

Determinants of Maternal Mortality in Yemen

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Determinants of Maternal Mortality in Yemen

A thesis submitted in partial fulfilment of the requirement for the degree of

Master of Public Health

BY

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YEMEN

Declaration: Where other people's work has been used (either from a printed source, internet or any other source) this has been carefully acknowledged and referenced in accordance with departmental requirements.

The thesis "Determinants of Maternal Mortality in Yemen" is my own work.

Signature:



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List of Abbreviations

Abbreviations

ANC	Ante Natal Care
BEmOC	Basic Emergency Obstetric Care
CEmOC	Comprehensive Emergency Obstetric Care
C-sections	Cesarean sections
EmOC	Emergency Obstetric Care
EPMM	Strategies toward ending preventable maternal mortality
HSR	Health Sector Reform
ICPD	International Conference on Population and Development
MDGs	Millennium Development Goals
MHVS	Maternal Health Voucher Scheme
MMR	Maternal Mortality Ratio
MNH	Maternal and Neonatal Health
MWH	Maternity waiting home
NGO	Nongovernmental organization
NRHS	National Reproductive health strategy
PHC	Primary Health Care
SARSA	Service Availability and Readiness Assessment
TFR	Total fertility Rate
UNFPA	The United Nations Population Fund
UNICEF	United Nations Children’s Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
WHO	World Health Organization
YFCA	Yemen Family Care Association
YNHDS	Yemen National Health and Demographic Survey

Glossary

Maternal Mortality: The death of a women while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any causes related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes'(1).

Maternal Mortality Ratio (MMR): Is the number of maternal death during a given time period per 100,000 live births during the same period(1).

Maternal Mortality Rate: the number of maternal deaths in a population divided by the number of women aged 15-49 years (or women years lived at ages 15-49 years)(1).

Adult lifetime risk of maternal death: the probability that a 15-year – old women will die eventually from maternal cause.

Signal Functions of EmOC: These are Key medical interventions that are used to treat direct obstetric complications that cause the vast majority of maternal deaths around the globe(2).

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Abstract

Background:

Yemen is a low developed country, ranking 154 out of 187 countries in HDI, 2014. The health situation is poor, with the health system being a scarce of resources. Maternal mortality is one of the main challenges facing Yemeni women at reproductive age. Yemen was not able to achieve the millennium development goal 5. Despite the progress in reducing maternal mortality, there are still big gaps within the country between rural and urban areas and gaps with neighboring countries.

Objective:

To analyse the maternal mortality situation in Yemen and review the effectiveness of the current reproductive health policies/ strategies to address maternal mortality in order to provide practical recommendations to the policy making and service delivery.

Methodology:

This is a literature review study, based on what already is done. The three-delay model is used to guide the review process.

Findings:

Women status, perception on quality of care and costs are the main determinants contributing to phase I delay.

Distance and transportation are the main determinants contributing to phase II delay.

Poor quality of EmOC services as a result of shortage of health cadres and lack of equipment are the main determinants of phase III delay.

Recommendations:

Multi sector approach giving priority, to improve the general situation of women in terms of gender equity, education, economic status and decision-making. Improving the quality of the EmOC services in terms of availability, accessibility, acceptability will directly contribute to reduction of maternal mortality ratio.

Key words: Maternal mortality, three-delay model, Yemen.

Word Count: 11,104

Introduction:

In Yemen, maternal mortality is a leading cause of death among women at reproductive age. Yemen has achieved substantial progress in combating maternal mortality over the last ten years. The Maternal Mortality Ratio (MMR) has dropped from 365 deaths per 100,000 live births in 2003 to 148 deaths per 100,000 live births in 2013. However, this still a high ratio compared to neighboring countries. In addition to that, Yemen is still far away from achieving the millennium development goal 5, that is the reduction of maternal mortality ratio to 75% from 1990 to 2015.

I have been working with the Yemen Family care association (YFCA) in the field of reproductive health, for the last five years. I closely observed how pregnant women are suffering to safely deliver their babies. Mainly in the underserved areas and rural areas where health facilities are hardly reached. Maternal health services are still underutilized in areas where these health facilities are easy to access. I have had the opportunity to coordinate several projects in delivering reproductive health services, including maternal services, to provide that women safely deliver their babies. I have chosen to do my research on the maternal mortality, to go in-depth in understanding the problem, and broader than from a clinical perspective. To explore the factors that influence the decision process of women to go to the health facility, and factors affecting the quality of the emergency obstetric care. To provide concrete recommendations to overcome the main barriers and obstacles, hindering women from getting high quality maternal services.

Access to a high quality obstetric care is not a luxury it is a basic human rights as indicated in, The united Nation Convention on the Elimination of All Forms of Discrimination Against Women.

This is a literature view thesis. In the first part, I will focus and examine the main determinants contributing to high maternal mortality guided by the three delay model. The second part will focus on evidence-based interventions from other low countries and which could be applicable to the situation in Yemen. In the Third part I will discuss the findings linked with the interventions. Finally, provide recommendations to the policy making, NGOs and services providers.

1 Chapter One

1.1 Background

Yemen is located in the southern part of the Arab peninsula(3). Unification between North and South has taken place on May 1990. Yemen occupies 52790km² and is ranked the second largest country in the Arab Peninsula, and is composed of 22 governorates. Its border with Saudi Arabia is to the north, Oman to the east, the Red Sea to the west and The Aden Gulf and Arabian Sea to the south as shown in the map below.

Figure 1 Map of Yemen (3)



1.2 Population

The total population estimate in 2014 was 26 million. Around 70% of the population lives in the rural areas, while 30% are in the urban areas. The population is scattered across 133,000 settlements. Yemen still has a high population growth rate of 3% annually and a high fertility rate of 4.8(4). Around 40% of Yemen's population is under 15 years old(see Population pyramid, annex 1). Yemeni have a life expectancy of 63 for males and 66 years for female.

1.3 Socio- Economic status

Yemen is one of the poorest countries in the Middle East. It is ranked 154 out of 187 countries listed in the human development index 2014(5). The Gross National Income (GNI) in 2012 is 1110\$ per capita, while the Gross Domestic Income is 2310\$ per capita. The

unemployment rate has increased from 37% in 2005 to 52% in 2010(6). The political situation is unstable and particularly the last 5 years it effects the economic situation. In 2005, 45% of the people live with less than 2\$ per day, however, this percentage has increased after the instable situation(7). Recently, more than fifty percent of the total population are suffering from food insecurity(8).

1.4 Education status

Yemen has achieved progress in expansion of the education services during the last few decades. The situation is however still poor compared to the neighbor countries. The MDG report of 2010, has estimated that the net enrollment, in basic education by 2008, is about 70%. Additionally, 82% of school aged boys and 69% of the girls are enrolled in primary school, compared to the secondary school where only 48% and 31% of boys and girls are enrolled (7).

1.5 Conflict situation

Yemen is committed to improve the health situation in general and maternal and child health in particular. This commitment is supported by the signing of the International Conference for Population and development (ICPD) action plan in 1994, and the Millennium Development Goals (MDG) in 2000. Currently, Yemen is facing a humanitarian crisis since 2004, which led to a major population displacement and severe disruptions in livelihoods and basic services. Recently, Yemen is facing the worst humanitarian crisis, which escalated by the conflict between Government forces, militants, tribal fighters and other parties. The fights spread in nine governorates including Al Dhale'e, Aden, Taiz, Hadhramaut, Marib, Shabwah, Abyan, Lahj, and Al Bayda. On the 26th of March, an international coalition led by Saudi Arabia started the operation Decisive Storm, which consists of airstrikes targeting Al Houthi armed forces and their supporters from the Yemeni army in Yemen. According to the United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA), the airstrikes hit targets in 18 out of 22 governorates. In June 2015, OCHA estimated that 1.2 million people were recently displaced since the start of the airstrikes. In addition to that. 50,000 people fled to Djibouti due to the conflict in Aden.

