

Factors influence utilization of maternal health among Nomads in Sudan

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Factors influence utilization of maternal health among Nomads in Sudan.

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

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Abstract

Background: Nomads are groups of people that move from place to place as a way of obtaining food, finding pasture or make a living. Sudan is one of countries with high maternal mortality; furthermore, maternal mortality ratio of nomads is very high and shows variation between different regions of Sudan.

Objective: Main objective of the thesis is to identify factors affecting utilization of maternal health services among nomadic communities in Sudan in order to make recommendations to improve their health.

Method: The thesis is a literature review of published and unpublished studies and research about nomads in Sudan. Findings from literature are analysed systematically by using the adapted framework from Andersen's Behavioural Model of Health Services Utilization.

Finding: Nomadic health practices and health services related factors are the major contributing factors to utilization of maternal health services. Nomadic health practices are influenced by the mobility life style of nomads, low education and level of knowledge, gender, beliefs, values and attitudes, household resources and geographical locations of the nomads. The existing health services are ill-adapted to the nomadic life style. The study also shows nomadic best practise, from other countries that, can be applied to nomadic context in Sudan, as community health workers, training and support of traditional birth attendants, provision of human-livestock joint mobile health services and establishment of Maternity waiting homes.

Conclusions and recommendations: Utilization of maternal health among nomads is extremely low because of many factors that need to be addressed. The thesis recommends evidenced based strategies to increase community demand for maternal health services or bring women closer to emergency obstetric services.

Keywords: Maternal health, Nomads, Utilization, Sudan, Maternal Mortality

Words count: 11,770

List of abbreviations and acronyms

ANC	Antenatal Care
CHWs	Community Health Workers
CPR	Contraceptive Prevalence Rate
EmONC	Emergency Obstetrics and Neonatal Care
FGM/C	Female Genital Mutilation /Cutting
FMoH	Federal Ministry of health
FP	Family Planning
GDP	Gross Domestic Product
HEP	Health Extension Program
HEWs	Health Extension Workers
HHs	House Holds
ICPD	International Conference on Population and Development
MDGs	Millennium Development Goals
MDR	Maternal Death Review
MMR	Maternal Mortality Ratio
MWHs	Maternity Waiting Homes
NHA	National Health Account
NMDRC	National Maternal Death Review Committee
OoP	Out of Pocket
PHC	Primary Health Care
PNC	Post-Natal Care
SHHS	Sudan Household Survey
SBA	Skilled Birth Attendant
SMoH	State Ministry of Health
SRH	Sexual and Reproductive Health
TBAs	Traditional Birth Attendants

THE	Total Health Expenditure
UNFPA	United Nation Population Fund
UNICEF	United Nations Children's Fund
VMW	Village Midwives
WHO	World Health Organization

Glossary

Adult lifetime risk of maternal death: "The probability that a 15-year-old women will die eventually from a maternal cause"(1).

Community health workers (CHWs): "members of the communities where they work, selected by the communities, answerable to the communities for their activities, supported by the health system but not necessarily a part of its organization, and have shorter training than professional workers"(2).

Maternal Health: "health state of women during pregnancy, childbirth and the post-partum period"(3).

Maternal mortality ratio (MMR): "Number of maternal deaths during a given time period per 100 000 live births during the same time period"(1).

Midwife: "A person who has been assessed and registered by a state midwifery regulatory authority or similar regulatory authority. They offer care to childbearing women during pregnancy, labour and birth, and during the postpartum period. They also care for the new born and assist the mother with breastfeeding. Their education lasts three, four or more years in nursing school, and leads to a university or postgraduate university degree, or the equivalent. A registered midwife has the full range of midwifery skills"(4).

Nomads: "group of people that move from place to place as a way of obtaining food, finding pasture for livestock, or otherwise making a living"(5).

Sexual and Reproductive Health (SRH): "State of complete physical, mental and social well-being, and not merely the absence of disease or infirmity, reproductive health addresses the reproductive processes, functions and system at all stages of life. Reproductive health, therefore, implies that people are able to have a responsible, satisfying and safe sex life and that they have the capability to reproduce and the freedom to decide if, when and how often to do so"(6).

Skilled Birth Attendant (SBA): "Someone who is trained with the proficiency in skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and new-borns"(7).

Traditional Birth Attendant: "a person who assists the mother during childbirth and who initially acquired her skills by delivering babies herself or through an apprenticeship to other TBAs"(8).

Introduction

I am a medical doctor, studied and graduated from the University of Kordofan, Sudan at 2003. I have been working in the public health field since 2006. I have worked for almost eight years in the public health field, with opportunities to work in various projects, positions and with different responsibilities.

As a medical doctor, living in a developing country, I came across various aspects of medical practices concerning reproductive health problems, challenges and solution approaches in a low income country. I was also exposed to different approaches to health care provision using public or individually centred interventions. During my work in Darfur, I had seen how nomads are marginalized and cannot access health services and especially reproductive health services. Furthermore I had observed the poor maternal health status of nomads; therefore I selected maternal health among nomads as an area to study.

Nomads in Sudan, are a group of people that moves from place to another as a way of finding pasture for livestock(9). Most of nomadic groups follow a fixed annual or seasonal pattern of movements and settlements. In the context of this thesis, the term nomads is used to refer to population that moves temporally or permanently along with their animals as way of living.

This paper will have in-depth review and critical analysis of maternal health of nomadic communities. The paper reviews available literature about nomads in Sudan and the region. The focus of the thesis is on the factors that influence the utilization of maternal health among nomads. Furthermore, this thesis will point-out cultural, traditional practices and values that impact the health outcomes. The thesis is arranged in three main parts; the background, main body and conclusion. The background part will provide an overview about Sudan and describes basic fact about nomads in Sudan. The main body will cover problem statement, justification and rationale, objectives of the thesis, the methodology, chapters of findings based on the conceptual framework and discussion. The conclusion part is about the major findings and recommendations.

Chapter 1: Background Information

This chapter provides basic information about nomads in general and their context in Sudan. Furthermore it focuses on the basic information of nomads in Sudan such as demography, socioeconomic and culture, their health status and the health system in Sudan.

Country Background

Sudan covers 1,882,000 km², located in the north-east of Africa between 15°00'N and 30°00'. Sudan borders Egypt, Libya, Chad, Central Africa, South Sudan, Ethiopia and Eretria (10). Administratively the country is divided into 18 states 'Walayat'(11) (see Annex 1). The total population of Sudan is estimated as 37,289,406 in 2014(12), 63% of people live in rural areas(13). The, average size of house hold is 6.4 members(13), crude birth rate is 31.2 births per 1000 people(14), growth rate is 2.48%(10) and the crude death rate is 16 deaths per 1000 people(13). In addition to that, the population of Sudan is described as a young population because 45% of population is under 15 years whereas under five year is 15%(14). Furthermore, 49.6% of population is 15-49 years and 5.4% of the population are elderly people of 60 years or more (13,14).

Geographical features of Sudan

Geographically the terrain of Sudan consists of flat plains with mountains. Blue and White Niles meet at Khartoum to establish the great Nile river which runs towards the north before it crosses borders with Egypt(15). Sudan has different climate zones; An arid zone at the north (Nubian Desert) as a continuation of a great desert and tropical zone at the South and South west (15). Existence of climate variation in Sudan, presence of the red sea and large numbers of mountains, have led to a variation in density of rain fall, temperatures, types of the soils and the topography. These factors play an important role in determining type and distribution of plants and pastures. Additionally pastures are essential factors for distributions and locations of nomad groups in different areas and zones.(15) The plant environment in Sudan is varied and ranges from herbs and weeds (72%), trees (16.7%) to bushes and shrubs (11.3%)(15).

Nomads Background

Nomads are groups of people that move from place to place as a way of obtaining food, finding pasture for livestock, or otherwise make a living(5,9). Most nomadic groups follow a fixed annual or seasonal pattern of movements and settlements. Nomadic people often travel by animal or on foot, and they live in tents or portable shelters made out of tree branches or hides of their animals(5,9). In the context of this thesis, the term nomads is used to refer to a population that moves temporally or permanently along with their animals as a way of living.

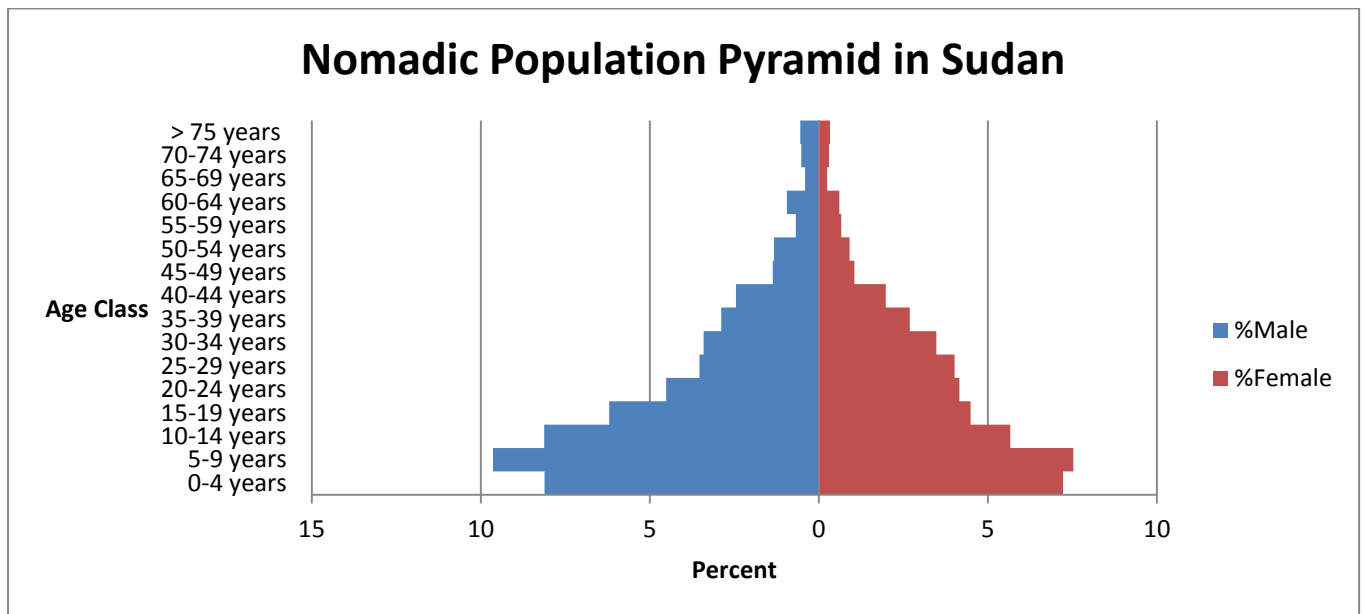
Globally the current estimated number of nomads is uncertain because recent updated and statistical data is not available, this is probably caused by unclear definitions and vague boundaries between settled and mobile communities.(16) Furthermore, the population of nomads is estimated at 50-100 million of nomads and semi-nomads across the world(17). The majority of nomads are found in Africa (60%) where they face challenges to access health services in comparison to settled populations(16,17).

