feel, I am not treated carefully at a health facility. I am afraid of my privacy during delivery because of the young nurse in the MCH."* (FGD-5, childbearing mother)

It is normal for clients to seek alternative care options if they feel dissatisfied with the available care provided at health facilities. A community leader reported that when beneficiaries are not satisfied with the only available care, they will seek care from their traditional birth attendants.

> *"Low service quality could also be a hindrance. If mothers are not satisfied with the service quality provided in the health center, they are more likely not to seek health services frequently. How health workers welcome care-seeking mothers influences mothers' acceptance and willingness to seek ANC, facility delivery, and PNC services."* (IDI-Community leader)

Sub-theme 5.2 - Lack of scheduled PNC services at health facilities

Despite some pregnant mothers' attendance at antenatal care and childbirth at health facilities, postnatal care checkups before they leave the facility are limited. The uptake and utilization of PNC services lies in service providers' appointments and mothers' understanding of the importance and relevance of PNC services. A recently delivered mother discussed the lack of PNC scheduling from the care providers who were managing her delivery.

> *"I do not know if I was checked before my discharge. I was okay in the morning, and the nurses did not mention any clearance or check-ups before I left the MCH. She did not give me a plan to come back for follow-up PNC checkups."* (FGD-4, recently delivered mother)

The maternal and child health continuum of care package ensures that all women and children receive timely and quality care from pregnancy to full child immunization. A qualified nurse explained the disconnection of the available maternal and child health services at the health facility level.

> *We do not have a PNC retention plan within 48 hours, 7 days, or 41 days. Maternal and child health service providers do not schedule PNC service return. There is no continuum of care packages connected from one service to another."* (IDI-Qualified Nurse)

Sub-theme 5.3 - Fragmentation of care across the maternity continuum of care

The in-depth interview participants highlighted that there is disjointed service availability in some areas, especially in remote and hard-to-reach areas. For instance, a primary health unit (PHU), which is a basic healthcare facility located near rural communities, provides basic services such as outpatient treatment and cannot cover maternity delivery and postnatal care services, leaving the community to disjoint the service provisions.

> *"I think only mothers living in urban cities who have all the necessary medical care can complete the entire maternity continuum of care, such as proper antenatal care, institutional delivery, and postnatal care. Communities living in rural or remote areas cannot complete because of the transition points between the different maternity continuum of care stages."* (IDI-Health policymaker)

Pregnant mothers feel that their unique health preferences and needs are not being considered by healthcare providers and do not receive appointments for the next visit. Failing to manage follow-ups and register appointments will result in incomplete or discontinued maternal healthcare.

> *"If I attend the check-up during pregnancy, I will not receive an appointment for delivery in the health facility. It depends on me if I need to come to the facility. There is no information system or referral mechanism that ensures that pregnant women go through various levels of care throughout the continuum of care."* (IDI-Childbearing mother)

Discussion

Fragile and conflict-affected states often lack consistent service delivery and struggle to respond to their populations' needs. Despite considerable progress in expanding and improving maternal, Newborn, and Child Health (MNCH) globally, gaps still remain in Low- and Middle-Income Countries (LMICs), particularly in Sub-Saharan African countries, including Somalia. External organizations support healthcare service delivery in Somalia (37). The Somalia healthcare system is structured into three tiers: primary, secondary, and tertiary level care, and each care unit has its own level of service provision, infrastructure, and capacity. The primary level care is typically

delivered through a network of health centers, health posts, community health workers, and maternal and child health clinics (MCH) that are mostly located in urban and rural areas and are very limited in nomadic areas. The secondary level care serves as a referral center for patients requiring more specialized medical care and services that are not available in primary care, such as in district or regional hospitals. The tertiary level of care represents the highest level of medical care available in the country, including highly specialized and complex medical services (25).