1.6 Health System in Yemen.

The health situation in Yemen is generally poor and one of the least favorable in the world. Characterized by a poor quality of service, low coverage, and a high mortality among children under five, a high malnutrition rate and a high maternal mortality ratio (see burden of disease, annex 2) (9,10). By the year 2000, the Ministry of Health adopted the Health Sector Reform (HSR) strategy(10), which aimed to bridge the gaps and fix the weaknesses in the health system. The HSR mainly focused on decentralization from central to the level of government and district, cost sharing mechanisms, community participants, involvement of the private sector and NGOs, integration of gender and a adopt sector wide approach with the donor community(10). The long-term goals of the HSR are; universal access to health services, improvement of quality of the services and financial sustainability.

Health services in Yemen provided through the following(11):

- MOPHP health facilities.
- Ministry of interior's facilities.
- Ministry of defenses facilities.
- Private health sector (profitable).
- Charitable health sector (non-profitable).

According to the public health law No.4 of 2009, the Ministry of Public health and Population sector (MoPHP) is the main body responsible for everything related to health in Yemen(12). The health system in Yemen adopted a four level system.

First level: Primary health Care PHC includes health units and centers that provide the basic health package. There is an increase in the number of health units and centers throughout the last few Years. However, there is mal-distribution and malfunction, the building of health facilities is influenced by political and tribal leaders interventions, and not adhering to the national strategies and guidelines(11).

Second level: this includes health services provided by districts and governorates' hospitals. These hospitals treat patients who are referred from the first level. The number of district hospitals are 182 and governorates hospitals are 53(11).

Third level: This includes the specialized hospitals where advance services are provided. Only two specialized hospital exist, one in Sana'a and one in Aden(11).

Fourth level: this level includes specialized services of the following institutions (centers); cancer centers, cardiac and kidney centers, blood bank and rehabilitation centers(12).

2 Chapter Two

2.1 Problem statement and justifications

Maternal health has received global attention through the last few decades. These efforts commenced from the international conference for population and development (ICPD), which was held in Cairo 1994. ICPD is considered a revolution in maternal health, by recognizing the reproductive health rights of women and setting a target of universal access to reproductive health services by 2015. These rights were emphasized in Beijing, 1995 at the 4th world conference of women. These global movements were crowned at the world summit 2000, where maternal health issues were included in the eight millennium development goals (MDGs). MDG5 aimed to decrease maternal mortality ratio by 75% from 1990 to 2015 and universal access to reproductive health services by 2015. According to WHO, maternal mortality is defined as "The death of women while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes(1).

By 2013, the global maternal mortality ratio declined from 380 maternal deaths per 100,000 live births in 1990 to 216 maternal deaths per 100,000 live births, in 2013(1). This represent 45% of the targeted goal. In spite of this improvement, there is still a big gap, an inequity between developed, and developing countries. About 800 women still die per day from preventable causes related to pregnancy and childbirth. 99% of these deaths occur in developing countries. According to the WHO around 289,000 women died in 2013, during or following pregnancy and childbirth(1).

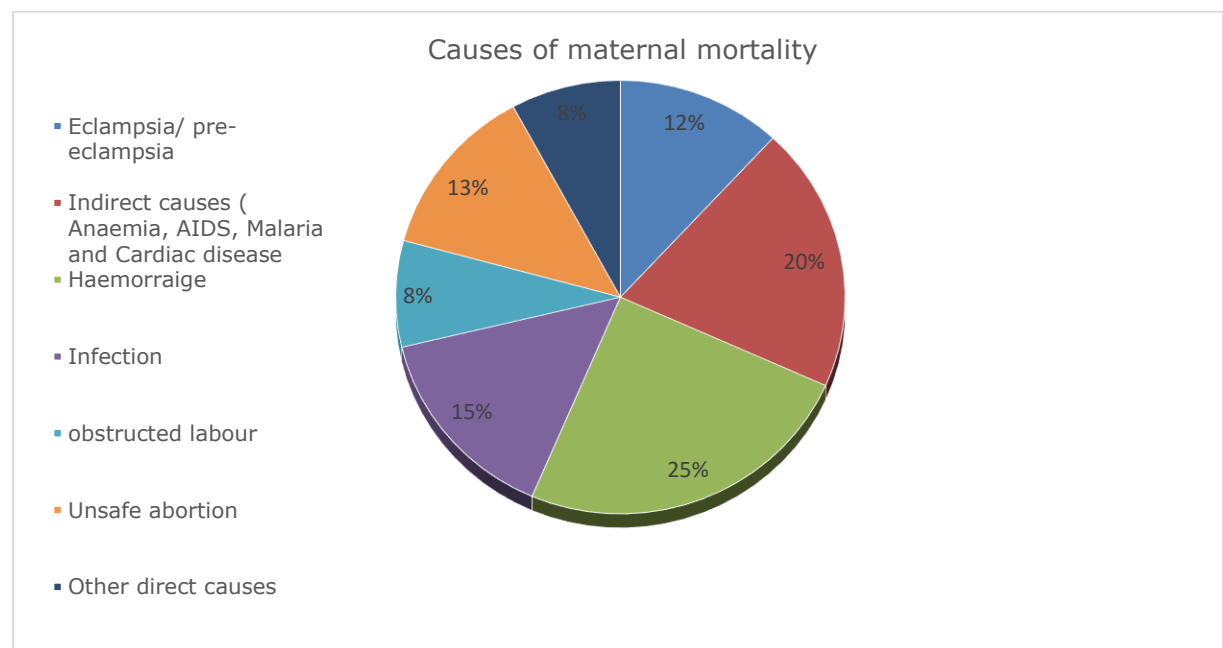
In 2014, WHO and others international organizations have put an overall target of 70 maternal deaths per 100,000 live births by 2035, and no country has maternal mortality above 140 maternal deaths per 100,000 live births (13,14). To attain that, annual rate reduction(ARR) must be 5.5% (14). It is possible to improve the situation of maternal health, evidence shows that 80% of maternal deaths could be prevented, if there is a commitment to implement the cost effectiveness solution that evidence shows works (15). This should include well trained staff, availability of equipment, drugs and emergency services (15).

Causes of maternal mortality:

Direct causes: related to the obstetric complication of the pregnancy status such as pregnancy, delivery, postpartum hemorrhage and infection(1,16).

Indirect cause: resulting from a previous existing disease or a developed new medical condition, which is aggravated by the pregnancy. For instance, Cardiac disease, Anemia, Malaria and HIV. Figure (2) shows the prevalence of the causes(16).

Figure 2 Causes of maternal mortality(16).



Around 80% of these causes can be prevented if timely managed(15).