In Sudan nomads are mainly pastoralists, but hunters and collectors are not found. Pastoralists are divided into three groups: A) Trans-humans who are migrating regularly between two grazing areas along a well-defined migratory route. B) Pastoralists; they migrate along conventional routes but move into different areas each year. C) Semi-nomads; these are groups that practice some non-pastoral activities such as farming while livestock is their main economy, In addition to that some of family members move with the animals, while elderly people, women and children usually remain in the village(16)(18).

Demography of nomads in Sudan

In general, data about nomads in Sudan is limited, because of the difficulty and challenges to reach nomads locations. Access to nomads' areas is difficult because of poor road conditions in Sudan(9). In addition to that, nomads are unlikely to be enumerated as they might seem to be afraid of evil eyes, furthermore, nomads might not willing to pay taxes of their animals(9). Additionally, there may be definition problems to classify nomads. The population structure of nomads is an expansive one (Figure 2), it illustrates that, the largest proportion of population is a young population, furthermore, it reflects the general population. This type of population structure can account for rapid growth of population and high fertility rate among general population and nomads(9,19).

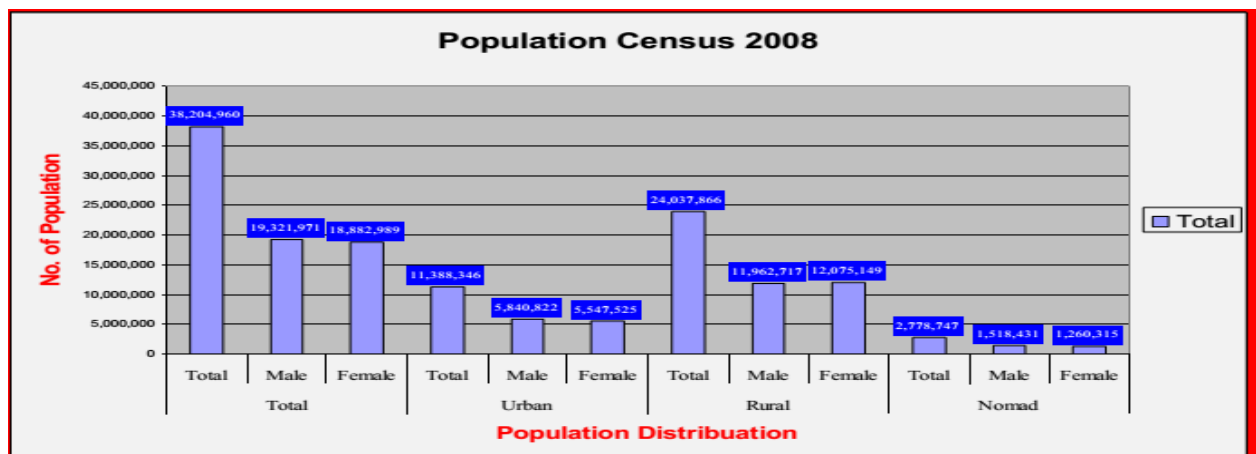
Figure 1: Nomadic Population Pyramid in Sudan, 2008(20)



Population size

According to fifth census of Sudan in 2008, the nomadic population was estimated as 2,778,774 people (Figure 3). Furthermore, nomads present 7,1% of the total population of the country (9,19). However, this percentage is expected to increase after cessation of South Sudan.

Figure 2: Total number of population 2008(21)



Findings from census also show that the number of nomad population is increasing, additionally, nomad numbers are expanding and growing as compared to statistics of previous censuses , (Table 1)(19).

Table 1: Growth of Nomadic Population in Sudan from 1973-2008(22)

Year	Population (X1000)
1973	1630
1983	2265
1993	696
2008	2779

The increased number of nomads can be explained by a number of reasons; i) The previous numbers of nomads were miscalculated in previous statistics, ii) Old statistics (e.g. censuses 1983,1993) often relied on projections from previous statistics, as well as previous growth rates, iii) Nomadic communities are reluctant to participate in the census for social and cultural reasons(9). In addition to that, enumeration of nomads can be affected by cross border movement of nomads and definitions used by the central bureau of statistic(19). Moreover, the low estimation of nomads at 1993, explained by above mentioned reasons, can, in addition to that, be assumed due to a famine that occurred in 1984-1985 which forced nomads to search for new pasture lands in other countries(23). Additionally, nomads had lost their livestock during the famine and settled in villages, therefore, they were counted in latter census with the settled population(24).

Data from the 2008 census also reveals that a majority of the nomads in Sudan are concentrated in the western part of the country In Darfur and Kordofan regions. The record of South Darfur state (now the states of the south and east of Darfur) has the bulk of the nomads (58.2%) and (19.6%) in the states of North and South Kordofan. There are about (16.1%) in eastern Sudan at Kassala and Red Sea states. The remaining proportions of nomads are spread over other states in smaller numbers and percentages(9,19).

Socio-Economic and cultural context

Economic value

The economy of Sudan is based on a combination of pastoral and agro-pastoral livestock production by farming and herding households in almost every region and state(25). Recent reviews indicate that livestock has consistently provided more than 60% of the estimated value added by agriculture to the Sudanese economy. Therefore nomads are substantially a more important contributor to national agricultural GDP than crop farming(26).

Nomadic society

Nomads in Sudan are from different ethnical groups and tribes in different states. In Sudan the nomads are sometimes labelled by the type of livestock they herd(24). Additionally ecological environment plays an important and crucial role in shaping nomadic societies, in general, the nomadic societies are known as either:

- a) So called 'Gamala/ Abballa'; nomadic pastoralists herding camels
- b) So called 'Baggara'; nomadic pastoralists herding cattle.

'Gamala' camels' pastoralists

The term Gamala is used for nomadic pastoralists who earn and herd camels. They always inhabit desert and semi-desert lands. The aridity and the ecological fragility have restricted these nomads to rear mainly camel and desert sheep(24). It is estimated that 60% of camel herders are in Darfur and Kordofan and 25% in the Red Sea area and the rest in the Butana area (27). Although there are several important 'African Gamala', the majority is Arab. The famous Arab tribes are; Northern Rezigate in Darfur, Kababish in Kordofan, Shokeria and Rashayda in East of Sudan. The notorious African Gamala are; Zagawa in Darfur and Bija in East Sudan(24) Migration of Gamala people is less habitual than that of the Baggara group, the former practices a more transitory lifestyle(27).

'Baggara' cattle's pastoralists

The so called Baggara groups predominantly rear cattle and occupy savannah lands. The famous Arab tribes are; Rezigate, Taaish, Habaniya, Salamat and Beni Halba in Darfur, Messiryia, Hawazma and Hammar in Kordofan. The African tribes are; Fallata in Darfur and Ambaroro in Blue Nile and Kordofan, as a fact these groups are historically from Fulani tribes as seen in West Africa(24).

Native administration

Nomads have adopted a tribal governance system that is similar to that of the other non-nomadic tribes systems. This system was developed based on traditions and culture of tribes(24). In fact this system has an influential role in the life of pastoralists; it arranges and regulates relationships between individuals, households and tribes. The system is designed on the tribal grouping and it acts as a powerful indigenous source of local government(24). Most decisions are always determined by a council of adult males.

Health profile of nomads

Nomads face challenges when trying to access health information and services, which are basically not only due to their mobile life style but this is also determined by other factors(16,28). Generally nomads live in a traditional setting in which they follow their traditional culture values and believe as almost all other population groups do(16). In general, cultural beliefs have a positive or negative effect on the general health status of nomads(16,29). Beside cultural beliefs, nomads face constrains to access health services due to financial and political difference between them and the settled population(18). These challenges are there because the majority of health systems in Africa are ill-adapted to nomads lifestyle

and needs, all health services are static and most of the health interventions are directed towards settled communities(30).

Findings from literature show that nomads appear to have better general health status compared to settled communities because of positive cultural practices(16,31). The mobile lifestyle of nomads act as protective factor against worm infestations and waterborne diseases such as cholera and hepatitis(16,31). These regular movement of nomads and low human density also reduces risks of epidemic outbreak, however, nomads can propagate epidemic from one area to another (32). Nomads have better nutritional status than farmers, as nomads use high rich milk diet and their supplemented food practices(32).

On the other hand, nomads are at risk and they are susceptible to a wide range of illnesses and infectious diseases such as Treponemal infection, brucellosis, measles, respiratory infection and diarrheal problems. Susceptibility and vulnerability of nomads are due to negative cultural practices, such as; i) presence and their proximity to livestock is a risk for transmission of zoonotic diseases , ii) dietary practices such as the drinking of raw milk, iii) The nomads perception about health need and their health seeking behaviour including traditional healers, iv) risky living environment including housing condition and v) frequent mobility and difficulty to access and utilize health services and treatment(31,32).