This study explores the multifaceted barriers to the completion of the maternity continuum of care and the reasons for discontinuation among different community domains, including urban, rural, IDPs, and nomads in Somalia. The maternity continuum of care gaps varies across different community categories, such as urban, rural, IDPs, Agro-pastoralists (beeraley-baadiye in Somali), and Nomadic pastoralists (reer-guuraa in Somali), due to a combination of factors like service availability, access to care like financial, distance, and transportation, socio-economic disparities, infrastructure, climate-related, and security issues. A similar qualitative study conducted in Ethiopia found that the lack of existence and availability of health facilities in some areas is why women do not complete the recommended maternity continuum of care, which is consistent with our findings (106). One of the primary challenges for maternal healthcare access in Somalia is access barriers with geographical remoteness, limited healthcare facilities, and inadequate infrastructure, exacerbating disparities in maternal, newborn, and child health access. A study conducted in Somalia focusing on constraints in maternal healthcare utilization among pastoral communities also found gaps in Healthcare access, including limited resources, distance, and transportation (4). The maternal decision-making process regarding care-seeking is influenced by different factors like education and awareness level, cultural beliefs, socio-economic status, and access to healthcare facilities. Previous studies also documented the decision and awareness to seek care by pregnant and delivering mothers, such as knowledge of pregnancy risks, appropriate time to book antenatal care, and maternal awareness regarding the importance of care seeking (106).

Access to skilled births during delivery is critical for reducing maternal and newborn deaths; however, limited trained birth attendants, especially in remote regions, can pose significant challenges (107). Although traditional birth attendants are widely utilized, they often lack the necessary skills and knowledge to manage obstetric emergencies safely and refer obstetric

complications when needed. Homebirth can be acceptable if it is attended by a health professional (usually a qualified midwife), but in communities living in remote, rural, or IDP areas, their home delivery is attended by unqualified traditional birth attendants, and our study came to the same conclusion (108). Some of the community interviewed preferred the use of traditional birth attendants and home deliveries because of economic preferences since they perceive the costs with a midwife or healthcare professional as unaffordable, which is also consistent with a study conducted in Indonesia *(*109*)*. Another study conducted in Ethiopia found that most women who give birth at home are assisted by untrained women (TBAs), and our study came to the same conclusion (105). The quality of maternity care services in Somalia is often compromised by complex factors such as resource constraints, understaffing, and inadequate training of the existing staff, which will cause substandard care. Many women and newborns do not receive timely postnatal care check-ups or essential postpartum services in Somalia, which increases the risk of both maternal and newborn complications and deaths. In common with the current study findings, a recent study conducted in Malawi revealed that the lack of scheduled postnatal care appointments is hindering the continuation of the maternity continuum of care and decreases the mother's check-ups and appointments before they leave the health facility (110).

While most of the urban locations in Somalia have access to quality healthcare facilities, most of the nomads and IDPs have limited access to quality healthcare services due to their socio-economic vulnerability, mobility, and inaccessibility to healthcare facilities. Similarly, vulnerable communities like IDPs and hard-to-reach areas have difficulties reaching the existing health facilities due to financial, distance, or transportation challenges. In conclusion, mothers do not have enough autonomy and decision-making power, they are economically dependent on their husbands, their level of education is low, health awareness and knowledge on pregnancy risks are limited, health professionals are not trusted more, they normalized the home deliveries, household living conditions is harsh, and there were service availability and access challenges.

Recommendations

11. Addressing accessibility challenges such as distance, transportation, time constraints, and financial burdens requires a multifaceted strategy, including bringing health facilities close to communities, improving transportation infrastructure, establishing mobile health clinics or

outreach programs, and implementing telemedicine initiatives to provide remote healthcare services in those communities if it is feasible to obtain affordable internet.

12. On-time antenatal care visits should be encouraged and advised to all communities through health education and awareness raising. All mothers should be educated to attend all levels of the continuum of care, including ANC four or more times, delivery at health facilities, and postnatal care attendance. This can be motivated by providing incentives or subsidies to encourage pregnant women to attend antenatal care appointments.
13. Mothers should be educated on essential services such as blood groups and tests, malaria prophylaxis, and tetanus toxoid prophylaxis. They should also receive specially designed health education related to birth preparedness, early and exclusive breastfeeding, postnatal care within 41 days, etc.
14. To improve geographical accessibilities, mobile health innovations can provide remote communities with access to maternal health information and services. Mobile applications such as text messaging and social media platforms can be explored to disseminate maternal health information, promote healthy behaviors, and provide counseling among pregnant mothers.
15. Targeted interventions, such as user fee exemptions, cash transfer programs, and community health insurance schemes, can be implemented to address socio-economic barriers to pregnant women.
16. Interventions to empower women, such as economic opportunities, education, and participation in decision-making processes related to their own healthcare and well-being, should be implemented.