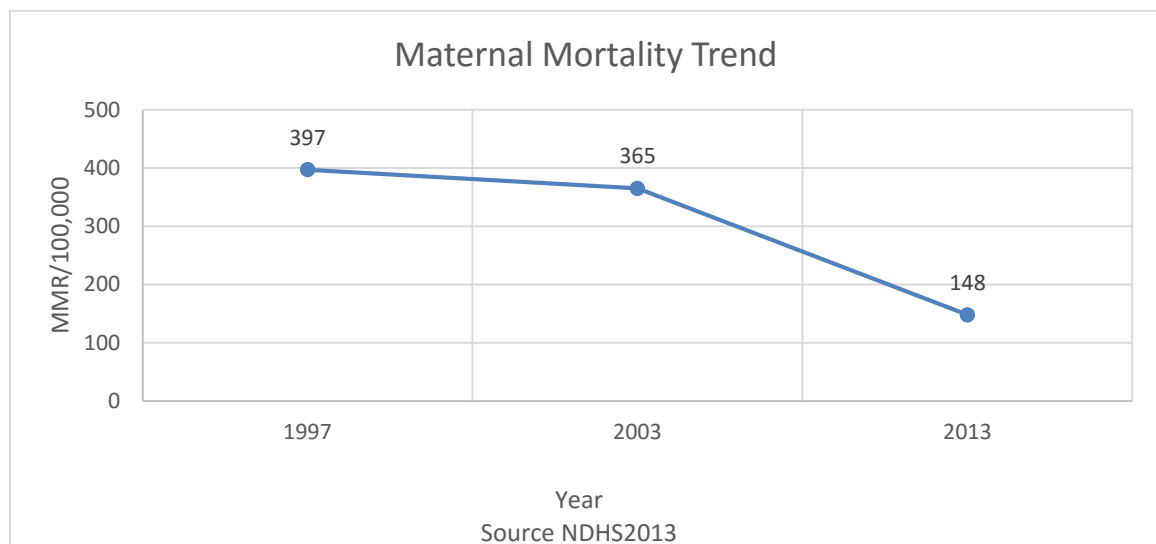
WHO has defined eight indicators to monitor the obstetric care services, they are(2):

1. Availability of EmOC services.
2. Geographical distribution of EmOC facilities.
3. Proportion of all births in EmOC facilities.
4. Meet need for EmOC.
5. Caesarian section as proportion of all births.
6. Direct obstetric case of fatality rate.
7. Interpartum and very early neonatal death.
8. Proportion of deaths due to indirect causes in EmOC facilities.

Situation in Yemen

Women in Yemen at reproductive age, represent around one sixth of the population (4,000, 000)(17). 42% of deaths among women at reproductive age are attributed to maternal causes, it is ranked number one among other causes of death(18). The maternal mortality ratio is one of the highest in the Middle East, approximately 148 maternal deaths per 100,000 according to the YNDHS 2013. Despite the improvement in reduction of the maternal mortality rate from 365 maternal deaths/100,000 live births in 2003 to 148 maternal deaths/100,000 live births in 2013. Yemen is still far away from attaining the Millennium development Goal 5, which is 88 maternal deaths /100,000live births by 2015 (WHO 2010 adapted goal is 135 maternal deaths / 100, 1000 live births by 2015). The MMR is still high in rural areas compared to urban areas (167 compared to 97). A study conducted in Al Muklla city 2010, shows that the maternal mortality through the period of 2000- 2010 shows an average of 106 maternal deaths per 100,000 live births. Additionally, the lifetime risk of maternal death in Yemen is 1 in 39, this is very high compared to 1 in 1800 in developed countries.

Figure 3 Maternal mortality trend in Yemen 1997 – 2013 (4).



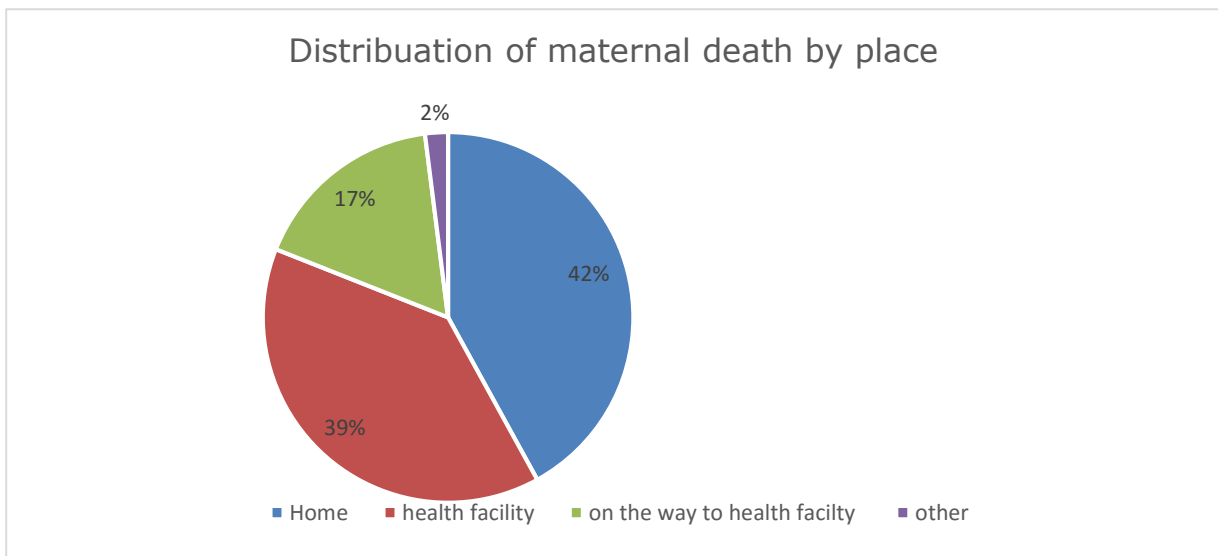
The decline of the maternal mortality ratio not will explained in the demographic health survey. Derived from literature review we can account for the decline because of the following causes:

1. Increased prevalence of contraceptive from 23% in 2003 to 34% in 2013.
2. Increased delivery by skilled provider from 25% in 2003, to 45% in 2013.
3. Increased coverage of the obstetric care services.
4. Systemic bias and underreporting of the maternal deaths should take into account.

The main causes of maternal deaths in Yemen are similar to the global situation. The majority of deaths occurred between the third trimester and the first week after delivery(17). Around 80% of maternal deaths are attributed to direct causes and 20% are attributed to indirect causes. Direct causes are, Hemorrhaging 39%, obstructed labor 23%, infection 19% and eclampsia 19% (17).

Maternal deaths could happen at home, on the way to the health facility and in the health facility. Figure 4 shows the distribution of maternal deaths based on the place of death.

Figure 4 Distribution of maternal deaths by place of death in Yemen, 2013 (4)



Underutilization of the available reproductive health services including maternal and family planning compounded the problem of the maternal mortality (19).

Effect of ongoing conflict on maternal mortality in Yemen.

Conflict is one of the major causes of mortality in human history (20). It can lead to direct mortality or indirect(20). War accounts for 0.5% of the total mortality. In conflict the health system collapses and information systems will not function (20). In conflict, mortality due to maternal causes continues and it actually increases. Women and children are the most vulnerable group in war (21). Due to conflict and the insecure situation, moving from one place to another, lack of access to health services the pregnant women are at high risk of unsafe delivery(21).In Yemen, with the current conflict there is no data on the effect of the ongoing war on maternal mortality. However, the author decided to highlight the problem with the available information from files, colleagues and international organization as much as possible.