Health services in Sudan

The health system of Sudan is decentralized, it is arranged into three-tiers (levels); national, state and locality (district) levels. The responsibilities of health planning, financing and health services delivery are shared between different levels(33).

Organization of health services

The interim constitution of Sudan of 2005 states that, “the government is responsible to provide universal and free-of charge basic health services. The minimum package of primary health care services should include Expanded Programme on Immunization(EPI), Integrated Management of Childhood Illnesses(IMCI), reproductive health, essential medicines, nutrition, health education and treatment of common illnesses”(34). Health services provision in Sudan is arranged in three different levels(14,33,34).these levels are primary healthcare level(PHC), rural hospital and tertiary hospital levels (Figure 4).

Figure 3: Adopted-Organization of health services in Sudan(14)



Primary care level: is the first contact point of people with the health system in Sudan. Primary care is provided through different service delivery points; PHC unit, dispensary and health centre(14).

- PHC units are out-patient facilities which provide basic primary health care services at community level they are always staffed by community health worker(35).
- Dispensary: it provides PHC services as treatment of common illness, wound care and some preventive services as vaccination of children and antenatal care. It also is indicated as a point for integrated management of childhood illnesses(35).
- Health centre: either rural or urban, the health centre provides, in addition to dispensary level, service packages; laboratory services and sometimes x-ray facility. Health centres are known referral points from other PHC outlets(35).

Rural hospital level: Rural hospitals are the referral points from health centres, they provide primary and secondary health care packages. They are distributed throughout the country for at least one per locality. The majority of hospitals have a delivery room and an in-patient capacity of 30-50 beds. Rural hospitals provide emergency services and they always have transport facilities for referral purposes(14,35).

Teaching hospital level: Teaching hospitals are at the apex of the pyramid. They provide secondary and tertiary healthcare often located at major cities and big towns. They serve as referral points for rural hospitals(14,35).

Management of health services

The health system of Sudan is managed in a three level system; federal ministry of health (FMOH), state ministries of health (SMoH) and locality level health management authority (14,33,35,36).

Responsibilities of FMOH includes; development of national health policies, human resource planning and development, strategic planning, health legislations, response to epidemics, international health and monitoring and evaluation of all health activities in the country(14,35,37). SMOH is responsible of; implementation of policies developed by FMOH, developing detailed health planning, in addition to programming and

project formulation(14,35,37). The local health authority is designed on district health approach. PHC facilities at locality level are administratively managed by locality authorities, while they are technically supervised by SMOH. Rural hospitals are managed mainly by SMOH(14,35,37).

Health System Performance

Although the health system in Sudan is well designed, it faces many challenges. The health system is influenced by factors like political instability, armed conflicts in different regions and socioeconomic status of the country (14,37,38). In general, the health system in Sudan manifests a very poor infrastructure of health facilities in particular at PHC level. In addition to that, health facilities become worse by lack of regular maintenance. Therefore, One third of the health facilities including first level of referral rural hospitals are not functioning(14,37). Health facilities are not evenly distributed between the states and between rural and urban areas(37). In Sudan only 45-65% of the population can access health services. This figure masks the variation between different states e.g. two thirds of population of South Darfur states have no access to health services while in the Northern state all off the population have access to health services (37). The same image of in-equalities is also observed within the field of health workforce. The World Health Organization (WHO) estimates out of pocket expenditure 74% in 2012. This indicates people are at risk of catastrophic expenditure, medical poverty trap and impoverishment(39).

The sexual and reproductive health situation in Sudan does not present a rosy picture. The national maternal mortality is 360 maternal deaths/ 100,000 live births, and this figure is only the tip of the iceberg of maternal health in Sudan(1). Births that are attended by skilled birth attendance are about 30% (40). According to a Sudan house hold survey of 2010, the prevalence rate of contraceptive is 9% and unmet need of family planning is 29%(41). The antenatal care (ANC) coverage of at least one visit by skilled personnel is 74% and at least four times by any service provider is 47% (41).Moreover, this even worse for nomads and will be addressed in the next chapters.

Chapter 2: Problem Statement, Objectives and Methodology

This chapter describes the problem statement of the thesis, justifications and objective of the thesis. This chapter includes the description of methodology used for the thesis as a study design and study framework. Furthermore, the chapter points-out the study limitations.

2.1. Problem Statement

Sexual and reproductive health has become an everlasting agenda in all international health meetings since the International Conference on Population and Development (ICPD) at Cairo in 1994. The key concern is to improve the maternal and neonatal health especially among the vulnerable women(30). Maternal health is defined by the World Health Organization (WHO) as "health of women during pregnancy, child birth and the post-partum period"(3).

Globally, an estimated 289,000 maternal related deaths were reported in 2013, 62% of which were in the sub-Saharan Africa region(1). Furthermore, Maternal Mortality Ratio (MMR) was estimated globally as 210 maternal deaths per 100,000 live births. The MMR has indicated a huge disparity between rich and poor countries as MMR in developing countries was 14 times higher than in developed regions(1).

In Sudan, MMR is estimated as 360 maternal deaths per 100,000 live births. The risk of adult women to die from pregnancy and child birth is 1 in 60 women(1). Sudan has managed to reduce the maternal mortality ratio(MMR) by 50% between 1990 and 2013(1). Maternal mortality figures of Sudan are inconsistent as WHO et al(1) estimated the MMR as 360 maternal deaths per 100,000 live births(1), while Sudan House Hold Survey (SHHS) of 2010 reported the MMR of 216 deaths per 100,000 live births(41). Additionally house hold survey (2006) had estimated MMR as 1,107deaths /100,000 live birth(42). In fact these huge differences between the figures can be explained to the different method used to estimate MMR with the fact of the cessation of South Sudan since 2011. The proportion of deliveries attended by trained personnel is about 30% at 2013(40). Finding from reports(43) show a huge variation between urban (41%) and rural (16%) areas that indicate a low coverage of birth attendants at rural areas(43). The proportion of institutional delivery is extremely low (20%) because the common delivery practice is home delivery, even in urban areas(41).

The status of maternal health of nomads is even worse, as Sudan census (2008) reveals a very high maternal mortality among nomads. It is estimated that the MMR is as high as 503 maternal deaths per 100,000 live births(9,44). Findings from literature (16,30–32) explain the high MMR among nomads by a number of reasons. Nomads encounter a

challenge to access and use of the services of trained midwives or other skilled maternal health service providers. This can lead to many complications during pregnancy and delivery. The cultural belief of having many children as a symbol of position within the nomadic society, indicates little use of family planning methods(28). This can lead to maternal mortality and morbidity, unless frequencies of pregnancy are well-spaced. Other cultural practices such as widespread practices of female genital mutilation (FGM) and early marriage are contributing to high maternal mortality. In addition to that, other reasons of high maternal mortality are caused because of i) misperceptions and practices related to nutrition, maternal diet and mother care practices, ii) limited access to health services and iii) low enrolment in formal education(28,32,45).

This high MMR can also be regarded as an indicator for high neonatal mortality rate. Although 75% of neonatal deaths occur within the first week of delivery, most of these deaths are related to pregnancy and delivery(14). Other poor maternal health indicators include; low contraceptive prevalence rate is very low (9%) and high unmet needs of contraceptive are 29%. The adolescence birth rate is high 102 births/1000 women and the prevalence rate of female genital mutilation (FGM) is 65.5% at national level (8).

2.2. Justification

Despite that the government of Sudan has adopted the strategy of "Health for All" (14,46,47), which aims to promote universal access of health, the high maternal mortality ratio among nomads indicates a low utilization of maternal health services. Utilization of health services is determined by many factors, the lifestyle of nomads is regarded as a barrier to access and utilize health services(48). The existing health care system in Sudan is ill adapted for the nomadic lifestyle. Besides questions of equity, and their demographic importance, the fact that, nomads have a right to access and utilize general and maternal health, is another good reason to take them into account for the planning and delivery of services(49). In general, the state of maternal health is measured by maternal mortality statistics; maternal mortality rates and ratio are only the tips of the "maternal health iceberg"(32). Apart from, the maternal death, women are at major risk of severe and long lasting consequences. Many of these consequences always occur during childbirth process such as fistulae, anaemia, infertility, chronic infections, depression and loss of productivity. But most of these consequences are preventable and can be avoided by timely access to skilled assisted delivery and efficient referral systems (32).

There is a need for better insights into the factors that influence the situation of nomadic maternal health; therefore this thesis is focused on maternal health among the nomad community of Sudan. It will analyse different factors that influence utilization of maternal health and propose suggestions and recommendation to improve the utilization of maternal health among nomads.

2.3. Objectives

2.3.1. General Objective:

The main objective is to identify factors affecting utilization of maternal health services among nomadic communities in Sudan in order to make recommendations to improve their health.

2.3.2. Specific Objective

1. To describe the maternal health status of nomads relative to other populations.
2. To describe individual and socio-cultural factors that influence the utilization of the maternal health service, as well as health practices.
3. To identify and analyse the institutional and policy factors related to maternal health services delivery in Sudan.
4. To analyse the best practices, to improve utilization of maternal health and maternal health practices, from other countries and how they are applicable in Sudan.
5. To make recommendations to improve the utilization of maternal health among nomadic communities

2.4. Methodology

2.4.1 Study design

This thesis is a literature review of published and un-published studies and researches on nomads in Sudan. Furthermore this literature review also includes scientific articles and published/unpublished reports about maternal health and nomads in Sudan. Because data about nomads in Sudan is limited, the author had searched and includes articles from neighbouring countries. Google and Google Scholar are the main search engines used to find related articles and other specific websites as; World Health Organization, Federal Ministry of Health, Central Bureau of Statistics, World Bank, UNFPA and UNICEF. Searching was also conducted through the library catalogue of PubMed and VU University Amsterdam. Some resources were extracted from KIT library publications.

