# Facilitators and Barriers to Accessing Maternal Health Services in Sudan: A Literature Review.


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## Sudan


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**Unravelling the Path: The Facilitators and Barriers to Accessing Maternal Health Services in Sudan: A Literature Review.**

A thesis submitted in partial fulfilment of the requirement for the degree of Master of Science in Public Health

by

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**Declaration**

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# List of Abbreviations

| Abbreviation | Meaning |
|---|---|
| **ANC** | Antenatal Care |
| **EmONC** | Emergency Obstetric and Neonatal Care |
| **FGD** | Focus Group Discussion |
| **FGM** | Female Genital Mutilation |
| **FHC** | Family Healthcare Centre |
| **FHU** | Family Healthcare Units |
| **FMOH** | Federal Ministry of Health |
| **GBD** | Global Burden of Disease |
| **HCWs** | Healthcare Workers |
| **HDI** | Human Developmental Index |
| **HDPNx** | Humanitarian Development Peace Nexus |
| **HIS** | Health Information System |
| **IDP** | Internally Displaced Persons |
| **KII** | Key Informant Interview |
| **LMIC** | Low Middle Income Countries |
| **MENA** | Middle East North Africa |
| **MHS** | Maternal Health Services |
| **MICS** | Multiple Indicator Cluster Survey |
| **MMR** | Maternal Mortality Rate |
| **NGOs** | Non-governmental Organization |
| **NHIF** | National Health Insurance Fund |
| **OOP** | Out-of-pocket Expenditure |
| **PHC** | Primary Health Care |
| **PNC** | Postnatal Care |
| **RSF** | Rapid Support Forces |
| **SAF** | Sudanese Army Forces |
| **SDG** | Sustainable Developmental Goals |
| **SGH** | State General Hospital |
| **SHI** | Social Health Insurance |
| **SMOH** | State Ministry of Health |
| **TBA** | Traditional Birth Attendant |
| **THI** | Total Health Expenditure |
| **UN** | United Nation |
| **VMWs** | Village Midwives |

## Key Definitions:

1. **Healthcare access:** Health care access is defined as “balance between the features of the health system providing services and the expectations and perceptions of potential or actual consumers in terms of system availability, accessibility, affordability, accommodation and acceptability” (1,2).

2. **Healthcare utilization:** is defined as “the quantification or description of the use of services by persons for the purpose of preventing and curing health problems, promoting maintenance of health and well-being, or obtaining information about one's health status and prognosis” (3)**.**

3. **Health equity:** is defined as “the absence of unfair, avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically or by other dimensions of inequality (e.g. sex, gender, ethnicity, disability, or sexual orientation). Health is a fundamental human right” (4).

## Acknowledgement:

In the name of Allah, the Most Gracious and the Most Merciful. All praises to Allah for guiding me and giving me the strength to push through this entire wonderful experience. Alhamdullilah.

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To my brilliant thesis and academic advisors (KC and AVD), I extend my deepest gratitude. Your unwavering support and invaluable insights and critical feedback have been the compass guiding me through the challenges of this academic pursuit.

## Dedication

"Brief is Life, But Love is Long".

These words hold profound meaning as they honour the memory of my dearest best friend, my late Father, the great **Abdelmotalib Hassan Abdelaziz**. His love and influence have etched an indelible mark on my heart, and his absence is deeply felt. As I continue this path, I carry his memory as a guiding light, striving to make him proud with every step I take.

## Abstract:

**Introduction:** Ensuring access to Maternal Health Services (MHS) encompassing of antenatal care (ANC), skilled institutional delivery by a Skilled Birth Attendant (SBA), and postnatal care (PNC) is crucial for maternal well-being, reducing mortalities, and healthy pregnancies. However, comprehending the factors that influence access within Sudan remains a significant challenge. This gap involves two essential dimensions: the supply-side, concerning health system capabilities, and the demand-side, encompassing patient expectations and experience.

**Objective:** To explore the supply and demand factors that influence access to MHS in Sudan and provide recommendations to policymakers, NGOs, and researchers to determine priority interventions related to MHS access in Sudan.

**Methodology:** Through Levesque's framework, a comprehensive literature review involving peer-reviewed, published, and unpublished grey literature was conducted to study the factors influencing access to MHS in Sudan.

**Results:** This study revealed that the health system factors that impact access are associated with 'acceptability, availability,' and' appropriateness. Patient access was influenced by the 'ability to perceive care', 'ability to seek' care, and 'ability to pay' for health services. Interestingly, the findings further revealed inequities in the health system like inequitable distribution of Healthcare Workers (HCW) and limited financial protection. The study also emphasized the pivotal role of NGOs in tackling accessibility challenges in Sudan's context.

**Conclusion:** Achieving Universal Health Coverage (UHC) and equitable MHS access requires a comprehensive understanding of the health system and patient-related factors. This thesis sheds light on these complexities, urging proactive measures to address access disparities and ensure comprehensive maternal care access in Sudan.

**Keywords:** Access, health system, maternal health services, Sudan

**Word count:** 12,186

## Introduction

I am Marah Abdelaziz, a dentist from University of Khartoum. Throughout my time in university, I immersed myself in student associations and actively engaged in organizing convoys to remote areas. These experiences resonated with me deeply, shaping my perspective and igniting a fire within. The confined space of a clinic didn't seem to align with my aspirations after graduation. A realization struck me: there's so much more to do beyond these clinic four walls!

This realization propelled me into the world of a voluntary NGO that is committed to research in the underserved rural communities. The more I ventured into the untouched corners of Sudan, the more my heart opened to the vastness of our country. Amidst this exploration, the disparities between different regions and the simplicity of life outside the capital became clear. It struck me profoundly that in certain villages, the scarcity of services left many with inadequate medical attention. I just wondered, ‘but wait, where do pregnant women follow up?’

With a renewed sense of purpose, I started working in the FMOH, determined to understand the complexity of our health system. It became evident that the health system indeed has constrained resources, and the alarming trade-offs that could lead to the absence of healthcare in certain regions. I was haunted by the thought that these pregnant women, devoid of privilege and access, could simply become statistics in a database—another tragic loss.

When a woman loses her life during childbirth, it is a tragedy that demands deeper investigation. No child should be left without a parent due to preventable factors that elude our understanding or remain unaddressed.

Therefore, this thesis aims to understand the health system factors and patients’ perspectives on accessing MHS in Sudan. My commitment is a tribute to the countless women who, year after year, lose their lives while bringing new ones into the world.

# Chapter I: Background

## 1.1 Context of Sudan

### 1.1.1 Geography and Demography

The Republic of Sudan ranked as the third largest country in Africa, is home to a population of approximately 46 million distributed among its 18 states (figure 1.1) (5,6). Sudan shares its northern border with Egypt, whereas its eastern boundary encompasses the Red Sea, Eritrea, and Ethiopia. South Sudan is located to the south, whereas the western borders extend towards the Central African Republic and Chad (7). The country's strategic position is a destination and transit point for refugees and asylum seekers. The number of refugees and internally displaced persons (IDP) in Sudan increased significantly following South Sudan's independence in 2011. As of 2022, Sudan provided refuge to around 800,000 South Sudanese and 330,000 individuals who sought asylum from Yemen, Syria, and neighboring countries (8).

With only 36% of the population residing in urban areas, the majority predominantly live in rural areas (9). The country has a relatively young population, with a median age of 18.4 and a life expectancy of 65 years (10,11). The population of females and males is evenly distributed (12). Women of reproductive age (15-49 years) cover 48% of the total female population (13). As indicated in the latest report in 2021, the population growth rate is 2.7% (14), with a total fertility rate of 4.5 births per woman, which is reported as a decline from the 1973 census of seven births per woman. On average, there are 5.6 individuals per household (15,16).


*Figure 1.1 Map of the Republic of Sudan*

*Source: https://www.worldatlas.com/maps/sudanv*

### 1.1.2 Sociocultural, Religion, and Traditional practices

The country's diverse population includes 19 major ethnic groups and 597 subgroups, with Arab-speaking Muslims being the largest, accounting for 70% of the total population. Some ethnicities have unique cultures and lifestyles (17). Among the numerous cultural practices in Sudan, female genital mutilation (FGM) stands out with an alarming prevalence rate of 86.6%, symbolizing women's purity and virginity within the culture. Another example of frequent practices like child marriage with rates of 34% by age 18 and 12% by age 15 (18,19). The country displays gender inequalities, given that Sudanese women face a 55% lower chance of employment compared to their male counterparts. Additionally, they possess less than 33% of the legal rights that men. (20). These disparities are closely tied with the patriarchal gender role, where men are expected to be the primary breadwinners and women are confined to the role of homemakers. The expectation for husbands to provide for their families financially due to this cultural norm often leads to women's financial independence being viewed as unnecessary (21).

### 1.1.3 Economical and political landscape

Sudan is classified as a low-income country by the World Bank, with over 36.1% of the population living below the monetary poverty line of $1.90 per day. A comparison of poverty rates between rural and urban areas in Sudan highlights disparities across localities, with rural areas experiencing higher rates of poverty. For instance, in rural North Darfur, the poverty incidence is 70%, threefold than that of the capital. This situation was further exacerbated by the COVID-19 pandemic, floods, and conflict (22–24). Internal conflicts have hampered Sudan's path to economic and human development since its independence in 1956, leading to compromised security and governance (25). The Human Development Index (HDI) of the country is 0.508, positioning it at the 172$^{nd}$ rank out of 191 countries. This place it lower than neighboring countries such as Egypt, which have an HDI of 0.731 (26).

In April 2023, an armed conflict over power and resources ignited between the Sudanese Army Forces (SAF) and the Rapid Support Forces (RSF). In the conflict-affected regions (mainly the capital Khartoum and Darfur), more than 70% of hospitals have experienced disruptions due to the impact of the conflict on health services. Consequently, the health services were negatively impacted by the interruptions of delivery, destruction of infrastructure, and relocation of HCWs, which ultimately led to decreased quality and accessibility. As a result, it led to hundreds of injuries, fatalities, and displacements, further exacerbating the country's humanitarian crisis (27).

### 1.1.4 Burden of Diseases

In Sudan, there exists a triple burden of diseases, characterized by communicable diseases, non-communicable diseases, and injuries arising from natural disasters like floods and manmade disasters like internal conflicts (28). The statistics represented in (Figure 1.2) indicate that maternal and neonatal disorders have persisted as the second most common cause of death in Sudan from 1990 until the latest update in 2019 (29).