Reproductive health policy:

The National Reproductive Health Policy was established in 2001 with a clear overall goal of providing a comprehensive and integrated system of reproductive health care.

The reproductive health strategies from 2001 -2005 and 2006 -2010 focused on the following components(12).

Maternal and Neonatal Health (MNH).

1. Family Planning including infertility.
2. Sexually Transmitted Infections and HIV/AIDS.
3. Adolescent and Youth Reproductive Health.
4. Early Detection of Breast Cancer & Cervical Cancer.
5. Management of Menopause and Menopausal-Related Disorders (MRDs).

The most recent reproductive health strategy 2011-2015 focused on(12).

1. Maternal and Neonatal Health(MNH).
2. Family Planning including infertility.

In 2013, the population sector in the Ministry of Health developed a national acceleration plan for maternal and child health care from 2013 to 2015. This plan aimed to accelerate the reduction of maternal and under five mortality to progress towards the MDG 4&5.

In Yemen the majority of deliveries is done at home. Only 36% of the delivery is supervised by skilled providers. EmOC plays a crucial role in saving lives of the mothers and babies(22). Any program that addresses the maternal mortality must take EmOC services as a priority.

2.2 Study objectives

2.2.1 Overall objective

To analyze the maternal mortality situation in Yemen and review the effectiveness of the current reproductive health policies/ strategies that address maternal mortality in order to provide practical recommendations to the policy making and service delivery.

2.2.2 Specific objectives

To identify the epidemiological and health systems factors that influence the high maternal mortality and find gaps in the health policies and practices, addressing the maternal mortality in Yemen.

To review evidence based interventions in other countries and review expert organizations advices and if they can be adapted to the situation in Yemen.

To make recommendations to policy makers, public health professionals, international and local NGOs, public and private health sectors in order to adapt the current strategies and interventions.

2.3 Methodology

2.3.1 Literature Review

This thesis is based on literature review, using available data online. Extensive search was conducted in PubMed and the VU library database, Google scholar, Science Direct and international organizations such as WHO, USAID, UNFPA and IPPF. Furthermore, the National policies, reports, assessments, grey literature were also used.

Key words: combinations of maternal mortality, determinants, Conceptual framework, social, economic, gender, quality of care, patient satisfaction, equity, Yemen, health system, cultural, emergency obstetric, distance, antenatal care, skilled birth attendance, utilization of health services, transportation, quality.

Inclusion criteria: maternal morbidity and mortality articles, publication range from 2000-2015. Except for one article from 1994 due to its importance in understanding the conceptual framework.

Languages: the search was limited to English and Arabic literature only.

Geographic area: Studies conducted in Yemen, if no studies were found the search was extended to countries with a similar situation.

2.3.2 Research strategy

Table 1 Research strategy

Type of study	Sources	Keywords in Objective 1	Keywords in objective 2
Published Peer reviewed.	Vu library Google scholar PubMed Science direct	Determinants, social, economic, gender, distance, transportation, emergency obstetric, human resources, conflict.	Interventions, maternal mortality, low income, conflict situation, emergency obstetric, impact.
Grey literature Reports	Google WHO Institutional sites – MOPH, NGOs reports	Determinants, social, economic, gender, distance, transportation, emergency obstetric, human resources, conflict.	Interventions, maternal mortality, low income, conflict situation, emergency obstetric, impact.

2.3.3 Conceptual Framework:

In order to shape the literature review, The Thaddeus and Maine three delays model (1994), was used to analyze the findings on the determinants of maternal mortality in Yemen. As discussed earlier 80% of maternal deaths are accounted to direct causes such hemorrhage, obstructed labor, unsafe abortion. The majority of these causes are preventable if timely managed. Any delay may lead to maternal mortality or severe complications and disability for the women, delay plays therefore a crucial role in maternal mortality(23,24).

The three delays model examines factors that contribute to maternal mortality by study of the factors that delay the reception of timely and adequate treatment. The starting of obstetric complication to the outcome(24). This model categorizes the delays into three phases as illustrated below.

First delay: delay on the decision to seek care at individual, family and relatives level. Factors like costs, distant from the health facility could be major causes, that hinder seeking the services and decision-making at individual and family level. The status of the women, the previous experience with health systems and the perceived quality of care could be relevant determinants in this phase (24).

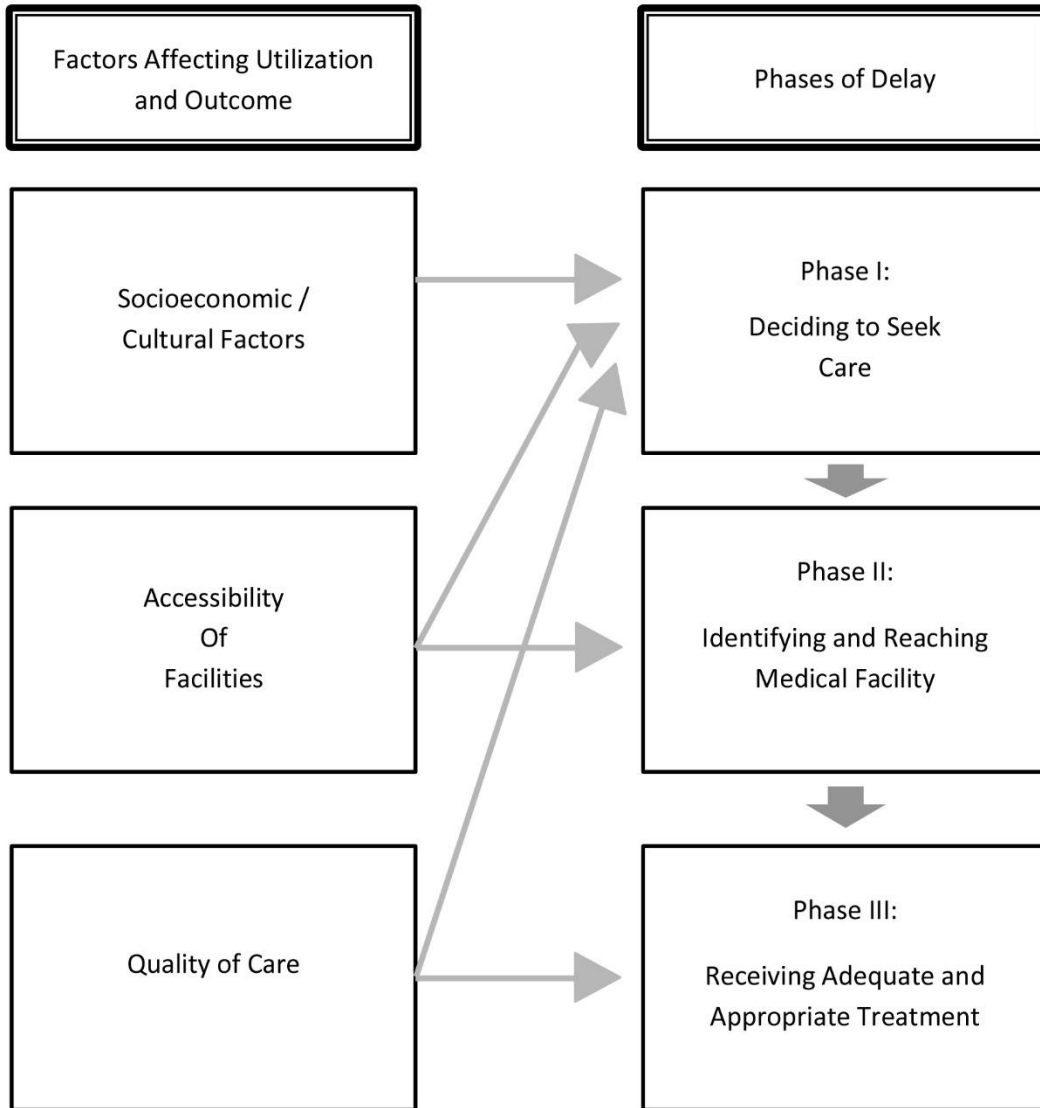
Second delay: delay in arrival to the health facility. This includes the accessibility and availability of health facilities. Other factors like cost of transportation, financials and quality of the road could play a role as well(24).