The search was limited to English language only. Data concerning nomads is limited; searching was extended to include all published articles from 1995 to 2014. In order to find related articles, the following key words were used in different combinations: Nomads, Pastoralists, migration, Safe motherhood, maternal health, reproductive health, sexual health, morbidity, mortality, conceptual framework, socio-economic, traditional medicine, belief and values, female genital mutilation, nomadic education, gender, map, population pyramid, life cycle approach, access, culture, traditional birth attendant, care, treatment, utilization, antenatal care, delivery, postnatal care, indigenous groups, national policy, maternal mortality road map, health system, teen pregnancy, early marriage skilled birth attendant, religious leader, spiritual healers.

2.4.2 Conceptual framework of study

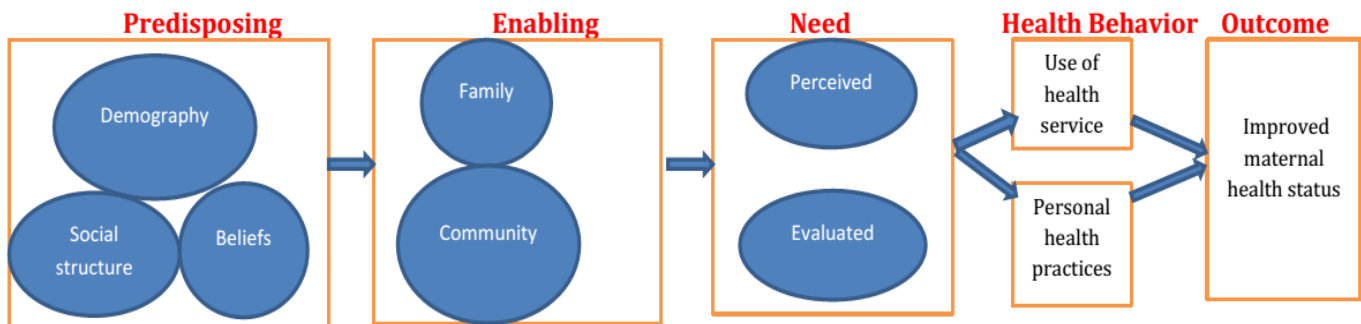
Andersen(50) stated that the utilization of health services is always influenced by the social determinants and individual behaviour. In the same line of thinking, several conceptual frameworks for analysing utilization of health services were found in the literature. These include Rosenstock's health belief model(51), Pathways to improve child and maternal health(52), Three Delays model for maternal mortality(53) and Anderson's behavioural model of health service use(50). The latter focuses on analysis of health service utilization from a socio-demographic perspective. This model is adapted and chosen for this thesis because it is in line with the objectives of this study. Andersen's behavioural Model of Health Service Use (Figure 5) theoretically assumes that certain characteristic factors are contributing to, or determining an individual's use of health services. The model groups these factors into three categories: 1) Predisposing characteristics; 2) Enabling characteristics; and 3) Need based characteristics(50).

1. Predisposing characteristics: within this framework one of the underlying assumptions is that some people are more likely to use services than others due to individual characteristics. In fact people with some characteristics have been found to be more likely to utilize health services, although these characteristics are not directly responsible for the utilization(50). These characteristics include demographic factors such as: age and sex (biological imperatives) and social structural factors, which reflect an individual's social standing or status. Additional social structure is measured by characteristic such as education size of the family and residential mobility. Furthermore individual-belief factors are another predictors for utilization of service and measured by values about health and illness, attitudes towards health services and knowledge about the diseases(50).

2. Enabling characteristics: The assumption is that some resources are needed by an individual to use and utilize health services. Therefore, these resources are labelled as enabling. These enabling factors can be at the family or at community levels. Family resources include income (economic status) and location of residence. At, community level the resources include availability of health facilities and health personnel to be used by an individual. Community resources also include the nature of the area where an individual resides, i.e. region of the country and urban/rural area(50). It is influenced by local culture and tradition that is determined by an individual's behaviour towards the practice of medicine.

3. Need-based characteristics: Included perceived needs and the evaluation of the need. The perceived need is how individuals perceive the illness and its severity or the probability of an illness occurring; while the evaluated need is how the needs are evaluated by a health professional(50). Therefore, the perceived need is the stimulus for the use of health services.

Figure 4: The adopted conceptual framework of the study explaining utilization of maternal health(54)



2.5. Study Limitations

This thesis shows limitations to analyse factors influence utilization of maternal health, these limitations includes:

- The study is based on a literature review of available scientific articles only, due to the constrained resources. Therefore, the study is limited to only what is extracted from searching literature and author’s experience while working on maternal health and nomads.
- Some of the data about nomads in Sudan is limited and out-of-date.
- Some of the data used in the study concerns rural areas and not those particular for nomads, but this data is regarded as proxy indication of the nomad’s maternal health state.
- Articles found and used in the study are only in the English language and only data from countries in the African region were extracted and used in the study.

Chapter 3: Maternal health and health behaviour

This chapter describes the status of maternal health in Sudan and how service is utilized by nomads and the general population. It also describes personal health practices of nomads that influence their use and utilization of health services.

Maternal health status

With a MMR of 360 maternal deaths per 100, 000 live births; Sudan is ranked as one of the countries with high maternal mortality in the world. For every maternal death, twenty women or more may develop delivery birth complications or disabilities(55).

Causes of maternal death are either direct or indirect causes. Direct causes of maternal death in Sudan are the same as in other sub-Saharan countries (3,56–58)includes; haemorrhage, eclampsia, sepsis, unsafe abortion and obstructed labour. The major indirect causes are anaemia, malaria and hepatitis(56,59).

The government of Sudan has formulated a national maternal death review committee (NMDRC) to appraise reported maternal death in order to improve maternal health status(56). NMDRC has developed a maternal death review (MDR) tool in which different methods are used such as verbal autopsies, clinical audit and near-miss reviews(56). NMDRC is experiencing challenges and problems due to limited resources as MDR requires strong commitment and dedication of different actors(56).Sudan census(9) shows MMR among nomads is very high, 503 maternal deaths per 100,000 live births with regional variations. The highest values of MMR are reported in the western part of the country (Darfur and Kordofan)(Table 2)(9).

Table 2: Maternal Mortality for Nomadic Population(60)

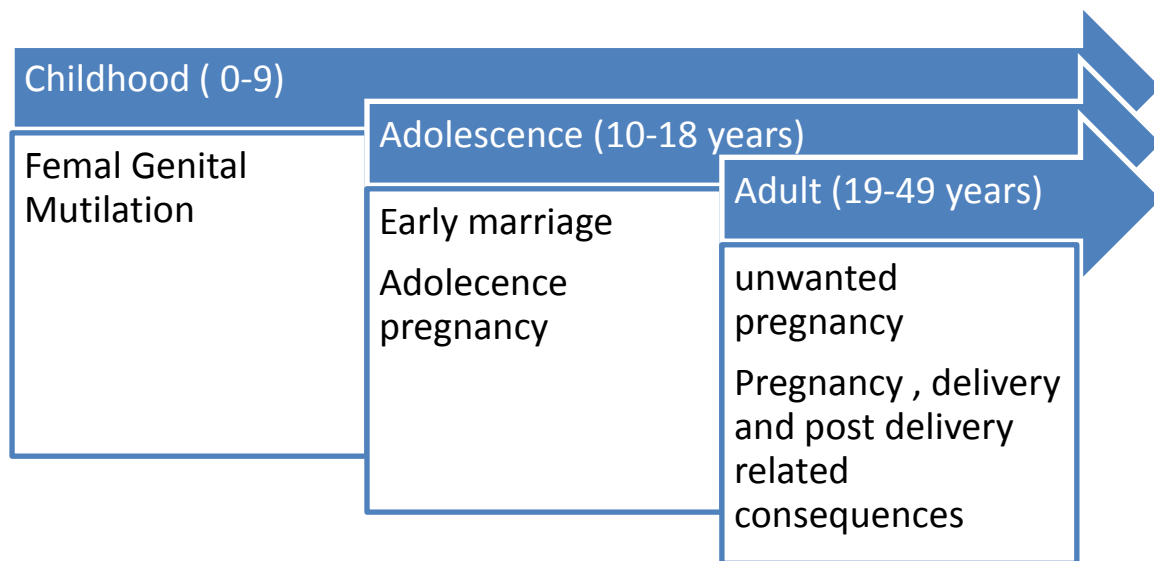
state	MMR per 100,000 live births
Northern	0
River Nile	499
Red Sea	672
Kassala	565
Gadarif	694
Khartoum	0
Gazira	0
White Nile	621
Sinnar	553
Blue Nile	627
North Kordofan	648
South Kordofan	639
North Darfur	648
West Darfur	633
South Darfur	727

The high MMR among nomads suggests gaps in accessing good quality maternal health service and health practices.