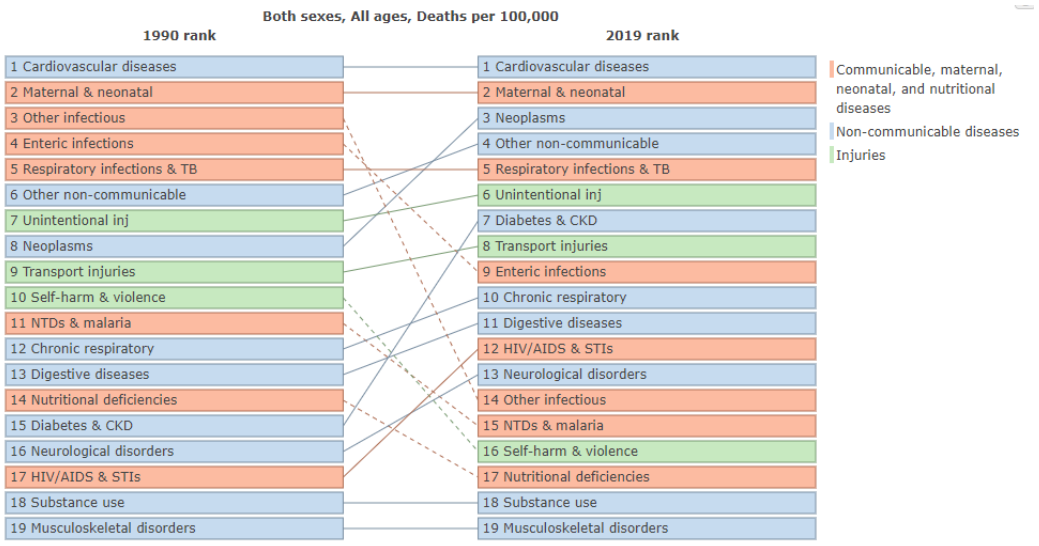


*Figure 1.2 List of common causes of Deaths in Sudan*

*Source: [https://vizhub.healthdata.org/gbd-compare/#0](https://vizhub.healthdata.org/gbd-compare/#0)*

### 1.1.5 Health System organization

In Sudan, the healthcare system is organized into three tiers. The responsibility for supervising national health policies, plans, and strategies lies with The Federal Ministry of Health (FMOH). This is followed by 18 State Ministries of Health (SMOH), which are also involved in planning and implementation. The third layer consists of localities that focus primarily on service delivery (30). The roles and responsibilities of the three tiers are further demonstrated in (Figure 1.3).

The health system is a decentralized system, in which services are delivered at primary, secondary, or tertiary levels. To ensure UHC, the MOH prioritizes delivering services at the primary health care (PHC) level, which consists mainly of Family Healthcare Units (FHU), family healthcare centres (FHC), and local hospitals. The States General Hospital (SGH) serves as a referral centre for the entire state (31,32). Beside public facilities, the for-profit private sector offers a variety of services, especially specialized care and it's available mostly in urban areas (33). Simultaneously, the FMOH collaborates with non-profit NGOs in the private sector to ensure the alignment and harmonization of activities, such as MHS delivery to IDPs and refugees through PHC facilities (30).

| | |
|---|---|
| **Federal** | Policy, planning, legislation, coordination, external relations, capacity building, tertiary referral centres |
| **States** | Operational planning, human resources for health, capacity building, secondary and rural hospitals |
| **Localities** | Primary health care services, midwifery and maternal and child health, environmental health, vector control,human resources for health |

*Figure 1.3: Roles and Responsibilities of different tiers within the health system*

*Source: [https://apps.who.int/iris/handle/10665/351258](https://apps.who.int/iris/handle/10665/351258)*

### 1.1.6 Health Finance of the country

The country spends only 4.7% of its Gross Domestic Product (GDP) on health, which is below the recommended 15% set by the Abuja Declaration (34,35). The public funds contribute to 23.8% and is allocated from sources like the Federal government, National Health Insurance Fund (NHIF), and Zakat[1] (34). The NHIF's aim is to ensure equitable coverage of Sudanese citizens by pooling funds from the sources mentioned, in addition to a 10% subscription fee from employees in the formal sector (compulsory) and a calculated estimate from the informal sector (voluntary) (36). According to the latest update, the NHIF coverage is 81.7% and this coverage includes the economically disadvantaged and vulnerable populations to access public and certain private healthcare facilities with the Social Health Insurance (SHI) (37). The majority of the service packages provided by the NHIF are free, however, some services require co-payments. In addition, the medications are subsidized by 75% (34). Despite the ongoing efforts, the out-of-pocket expenditure (OOP) still remains high with 52.9% (38).

## 1.2 Overview of Maternal Health in Sudan

Maternal health, as defined by the WHO is "the health of women during pregnancy, childbirth and the postnatal period" (39). The lives of many women during pregnancy, labour and, post labour period could be protected by providing the necessary healthcare services like ANC, delivery care and PNC (40).

An important indicator to assess maternal health in Sudan is through Maternal Mortality Ratio (MMR). This is defined as "the number of maternal deaths during a given time period per 100,000 live births during the same time period" (41). The indicator of MMR in Sudan is considered one of the highest in the Middle East North Africa (MENA) region, ranking after Yemen and Afghanistan (42,43). Sudan has made progress in reducing the MMR by a 57%. According to the latest survey, the rate dropped from 667 deaths per 100,000 live births in 2000 to 295 deaths per 100,000 live births in 2017 (Figure 1.4) (44). However, Sudan remains far from the global target of achieving less than 70 MMR per 100,000 live births by 2030 (45). Reducing the MMR and ensuring access to quality MHS for every Sudanese woman was set as a priority according to the latest Sudan's National Strategic Plan (2017-2030) (46).

[1] Zakat: It is one of the five pillars of Islam, and it is considered a religious responsibility to those who are wealthy to assist those in need through financial contributions. In Muslim countries, it serves as "a financial and institutional structure offering social safety to the vulnerable and impoverished population"

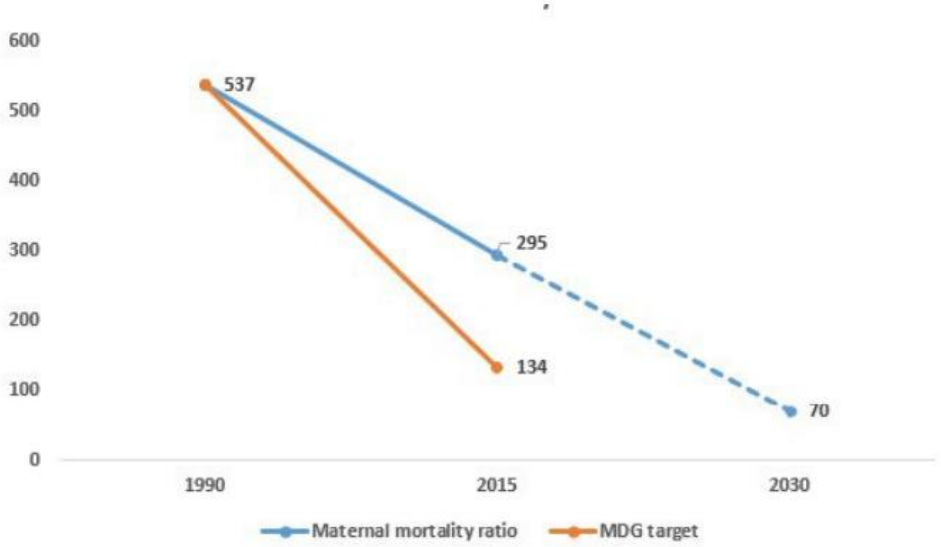


*Figure 1.4 Maternal Mortality Ratio in Sudan 1990-2030*

*Source: Country Cooperation Strategy for WHO and Sudan 2022-2025*

# Chapter II: Problem Statement, Justification and Objectives

## 2.1 Problem Statement

Maternal mortalities are posing a significant concern, as they are the second leading cause of death in women of reproductive age accounting for 14.6% of deaths. It closely follows HIV, which accounts for 15.7% of deaths (47). To tackle this problem and significantly reduce maternal mortalities, the access and utilization of MHSs like ANC, institutional delivery with Skilled Birth Attendants (SBAs), and PNC are essential (48).

The Sudanese government endorsed a free healthcare policy for children under five years and MHS such as ANC, deliveries (including caesarean section), and PNC in 2008. However, a policy analysis conducted 2 years after implementation revealed discrepancies in the implementation of the package across the different states in the country. For instance, only the emergency caesarean section was free in Gezira state, however, both emergency and elective caesarean sections were free in Khartoum. In other states like Blue Nile and South Kordofan, the policy wasn't effective as they had limited funding (49). In 2020, a healthcare facility assessment for MHS reported that the percentage of women receiving ANC without incurring any fees was only 54.0% in rural areas and slightly higher at 56.5% in urban areas. Moreover, the study found that less than 20.0% of the service delivery points operated without charging any fees for delivery care, caesarean delivery, and PNC services (50).

As per WHO recommendation, the majority of deaths among women are preventable and can be reduced by attending at least four ANC appointments for low-risk pregnancies (51). ANC helps pregnant women, and their families recognize potential complications and danger symptoms. It provides an informal platform for discussions and information sharing, enabling high-risk women to learn from uncomplicated deliveries (52). Sudan's ANC services are underutilized, with only 74.3% of pregnant women attending at least once, which is still below the global target of 90% (53,54). In certain states like Kassala, free ANC services are underutilized, with only 11% attending four or more visits, and 10% not attending any at all (55). Of all women, 79.1% received ANC from a skilled provider whereas 19.9% did not. The percentage of women receiving ANC is higher in urban areas (90.8%) than in rural areas (74.9%) (18).

Maternal deaths can be averted by increasing awareness of safe motherhood and providing access to institutional delivery by qualified birth attendants (56). Around 60% of rural communities in Sudan face a lack of access to essential midwifery care. In these isolated areas, the most trusted caregivers are midwives and Traditional Birth Attendants (TBAs) (57). Although TBAs do not fall under SBAs, their potential value has been acknowledged in obstetrics as they recognize labour signs, refer cases with complications, ensure hygienic delivery, and promote breastfeeding (58). Although delivering in healthcare facilities is crucial, there is a notable inclination towards home births in Sudan. The latest Multiple Indicator Cluster Survey (MICS) indicated that 71.3% of women gave birth at home and only 27.7% gave birth in a healthcare facility. The proportion of women in urban areas who gave birth in a health facility (45.2%) is more than double that of their rural counterparts (21.5%) (18). The risks associated with home deliveries include unsanitary conditions and the inability to identify maternal and foetal complications for referrals (59).