Third delay: delay in the receiving of a high quality treatment. Factors at this level include; availability of EmOC services, shortage of supply and equipment, lack of trained cadres(24).

The conceptual framework, though focusing on the 3 delays during emergency and pregnancy complications, ANC care situation in Yemen will also be elaborated in the findings. Research shows that ANC care can help in the early detection of risk factors in pregnancies; women can experience complications even after a complete ANC visits/care. In order to understand the determinants of delay, it is also essential to know the situation of ANC in Yemen.

Another consideration for this review is the escalated conflict situation in Yemen in the past few months, but the intensity of the effect of conflict varies between the governorates in Yemen. The conflict has affected a few governorates and their health systems severely whereas few have their health systems still functioning well. This might have an effect on maternal health services in Yemen; however the conflict situation is not the backdrop of this review. The effect of the conflict will be highlighted in some of the determinants of the three delays.

Figure 5 The three delays model, (Thaddeus and Maine, 1994)(24)



The three delays model.

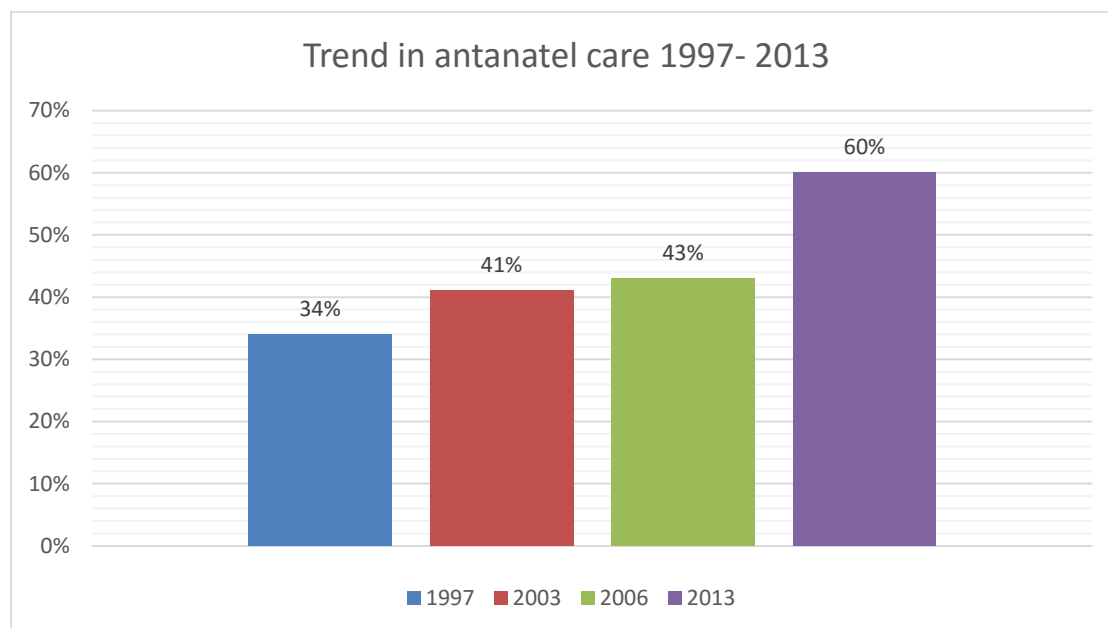
3 Chapter Three: Findings

3.1 Antenatal care

The impact of antenatal care on reducing maternal mortality is not clear. There is a forward push to expand and implement the antenatal care program globally. Nevertheless, there is no evidence off the direct effectiveness and role of antenatal care in reducing maternal mortality(25). Pregnant women, who received complete good quality antenatal care are also at risk to develop complications. Maternal health experts mention that antenatal care contributes to the reduction of maternal deaths by controlling chronic conditions such as hypertension and anemia. Also by raising the awareness and information about safe delivery plays an important role as well(26).

The primary aim of antenatal care is to identify women who are at high risk to develop complications, and to refer them to appropriate health care services.(25). The WHO recommended four antenatal care visits to monitor and follow up pregnancy for a low risk pregnancy and more than four visits for a high-risk pregnancy(25). A systematic review shows that reducing antenatal care visits is not associated with any negative outcome for pregnancy at lower risk women, but women will express dissatisfaction(27). In Yemen, studies show a substantial increase in the number of women who seek antenatal care services. This percentage of women who received antenatal care, increased from 41% in 2003 to 43 % in 2006(YMICS) (28,29). The latest available data from YNHDS 2013 shows an increased percentage of women who received antenatal care up to 60% as illustrated in Figure below(4).

Figure 6 Trend in antenatal care in Yemen, 1997 – 2013 (4).



The utilization of antenatal services is also influenced by the place of residence. Women living in urban areas are more likely to receive antenatal care (80%) than compared to women living in rural and remote areas (50%). Similarly, women with higher education use antenatal care more than women with secondary education(4,28,29). Women living in urban areas are more likely to have four ANC visits 47% compared to 15% in rural areas.

A study conducted in Muklla, showed an even higher percentage of antenatal care utilization which is 77% (30). The antenatal care was mostly provided by doctors (50%) , followed by midwives or nurses (4%) and lesser percent by auxiliary nurses or midwives. Only 28% of the women nationally, received vaccination against tetanus. In some cities like Muklla out of the 77% who received antenatal care, 95% of the women were vaccinated against tetanus(4). These differences in percentage, could be due to the sampling process. In the Muklla study , a recruitment sample of respondents in health facilities and not in the community, which is one of the study limitation. In Yemen the antenatal care consists of routine screening of the complication like anemia, hypertension and malaria(4). Women are given iron, folic acid and are provided with necessary information to have a safe pregnancy. In YNDHS 2013, half of women were informed about danger signs of pregnancy during ANC visits.

Many factors influence the decision to receive antenatal care such as; age of the mother, education and birth order. For instance, antenatal care declines with the increased age of the mother and with a higher order off births(4). Urbanization is an important consideration, for instance ANC coverage in Aden (urban city) is 88% while in Reimah (majority of city is rural) it is 18%. Finally, the YNDHS revealed that women who received ANC are more likely to deliver in health facility 54% compared to 15% who received no ANC(4).

3.2 Findings of phase I delay

This level examines the determinants that effect the decision making process to go to the health facility, to seek help in complications raised during pregnancy, and delivery and post-delivery complications. Before going into the findings in this paragraph, I will present here the current situation of maternal health in Yemen. Although the percentage of women who delivers in the health facility in Yemen is increasing over time, the majority of deliveries still take place at home as illustrated in figure below.

Figure 7 Distribution of live births by place of delivery in Yemen, 2013 (4).