Nomads' cultural practices

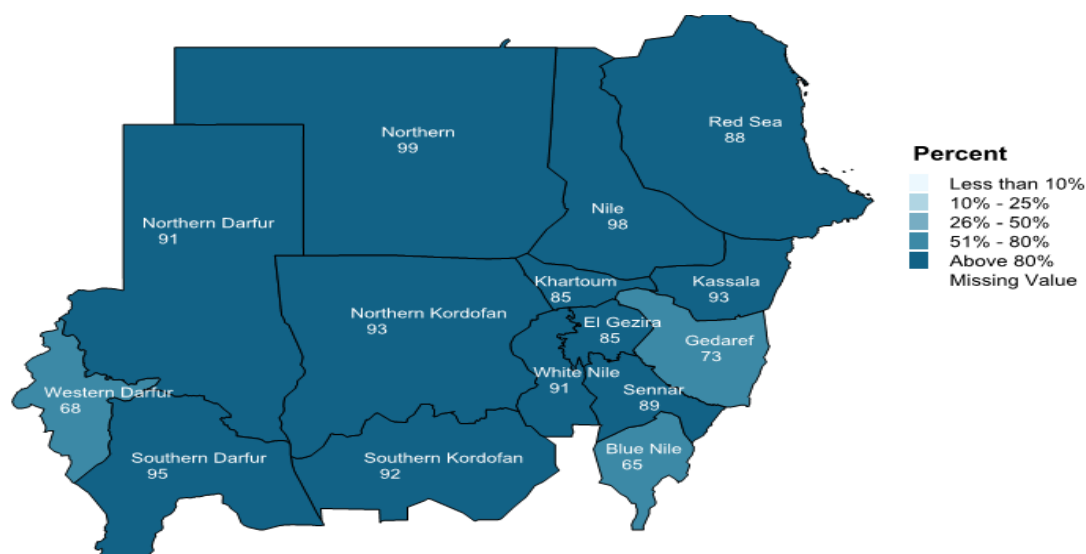
The so called life cycle approach is a tool developed by the United Nation Population Fund (UNFPA) to understand sexual reproductive health concerns during human life cycles (61,62). The tool can be applied to maternal health of nomads in Sudan, as a continuum from childhood to adulthood (Figure (6) below).

Figure 5: Adopted Maternal health issues during life cycle(62)



As illustrated above, during childhood, Female Genital Mutilation (FGM) is commonly practiced in Sudan, the prevalence rate is estimated, by Sudan survey of 2010(41), as (65.5%) while another rate is reported by UNICEF(63) in 2013 as (88%) among girls aged 15 to 49. Inconsistency between two figures is contributed to the fact that the Sudan house hold survey includes states from southern part of Sudan which were not included in the UNICEF report because of cessation of South Sudan(41). The prevalence rate shows regional variation between states (Figure:7) and the rate is almost the same in rural and urban areas and among different socioeconomic quintiles(64).

Figure 6: Geographic distribution of FGM/C in Sudan -2010(65)



FGM in Sudan is typically performed on girls between 6-9 years of age(66). Historically, FGM is a tradition of nomads tribes for many decades(67). WHO defines FG as “Female Genital Mutilation (FGM) and comprises all procedures that involve partial or total removal of the external female genitalia, or other injury to the female genital organs for non-medical reasons”(68). FGM is classified into four types based on the extent of anatomical procedures; clitoridectomy, excision, infibulation and others(68,69). The decision of FGM is most of the time decided by the girl’s grandmothers and the mother. When a girl is not circumcised she cannot be married (66,70). The fact that FGM is bad from the outlook of the violation of a child’s right, it later adversely affects the women well-being(69,71,72). Evidence from a study, conducted by WHO, had revealed that women with FGM are at higher risk to develop delivery consequences for both the mother and the baby(69,73).

After mutilation girls are considered adolescents who can undergo early marriage. Data for census(9) show the mean age for marriage of nomadic female is 19 and for males is 24 years. The proportion of females who married at age between 12-14 years is 5.8% (Table 2) and those aged between 15-19 years is 34 %, Almost two-thirds of females between 20-24 years old are married(9). Early marriage is a maternal health concern because it is always inter-linked with adolescence/ teen pregnancy(74). Teen pregnancy is known as a leading second cause of death in adolescence because of delivery and birth complications(74).

Table 3: Proportion of Early Marriage among nomads-2008(75)

Age group	Percentage	
	male	Females
12-14	1.2	5.8
15-19	5.7	34
20-24	28.8	68.2

Use of health services

Safe motherhood describes direct and indirect attempts and efforts to reduce maternal deaths and morbidities. Direct attempts include those interventions directed towards access to high quality and affordable reproductive health services. Indirect attempts include efforts to address social and other factors that influence maternal health. United Nations has launched a safe motherhood initiative to improve maternal health(55). The initiative has prioritized four main areas to improve maternal health; family planning, antenatal care (ANC), skilled birth attendance and emergency obstetrical and neonatal care.

Findings from SHHS(41) shows, the coverage of one visit of ANC(74%) is higher than coverage of four visits ANC(47%), which might indicate a low quality of service from the clients perspective. Utilization of ANC services in Sudan is influenced by some factors. These factors(76,77) are; the mothers' education has a direct positive relation with utilization of the services; utilization of ANC in urban areas is five times higher than rural. The distance to health facilities and perceived quality of ANC also contributes to utilization of service(76,77). SHHS(41) shows a very low proportion of institutional delivery (20%). This is because the culture of Sudanese women prefers delivery at home in presence of a trained midwife or traditional birth attendant (TBA) rather than facility based delivery(78). They perceive delivery at health facilities as there is something wrong with them. Delivery at home, where there is no means of transportation, in case of emergency, may lead to maternal death, furthermore, obstructed labour during home delivery is known cause of fistula in Sudan(78,79).

Obstetrical fistula is known as a serious devastating and humiliating condition, that results from prolonged labour(78,80). In the majority of cases, fistula has developed because the delivery was conducted at home and attended by unskilled personnel(78). In Sudan almost half of fistula cases are from the western part where the bulk of nomads live(78,79). Fistula development is influenced by socio-cultural factors as FGM, early teen pregnancy, low level of education, poverty, malnutrition and poor health system(78-80).

Findings from SHHS (2010) show poor family planning indicators. The survey indicates only 9% of women used family planning methods and the unmet need for contraceptive is 29%(41). Literature review (81-83)reveals, utilization of family planning in Sudan is influenced by many factors. Education of women and their husbands and religious belief are the major influential factors(81). The little interest of women in family planning can be related to religious ideology; in Islamic countries always birth of children is perceived as natural practice. Therefore majority of Sudanese women perceive family planning methods as taboos(84).

Distance to the health facility, the husbands consent and perceived quality of service are contributing factors to family planning

utilization(83). Other factors are cultural believes and number and gender of children as mothers who have only boys or girls, are socially demanded to repeat pregnancies until give birth of baby-boy or baby-girl (82).

Chapter 4: Health Needs and Enabling Characteristics

Although individuals may be predisposed to use the service, some means should be available for people in order to be able to actually utilize the service(85). This chapter will define the enabling conditions that make the maternal services accessible for nomads.

Health Needs

While predisposing and enabling characteristics may facilitate or constrain service utilization, individuals have to perceive their illness in order to seek health care. As highlighted in chapter 2, Anderson had classified the health or illness needs into both perceived and evaluated needs.

The perceived need defines individuals and family perceptions about illness and probability of seeking health advice. The perceived need is influenced by community culture and individual belief in addition to the level of health awareness(50). Individuals evaluate their perceived needs by i) the disability of time and days that hinder them from performing their regular activities, besides the opportunity cost, ii) symptoms and diagnosis experienced by individuals and iii) how an individual expresses its general state or condition of health; whether poor, fair, good or excellent(50).

The evaluation illness is about the actual symptoms and the clinical diagnosis of the severity of illness(50). The evaluated need is evaluated by the a health professional (50). of the evaluated need is determined by the following factors: i) inappropriate staff attitude ii) low self-esteem of the user and little assertiveness iii) health illness related stigma, iv) availability and stereotype of staff and v)working hours in the health facilities(50).

The health need as described above is determined by the level of awareness and inter-related to other factors as gender, culture and tradition. Findings from literature(84) show, the perceived needs of Sudanese rural women is strongly influenced by religious and beliefs. Sudanese women are as other Islamic women everywhere, they believe the outcomes of health problem is by God willing(84,86). Additionally, Serizawa et al(84), Ali et al (77) and Furuta and Mori(87) found that, Sudanese women perceived ANC as curative need rather than preventive measure. Moreover Hampshire (48) reveals, health needs of nomads are strongly influenced by gender norms, as access to information and health services which are controlled by men(48). Additionally, home remedies and treatment of reproductive health issues are under women responsibilities(48). Men do control the resources and they are the decision makers, therefore health information and access to services lies within men and their willingness to provide them. Men in nomadic society believe that reproductive health needs are better treated at home and by

other females (48). Women may feel shame or be embarrassed to discuss their needs with their husbands and ask for their help(48).

Enabling factors

House hold resources

The individual and family income is one of enabling conditions that determine the use of health services(85). Financial resources influence the ability of individuals to seek health care. Financial resources can be measured by resources as income, occupation and employment(85).

Findings from literature show that, Sudan is a low income country, ranked as 139 out of 177, based on a human development index, and as 53 out of 88 in the human poverty index(37). Health services in Sudan are charged by users, people usually pay directly from their own resources(88). The out of pocket expenditure is almost 65% of the total health expenditure (THE)(88). Sudan's House Hold's Health utilization and expenditure survey(88) conducted in 2009 showed that, households spent, on average, 20% of their income on health, one- quarter of the general population is facing financial challenges to access health services (37,88). Coverage of population by health insurance in Sudan is extremely low (less than 15%), Nomads are not covered by the National Health Insurance Fund (88). The direct cost of service is important as an enabling factor for use of service. Other significant costs as transport, patient food and opportunity costs should not be forgotten as other determinants (89).

In general, nomads financially can afford the cost of health treatment and care. As mentioned in Chapter 1, nomads contributed almost 60% of the GDP in addition to that 90% of livestock are held by nomads(9,26). Women in the nomadic community are economically active as they are allowed to earn small groups of animals such as sheep and goats, they are responsible for milking and selling surplus milk, they can cultivate small areas(24). The income of these activities is used by women to purchase personal items or to invest in other small income generation activities (24).

Geographical locations

The position and location of health services is a significant dimension that determines the utilization of health services. The location of service is linked with household income characteristic such as an enabling condition affecting the use of services (48,85). Geographical location and the urban-rural nature of the region are other enabling conditions that influence the utilization of health services(90). Evidence shows that there is a direct association between distance and use of service, this explains the fact of better utilization of services in urban settings compared to rural areas(90). Location of health services is a significant critical factor in the uptake of maternal health and especially delivery services(90).