The period immediately following childbirth, known as the postnatal period, is crucial for the health of both women and newborns. The World Health Organization (WHO) has estimated that over 50% of maternal deaths worldwide occur within the first 24 hours after delivery (60). PNC can be provided by trained birth attendants or midwives in health facilities, or through home visits. The main objectives are to assess health conditions, provide advice on hygiene and breastfeeding, offer counselling services, parenting support, and ensure timely access to healthcare services (61). Even though PNC coverage is crucial, it is frequently insufficient in low- and middle-income countries (LMICs) (62). Particularly in Sudan, only 34.0% of pregnant women and their newborns use PNC services (63). In general, more than half (51.5%) of women who delivered in a health facility remained in the facility for 12 hours or longer after delivery. The percentage of women who remain for 12 hours or more varies across the country, with Central Darfur at 29.3% and White Nile State at 73.2%. Moreover, only 17.6% of women in rural areas received a health check following delivery, unlike 39.3% in urban areas, highlighting the urban-rural discrepancy (18).

## 2.2 Justification

Pregnancy is a natural process and health is a fundamental right. To achieve UHC every woman deserves the right to access MHS whenever they need it, without any financial hardship (64). More than 74% of maternal deaths can be avoided with timely access to quality MHS during pregnancy, childbirth, and the period immediately after birth (63). Studies have revealed that maternal mortality is higher in developing countries owing to inadequate healthcare access and disparities in the healthcare system (65). In Sudan, the MHS coverage tends to be significantly lower in rural areas of the country. Inequitable distribution of healthcare facilities, HCWs and health expenditure within the country, limits the chances of accessibility to adequate care. Other factors such as socioeconomic status, cultural influence and education are not often looked at (66).

Despite its significance, research regarding the MHS in Sudan remains relatively limited, as available studies focus on the causes of maternal mortality (67), factors affecting utilization of ANC (68) and ethnographic studies on health behaviours related to safe motherhood (69). Additional studies have identified the factors that influence nomadic communities to utilize MHS and those that contribute to maternal mortality in Sudan (70,71).

However, to the best of the author’s knowledge, no study has been conducted to study the factors that influence access to MHS from both the healthcare provider's perspective (supply side) and pregnant women’s experiences and perceptions (demand side). To fully comprehend accessibility to health services, one must consider how health system factors and patient factors interact. Thoroughly examining this intricate relationship is crucial to identifying the barriers and enablers to accessing maternal health services in the country. Therefore, this thesis will contribute to exploring the factors that influence access to MHS. Through this, it will serve as a base for implementing appropriate interventions, aiming to guarantee proper maternal care, leaving no woman behind.

## 2.3 Objectives

### 2.3.1 Main Objective

- To explore the health system (supply side), and patients (demand side) factors influencing access to MHS in Sudan, in order to provide recommendations to policymakers, NGOs and researchers to determine priority interventions and address the gaps related to MHS access in Sudan.

### 2.3.2 Specific Objective

1. To identify the facilitators and barriers linked to accessing MHS from the supply side.
2. To identify the facilitators and barriers linked to accessing MHS from the demand side.
3. To provide recommendations based on the findings to policymakers in order to improve access to maternal health services in Sudan.

# Chapter III: Methodology

## 3.1 Study design

This thesis is a literature review study on the facilitators and barriers to accessing MHS in Sudan.

## 3.2 Study area

The study area focused on the Sudan context, with a particular focus on the public and non-profit NGOs MHS provided for women in Sudan (free or affordable services).

## 3.3 Conceptual Framework

To address the objectives of this thesis, three conceptual frameworks were studied: the Thaddeus and Maine Three Delay Model (72), the Andersen Model (73), and the Levesque model (74). The first two frameworks provided a narrow focus, either only focusing on delays in accessing care or primarily emphasizing healthcare utilization instead of healthcare access, respectively. Levesque's framework was chosen to address the research objectives.

The Levesque framework, developed through an extensive analysis of healthcare access literature, offers a holistic perspective on healthcare access. It considers both the patient and provider viewpoints and describes healthcare access as a six-step process (represented by the blue arrow): health needs, perception, seeking, reaching, service utilization, and health consequences. The model incorporates five dimensions of health services: approachability, acceptability, availability/accommodation, affordability, and appropriateness, while linking them to five personal abilities (perception, seeking, reaching, paying, and engaging). This patient-centred framework considers socioeconomic factors, enabling researchers to examine facilitators and barriers to access from individuals' abilities rather than solely focusing on health system shortcomings. Levesque's definition of access emphasizes the opportunity to identify, seek, reach, obtain, and utilize healthcare services while meeting individuals' needs (74).

The purpose of this framework is to examine how various elements of the health system influence the accessibility of MHS for pregnant women in Sudan. By thoroughly investigating the factors that either facilitate or hinder access, this study aims to pinpoint bottlenecks and shed light on potential areas for improvement to make maternal health services more accessible to women in need. Table 3.2 further explains how the framework addressed the research questions.

| Research Objectives | Dimension of the framework | Categories Studied |
|---|---|---|
| To identify the facilitators and barriers linked to accessing MHS from the supply side. | Supply side factors (Health system capabilities) | Approachability<br>Acceptability<br>Availability and accommodation<br>Affordability<br>Appropriateness |
| To identify the facilitators and barriers linked to accessing MHS from the demand side. | Demand side factors (Patients experiences) | Ability to perceive<br>Ability to seek<br>Ability to reach<br>Ability to pay<br>Ability to engage |
| To provide recommendations based on the findings to policymakers, NGOs and researchers to improve access to MHS in Sudan | | |

*Table 3.2 Research Analysis matrix aligning the research objectives to the framework elements*

## 3.4 Search Strategy

A comprehensive literature search was done on MHS in Sudan. The search strategy was carried out in June 2023, screening for peer-reviewed articles using different databases namely, PubMed, Google scholar, Medline and Vrije Universiteit (VU) library.

The search strategy used a controlled vocabulary following the formula: (Access) AND (Maternal Health) AND (Sudan), or (Antenatal) AND (Equity) AND (Sudan). The full list of keywords in table 3.3 in annex includes other components of MHS like (Antenatal), (Postnatal), (Institutional delivery) and the different states of Sudan. The snowball technique was used to generate additional articles relevant for this thesis. Only peer-reviewed English articles were assessed and there were no restrictions on the publication dates.

The knowledge gap on access and utilization of MHS were identified. Further, the search was finetuned using the NOT operator, for example ‘Antenatal’ AND ‘Sudan’ NOT ‘South Sudan’. To avoid missing articles with relevant data and not to exclude any article, other health terms that relates to maternal health were searched like ‘obstetric haemorrhage’ ‘Obstetric fistula’, or practices like ‘FGM’ were included. In addition, further review of articles conducted in major maternity hospitals like Omdurman maternity hospital were included, to check relevant factors that are related to institutional delivery or postnatal care.

The grey literature was manually searched through the websites of NGOs and CSOs that work in the field of maternal and reproductive health in Sudan. A few examples of these NGOs are WHO, UNFPA, UNICEF, MSF, IOM and situation reports from reliefweb based on the current

situation in Sudan. Unpublished English and Arabic reports and policies on maternal health were obtained from staff working in Sudan's FMOH.

For the discussion, the search was expanded to include countries with not only similar health systems, but also comparable socio-cultural contexts, like countries in the MENA region, LMIC and countries that face challenges in healthcare delivery to either limited resources or political instability or conflicts like Yemen, Syria and Afghanistan.

### 3.5 Selection criteria

The articles retrieved from the search strategy had to go through the following inclusion and exclusion criteria depicted in (figure 3.1) based on population, context, concept, study time and language.

The inclusion criteria for this study focused on Sudanese women of reproductive age, including refugees, nomads and IDPs. The context included the 18 states of Sudan, encompassing urban, rural, camps, and village settings. The concept examined maternal health drivers, services, and outcomes, with a specific emphasis on factors such as accessibility, availability, affordability, acceptability, approachability, and the ability to seek, perceive, reach, pay for, and engage with the MHS. The study type included mixed methods, qualitative, quantitative, and cross-sectional studies. For peer-reviewed articles, there were no specific date restrictions, but screening primarily occurred after 2011, following South Sudan's independence. If there was insufficient data, articles published before 2011 were also included. Only publications in Arabic and English were assessed for language.

The exclusion criteria involved case reports, alongside publications that were not in English or Arabic.

### 3.6 Methods limitation

The primary limitation of this study is the limited peer-reviewed literature that specifically addresses access to MHS, particularly in certain states and among specific groups such as IDPs and refugees. This scarcity of relevant literature may result in a partial understanding of the complexities of maternal healthcare access in Sudan.

Moreover, this thesis was written during a period of political instability in Sudan, which resulted in the shutdown of both the Sudan Health Observatory website and the FMOH website. Consequently, crucial sources of information regarding the ongoing interventions of MHS in Sudan became inaccessible. Relying solely on a literature review might not provide a holistic view. Moreover, the political turmoil posed challenges in employing other triangulation methods, such as key informant interviews, to further explore the supply-side factors and focus group discussions to gain deeper insights into demand-side factors.

### 3.7 Ethical Considerations:

Obtaining ethical clearance was unnecessary as no primary data was collected.