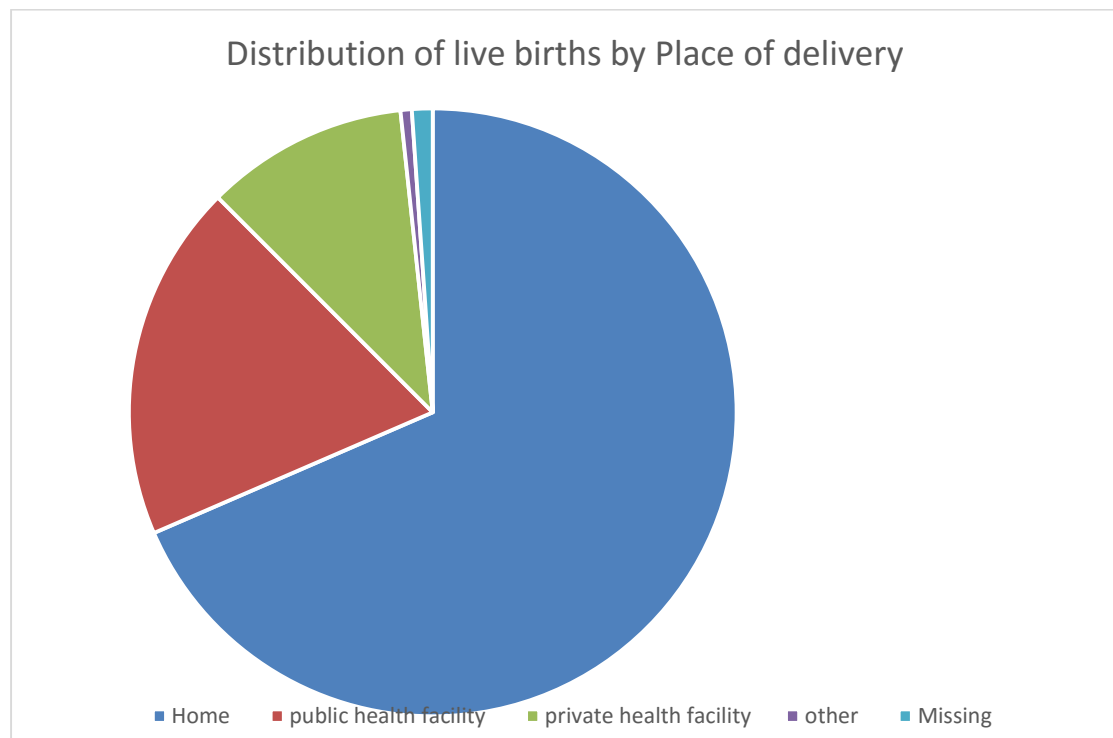
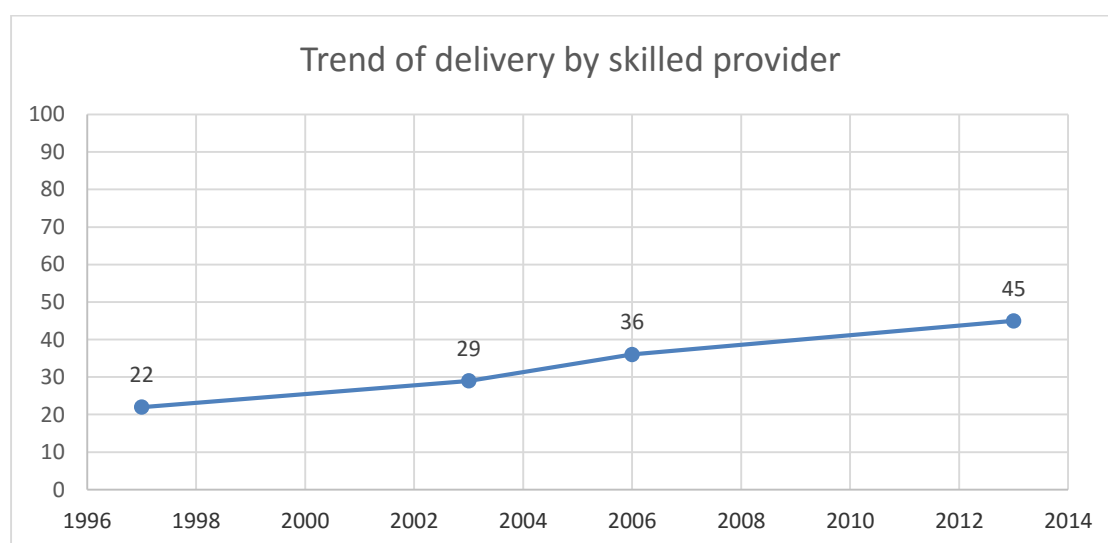


Figure 7 shows that about 70% of deliveries take place at home, while only 30% of deliveries take place at a health facility(4). Many factors influence this decision process regarding the place of delivery. The reasons reported by women for delivering at home, 60% mentioned it is better to deliver at home, 25% said that health facilities are too far away, 25% mentioned the high cost of the services. Lastly the YNHDS 2013, clearly shows a strong relation between mother's education and the place of delivery. The uptake of ANC and place of delivery and place of residence plays a role as well. The number of births delivered by skilled health personal also increased from 29% in 2003 to 45% in 2013, as shown in the figure below. Most of the women in rural areas deliver at home, the disparities are immense. For instance, in Aden(urban) 67% of women deliver in health facilities, compared to 4% in Reimah(rural) .

Figure 8 Trend of delivery by skilled provider in Yemen, 1997 - 2013(4).



Delivered by skilled provider is influenced by mother's education, residency, mother's age, and wealth quintile.

As mentioned earlier , about 42% of women died at home while 39% died at the health facility and 17% on the way to the health facility (4).

Many determinants influence the decision-making process for seeking medical help. These factors are interlinked to each other, and all together with different forces of each determinants lead to the

final decision. These are shaped by the social, cultural and educational level and the women's situation in the community. Perception of accessibility of the health facility, in term of distance, transportation and costs. Moreover, perception of the quality of care. According to several studies, the following factors play a role in the decision to go to a health facility, if a complication arises during pregnancy.

3.2.1 Perceived quality of care

The perception of the community about the quality of care is crucial. A variety of determinants create the perception. Perception of health services plays a positive or negative role in the decision to go to the health facility during labor, or if complications arise during pregnancy (31). When women have a poor perception of the health services, they may decide to deliver at home(32). The world Bank report stated that health services in Yemen are poor in both public and private and the majority of the people are not satisfied with the health services (32). This poor quality affects the utilization of the services (32). In Yemen only 30% of deliveries take place in the health facility (4). Even in the main cities, where the health facility is conveniently located and easily accessed, services remain underutilized. About nine percent of women mentioned that the bad behavior of health providers plays a role in taking a decision to deliver in home rather than in the health facility, In Sana'a city 22% of women stated that rude behavior of health cadres prevent them from going to health facility (4,33). A quote from a woman "there is no need for hospital delivery. We hear that nurses bite women in the labor room!"(33). Another nine percent mentioned the poor treatment in the health facility as a reason to deliver at home(4).