Declarations

Abbreviations

ANC: Antenatal Care; CoC: Continuum of Care; MH: Maternal Health; SBA: Skilled Birth Attendant; SDG: Sustainable Development Goal; WHO: World Health Organization; PNC: Postnatal Care; SHDS: Somalia Health and Demographic Survey; IDPs: Internally Displaced People; AOR: Adjusted odds ratio; CI: Confidential Interval; C-section: Caesarian Section; MNCH: Maternal, Newborn, and Child health globally; LMICs: Low- and Middle-Income Countries; IDI: In-depth Interviews; KII: Key Informant Interviews; FGDs: Focus Group Discussion; UHC: Universal Health Coverage.

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Ethics approval and consent to participate

Study details and guidelines were explained to participants before the interviews began. Consent to participate in the study was obtained from all participants. Respondents were notified that their involvement in interviews was voluntary and that they could decline to answer any questions. Participants were assured that their identities would remain anonymous and no compensation would be given. The National Institute for Health, Somalia, provided ethical approval for this study.

Consent for publication

Not applicable

Availability of data and materials

Data are available on reasonable request. All data relevant to the study are included in the article or uploaded as online supplemental information.

Competing interests

The authors declare that they have no competing interests

Authors' contributions

Adam Abdulkadir Mohamed wrote the main manuscript text. Abdi Gele prepared the tables and reviewed the manuscript. Ayse Akin checked the correctness and participated the tools preparation and also reviewed the manuscript. Sare Mihciokur and Sarp Üner also reviewed the paper.

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This study did not receive funding.

APPENDIX 4: Consent Form

INTRODUCTION

The purpose of this study is to explore the maternity continuum of care barriers among women in Somalia.

PROCEDURES

If you agree, I "……. (Investigator or assistant)" will interview you for 45 to 60 minutes. The full interview will be recorded on a digital voice recorder, "tape recorder," and the interviewer will also take notes. You will be identified by a pseudonym for the study, which means all information collected in this study will be given code numbers, and a pseudonym name will be recorded. This cannot be linked to you in any way, and your name or any identifier will not be used for any publications or reports from this study. During the interview process, you have the right and choice to skip any questions. After the interview, the audio recording will be transcribed, and you will receive a copy of the transcript for your review. This will be delivered in person or via e-mail to the address that you provide to me, after that, your participation is over. At the conclusion of the dissertation research, you will be shared the findings from the study.

RISKS

There are no known or foreseeable risks for participation in this study, the study will be conducted in your own familiar environment and there are no drugs, or any other harmful substances administered in this study.

BENEFITS

If you voluntarily agree to participate in this study, there are not any personal benefits to participation. It is hoped that that the formation gained in this study will benefit societies, researchers, and health policy planners by assessing and exploring the continuity or discontinuity of maternal, newborn, and child health services utilization in order to recommend the best practices to improve MNCH services.

COSTS AND COMPENSATIONS

You will not have any costs related to participating in this study, other than the time spent during the interview and reviewing the interview transcript.

PARTICIPANT RIGHTS

Your participation in this study is completely voluntary and you may initially refuse to participate or stop participating in the study at any time. If you decide not to participate in the study or leave

the study early, it will not result in any penalty or detrimentally affect your relationship with the researcher.

CONFIDENTIALITY

All information collected in this study will be given code numbers and pseudonym names will be recorded. This cannot be linked to you in any way and your name, or any identifier will not be used in any publications or reports from this study.

To ensure confidentiality to the extent permitted by law, the following measures will be taken:

Your interview will be recorded and transcribed, but you will be identified in the transcripts and on tape with a pseudonym.

The data will be stored on a password-protected computer in a locked room at all times and will be accessed by only the investigator of this study.

The data will only be kept until the completion and publication of the study. If the results are published, your identity will remain confidential.

PARTICIPANT SIGNATURE

Your signature below indicates that you voluntarily agree to participate in this study, that the study has been explained to you, that you have been given time to read this document, and that your questions have been satisfactorily responded. You will receive a copy of the written informed consent prior to your participation in the study.