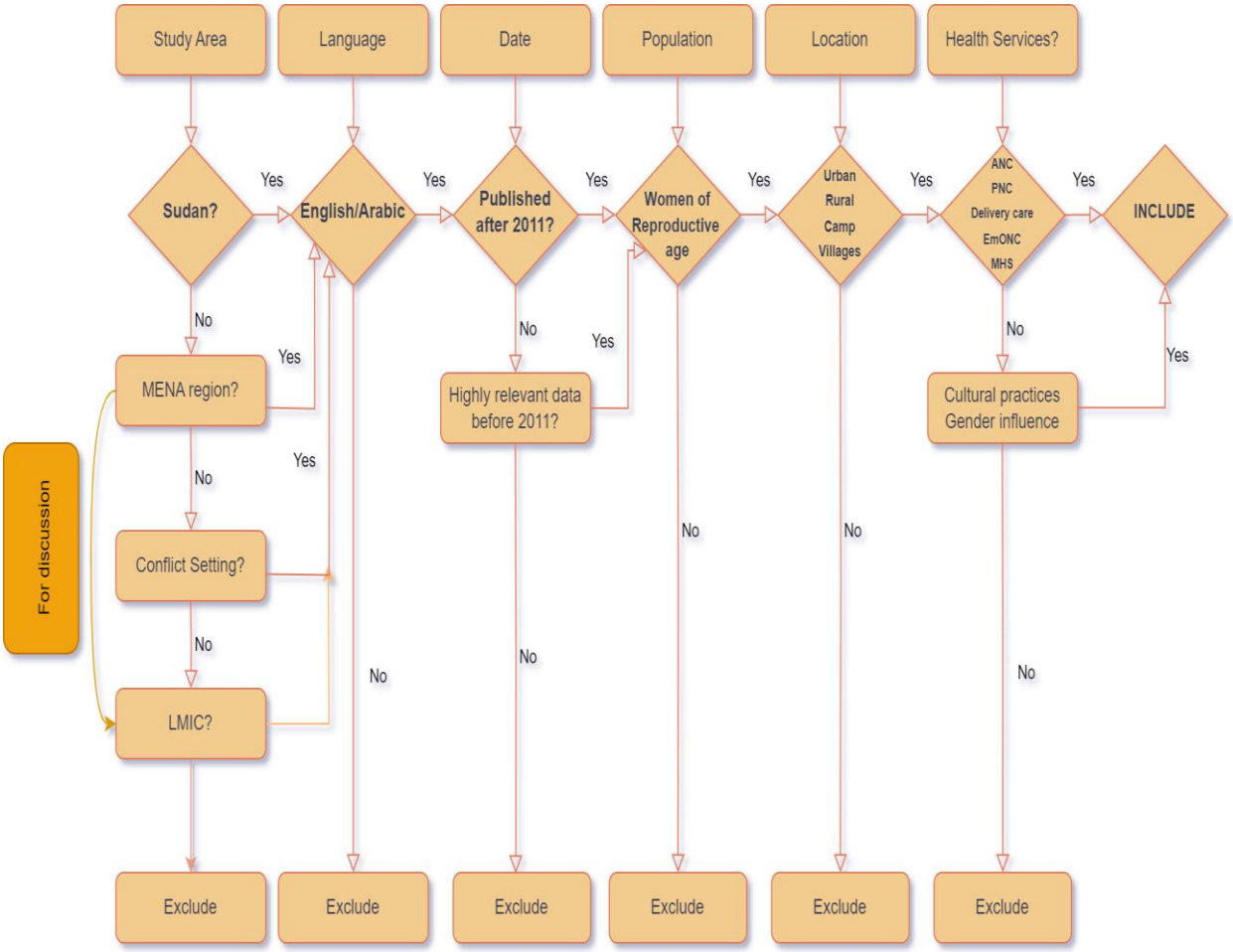


*Figure 3.1 Selection and search process: Inclusion and Exclusion Criteria*

## Chapter IV: Results

This chapter will present the findings from the literature based on Levesque's framework according to the sequence of the objectives. While the six-step healthcare access process (represented by blue arrow) establishes a connection between the supply and the demand, the focus will be directed to address the factors associated with the supply independently from the demand factors. Through this approach, a comprehensive understanding of the enablers and barriers becomes evident. In this chapter, the elements belonging to each category will be emphasized by being presented in **bold**. In certain categories, there was no relevant data found in the literature, so the categories weren't mentioned in the text.

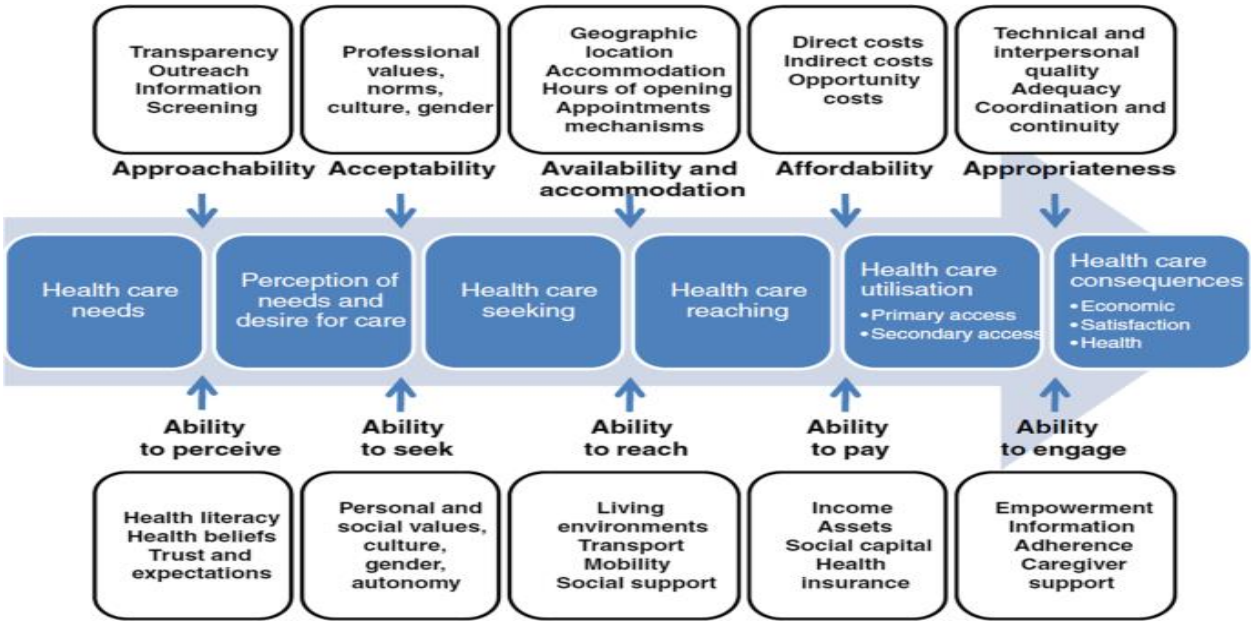


*Figure 4.1: Levesque Patient-centered access to health care Conceptual Framework*

*Source: https://equityhealthj.biomedcentral.com/articles/10.1186/1475-9276-12-18*

### 4.1. Supply side factors:

#### 4.1.1 Approachability

Approachability refers to the characteristics of service providers that make pregnant women and mothers aware of their existence and accessibility (74). The variables that establish approachability are connected to **transparency, outreach**, **health information,** and **screening**.

To improve the access and utilization of maternal healthcare services, providing accurate and valuable **health information** about nutrition, potential pregnancy complications, and the availability of services is essential (72). The FMOH implemented the community health promoter initiative in 2002, training Community Healthcare Workers (CHWs) to disseminate information on reproductive and maternal health across 18 states. By 2019, the program had successfully covered 84% of the targeted areas. Notably, in 2018 and 2019, there was a focus on

refresher training in Kassala, attributed to an increase in refugees from Ethiopia and Eritrea. However, the assessment did not mention the number of women who accessed MHS as a result of these efforts. As health promotion is limited in Sudan, priority was given to health promotion and prevention through educational initiatives and outreach in Sudan's most recent National Health Policy 2017-2030 (30,46).

A cross-sectional study in Darfur's IDP camps revealed the positive effect of community health workers' interpersonal communication (IPC) on pregnant women's uptake of MHS. IPC was associated with increased ANC (OR, 18.6%; 95 CI, 13.1 to 26.5), institutional delivery (OR 5.4, 95% CI 4.0 to 7.4), and PNC visits (OR 5.5, 95% CI 4.0 to 7.7). Personalized messages based on women's characteristics increased the chances of institutional deliveries by over three-quarters (74). However, this was study was only conducted in IDP camps in Darfur and cannot be generalized to the entire country.

NGOs like UNFPA support the FMOH at the community level, by organizing **outreach** and training midwives to raise awareness about the importance of MHS. However, publications on the exact number of outreaches, location and impact have not been published (55). In addition, during the time of conflict, other NGOs join efforts to address maternal health issues like nutrition and safe delivery by providing mobile clinics, for refugees, IDPs, and hard-to-reach areas (75–77).

### 4.1.2 Acceptability

Acceptability refers to cultural and social elements that influence whether people are likely to accept the services (74). According to this framework, this is based on professional values, norms, culture, and gender.

It is critical to place a strong emphasis on ethics when discussing **professional values** in the context of healthcare to ensure that healthcare professionals remain committed to protecting patients' rights, including privacy and confidentiality, and treating them with respect and dignity (78). A cross-sectional study in 3 maternal teaching hospitals in Khartoum revealed that women had their privacy compromised by HCWs due to the absence of curtains or visual barriers, resulting in exposure to a large number of students (79). Fear of losing modesty during examination or childbirth in under-equipped facilities may discourage women's desire for care at such healthcare facilities (80). Another study highlighted that only 48.4% of nurses were aware of the Sudanese Charter of Patients' Rights, and only 37.7% had read it. Despite the relatively low awareness of this ethical cornerstone, only 10% of the nurses showed a lack of understanding of patients' rights, as opposed to 65.8% who showed acceptable knowledge (81). This can create mistrust if the HCWs fail to respect the patients and provide suboptimal care, which can discourage access(82). However, those studies do not indicate the generalizability of this finding to other geographical areas in Sudan.

In a qualitative study, Sudanese women experienced dissatisfaction with healthcare professionals as they are unfriendly and disregarded their dignity. The determinants of women's satisfaction were due to the limited communication between them and the healthcare provider. Although

women acknowledged that VMWs have lower qualifications than physicians, they valued the supportive and compassionate approach of VMWs (83).

In line with ethical considerations, the majority of Sudanese specialists and consultants in obstetrics and gynaecology indicated concern with the rising number of litigations against doctors, with close to 33% facing a direct ligation (84). This will increase the chance of opting out when treating high-risk patients and increase the tendency to practice a form of defensive medicine[2] (85). Consequently, this can affect the availability and quality of medical services for high-risk patients accessing MHS. Thus, the Quality Directorate at the FMOH emphasized during the last Health Forum that the quality **culture** in Sudan among medical practitioners is poor and requires urgent interventions (86).

Another barrier to access to MHS is that unmarried pregnant women find it difficult to seek emergency post-abortion care in Sudan. Seeking care at public health facilities could place unmarried women at risk of arrest for extramarital sex. However, many practitioners avoid reporting such cases to the police to ensure legal immunity for unmarried women (87).

**Gender** is considered an important determinant of acceptance of healthcare services in Sudan. The unavailability of female healthcare providers in Darfur clinics is considered a significant barrier to the utilization of health services. The majority of women in Darfur feel embarrassed and uncomfortable being examined by male practitioners (88). Therefore, addressing the gender gap is essential to promote access.

### 4.1.3 Availability and Accommodation

The availability and accommodation according to the framework relate to the physical accessibility to MHS and the provision of timely care by HCWs. The available results discuss geographic location, accommodation, opening hours, and appointment mechanisms' effect on accessibility (74).

**Geographical** accessibility relates to the distribution of MHS that addresses the needs of women in Sudan. For many Sudanese families, accessing healthcare is a significant challenge. Only 70% of the population can travel 30 minutes or less to a health facility from their place of residence, and approximately 80% can access a facility within an hour (63)**.** The distribution of PHC varies greatly across different regions in Sudan, highlighting inequities in healthcare access. For example, in South Darfur, there is only one PHC facility for every 20,779 people, whereas in the Northern State, the ratio is significantly better, with one facility for every 3,039 people (89). This disproportionality further affects women living in remote areas, who are less likely to access appropriate care (90).

One of the main causes of maternal mortality in Kassala is the absence of nearby emergency health facilities (67). The lack of essential healthcare services is evident in numerous regions. Apart from Khartoum, Sennar, and West Darfur, less than 30% of PHC facilities offer essential healthcare services and approximately 14% of these facilities do not operate to their full capacity. This shortfall could be due to facilities being understaffed or lacking appropriate infrastructure (91). This could further be explained under 4.1.5.