When the health facility is not well equipped and staff are not well qualified, this will lead to poor quality of health services and perception of poor health services among women. Many assessments have shown the weakness of the health system in Yemen. A situation analysis, on emergency obstetric care, in public hospitals implemented in 2006, in five governorates; Sana'a, Hajjah, Mariab, Al- Mehweet and Abian reported that the emergency services are poor in quality (34). 62% women mentioned that they prefer to deliver at home because of the privacy, support and a comfortable environment which the health facility lacks(4,35,36). Concluding; The past experience, distance to the health facilities, the availability

of the staff, the availability of drugs, the costs, the privacy, the waiting time and the behavior of the health cadres can influence the perception about the quality of care. When obstetric complications occur, going to the health facility is not always the first option. People try different approaches, which leads to delay of seeking health care. , Patient satisfaction must be at the center of the health services goal. The patients decide where to seek health services and when (31,32).

3.2.2 Cost

The cost is an important factor in the decision to seek health care. Cost is not limited to the cost of the health services. It includes cost of transportation, drugs and supply costs. Cost sharing services is one of the strategies adopted in the health sectors reform in 1998 and implemented since 1999(10,37). Al Serouri, mentioned in his study , that introduced the fee user strategy lead to reduce services utilization in the public sector (37). Health services including antenatal care, delivery, and emergency obstetric are not free of charge. Women have to pay for health services regardless their income and if they are in public hospital or in private (38).

Several studies show that the cost is a concern in seeking health services among Yemeni women. In a cross sectional study in Sana'a city 41% considered the delivery costs as unaffordable(33). A study conducted in Hajjah governorate, shows that 27% of women mentioned the costs of delivery as a main obstacle for going to the health facility to deliver(36). The cost of normal delivery, in a public hospital, is around 7000 Y.R and this does not include the cost for drugs and other costs. In rural areas the cost for transportation maybe high and hinder the women from going to hospital. Women also paid unofficial money; this should be taken into account. There is a decree by the Ministry of Health, to make maternal services free, but there is no implementation of this decree. That is because there is no policy for implementation of the decree and no alternate funding mechanism for the health facility. Public facilities use patient fees to cover the running cost, they buy consumables and sometimes motivate the health workers. In absence of this fee, the running cost of the facility needs to be managed from elsewhere. In private hospitals, the cost for normal delivery ranges from 10,000 to 100,000. The cost for a caesarian section ranges from 40,000 Y.R to 500,000 Y.R in private hospitals. The decision to spend money in health care is not a priority for Yemeni families. In cross sectional

studies, Sana'a majority mentioned that the fees of the health services are unacceptable and unaffordable(33). Its noteworthy, to mention that 98% of the women did not have a health insurance and only 1% was covered by a employer based insurance and 1% covered by other insurance mechanisms(4). Several studies have shown, without financial support and assurance, that a woman will not face a financial catastrophe if she pays for the health care services, but access to maternal health services will be difficult.

3.2.3 Distance and road

Long distances and poor roads are main obstacles in accessing health facilities (2). However these health facilities should be reachable by the women and geographical distribution should be taken into account while designing and planning for health facilities.(2) Distance to the health facility plays a role in the decision to go to the facility or not. Women who live near the health facility have more chance to deliver with skilled health providers. Long distance and poor roads may discourage women from going to health facility. On the other hand, a manageable distance to the health facility and good road networks and conditions may encourage women to go to the health facility. In addition, the status of the road will affect the transportation cost as a rugged road will increase the transportation cost. A shorter distance to the health facility may not be the only reason for a better utilization of health care services(24). There was no study found in Yemen to examine the relation between maternal mortality and distance to the health facility.

A study conducted in Sana'a, shows that the distance to the health facility is a major concern among the women, 50% of the surveyed women mentioned that, if the health facility is nearby, this would encourage seeking the health services.(33) A study conducted in Tanzania shows a strong relation between distance to the health facility and maternal mortality are due to direct causes. It revealed that the maternal mortality increased from 111 maternal deaths per 100,000 live births among women who lived within 5 km from the hospital compared to 442 maternal death per 100,000 live births among women who lived 35 km away from the hospital.(39) In Yemen, we have 54000Km of roads, only 6000 are paved and the others are not paved yet(40). Three in five women in Yemen indicate that the distance to the health facility is a problem for seeking health services.(4) Recent study stated that 11.7% of women preferred to

deliver at home due to distance and transportation (35). In the areas affected by conflict there is difficulty to move from one area to another, the road is also affected mainly by air strikes. This adds more challenges in accessing health services and leads to delay.

3.2.4 Illness factors (Failure to recognize the danger signs)

Recognition of the dangers signs of pregnancy is very crucial in taking decision to go to the health facility (24). It is very important that women know early, that they have a serious condition, which needs an urgent medical intervention. According to the KAP study, conducted in Al- mehweet and Hajjah governorates 2013, it shows that the majority of the women were able to recognize the danger signs of pregnancy(36).

Table 2 Knowledge of the women about the danger signs of pregnancy(36).

Signs/Symptoms	Spontaneously Mentioned (S) %	Prompted (P) %	Total Knowledge (S+P) %
Vaginal bleeding	47.0%	37.9%	84.9%
Abdominal pain	37.1%	55.3%	92.4%
Fever	30.1%	57.1%	87.2%
Headache	26.3%	57.9%	84.2%
Weakness	26.3%	57.1%	83.5%
Swelling of hands and feet	24.8%	58.6%	83.5%
Dizziness	23.3%	62.4%	85.7%
Delayed/Long delivery	18.9%	68.9%	87.8%
Vaginal discharge	17.3%	57.9%	75.2%
Excessive vomiting	13.0%	68.7%	81.7%
Loss of fetal motility	12.9%	67.4%	80.3%
Convulsions/shaking	9.8%	66.9%	76.7%
Shortness of breath	9.8%	72.9%	82.7%

From the table it shows that around 47%, 37%, 31, of the women spontaneously mentioned the vaginal bleeding, abdominal pain and

fever as a major signs. Similarly, a KAP study conducted in Al-Hodeidah, Lahj and Taiz in 2012, shows that the majority of the women are aware of the danger signs of pregnancy(35). Also in Muklla 2010, the majority of the women, who visited health facilities, have been informed about the danger signs of the pregnancy(30). An assessment conducted in 2006, reported that there is a delay in seeking health care due to lack of awareness about danger signs(34).

From the available studies, it emerges that, even though women recognize the danger signs of pregnancy, there are other factors that influence the decision. Because of these factors, women did not seek health services unless a complication occurred or her life was at high risk(19).

3.2.5 Women's status

Studies have shown that empowering and supporting women's autonomy will increase the utilization of the health care services. A lower status of women in the family and limited decision-making power can lead to a choice of traditional care(41). Education level, economic status, the power relation between women and men, play a role in the decision making process(24). A study named "the role of demands factors in utilization of professional care during child birth" conducted in four governorates in Yemen in 2011 showed that the feeling of women, to be supported by others, is a major reason for preferring delivery at home rather than in the health facility(19). Autonomy of the women is considered a main determinant in the utilization of maternal health services in India (42). The power of women to make a decision is highly influenced by cultural beliefs, norms and values(19).

In some countries, women need permission to go to the health facility even if her life is at risk. In Yemen, the status of women is still seen as subordinate to the man in many ways including decision-making, financial control and mobility. Women indicate that they cannot make a separate decision regarding reproductive health services.(33,35). This means that, the decision of seeking health care in case of complications occurred at pregnancy or delivery will depend on the partner or other relatives rather than the women's need.