Nomadic seasonal movement affects their utilization of health service. Nomads in Sudan always move with their livestock for long distances, searching for water and pasture. The movement and distribution of nomads in Sudan is influenced by factors that determine their locations, these factors are either environmental or human related: i) seasonal shortage of water, ii) density of biting flies, iii) lack of salt in sand soil and iv) the culture of the population(91). The majority of nomads are on the western part of Sudan as shown in chapter 1. These regions had undergone civil war and unrest for a long period which adversely affected the availability of health services(92).

Health services

Access to Health service at community level is a significant enabling factor that influences utilization of health services. The health services should be available in terms of health facilities and/or health staff at community level.

At policy level, findings from literature show that the government of Sudan (GoS) has developed many policy papers and documents in order to improve the sexual and reproductive health in the country as for example the National Reproductive Health Policy(14), the 25 years Strategic Health Plan(33) and the Reduction of maternal and neonatal mortality road map(47). Despite the policy focus on maternal health as government priority area, policies had failed to spot, nomads as a vulnerable group. It was assumed that nomads are included within the rural population. Therefore this neglect of specific interventions for nomads is a challenge to improve service utilization among them. The current policy document of Reduction Maternal and Neonatal Mortality Road Map is built on making Pregnancy Safer Initiative in Sudan(47). The priorities issues and the focus of the road map are i) to improve skilled delivery care at facility and community level, ii) focused antenatal care, iii) post-natal care, iv) neonatal care and v) provision of adolescence and youth reproductive health service(47).

Health services distribution in Sudan shows disparities not only between different regions and states but that urban health service is far better than rural (37). As shown above in chapter (1), availability of health facilities is a major challenge for utilization of health services. Only one third of existing PHC units provides minimum service packages that includes reproductive health and more than half of the health facilities provide poor quality service due to lack of maintenance and regular supply of minimum equipment(37). The emergency obstetrics and neonatal care services in Sudan are provided through rural and tertiary hospitals(55). These hospitals are unevenly distributed between regions and states, in fact states that are highly populated by nomads shows very poor indicators of population coverage by hospitals(37).

In-term of human resources for health, the current status of the health staff is that of critical shortage, Sudan is one of 57 countries considered

by the WHO as one of the lowest countries regarding health workforces(36). WHO estimated the density of health workers per population in Sudan as 1.23 health workers (doctor, nurse and midwife) per 1000 population(36). Even though, this indicator is worsened by maldistribution of health staff between different states and between rural and urban areas. Almost 70% of the health workforce live in urban areas of which 38% are in the capital city serving only one third of the total population(37). In addition to that, inequity is also observed at different levels of health services. Distribution of health workforce is skewed towards secondary and tertiary levels of health care(67%), the rest (33%) are at PHC facilities(36). Findings from literature(55) reveal that nurses and midwives are the key providers of reproductive health services in Sudan followed by physicians and medical assistants. However, density rate of nurses in Sudan is 0.47 nurse per 10, 000 and the rate of midwives is 0.37 midwife/10,000 , the rate of physicians is 0.31 physician/10,000 (36). These low rates influence service utilization by nomads and general population.

Chapter 5: Predisposing Characteristics

This chapter describes the predisposing characteristics of nomads that influence the utilization of maternal health services. These characteristics include social structural factors such as the nomad's education, gender, household structure and the mobility of the nomads. This chapter also describes individual beliefs, values and attitudes affecting utilization of maternal health services.

Social structure

The social structural is characterised in education, gender, and residential mobility measure, individual life style and indicates that the physical and social environments on top of related behaviours influence utilization of maternal health.

Education among nomads

Evidence from studies(93,94) in other developing countries show there is a positive correlation between school education and maternal health. The higher education of women is associated with better utilization of health service and vice versa. Education of women can lead to the shift of traditional the power balance within the household. Additionally it might change decision making mechanisms and allocation of resources with in the family. School education can change the women's believes about illness and perceived needs towards health services(93). Based on these facts, education is always seen as a predictor for utilization of health service.

In general, education in Sudan is the same as any other sub Saharan African countries, it shows poor education indicators. The illiteracy rate is very high among the nomadic community, 80% of women are illiterate and the illiteracy rate among nomadic men is about 75% (95). The basic education enrolment rate of Sudan is 73.2% (76.8% for boys and 69.4 % for girls), there are regional disparities between urban/rural areas(96). The worst off are the children of nomads of which almost 80 % are out of school(96). The fifth census shows nomadic girls are almost four times less likely to go to school than rural girls, and five times less likely compared to girls in urban areas(95,97).

Poor education indicators are confounded by some factors. Gender is one of the factors that directly or indirectly determine education among nomads' communities. The relation between gender norms and education is circular; In-equalities in education are influenced by gender and low level of education amplifies gender's in-equities in the community(97).

Gender

The gender relations in nomadic community can be seen as the different roles and responsibilities assigned by society to men and women(98). The traditions and cultures delineate the division of tasks and responsibilities for individuals within the nomad society, it sketches the position of

women within the family and community(98). Gender is a known significant factor that influences causes and management of illness and it determines the health seeking behaviour(98). Gender norms might affect maternal health through harmful tradition practices as early marriage and female genital mutilation. The gender norm is always related to belief and values of the community. Findings from literature show, nomadic women are economically dependent of their husbands. The majority of nomad females (68%) are engaged in unpaid family work and 15% work on their own account (9,97). Decision making of seeking healthcare among nomads is similar to other communities in developing countries, in general, women lack autonomy in health care decision making (24,48,99). The decision is always made by husbands as they control the resources, Women should seek permission before they access health services(24,48,99). In general nomadic women neither hold any position nor have any representation in the native authority of the nomad society. Normally females are also forbidden from meetings convened by local/tribal leaders to decide issues regarding community affairs(24)

Hampshire(48) conducted a study on Arabic nomads groups in Chad, in fact these groups are similar to nomads in the Western region of Sudan. She revealed that decision making about childbirth and reproductive health issues always falls within the female domain. Mothers and other female kin are the popular birth attendants among nomadic groups. However, in situations when childbirth became problematic, local traditional birth midwives are consulted

House Hold Structure

Within nomadic lifestyle, household members often have different roles and tasks based on age and sex. Men always are heads of the household. Sometimes male members may spend long periods away from their families as they are herding animals in far distant parts. In these cases women often accept responsibilities to act as head of the household(24,97).

Residential mobility

Most nomads travel in groups of families called bands or tribes. These groups are based on kinship and marriage ties or on formal agreements of cooperation(9,24). Nomads in Sudan have annual movement between north and south. Each year, biting flies, rains and mud, force nomads northward and a few months later, they return to the South. Nomads always use defined and demarcated animal migratory routes which might extend beyond borders of countries(9,24). Cross – border movement is known historically and is always without any restrictions (political or conflicts), it aims to benefit from natural variation of range land and water on the other side of borders. When nomads cross borders to other countries, they share benefits and vulnerabilities across these borders(16,24).

Beliefs, Values and Attitudes

Despite the fact that modern or western medicine have been approved for its efficiency in treating health problems, traditional medicine continues to be used by more than 70% of populations in developing countries(100). Many communities in developing countries believe that some illnesses result from witchcraft or due to evil spirits,, people seek treatment from traditional and spiritual healers(100).

The use of traditional and alternative medicine among Sudanese is well contextualised by Dr. Tigani El Mahi who stated that “the belief in supreme beings or supernatural existence is widely accepted by Sudanese, not only among illiterate but also among well educated people”(100).

Literature shows that in rural areas of Sudan, the common cultural practice is to use self-care, home remedies or consultation of traditional healers. Religious healers called “Wali, Fagir or Shiekh” are perceived as holy persons by the general population. This perception leads people to seek treatment from those people who have extraordinary powers as, blessed by God, to cure by prayers and charms and summons(100).

As mentioned earlier, specific data about nomads is limited. Nomads and rural populations always share the same health problems and concerns although, the frequency and magnitude may differ between them(16). Findings from literature show that nomads have multiple sources for seeking health care; i) Self-medication with plants. ii) Herbalists. iii) Ambulant drug vendors. iv) Spiritual healers. v) Rural health centres(48,101). Nomads usually consult traditional healers or use drugs from ambulant vendors as health services are either absent or ill-adapted to the nomads’ lifestyle. Health service are usually accessed by nomads at late stages of illnesses and they are in compliant with long treatment(102).

Religious leaders have always played a significant role that directly or indirectly influenced maternal health. As mentioned above, the practice of certain traditions such as FGM and early marriage have cultural and or religious reasons. Decisions about seeking care for a maternal health problem is under the domain of women, but influenced by husbands and religious leaders(103).

Chapter 6: Nomadic best practices from elsewhere

This chapter will describe evidence based interventions that are used to improve utilization of maternal health among nomads elsewhere and analyse application of these intervention in the context of Sudan. These Nomads best practices are chosen based on the framework of the thesis to address health behaviour. They are either increase the demand for utilization and use of maternal health services or bring women closer to emergency obstetrical services.

Community based integrated primary health care intervention

Community based integrated primary health care intervention has been approved(104,105) as an effective and efficient intervention to reduce maternal deaths and to improve utilization of maternal health service in Ethiopia. Ethiopia used to be one of the countries with the highest maternal mortality ratio in the world, it is estimated as 673 deaths per 100,000 live births in 2005(104). The health system in Ethiopia is characterised by limited and very poor quality of health services at pastoral areas, the designed health service is not suitable with pastoral life style(106). Based on that, the government of Ethiopia has adopted a new approach a so called "health extension program (HEP)" to provide services in pastoral areas (104–106). The main goal of the approach is to prevent access to maternal mortality and morbidity among pastoralists, through enhanced equitable access of promotive, preventive and selected curative health interventions as community based health services (104). The program has deployed more than 30,000 trained female health extension workers (HEWs) to provide health services at 15,000 rural communities. These HEWs have been trained on 16 modules including maternal health(105). The main tasks of HEW is to conduct outreach activities at community level focusing in health promotion and to connect communities with health post(105).