[2] Defensive medicine: Medical practices made by HCWs to protect themselves from malpractice and legal issues.

Consequently, the country faces a critical shortage of medical personnel offering Emergency Obstetric and Neonatal Care (EmONC), particularly in rural Darfur, as almost 66% of Sudan's health workforce resides and works in urban areas (92). Supporting these findings is a study in Darfur, revealing that poor women living in distant regions are least likely to obtain adequate care because of the scarcity of HCWs (93).

Another barrier to access is natural disasters. Floods in Sudan during the rainy seasons are a major obstacle to receiving essential services. In 2019, relief campaigns faced considerable challenges reaching 123 villages in the White Nile State due to the devastating floods. Furthermore, the lack of adequate public infrastructure, such as roads and bridges, becomes a major obstacle in accessing essential MHS during that time (94).

To **accommodate** the specific reproductive health needs of IDPs and women in conflict settings like Darfur, NGOs such as Save the Children have collaborated with the SMOH to establish PHC clinics. The PHC clinics provide essential services such as ANC, basic obstetric care, and PNC. These strategically located clinics are within reasonable distances from the camps, with a capacity of 10,000 individuals per clinic to facilitate access. This proximity to healthcare facilities can enhance access and utilization of services (95).

A separate qualitative study emphasized that, despite the availability of free MHS, not all women utilized this valuable support. The primary reason behind this underutilization was the limited **opening hours** of the clinics, as they were closed at night, precisely when many pregnant women went into labour. This unfortunate timing hampers access to timely and essential care. Women experiencing labour at night tend to give birth with the assistance of TBA, which can lead to complications. In places where overnight services are offered, such as Nyala referral hospitals, services are still underutilized owing to concerns about **security risks** and expenses for transportation (96). The critical nature of managing potential complications during labour and delivery necessitates 24/7 accessibility to healthcare facilities. Nevertheless, only 29% of the facilities were functioning on a 24/7 basis, with the states of Gadarif and Gezira having a comparatively higher availability of 37% and 36% respectively (97).

### 4.1.4 Affordability

The utilization of MHS is influenced by the affordability of the services. The Levesque's framework identifies three factors that affect affordability: direct cost, indirect cost, and opportunity cost (74). To promote financial protection and institutional delivery, it is essential to prevent pregnant women from facing any financial burden when opting for institutional delivery (98).

The utilization of healthcare services in Sudan differs greatly between income groups and states, with the wealthiest quintile using health services four times more than the poorest quintile ( (36)(99). As 36% of the population below poverty line and some services requires co-payments, this can lead to catastrophic expenditure high out-of-pocket expenditure, underscoring the influence of economic status on healthcare access and equity (24)(34)(38).

The constitution mandates that PHC services must be provided for free (100). From 2008, free care policy (for mothers and under-fives) has been implemented. However, in some states, certain services, such as emergency caesarean sections are being fully charged due to the lack of clear descriptions of free services across different states in the policy (49). As there are no recent publications on the policy effectiveness on ground, it is presumed that certain states still face challenges to its implementation. This could lead to **direct costs,** such as user-fees for consultation, treatment and medications (101), which could act as a recognizable barrier to affordability, hence limiting access to MHS (102).

In 2020, the National Medical Supply Fund (NMSF) reported a staggering increase in the cost of emergency maternal medications, which directly affect the costs being paid by the patients or their families (103). The unaffordability of medicines, according to community members and health providers, can have serious **indirect** implications. The consequences may include treatment delay and seeking alternative care (104). However, in states like Blue Nile, the PHC centres reported a high percentage of exempting user-fees on maternal health medications, unlike central Darfur does not offer this exemption (50).

Due to improper roads and limited healthcare facilities, women from low-income households may find it challenging to afford the **indirect costs** of seeking care, such as transportation fees. The costs associated with accessing MHS can cause women to avoid seeking them, and resort to borrowing or selling assets instead (31).

### 4.1.5 Appropriateness

Appropriateness requires services to align with patients' needs, including timely delivery, thorough health assessments, accurate treatment decisions, and high-quality technical and interpersonal services (74).

When describing the **technical and interpersonal quality**, it is essential to mention factors like availability of HCWs, appropriate infrastructure, and availability of medical supplies to enhance the access to MHS. In Sudan, 70% of the HCWs work in the urban areas, which covers 35% of the population, leaving over 65% of the population of rural areas to be covered by only 30% of the HCWs, as demonstrated in figure 4.1 (105). According to the maternal health situational analysis, that there were significant disparities in the distribution of reproductive health staff across seven states. The concentration of qualified staff was highest in Khartoum, averaging 28 per facility, and lowest in Kassala with only 10 staff per facility (97). In addition, 67% of the HCWs work in secondary and tertiary care services, leaving the primary care understaffed (105).

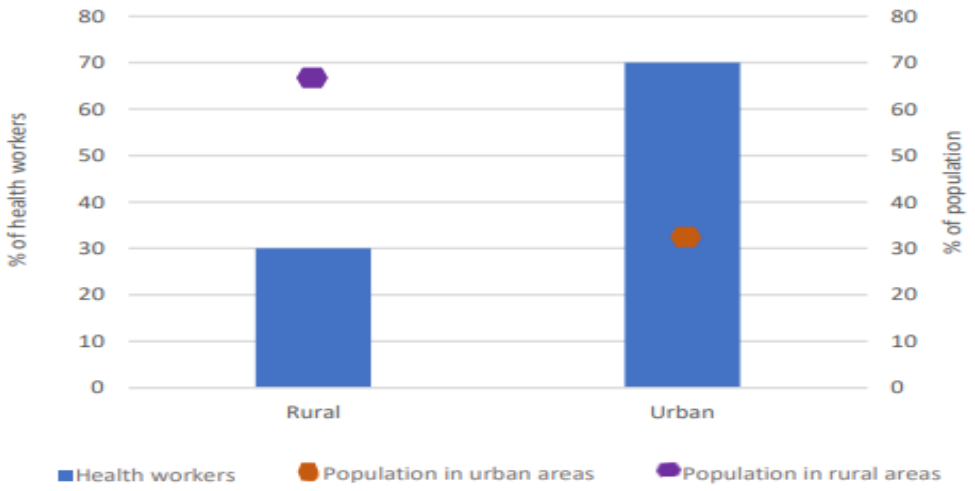


*Figure 5.1 Geographic Distribution of HCWs (2017)*

*Source: https://rho.emro.who.int/sites/default/files/Profiles-briefs-files/SUD-WHOEMHRH655E-eng.pdf*

Meeting the growing demand for health services is a significant challenge for the FMOH due to the ongoing high turnover and migration of healthcare professionals. The low nurse-to-doctor ratio negatively impacts the overall quality of care provided. In 2021, there were only 33.5 nurses and midwifery personnel and 2.8 physicians per 10,000 population. This loss of healthcare professionals not only affects the quality and quantity of healthcare services at primary healthcare facilities but also has a more pronounced impact on tertiary level healthcare (66). Table 4.1 highlight the inequities in medical personnel distribution in six different states. This inequitable distribution can particularly play a barrier in accessing quality MHS for women in the rural areas. For instance, in a qualitative study, women expressed dissatisfaction with the quality of services in the ANC clinics, citing long queues and staff unavailability (106). Another justification could also be attributed to the fact that dual practice in the private sector by HCWs in Sudan is common (107).

| | Medical staff (total) | | | | Medical staff (per 100,000 residents) | | | |
|---|---|---|---|---|---|---|---|---|
| State | Technicians | Medical assistants | Nurses | Public health officers | Technicians | Medical assistants | Nurses | Public health officers |
| Gadarif | 833 | 111 | 800 | 110 | 41.4 | 5.5 | 44.7 | 5.5 |
| Kassala | 578 | 192 | 857 | 34 | 24.5 | 8.1 | 36.3 | 1.4 |
| Khartoum | 5,076 | 228 | 4,343 | 165 | 68.7 | 3.1 | 58.8 | 2.2 |
| Red Sea | 284 | 102 | 557 | 43 | 19.6 | 7.1 | 38.5 | 3.0 |
| Sinnar | 698 | 292 | 1077 | 46 | 39.3 | 16.4 | 60.6 | 2.1 |
| South Darfur | 726 | 254 | 544 | 40 | 18.3 | 6.4 | 13.7 | 1.0 |
| **Sudan (overall)** | **14,291** | **2,999** | **16,037** | **1,135** | **26.1** | **7.6** | **40.5** | **2.9** |

*Table 4.1 Specialists and doctors per 100,000 residents in selected states 2016*

*Source: https://www.cmi.no/publications/file/7755-out-of-pocket-healthcare-expenditures.pdf*

The majority of women who had access to health facilities expressed dissatisfaction with the quality of public services. As a result, those with the financial means opt for private facilities, influencing their choice of healthcare access (108). According to another qualitative study comparing private and governmental ANC services, women favoured private ANC, claiming that the cost of accessing it was only slightly higher than public services. The choice was made based on the belief that private facilities provided superior treatment, a more pleasant environment, and more frequent access to consultants (106). In addition, the women in the study emphasized that doctors seemed uninterested to listen to their concerns and lacked empathy. Moreover, women were unaware of pregnancy warning signs at PHC in Kassala, as the ANC visits were considerably shorter than recommended, lasting only five minutes or less, in contrast to the suggested duration of 30 minutes for the first visit and 20 minutes for follow-up visits (109). This can affect the health literacy (4.4.1), which will subsequently influence accessibility. In contrast, in River Nile state, women expressed high level of satisfaction associated with midwifery care (82.8%), reporting that midwives are more considerate, and they have a better rapport with them (106,110).

According to a situational analysis that was carried out in 7 states, it was found that 90% of the healthcare facilities providing ANC have the **essential medical equipment** like a functioning blood pressure cuff and adult scale. In addition, those facilities had the diagnostic means to carry out lab tests such as haemoglobin and urine analysis. However, the report pointed out that the ultrasound machine was only available in 33% of the secondary and tertiary healthcare facilities (97). The unavailability of essential equipment especially during labour, may encourage women to opt for home deliveries (111). A study in Kassala found a 19.5% total mortality index for near-miss cases, indicating poor care and high MMR. In addition, less than 10% of cases receive intensive care, with admission criteria varying based on unit availability (112).

Over the years, NGOs have played a crucial role in making significant progress in reproductive health in Sudan. These organizations have **coordinated** efforts with the FMOH to enhance the quality of MHS and improve their accessibility as mentioned under 4.1.1 and 4.1.3. NGOs like JICA's trained VMW in 8 states to promote safe delivery. The project's evaluation revealed that VMWs delivered appropriate care following the training (113). Ensuring seamless **continuity** in compliance with the 2013 presidential decree, VMWs were designated as official employees instead of volunteers and between 2012-2017. The VMW employment rose from 23% to 49%. In parallel, other efforts made by UNFPA to improve obstetric care access included upgrading EmONC facilities, training medical staff, providing ambulances, telecommunication services, and educational and media campaigns (57). These combined efforts by NGOs compliments the FMOH mission in ensuring access to MHS.