Participants Name (printed) _____

_____ _____-

(Participant's Signature). (Date)

APPENDIX 5: Focus Group Discussions Tool

1. Can you tell me your experiences related to your pregnancy, delivery, and after delivery? Probe: If you did not attend ANC, what was the reason? What do you think would have facilitated to attend ANC? Why did you prefer to deliver at home?

Discuss:

2. Did your current child receive childhood vaccinations? Which vaccines? If not, what do you think the challenges?

Discuss:

3. What do you think are the factors hindering you to utilize all of the services (ANC, Facility Delivery, PNC, and Immunizations) probing: Can you elaborate more? How about the roads, distance to health facility and etc.?

Discuss:

4. Can you discuss barriers if you want to utilize the existing health services if any? Probing: Which services are available in you locality? Do you think you can access all of the services?

Discuss:

5. Do you have any financial difficulties to access the services? Explain more?

Discuss:

6. Do you usually get support from the family or husband when you want to go to the health facility? Who supports you? Do you need permission to decide?

Discuss:

7. How are the attitudes of the health Workers in the facilities? Do you have any problems?

Discuss:

8. Why do you vaccinate your child? What do you believe about the child vaccination? How do you explain the perceptions of your community towards child immunization?

Discuss:

APPENDIX 6: In-depth Interview Guide

I	Section I: Identification	
1	Questionnaire ID	_____
2	Area Identification	_____
3	Name of moderator	_____
4	Name of note-taker	_____
5	Date of discussion	_____
6	Start time:	_____:_____
7	End time:	____:_____

II	Section II: Participant Demographic Intake Sheet					
1	Participant code					
2	Age					
3						
4	Marital status					
5	Are you employed? (Yes/No)					
6	Educational level					
For recently delivered women						
7	Parity					
8	Place of delivery in last pregnancy (facility/home)					

	For all participants		
	Antepartum	**Intrapartum**	**Postpartum**
The practice of ANC, Delivery, and PNC services			
1	How early do women go for ANC? **Probe** why do they go at that time? Why earlier or later?		How early do women go for PNC? **Probe** why do they go at that time? Why earlier or later?
2	How often do they go to ANC? **Probe** why do they go at that time?		How often do they go for PNC? **Probe** why do they go at that time?
3	Do women think skilled attendance during pregnancy helps their pregnancy?	Do women think skilled attendance during childbirth helps themselves and their babies?	Do women think skilled attendance during postpartum helps their babies and themselves?
Reasons for use of ANC, facility delivery and PNC			

4	Explain factors that would motivate women to utilize ANC service in their pregnancy	Explain factors that would motivate women to utilize delivery service in their pregnancy **Probe** for reasons for using continuum of care	Explain factors that would motivate women to utilize PNC service in their pregnancy **Probe** for reasons for using continuum of care
Barriers for attending ANC, facility delivery and PNC use			
5	If women do not go for ANC, what are their reasons? What are barriers to accessing ANC? **Probe** for. a) Financial barriers and opportunity costs b) Distance and access c) Socio-cultural d) Quality of care	If women deliver at home, what are their reasons? Explain the constraints that influenced women to utilize facility delivery services? **Probe** for. a) Financial barriers and opportunity costs b) Distance and access c) Socio-cultural d) Quality of care and non-dignified care	If women don't go for post-natal care, what are their reasons? What are barriers to accessing PNC? **Probe** for. a) Financial barriers and opportunity costs b) Distance and access or lack of service c) Socio-cultural d) Quality of care
Reasons for discontinuation across the continuum			