Evidences founded by Darmstadt et al(107) show, Community Health Workers (CHWs) has been approved effectively in reduce maternal mortality. In addition to that, Banteyerga(108) and Ergano et al (104) had evaluated the impact of HEP in relation to maternal health utilization in pastoral areas of Ethiopia. They reported that, the coverage of antenatal care service, tetanus immunization and use of family planning had increasingly improved after introduction of health extension workers(104,108). The improvement of maternal health indicators is contributed to design health intervention as it was aligned to the life style of pastoralists, because health extension workers are from the nomadic society (106,108). HEP indicates a positive impact on community health and the community behaviour can be changed to more healthy behaviour.

Delivery of health service through mobile clinics approach

The health care service is always delivered either through mobile clinic or fixed health facilities located at nearby villages or towns. The fixed or

static health facilities can provide services to nomads who temporally settled around towns at certain times of year(102). The mobile clinics are recognized as the best choice to provide health services to continually moving nomads, the mobile clinic is more cost-effective than fixed facilities(102). Even with both approaches the utilization of service is influenced by the perception of health needs and preference of the informal health system. Findings in literature from Chad show that a combination of human and animal health interventions are an effective measure to improve the nomads health(28,102,109). The joint vaccination campaign for children and women beside livestock has increased the coverage of vaccination of children and women. It has been found that, the cost was reduced by 15% compared to separate campaigns(32,109).

New roles for Traditional Birth Attendants (TBAs)

Findings from literature show that skilled birth attendants are approved as a most effective measure to reduce maternal mortality(107). There is a critical shortage of skilled birth attendants in developing countries because of geographical, political and social reasons(110). TBA's are regarded as alternative to cover the gap of skilled birth attendance to improve maternal and neonatal care(110). TBA's are feasible, socially acceptable and an available option for women in developing countries(110). Evidence(107,110,111) shows that training and support of TBAs can reduce maternal deaths in areas with low coverage of skilled birth attendants. The effective use of TBA's should incorporate training, linkage to health services, continuous in-service training and skill development, access to clean delivery Kits and resuscitation equipment and effective referral pathways(110,111).

Regarding the nomads' context, Kawai(112) has conducted a study among Masaai of Magadi in Kenya to explore the role of TBA in perinatal care among the nomads. The study revealed that TBA's are remaining trustworthy sources of maternal health service for the study group(112). This result can be explained by the fact that the studied group lives in an area that is often isolated during the rainy season, additionally, roads are blocked during this time of year and women could not walk far to reach located health facilities(112). Therefore TBAs are the only service provider that can be accessed by nomads. TBAs provides services of antenatal care and attending deliveries(112). The study suggests' to use the advantage of the long standing experience of TBA to provide advice to pregnant mothers. It recommends assigning TBAs new roles and training them to provide antenatal care and postnatal care services, TBAs can help to identify pregnancy danger signs and can refer complicated cases to nearby health facilities.

Mekonnen(113), mentioned in this context that within the development of the capacity of traditional birth attendance in nomadic communities in Ethiopia, it is crucial to avoid competition and tension between TBA's and

health workers, TBAs can be trained to identify complications and refer them to health facilities(113).

Maternity/ Birth Waiting Homes

The Maternity or Birth Waiting Homes (MWHs) have been efficiently managed to solve geographical barriers and transport problems of women to access maternal health service care in rural and remote areas(99,114). MWHs are often located near health facilities, in order to enable women to timely reach and access health services before initiation of labour and even to stay there until it is time to give birth(114). The construction and operation costs of the maternity homes can be financed by 'the communities themselves, government or any other donor. This intervention is used by developing countries such as Sierra Leone, Cuba, Malawi, Nigeria, Papua New Guinea and Zimbabwe to bridge the geographical gap by bringing women at risk closer to emergency care.(99,114). Although there is limited evidence on effectiveness of this widespread use maternity homes, it is likely to reduce maternal deaths in regions with low access to health services(114). Evidence(115) from Ethiopia shows effectiveness of the program in reducing maternal mortality. On other hand, MWHs has implications and challenges reported by other countries as the waiting time sometime is lengthy, women should bring a relative to support her and some MWHs have logistic problems as kitchens(114).

The above mentioned interventions were evidence based effective in improving maternal health and reducing maternal deaths. All these intervention are applicable to Sudan because the nomads context is quite similar to those countries, this will be discussed further within the next chapter.

Chapter 7: Discussion

This chapter is organized into two parts; the first part will summarise the major findings from previous chapters. The latter part focuses on analysis of findings based on the conceptual framework of the study and best practices and lessons learned from nearby countries.

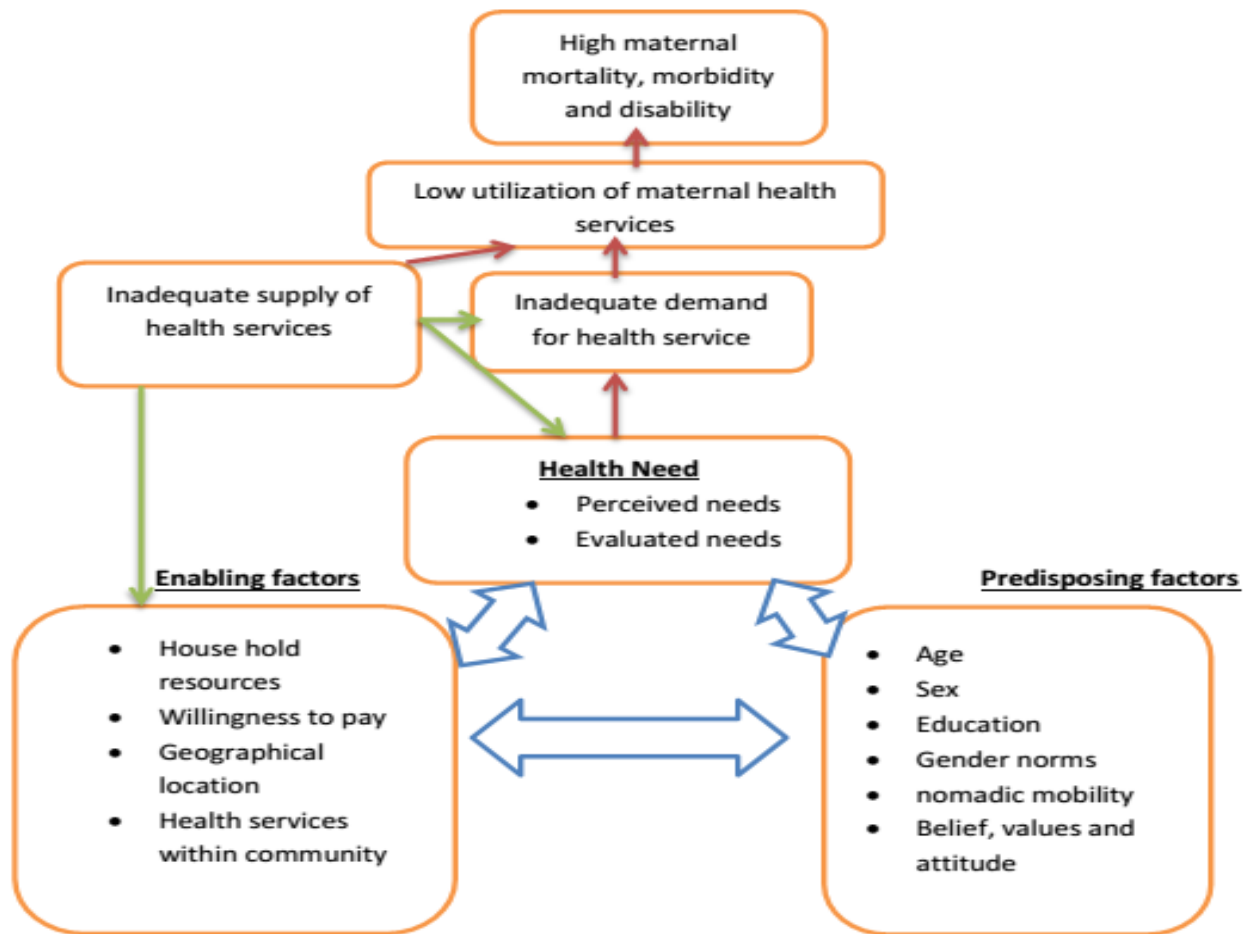
In general, maternal health and maternal mortality are regarded as indicators of a nation's health and are signs of in-equity between rich and poor countries more than any other health indicator(94). The state of maternal health can be a predictor of the women's position in the community, reflect access to social, economic opportunities and health care.

Although causes of maternal deaths are well-known, they represent only the tip of the iceberg of maternal health. In this thesis, findings have showed that, utilization of maternal health among nomads is ascertained by predisposing factors, enabling conditions and health needs. Figure (8) is developed by the author to summarise linkages and relations between findings from previous chapters that influence utilization of maternal health services among nomads.

The figure critically analyses utilization of maternal health services by nomads from demand and supply sides barrier perspectives. The low utilization of maternal health service is always due to either demand sided factors and/ or supply related factors Demand is about the willingness of people and ability to pay for the service based on their expressed needs. Decision making of using and utilizing the service is mould by presence or absence of components of predisposing factors, enabling conditions and health needs. These factors have a key function to inspire people whether to use formal health services or use traditional or spiritual healers services, these factors are tightly interacted and linked with each other in several ways. Even though, components of each factor are also inter-related and amplifying each other.

On the other side, low utilization of maternal health services, subject women to high risks that lead to unfavourable consequences and permit access to maternal morbidities, mortality and disabilities.

Figure 7: Interaction of predisposing factors, enabling factors, health need, and utilization of maternal health.