In 2020, Sudan signed the Humanitarian Development Peace Nexus (HDPNx) agreement with the WHO (114). Considering the ongoing conflict and humanitarian requirements, it becomes essential now to synchronize the harmonization of short-term humanitarian interventions (that includes MHS) with long-term development efforts to ensure sustainability.

## 4.2. Demand Side Factors

### 4.2.1 Ability to perceive

To acknowledge the importance of health care in populations, it is crucial to possess the ability to perceive the need for care. This is influenced by factors such as health literacy, health beliefs, and expectations regarding health and sickness (74).

Health literacy is associated with limited awareness about the benefits associated with MHS (115). It was found that educational attainment influences the likelihood of women giving birth in healthcare facilities. The MICS states that women with primary education have a higher delivery rate in health facilities (25.8%) than those without education (11.5%). For women with a secondary education, the percentage increased to 49.8%, but for those with a higher level of education, there was a further increase to 75.5% (18). Additionally, another study revealed that women with secondary education or above had a significantly higher probability of institutional delivery (50.8%) than those with no education (8.8%) (99).

Literacy among women also influences service utilization. For example, a study in Khartoum State reported that the utilization of family planning services, including modern contraceptive methods, was significantly associated with female literacy (116). Furthermore, low literacy rates, living in rural areas, and low uptake of ANC were linked to maternal mortality based on a study in Kassala. The study revealed that near-miss cases were more common among illiterate women who had not received ANC (112), and two other studies reported similar findings (117)(67).

Concerning obstetric complications, it appears that both pregnant women and their families in Sudan are not well informed about danger signs. In addition, insufficient awareness about the significance of antibiotic prophylaxis during puerperium among women and delivery personnel may explain why 20% of women in the study did not use postnatal antibiotics, indicating limited knowledge in the community around the potential risks around pregnancy and delivery (118).

The deeply rooted **health beliefs** in the Sudanese community can act as a potential barrier to the access and utilization of health services. For example, the perception that pregnancy can be managed without professional assistance is reinforced by the local belief that it is a natural process (69). Only two studies mentioned the **trust and expectations** associated with healthcare services. One study is the analysis of household survey, and it highlighted that women who face difficulty in their pregnancy have a higher chance of giving birth at a health facility (99). On the other hand, the other qualitative study in Khartoum revealed that the majority of women were concerned about contracting HIV/AIDS during caesarean section within health facilities (119).

### 4.2.2 Ability to seek

Ability to seek determines the individual independence and capabilities to decide to whether to seek care (74). Considerable attention has been given to this aspect in the literature. It is important to note that this area frequently intersects with other critical factors such as **personal and social beliefs, cultural influences, gender dynamics,** and **individual autonomy**, all of which have a significant effect on the accessibility of maternal health services.

According to different studies, multiple **personal beliefs** were noted. An example of a common personal **belief** is the fact that women in the village believed that their experience with previous pregnancies and deliveries would enable them to manage most pregnancies without medical examinations. As a result, they chose not to go for regular prenatal care visits to the healthcare facilities (69)(99). However, two study in Darfur reported that being multiparous was not associated with the utilization of ANC (88,120).

In Sudan, religious beliefs shape healthcare practices. Women believe that financial constraints and negative pregnancy outcomes are God's will. Religious healers are seen as having special powers to heal through prayers and charms (70). This religious belief was identified as a barrier to accessing MHS, specially in refugee women (121). Similarly, it was also reported that women who just delivered and their newborns should stay home for forty days in order not to be vulnerable to witchcraft. This practice inhibits women from receiving the necessary postnatal care (69).

Various tribes exhibit diverse **social beliefs.** For instance, the Hedendawa tribe follows a traditional practice where pregnant women refrain from consuming eggs. This custom is based on the belief that doing so will lead to lower birth weight for their infants and facilitate easier deliveries, especially for women who have undergone pharaonic circumcision (122). However, this practice could have implications for both the mother and the newborn. The mother will less likely opt for facility delivery, and the baby's postnatal growth could be affected (123). Moreover, women in rural areas associate going to a health facility with a tendency to have a caesarean section, which contradicts their view of birth as a natural process without medical intervention (124). Consequently, in such settings, women tend to give birth at the comfort of their own homes with the help of TBA.

A qualitative study in Sudanese immigrants in Canada, encountered difficulties with the supine position during childbirth in health facilities. As they are accustomed to the squat position, which is common in their traditional practices from rural areas (124). Similarly, certain **norms** around delivery can hinder access to MHS. For example, in some parts of Darfur, women have a preference for giving birth at home with a TBA on a mat (95).

In Sudan, as in many sub-Saharan countries, gender discrimination is perpetuated by the deeply entrenched traditional sociocultural norms, particularly within family matters. These norms strongly support and reinforce the dominant role of males in society. Pregnant women are expected to take care of the house chores and care for her family (124). The adherence to conventional gender roles could impose constraints on women's time and energy, thereby impeding their ability to prioritize their health and attend ANC (125). Ensuring access to MHS involves challenging and transforming gender norms, so women can prioritize their health and well-being during pregnancy.

According to the Gender report by UNICEF, it was reported that women are less aware of healthy feeding habits than their husbands and this is attributed to the fact that they tend to stay indoors, thus they are not exposed to health information (125). Nomads in Sudan, perceive that maternal health is purely a woman concern and the males should not engage in it (70). In another studies, the women had to permission from their husbands when deciding to seek healthcare

(67)(69). This can affect the **autonomy** to make informed health decisions. Women's autonomy in Sudan is often linked to education and gender, the higher the level the education, the more likely to make conscious health decisions like accessing MHS (126).

### 4.2.3 Ability to reach

Ability to reach health care relates to "the notion of personal mobility and availability of transportation, occupational flexibility, and knowledge about health services that would enable one person to physically reach service providers" (74). According to the framework, what influences the ability to reach is **living environments, transport, mobility, and social support.**

**The living environment** for women in the rural areas of Sudan, can make it very challenging to access MHS. This is either due to the limited availability of healthcare facilities, long distance to the facility or improper roads (127). As mentioned under 4.1.4, **transportation** costs could act as a barrier for the utilization of MHS (99). It is a major barrier that prevents or reduces the chance of accessibility and utilization among women living in remote areas (127). Despite certain services being free of charge, fee exemptions do not overcome geographic barriers, weak transportation systems, or high transportation costs (99). Delivering at home, where there is no means of reliable transportation, may lead to maternal death in cases of emergency (128,129). When investigating the causes in delay to access a health facility in Kassala, 54.7% of the maternal deaths were due to transportation problems (67). In addition, the **mobility** and travel scenarios are based on the situation during the dry season. Slower travel speeds may be encountered in some states during the wet season, which would lower accessibility to some EmONC facilities during emergencies (130).

**Social support** from family and friends can play a significant role in reducing stress during pregnancy (131). In times of crisis, such as in Darfur, women have limited access to healthcare, relying mainly on the assistance of a VMW and the presence of their female relatives and family during childbirth. This previous lack of exposure to modern healthcare services could often led to feelings of anxiety and hesitation among pregnant women, making them reluctant to seek medical help (88).

The recent conflicts in Sudan, disrupted healthcare facilities and restricted access to healthcare services (131). Moreover, the prevailing **insecurity** resulting from the conflict can hinder access to MHS, as individuals fear potential attacks when attempting to reach a healthcare facility (131).

### 4.2.4 Ability to pay

It defines the ability to generate monetary resources such as income, savings, borrowing, or loans to cover healthcare expenses without having to resort to extreme measures like selling a home (74). The framework illustrates this through the aspects of **income, assets, social capital,** and **health insurance.**

According to **income factors**, attending ANC visits showed a significant disparity, with 95.6% of women from wealthier households seeking ANC compared to only 66.7% from poor households (104). Similarly, another study demonstrated that the likelihood of having an institutional delivery increased with a higher wealth index (59.4% for the richest group and 4.4% for the poorest group; $p = 0.001$) (99).

Institutional deliveries often come with additional care-seeking costs, especially when women are accompanied by family members. The additional expenses incurred in obtaining MHS may cause women from poor households to avoid seeking institutional care (99). Additional explanation for preference of home deliveries attended by TBAs could be attributed to their approachable nature and flexible payment options, which can be negotiated based on the amount and timing (132). Nonetheless, some mothers in River Nile state expressed dissatisfaction, attributing it to the perceived high cost of the midwife's services (133).

The **SHI** coverage with free medicines for children under 5 has increased; however, the availability of free pregnancy-related medicines remains low. In addition, evidence suggests that health insurance membership in Northern state did not lead to reduced healthcare costs for delivery care, indicating poor financial protection (49). However, UNICEF scheme of the mother and Child Cash Transfer Plus (MCCT+) provides **social protection** as it functions to provide financial support, access and knowledge to pregnant women and children during the first 1000 days of life. This scheme not only offers economic assistance but also empowers women with information to access MHS, thus leading to enhanced maternal and child health outcomes (33).

### 4.2.5 Ability to engage

According to Levesque, "the ability to engage in health care relates to the participation and involvement of the client in decision-making and treatment decisions, which is in turn strongly determined by capacity and motivation to participate in care and commit to its completion" (74). This is interlinked with **empowerment**, **information adherence** and **caregiver support.** However, limited studies have been mentioned in this element.

As mentioned under 4.2.2, the gender dynamics can limit them from making health decision like accessing services. Instances where women are discouraged from seeking care at healthcare facilities, even when experiencing unbearable pain during labour, serve as indications of insufficient **empowerment** and restricted autonomy concerning healthcare decisions. In a study investigating factors associated with teenage pregnancy in Kassala, the authors attributed the strong association between teenage pregnancy and lack of ANC to the low decision power those teenagers own (74). Therefore, NGOs like UNFPA support women's empowerment programs that include income generating schemes, awareness campaigns about cultural practices and empowering women to make their own informed health decisions (134).