6	Why do women go to the facility for first ANC, but discontinue for subsequent ANC visits? **Probe** for. a) Financial barriers and opportunity costs b) Distance and access c) Socio-cultural d) Quality of care	Why do women go to the facility for ANC, yet mostly deliver at home? **Probe** for. a) Financial barriers and opportunity costs b) Distance and access c) Socio-cultural d) Quality of care and non-dignified care	Why do women go to the delivery at the facility, yet mostly don't receive PNC? Explain the obstacles influenced women to utilize skilled care during pregnancy, childbirth, and postpartum in your community? **Probe** for; a) Financial barriers and opportunity costs b) Distance and access c) Socio-cultural d) Quality of care
7	In your opinion, what should be improved regarding ANC services?	In your opinion, what should be improved regarding facility delivery services? Continuity of care?	In your opinion, what should be improved regarding PNC services? Continuum of care?
Traditional practices during pregnancy, childbirth, and postnatal period			
8	Can you tell us about the traditional practices and beliefs during pregnancy, delivery and postnatal period in your community?		
9	Do you think these traditional beliefs, religious practices, and cultural norms affect mothers to use care during pregnancy, delivery, and postpartum period in your community? Explain how and why?		
10	How do you see community volunteers/TBAs, and health professionals and maternal health services provided to the community?		
	For recently delivered mothers only		
11	How do you rate the quality of care you received during ANC follow-up? What kinds of services do you receive in ANC? Are you satisfied?	How do you rate the quality of care you received from the facility during childbirth? What kinds of services do you receive in childbirth? Are they satisfied?	How do you rate the quality of care you received during PNC? What kinds of services do you receive in PNC? Are they satisfied?
12	If the mother received ANC.	If delivered in health facility.	If use PNC:

	Ask: Explain factors that motivate you to utilize ANC service in their pregnancy	**Ask:** Explain factors that motivate you to deliver in health facility	**Ask:** Explain factors that motivate you to utilize PNC service
13	If the mother did not go for ANC. **Ask**: what are the reasons not attending ANC services?	For home delivered mothers; **Ask:** what do she think are the obstacles when accessing a health care facility? Her reasons for discontinuation?	If women do not go for PNC. **Ask:** a) what are the reasons for not getting PNC? b) what are the reasons for discontinuation?
14	Explain the support you get from the community to and decision making on health services during pregnancy. delivery and postnatal period		
15	Explain us your experiences relating to the utilization of ANC, birth, and PNC care provided by skilled birth attendants. Prove for. a. their interactions with skilled birth attendants during ANC, delivery, and PNC b. their confidence in skilled birth attendants' abilities, and c. respect and compassion of attendants (respect for the traditional beliefs of the women, etc).		
	For community and religious leaders and community volunteers only		
Community perceptions about health providers and maternal health programs			
16	How the community see the maternal health programs and health professionals? Tell me the perception about maternal health care services. Perception about different care providers.		
17	What efforts has your community made to increase maternal health service in your community?		

Thank you for your participation!!

APPENDIX 7: Definition of Terms

Access to healthcare	A concept that measures the capacity of the health system to reach the population without excluding part of it from receiving healthcare services. Ensuring a high degree of access to healthcare improves people's overall health status, prolongs life expectancy, and decreases health inequalities.
Continuum of Care	A system that guides and tracks patients through comprehensive health services spanning all levels and intensity of care.
Early neonatal death	The death of a baby aged 0 to 7 days after birth.
Health	A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity
Health Facility	A physical structure where health services are offered. This means primary clinics, community care centers, and hospitals in Somalia.
Health outcomes	A measurable result related to a specific aspect of health care. For example, a change in maternal weight or hemoglobin level over time.
Intrapartum care	The care of healthy women in labor at term (37–42 weeks of gestation).
Late neonatal death	The death of a baby aged 8 to 28 days after birth.
Live birth	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.
Maternal death	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 from accidental or incidental causes.
Maternal health	Broadly, it refers to women's health during pregnancy, childbirth, and postpartum.
Maternal Mortality Ratio (MMR)	Number of maternal deaths per 100,000 live births
Maternity Continuum of Care	The maternity continuum of care refers to a spectrum of healthcare services provided to pregnant women and newborns throughout pregnancy, childbirth, and the postnatal period. The goal is to ensure safe motherhood and healthy outcomes for both mother and child.
Neonatal death	The death of a baby aged 0 to 28 days after birth.
Neonatal Mortality Rate (NMR)	Number of neonatal deaths per 1000 live births
Participant	An individual who has agreed to be part of this study.
Perinatal death	Comprises the combination of stillbirths and early neonatal deaths.
Perinatal period	It commences at 22 completed weeks (154 days) of gestation and ends seven completed days after birth.
Prenatal care (also known as antenatal care or ANC)	Health care provided by skilled healthcare professionals to pregnant women and adolescent girls
Skilled birth attendant	They are usually defined as doctors, nurses, midwives, or auxiliary nurse-midwives who attend a delivery. In some low—and middle-income countries, skilled birth attendants might not be fully trained.