The different components of predisposing factors include age, sex, education, mobility and belief and values. These components are closely inter-linked and interrelated. Life cycle approach of reproductive health describes the specific age related maternal health issues. In nomad communities, maternal health related problems and issues can be seen as early as during childhood and adolescent life time. The practices of FGM, early marriage and teen pregnancy are extensively performed by nomads. As shown in chapter (3), FGM is been practised by almost all nomads in Sudan at all regions. In addition to immediate fatal and serious complications, FGM can jeopardize maternal health wellbeing in future during adulthood period, as women became at a greater risk to develop fistulae and birth complications that can lead to maternal death or disabilities. Besides FGM, female early marriage is widespread among nomad society as findings show that 34% of girls, whose age are less than 19, are married. Despite this there is no data about teen pregnancy, but it is postulated to be high, based on the fact of high prevalence of early female marriage before the age of 19 and a low contraceptive prevalence rate and a high unmet need of family planning as described in chapters (2) and (3).

These traditional harmful practices are associated with low levels of education and low levels of awareness about maternal and general health, which are also other critical findings among nomads. The high illiteracy among nomads and particularly among women is influenced by gender norms, which define the role of women within households and society. The roles of women in nomadic society are mainly reproduction with some limited productive or economic activities. These ascribed roles and position of women in society will lead to sustain illiteracy among women and traps women in to poverty. Keeping in mind that, the level of education is correlated with maternal health wellbeing. The majority of nomadic tribes have manifested un-equal distribution of power between men and women. Although some nomadic women are economically active, they are still dependent on their men. As shown in chapter (5), women perceived their husbands as a decisive authority for consent to seek health advice and when and where to use the service. The nomads misperceive maternal health needs as women issues and men are not involved and it should be treated at home and by female kin. This misperception leads to deny access of women to maternal health services.

Furthermore, the life style of nomads and the physical environment are also significant predictors for the maternal health. The regular movements of nomads act as barriers for women to access maternal health services. The situation is even worse, as mobile facilities are not available to accompany the moving groups. Beside the movement, the distance to reach the health facility is another crucial factor to utilize the service. As shown in chapters (1) and (5), nomads are concentrated in the western region of the country where access to health facilities is limited for both nomads and settled communities. In fact, the current on-going civil conflict at Darfur and some parts of Kordofan has negatively impacted on the state of maternal health(116).

The health seeking behaviour of nomads is governed by individual beliefs, values and attitudes about health needs, similar to other population groups everywhere. These traditions and beliefs determine whether to use formal health service or traditional and spiritual healers. Consultation of spiritual and traditional healers is widespread in Sudan. Utilization of non-formal health service is not always due to non-availability of health facilities and low level of education, it is related to the perception and beliefs. Decision making of which services should be used is also moulded by tradition and the structure of the society, as discussed in chapter (5), religious leaders have a significant role in manipulating people's perceptions and beliefs. Health seeking behaviour of nomads needs to be more explored by studies and researches as current data and information is critically limited.

The responsiveness of health services, health staff and cost of the service are part of the features of the health system that affects the utilization of the service. As shown in chapter (5), the coverage of population by health

facilities is low in Sudan; the national coverage figure masks huge disparities between different states, the rural and urban area. Limited availability of health facilities in rural areas is a crucial factor for the nomads' maternal health specially the lacking of Emergency Obstetrics and Neonatal Care facilities. Shortage of key maternal health staff is another factor, as the national coverage of midwives (one midwife per village) is only 56%(47,117). This critical shortage of trained skilled midwives will encourage people to continue to use the service of TBAs. Based on the authors observation and working experience, TBAs are popular among rural communities especially among nomads as 'the key maternal health service provider, not only because of shortage of trained village midwives, but also because of traditional beliefs, perceived quality of formal services and cost of services. The unregulated work of TBAs can adversely impact the maternal health. Thus as the government is not able to supply the demand of skilled village midwives, new roles for TBA's can be defined as community health workers in order to avoid maternal morbidity and mortality.

Another factor related to the health services is the affordability of the price of the service, Although nomads in Sudan have income resources that can cover the cost of health services, the willingness to pay remains a question that needs to be answered by further research and study. It is the author's hypothesis that the willingness to pay is interlinked to the gender norm, tradition, opportunity cost and level of education among nomads.

The absence of specific health policy, targeting the needs of nomads as a sub-population, can be solved or addressed by special interventions for nomadic health provision and utilization.

Findings from previous chapters revealed that, nomads in Sudan are similar to those of nearby countries. The similarities include tradition, culture and attitudes, for example, FGM is widely practiced among nomads of Ethiopia, Chad and Masaai of Kenya. In addition to that, the nomads of these countries have the same socio-economic factors that permeate the practice of FGM as a low education level, popularity of FGM in rural areas, low health facility coverage and the same reasons for performing FGM. The prevalence of FGM is reduced in these countries through implementation of the same anti-FGM intervention. These similarities strongly suggest adaptation of best practices from other countries can improve the utilization of maternal health among nomads in Sudan.

As shown in chapter (6), some interventions have been approved effective to improve utilization of maternal health. These interventions can address factors related to utilization of maternal health. Community based primary care intervention as training and deployment of community health workers (CHWs) can improve maternal health. CHWs play an instrumental role in health service delivery in rural and low resources

area. CHW's differ from TBA's as they seem to be younger, more educated and less bound to harmful traditional practices(107). Evidence from literature shows that CHW's can reduce maternal deaths by educating women about a childbirth plan and referral plan during childbirth, to mobilize their communities to use skilled birth attendants services and provide delivery care for mothers and neonates(58,107,114). CHWs can raise the level of awareness and change the behaviour of nomads to discourage traditional harmful practices (FGM & early marriage). They can play a significant role in identification of danger signs during pregnancy and improve referral of women from community to health facilities.

Delivery of health services through mobile clinics is the most effective approach for nomads. As nomads are continuously moving, mobile facilities are always the best approach for service delivery. Utilization of this service is influenced by health needs of nomads(28,109).

WHO has excluded TBA's from the definition of skilled attendants(4), they have banned it from the service provision everywhere in the world. As has been shown in chapter (6) there is strong evidence about the effectiveness of training TBA's so that nomadic community continue to trust them as service providers just as other population groups in developing countries(107,110,111). The use of service of TBA's is influenced by the nomads' tradition, beliefs and evaluated needs of the women. The author suggests TBA's can be assigned a different role in order to regulate them. The new role can be as community promoters / mobilizers to mobilize women to use formal maternal health services and to support the referral systems.

Another intervention that can improve nomadic maternal health is maternity homes. This intervention can play a significant role in the reduction of maternal mortality. The intervention provides a safe place where women can stay near a health facility, while her family can move to another area(114).

Concluding, utilization of maternal health services among nomads is low. The low utilization of service is determined by tradition, culture and values of nomads. In addition to that, nomads in Sudan have a similar environment as other nomadic groups in other countries. These resemblances suggest application of successful intervention for these countries to improve maternal health.

Chapter 8: Conclusions and recommendations

This chapter presents conclusions derived from the study and provides recommendations based on the findings and a proposed way forward for better utilization of maternal health.

8.1 Conclusions

In conclusion to this study, utilization of maternal health service is extremely low by nomads. There are many factors influencing utilization of maternal health among nomads in Sudan which need to be addressed. In general, these factors are the same as other nomadic areas in the African region. The factors include the individual characteristics as age; children and adolescents are exposed to maternal health issues as female genital mutilation, early marriage and teen pregnancy. Utilization of services is also affected by low level of education and low level health awareness. The mobile life style of nomads and gender inequity acts also as a major challenges that inhibits women from better utilization of maternal health services. Although nomads can afford cost and price of services, their willingness to pay cannot be judged. Availability of health facilities and health staff at community level are crucial factors that challenged nomadic women to access health services.

Lastly, utilization of health services is correspondently influenced by the nomads perceived and evaluated needs. Nomads health needs are permeated by belief, values and tradition which are structured in the fabric of their society in Sudan.

8.2 Recommendations

Based on findings and conclusions, the thesis recommends evidenced based strategies and interventions to improve utilization maternal health among nomads. The recommended strategies are either to increase community demands for maternal health services or bring women closer to emergency obstetric services. The following recommendations are proposed at policy level, service delivery and community levels;

Policy level

- ✚ Federal ministry of health should develop a national policy (plan) on nomadic health including sexual and reproductive health.
- ✚ The government should include nomadic community health workers and nomadic village midwives within existing human resources for health strategic policy and to develop curricula of basic and in-service training programs.
- ✚ The government should develop national policy on management and control traditional medicine.

Service delivery level

- ✚ State ministries of health should increase coverage of service for nomads by adopting mobile clinic approach.

- ✚ State ministries of health should train and deploy nomadic community health workers and nomadic village midwives to improve utilization of maternal health.
- ✚ State ministries of health can adapt maternity homes intervention to improve utilization of maternal health.
- ✚ State ministries of health should sensitize and train health staff at fixed health facilities on the special needs of nomads.
- ✚ State ministries of health should improve the quality of maternal health services by provision of essential equipment, instruments and supplies.
- ✚ State ministries of health should equally re-distribute human and financial resources between rural and urban areas.

Community level

- ✚ Establishment of nomadic women social networks to promote use of service and empower women.
- ✚ Conduct health awareness campaigns at community level to raise the level of awareness of nomads about the importance of maternal health.
- ✚ Establishment of an advocacy group from tribal, religious and community leaders to advocate for a better utilization of maternal health.

The study proposes the following areas for further research:

- ❖ Assess and explore the quality of maternal health service provided for nomads.
- ❖ Explore cultural factors that influence maternal health among nomads
- ❖ Identify the attributes of traditional and spiritual healers and sexual and reproductive health among nomads.
- ❖ Understand the linkage between the mobility pattern of nomads and maternal mortality.
- ❖ Exploring factors that influence the willingness to pay for health services by nomads
- ❖ Factors influencing utilization of formal and informal maternal health services among nomads.
- ❖ Explore factors influencing the decision making within the nomadic household.

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Annex 1: Map of Sudan

Figure 8: Map of Republic of Sudan(11)