## 4.3 Overview of supply and demand facilitators and barriers to accessing MHS in Sudan

Based on the literature findings, Table 4.2 summarizes all the supply and demand facilitators (indicated by ✅ ) and Barriers (indicated by 🚫) based on the Levesque's framework categories.

| Supply Factors | Demand Factors |
|---|---|
| **Approachability** | **Ability to perceive** |
| **Health Information**<br>✅ IPC<br>✅ Personalized messages<br>✅ Health promotion<br>**Outreach**<br>✅ Vulnerable groups<br>✅ During conflict/floods | **Health Literacy**<br>✅ Education<br>⛔ Low literacy rates<br>⛔ Unawareness of danger signs<br>⛔ Unawareness about prophylactic drugs<br>**Health beliefs**<br>⛔ Unnecessary services<br>**Trust and Expectations**<br>✅ Trusting health services during complicated delivery<br>⛔ Fear of contracting HIV in clinics |
| **Acceptability** | **Ability to seek** |
| **Professional values**<br>⛔ Compromised privacy<br>⛔ Limited knowledge on patients' rights<br>⛔ Attitude of HCWs<br>⛔ Unfriendly<br>⛔ Limited communication from HCWs<br>⛔ Unmarried women can be arrested<br>**Culture**<br>⛔ Poor quality culture<br>**Gender**<br>⛔ Absence of female HCWs | **Personal beliefs**<br>⛔ Multiparous does not need MHS as they have experience<br>⛔ Religious reasons<br>⛔ Stay at home for 40 days postpartum due to witchcraft<br>**Social beliefs**<br>⛔ Fear of caesarean-section<br>⛔ Preference for squat position instead of the supine position at MHS.<br>**Culture**<br>⛔ Preference of TBA due to birth rituals (delivering on a mat)<br>**Gender**<br>⛔ Husband permission<br>⛔ Unsupportive husbands<br>⛔ Limited time because of household chores<br>⛔ Women tend to stay more indoors.<br>**Autonomy**<br>✅ **Education** |
| **Availability and Accommodation** | **Ability to reach** |
| **Geographical**<br>✅ Proximity to health facility<br>⛔ Distance to health facility<br>⛔ Limited services in remote areas<br>⛔ Understaff in remote areas<br>⛔ Shortage of EmOC staff due to distance in rural areas | **Living environment**<br>⛔ Long distances to travel in rural areas<br>⛔ Improper roads<br>**Transport**<br>⛔ Transportation costs<br>**Mobility**<br>✅ Dry season |

| | |
|---|---|
| ⊘ Floods<br>**Accommodation**<br>✓ Clinics in conflict affected areas<br>✓ Clinics to accommodate needs for IDPs and refugees<br>**Opening hours**<br>⊘ Clinics that don't operate 24/7 | ⊘ Insecurity due to conflict<br>**Social Support**<br>⊘ Family and friends support to deliver at home |
| **Affordability** | **Ability to pay** |
| **Direct costs**<br>✓ Wealthier quantile<br>✓ Free services<br>✓ User-fees exemptions in some states<br>⊘ Poor quantile<br>⊘ Certain free services<br>⊘ Free in certain states<br>⊘ Limited free treatment options<br>**Indirect costs**<br>⊘ Transportation cost<br>⊘ User fees<br>⊘ Medication costs<br>⊘ Cost of certain treatments | **Income**<br>⊘ Low income<br>⊘ Additional costs associated with MHS care<br>**Social capital**<br>✓ Cash transfer initiatives<br>**SHI**<br>⊘ Low availability of pregnancy medications<br>⊘ Poor financial protection |
| **Appropriateness** | **Ability to engage** |
| **Technical and Interpersonal quality**<br>✓ Proper infrastructure<br>✓ Medical supplies<br>✓ Lab tests<br>⊘ Turnover of staff<br>⊘ Low nurse to doctor ratio<br>⊘ Long queues<br>⊘ Staff unavailability<br>⊘ Dual practice<br>⊘ ANC consultation is less than recommended time<br>⊘ High Near misses<br>⊘ Admission criteria for ICU depends on unit availability<br>**Coordination and continuation**<br>✓ NGO efforts<br>✓ Training of VMWs<br>✓ Incorporating them into the health system<br>✓ Setting up mobile clinics<br>✓ Revamping infrastructures | Empowerment<br>⊘ Limited autonomy<br>✓ NGOs empowerment programs |

*Table 4.2 Summary of the Supply and Demand facilitators and Barriers from the Levesque's framework categories. Table developed by the author.*

# Chapter V: Discussion

## 5.1: Discussion of main findings

This chapter aims to analyse the findings from the previous chapters, with a focus on the factors that influence MHS access from the perspective of the health system (supply) and women's perspectives (demand) using Levesque's framework. The findings identified more barriers than facilitators to accessing MHS (table 4.2), which justifies the underutilization of ANC, PNC, and preference for home births in Sudan.

When focusing on the health system factors, most of the findings that enable, or hinder access are often interconnected and linked to the acceptability, availability, and appropriateness dimensions of the framework. On the other hand, the barriers and facilitators associated with women's experiences and preferences were significantly influenced by the 'ability to perceive', which is a cross-cutting factor that plays a major role in determining patients' accessibility to MHS. Additionally, 'ability to seek' with elements elaborating on patriarchal gender norms and the influence of deeply rooted cultures, along with the 'ability to pay' were major determinants of accessibility.

The high MMR in Sudan is an indicator of concern, urging a thorough investigation of its underlying causes, including the limited access and utilization of MHS. To address this issue effectively, the health system first needs to identify the specific needs of the population, enabling a tailored approach to encourage access to MHS. Providing customized information about the significance of MHS has proven beneficial in increasing accessibility and utilization in IDP camps in Darfur. Extending this approach to cover other geographical areas within the country can influence access. This is similar to a study in Eritrea by Chol et.al, which highlighted the positive impact of informative health education sessions on pregnancy danger signs in improving women's access to and utilization of MHS (135).

The findings from the supply side of the framework did not only identify that the limited resources of the health system, but it also shed light on important aspects that are only addressed superficially that can hinder access like the acceptability of the services. The common preference associated with home births in this country, could stem from the fact that HCWs do not adhere to the professional values, which could range from HCWs attitude to compromising privacy of women during investigation. These factors can repel women from seeking health services, particularly in a predominantly Muslim country like Sudan, where the Islamic principles along with cultural aspects emphasize on modesty specially during sensitive situations like medical examinations.

Consequently, the limited number of female HCWs was identified as a barrier to access, and encouraged the preference for TBAs and VMWs, despite their limited experience, especially in pregnancy danger signs. However, they are more culturally embedded and share the same gender as the patients, aligning with societal expectations. These results are similar to those reported by Jasmine et.al in Qatar, where the presence of female HCWs facilitate access to breast cancer screening (136). Whereas, women in Ethiopia preferred male HCWs based on the perception of better professionalism (137).

The triple burden of diseases in Sudan can be attributed to multiple factors, including the limited and inequitable distribution of healthcare facilities and their restricted opening hours, which act as significant barriers to access. When healthcare facilities are not easily reachable, it

discourages people from seeking care, particularly during labour emergencies when rural women often require urgent assistance. Distance was identified as the main barrier among women to access health services in Egypt and South Sudan (138,139). In addition to distance, accessibility becomes even more challenging during flood season due to road conditions. The outreach efforts play a pivotal role in health promotion and maternal health service provision in hard-to-reach areas, conflict zones, and during emergencies such as floods. However, their sustainability remains a concern. Those outreach initiatives often sporadically target rural areas and underserved regions, and while they provide crucial aid in critical times, their intermittent nature poses challenges for establishing consistent healthcare access.

When addressing the affordability of the services, there is no clear benchmark on 'free' or subsidized MHS through the different states within the country. This evidence demonstrates inequity and low evidence on financial protection. Despite the inflation and political instability, the SHI subscribers must pay co-payments and user fees. This can further deter access to services, particularly for individuals with limited incomes.

The main findings on the appropriateness of healthcare services are closely intertwined with the availability of HCWs, as it can significantly impact the quality of care provided. For instance, if a PHC centre is overwhelmed and serving beyond its capacity, it will lead to long queues, negatively affecting the quality of care. This situation can result in various issues, such as overwhelmed HCWs, which may increase the likelihood of medical errors or prolong waiting times, causing frustration for both healthcare providers and patients, ultimately discouraging access to MHS or encouraging women to access private MHS instead. A similar study in Yemen revealed that women resorted to private services due to their perception of better quality in comparison to public facilities affected by staff shortages (140). The burden on healthcare facilities could act as a 'push factor'[3] for HCWs to seek employment in the private sector, which may explain the high prevalence of dual practice in Sudan (75%). This phenomenon is mainly associated with limited resources and low salaries in the public sector, which demotivate HCWs from remaining in public service (141).

Regarding the demand factors, the ability to perceive the importance of MHS is a repercussion of the health system's efforts to enhance accessibility. This perception is closely tied to health literacy, which is influenced by health promotion efforts. The study findings reveal a positive association between education and increased health literacy, leading to greater awareness among women about the significance of MHS. However, it is important to consider women who haven't received formal education. To bridge the gap in health awareness and promote access to MHS for this group, as mentioned, the targeted health promotion campaigns can be instrumental.

Moreover, health literacy plays a vital role in recognizing danger signs during pregnancy and addressing health beliefs that may hinder access to essential healthcare services. For example, cultural factors like the belief that pregnancy complications and danger signs are predetermined by the will of God can be addressed through improved awareness of potential risks and complications. Furthermore, health literacy helps dispel myths and misconceptions that impact access to MHS. For example, raising the awareness about the safety of healthcare facilities can counter the misconception of contracting HIV in such settings. Similarly, addressing cultural practices, like the belief that women must stay home for 40 days after childbirth, can help

[3] Push factors: Factors that influence the migration of HCWs.

improve attendance at PNC visits, which are critical for the well-being of both the mother and newborn.

The ability to seek care and access to maternal health services (MHS) in Sudan is closely linked to diverse personal and social values, posing challenges in understanding specific cultural motives. However, a shared theme is the cultural and religious perspective that views pregnancies as a natural process, leading some women to consult religious healers who may not be trained to address pregnancy issues. This cultural belief can act as a barrier to seeking formal healthcare services. Accessibility to MHS is strongly influenced by the acceptance and support of husbands, who often hold the role of primary breadwinners. This phenomenon has been observed in other countries like Saudi Arabia, Tanzania, and Mali, reflecting limited autonomy for women in decision-making regarding healthcare (142–144). This limited autonomy in healthcare decision-making can have adverse effects on pregnancy outcomes, especially if women must wait for their husbands' approval to access MHS. Allowing women to make their own health decisions by empowering them and promoting their autonomy can greatly improve maternal health outcomes.

In Sudan, inflation and political instability significantly affect individuals' economic capacity to pay for MHS. The findings highlight income as a critical determinant of MHS access, favouring wealthier individuals with better access to ANC and institutional deliveries compared to the poorest groups. Addressing financial barriers through effective insurance coverage and targeted cash transfer programs, particularly for the economically disadvantaged women, emerges as essential in promoting MHS access. This aligns with findings from Afghanistan where cash transfer programs increased MHS utilization (145). However, a challenge arises as cash transfer programs in Sudan are often associated with NGOs. Relying heavily on NGOs and parallel programs raises concerns about the long-term sustainability of cash transfer initiatives. Funding challenges or shifting priorities for these organizations could compromise the continuity and effectiveness of cash transfer programs, leaving beneficiaries without ongoing support.

Enhancing health literacy, understanding women's needs, and promoting autonomy in decision-making are essential aspects of empowering women and improving access to MHS. Empowered women are more likely to seek timely and appropriate health care, resulting in better health outcomes. However, it is important to recognize that empowering women alone may not address all barriers to accessing MHS, as it is multifaceted and intertwined with socioeconomic and cultural beliefs.

### 5.2. Equity: Unmasking the elephant in the room.

To achieve UHC and ensure equitable access to health services for all women, it is crucial to address the existing inequities within the health system. Notable discrepancies were evident from the health system's perspective, hindering access to MHS. Inequalities between rural and urban, along with inequities associated with the unequal distribution of HCWs and health facilities, limited outreach and mobile clinic initiatives, and insufficient efforts to address the healthcare needs of IDPs and refugees.

Consequently, achieving the goal of accessible MHS becomes increasingly challenging. The demand side barriers were primarily associated with cultural factors, which are not easily desensitized. However, by providing sufficient health promotion to enhance health literacy, along with improving accessibility to nearby health services and implementing financial protection schemes, we can bridge the gap in access.

Without addressing these factors, only a select privileged group in the community will be able to afford and access MHS. Thus, comprehensive steps must be taken to ensure that healthcare services are accessible to all, leaving no one behind.

### 5.3. The Indispensable role of NGOs and CSOs

Due to the political instability and shocks Sudan has been facing, the collaboration between the FMOH and partners played a pivotal role in addressing huge gaps in accessing services. The NGOs provided a commendable level of transparency in addressing the needs of IDPs and refugees. Furthermore,

have been actively targeting critical areas for women's empowerment (recognizing its potential to enhance autonomy and ultimately improve access to MHS), outreach (for the hard-to-reach communities during natural disasters and conflicts), training of VMWs and revamping infrastructures for public healthcare facilities to enhance the quality of services.

### 5.4. Evaluation of Levesque's Patient-centred framework

To our knowledge, this is the first time the Levesque framework has been applied to explore the facilitators and barriers to access MHS in Sudan. The framework is widely used to address access issues as it effectively considered both supply and demand factors that influenced accessibility. Through this framework, the study identified inadequately studied areas such as approachability and acceptability from the health system side and the 'ability to engage' from the patient's perspective. The sequence of the framework allowed seamless integration between different factors.

However, there were certain drawbacks while using this model. Some elements fell into more than one dimension, consistent with Anthony et.al example where the proximity of healthcare facilities could be explained within 'availability' from supply-side and 'ability to pay' as it could influence transportation fees from the patient's perspective (146).

As the study also studied refugees and IDPs women in the country, it is important to integrate 'language', 'responsiveness' or 'accountability' components as they can affect the access throughout the cycle. As the research also intended to highlight the effect of political instability, there was no element of 'security' which can influence the ability to seek in the circumstances of political unrest and conflict. If the model can be conceptualized based on different contexts, then in Sudan, it would incorporate important elements like language, accountability and security considering their potential influence on accessing MHS in the country.

### 5.5. Strengths and Limitation of the study

This study possesses several strengths that contribute to its significance and relevance. Firstly, its inclusive nature ensures that all women of reproductive age in Sudan, across all states, are represented, shedding light on the factors affecting the access to MHS in the underserved communities in the country. Additionally, the study conducted an in-depth search for both peer-reviewed and grey literature (published and unpublished), ensuring a comprehensive approach to addressing the research objectives. The contextual relevance of the study is evident, considering critical aspects like ongoing political unrest, cultural beliefs, and deeply rooted traditions within Sudan.

Nevertheless, there are some limitations that need to be acknowledged. Firstly, the interchangeable use of the term 'access' and 'utilization,' may have introduced some confusion. However, utilization is part of the healthcare access process as seen in the Levesque framework. Another limitation concerns the researcher's bias when exploring and categorizing factors within the framework. To minimize this, articles were selected according to the defined objectives and the thesis advisor provided additional oversight and feedback.

Another weakness is the use of small cross-sectional studies particularly from urban areas, raises concerns about the external validity and generalizability of the findings to the entire country. Moreover, the limited availability of supply-side data from peer-reviewed articles and restricted access to FMOH reports due to a dysfunctional website hindered the comprehensiveness of the study. It is worth noting that certain data related to the supply-side were derived from available resources like MICS (2014) and free care policy (2012), which are outdated, and circumstances changed ever since.

# VI: Conclusion and Recommendations

## 6.1 Conclusion

In conclusion, the high MMR in Sudan is a cause for concern, particularly in the context of political instability and its adverse effects on the country's health system and infrastructure. The absence of a robust evidence base might be the reason why health responses so far have not succeeded in enhancing access to MHS and reducing MMR in Sudan. The study revealed several key facilitators and barriers affecting MHS accessibility from the health system (supply) and the patient's (demand) perspective.

Regarding the supply side, the literature showed that health education and information provision emerged as crucial facilitators in encouraging access to MHS. Additionally, the availability and proximity of healthcare facilities, coupled with the affordability of services, played significant roles in enhancing accessibility. Barriers to MHS accessibility were evident in the 'acceptability' aspect, where women were deterred from seeking services due to male healthcare providers, negative attitudes, and compromised privacy during examinations. Furthermore, the 'availability' aspect highlighted the limited healthcare facilities in rural areas, which can affect the 'appropriateness' element, resulting in a scarcity of HCWs and a decline in the technical quality of care.

On the demand side, several factors were identified as influencing MHS access, including education and income. Those factors highlight the existing inequities associated with the supply-side in health promotion and social protection when it comes to accessing MHS. The barriers reported from the demand side were the bulk of the findings. Among these barriers, health literacy and gender emerged as the main factors affecting autonomy and decision-making in seeking MHS. Lower health literacy rates indicated less awareness of the benefits of the MHS provided and hence decreased their access. Similarly, gender impacted access, due to cultural norms and expectations regarding women's roles. The cost associated with transportation to reach healthcare facilities, especially in rural areas, makes the patients reconsider accessing MHS and adhere to the deeply rooted culture that seeks care from TBAs, VWMs and religious healers.

The findings highlighted the valuable contributions made by NGOs in improving maternal health needs, particularly in vulnerable communities such as refugees and IDPs. In addition, the study emphasized the importance of considering additional factors beyond the standard framework when addressing access to MHS in politically unstable environments like Sudan. Factors such as security concerns, accountability, and linguistic considerations emerged as critical components in ensuring effective and inclusive healthcare delivery in such complex settings.

## 6.2 Recommendations

Driving from the conclusion of this thesis, it is important for the health system to address the underlying barriers that hinder access to MHS in order to ensure timely quality services are obtained by Sudanese women. The recommendations addressed will be categorized per sectors (policy level, service provider level and researchers) with the main aim of ensuring no woman is left behind and is able to access quality healthcare services without any financial hardship.

The recommendations that have the possibility to achieve an immediate impact and are reasonably feasible are the ones targeting healthcare providers. However, a significant impact can be achieved by tackling health system barriers, which necessitates collaborative efforts among partners coupled with strategic resource allocation. These efforts are essential to formulate effective strategic interventions that comprehensively address MHS barriers in Sudan.

**Policy Level Recommendations**

1. **Conduct a new nationally representative survey on maternal health and other SRHR services taking into consideration the recent economic and political shocks in Sudan.**

This mapping process by the FMOH and collaborating partners can help in identifying the exact needs of pregnant women, which is essential in developing effective strategies with the resources available. This strategic approach will ensure equitable resource allocation and can result in enhancing access in areas that were previously deprived of healthcare resources. Although the feasibility of this recommendation might be challenging during political instability, establishing a comprehensive database with updated information on MHS coverage, utilization, and other relevant data is essential. Such timely data facilitates the mapping of specific needs, allowing for more targeted and customized interventions.

2. **Establish clear financial protection mechanisms.**

To ensure equity and address the barriers associated with affordability and inability to pay for MHS, it is essential that both the FMOH and the NHIF update and implement clear and standardized financial protection mechanisms for MHS across all states. This could include increasing the coverage of SHI or subsidizing MHS especially for residents in rural areas and for the economically disadvantaged households to prevent catastrophic costs and promote access to MHS.

3. **Update the strategic preparedness plan to improve MHS accessibility during the conflict.**

The health system must have a robust preparedness plan to ensure women are able to access MHS during critical times like conflicts. In collaboration with partners, the FMOH can first create a dedicated workforce with representatives from SMOHs, Humanitarian agencies, and community leaders to develop a preparedness plan that considers MHS accessibility. This plan would dedicate funds for emergency maternal medications, essential supplies, and transportation. In addition, the plan should have regular drills on disaster management to ensure seamless implementation. By adhering to this comprehensive strategy, the health system can ensure that MHS remains accessible and responsive during the conflict, safeguarding the well-being of women and newborns.

**Healthcare provider recommendation:**

1. **Comprehensive capacity building programs for HCWs.**

This could involve training the HCWs providing MHS to ensure that they provide gender-sensitive care by respecting privacy, the cultural diversity, and adhering to professionalism and ethical standards. This will establish a sense of trust among women, encouraging them to utilize the services.

2. **Conduct regular health promotion campaigns**

As health literacy influences access to MHS, it is important to organize tailored health promotion campaigns to bridge the knowledge gap about MHS. The campaigns can include different healthcare professionals, community leaders to communicate the importance of safe delivery practices and timely medical interventions. This could be done through radio station, community gatherings and social media, all while ensuring cultural sensitivity. This will help address the misconceptions around MHS and empower women to prioritize their health.

**Recommendation for future research**

1. Conduct further research by **triangulating the current findings** through FDG involving women from diverse backgrounds. This will provide deeper insights into the demand-factors. Furthermore, conduct KII with representatives from FMOH and partners to comprehensively analyse the supply-factors influencing MHS access in Sudan.
2. Researchers can further explore the **best strategies and interventions** to address MHS access and utilization in Sudan.

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**Annex:**

Table Keywords used for literature search

| | AND | | |
|---|---|---|---|
| OR | **Services** | **Factors** | **Context** |
| | Antenatal care | Access | Sudan |
| | Institutional Delivery | Utilization | Khartoum |
| | Postnatal Care | Barriers | Darfur |
| | Maternal health services | Facilitators | Northern State |
| | | Acceptability | Red Sea State |
| | | Approachability | Kassala |
| | | Availability | Gezira |
| | | Affordability | White Nile |
| | | Appropriateness | Kordofan |
| | | | Blue Nile |
| | | | Senna |
| | | | FMOH |
| | | | SMOH |
| | | | PHI |
| | | | NHIF |

*Table 3.3 Keywords for searching the Literature*