Furthermore, one of the main factors, that hamper women from accessing health care, is the need of women to be accompanied by someone to the health facility or they are not allowed to go alone. Overall, 80 % of the women mentioned that being accompanied by someone to the health facilities is a main concern in seeking health

care services. A KAP study conducted in three governorates Taiz, Lahj and Hodeida revealed that 72% of women must have company while going to the health facility, 23% only are allowed to go alone and 4.4% are not allowed to go out at all(35). In Sana'a city, which is the capital and has the most urbanized area, men still have the idea that women cannot go to the health facility alone, particularly if it is not located near the home (33). Study in India shows that women with free mobility, are more likely to utilize health services(42). The participants in the study mentioned that the right to choose where to give a birth, either at home or in the health facility, is a central part of their autonomy. The issue of making a personal decision, regarding the place of birth, were highlighted by women situation reports issued by the National Women Committee (NWC) as these rights have been violated by the husband or relatives(43). If the services are designed in a way that is not appropriate or acceptable by the culture of the community this will lead to the hindering of access to the health services and add more barriers for the women(13). It is not acceptable that a male doctor examines women, not even in emergency. In some cases, women will prefer to die rather than to be examined by a male doctor.

Several studies have shown that the women's status is shaped by education and economic level.

3.2.5.1 Education level

There is a strong correlation between the level of education and utilization of the health services. Several studies have shown, that utilization and seeking of health service increases with higher education. In developing countries, men usually have better access to formal education than women. About 54% of Yemeni women have no education. In Yemen, 80 % of the women who died due to maternal deaths are not educated (4). Recently, the YDHS 2013, shows a link between the educational status of the mother and place of the delivery. It was revealed that only 22% of women who had no formal education, deliver at the health facility, compared to 64% of women with higher education, 44% of secondary education, and 36% with fundamental education(4). The education level influences the behavior of the mother and her attitude toward health services . Studies have indicated that education strongly influences the women's decision regarding their health. In Yemen, high-educated women are more likely to deliver under skilled birth 88.8% compared to 30% of women with no education. Educated women have a better

access to information, a better economic status and better control over financial resources(4,19,41). For example, high educated women are more likely to employed 43% compared to low educated women 9%(4). Women feel that the low education level acts as a barrier for accessing health services.

3.2.5.2 Economic status.

Studies show that utilization of health services increases with the increase of the economic status. Yemen is a low-income country with limited resources and a high unemployment rate. According to YNHDS 2013, only 10% of married women are working(4).The total health expenditure is 5% of the gross domestic product (44).The general governmental health expenditure is 364 million which is 4.3% of the government budget(44). This governmental budget is very low if compared to other countries in the region. The government expenditure for health per capita is 18 \$ in 2013. The out of pocket expenditure is 78% of the total health expenditure (12,44). There is no national health insurance, only 1% of women covered by private insurance(4). The poor economic situation influences the seeking of health care.

3.3 Findings of Phase II delay: Reaching a medical facility

Women who decided to seek health care, and overcome the first delays factors, It does not mean that she will reach it in time. They may experience what is called the phase II delay. In the second delay, we examine the factors that affect the physical access to health services after women decide to go.

Physical access and reaching the health facility play a key role, either in decision making to seek health care services, or treating the severe and complicated cases. Delay in reaching the health facility could be caused by living far away from the health facility, a poor infrastructure and poor transportation system. In Yemen, 24% of the women mentioned that the place of the health facility play a role in their decision to deliver in the health facility or at home (4). In a study conducted in Sana'a city around 32% of women go to the health facility by foot where (33). Table below shows the average interval between the onset of the complication and deaths, it shows that women with hemorrhage have only two hours to reach the hospital otherwise she will die. This emphasizes the importance of

Table 3 Estimated average interval between onset of major complication and death(2).

Estimated average interval between the onset of major complication and deaths, without medical intervention		
Complication	Hour	Days
Hemorrhage postpartum	2	
Antepartum	12	
Rupture Uterus		1
Eclampsia		2
obstructed labour		3
Infection		6

Studies show that the following factors play a role in delay accessing to health facility(24).

3.3.1 Distribution of facilities

Appropriate distribution of the health facilities increases access and utilization of the health services. In contrast, an improper location of the health facility, aggravates the poor maternal health situation. Yemen is a big country around 52790km² and population is distributed in small settlement which are more than 134,000. This makes the distribution of the health facility per population a complex process with only limited resources. 70% of the Yemen population lives in the rural area where only 20% of the health services exist. And 80% of the health facilities present in the main city, where only 20% of population are(12,45). This inequity in distribution of health facilities creates a challenges in delivering the services to remote areas. According to the service availability and readiness assessment (SARSA) 2012, conducted by the World Health Organization revealed that among 122 surveyed health facilities, only 20% provide comprehensive emergency care and 43% provide basic emergency care (46). Multi cluster assessment conducted in Aden in June 2015, mentioned that 96% of people have problems in accessing health services due to the fighting inside the city (47).

3.3.2 Travel distance

Study shows that the average time to go to the health facility in Sana'a(the capital) is around a quarter of an hour to half an hour in the capital city, while the national health survey estimated the average time to reach the facilities is one and half hour (4,33). From my observations, women from some rural areas need more than four hours to reach the nearest health facility. In areas which are directly affected by the conflict like in Aden, Abyan and parts of Taiz,

assessments show that women could not go to health facilities even if it's nearby, due to the insecurity and fighting in the streets and between buildings(48).

3.3.3 Transportation

Transportation plays a central role in delivering health services and enable people at need to reach health facilities (49). Getting women, at labor, to a health facility on time minimizes the risks and saves lives because of possible maternal mortality. After the decision takes place to go to the health facility, either for normal delivery or for emergency, the role of the transportation takes place either positive or negative. For example, 70% of people lives in remote areas where transportation is a major concern. Poor infrastructure and limited transportation options make an obstetric emergency a virtual death sentence. Ambulance services will not function neither in rural nor in urban areas(32). For instance, in an emergency setting, people use to hire a car and the cost is usually higher than a regular one, mainly if it is at night or in an area where cars are scarce (32). Nowadays the situation is getting worse, there a severe shortages of fuel which will lead to increase the transportation cost ten times more than the current cost. In addition few ambulances have been attacked during the conflict, mainly in Aden and Taiz (50).

3.3.4 Death on the way to hospital

The national health survey 2013 revealed that 17 % of maternal death happened on the way to the health facility (4). This is either due to the first delay determinants or delay in arriving to the health facility. Many factors contribute to the phase two delay such as poor communication and lack of information, people don't know which hospital they have to go to (32). From my own experience in many cases it takes hours to figure out a working hospital in a rural areas.

3.4 Findings of phase III delay: Receiving adequate treatment.

There is a strong correlation between emergency care at the health facility and maternal mortality. Receiving adequate treatment of obstetric care directly contributes to reduction of the maternal mortality ratio(2). According to the last YNHDS 2013, 39% of maternal deaths happen at the health facility compared to 24% death in the health facility in 2003(4,29). This section will examine the factors that contribute to an inadequate response of the health system to emergency obstetric cases. The possible explanation of the deaths in health facility due to emergency obstetric complication. First, delay in providing treatment due to many factors for example,

shortage of health staff, lack or shortage of drugs and equipment. Second, unqualified staff in dealing with emergency obstetric cases resulted in mismanagement and misdiagnosis. According to the monitoring obstetric handbook, a full functioning EmOC facility, is when the health facility provides a complete set of signal functions.

Table 4 Signal functions used to identify basic and comprehensive emergency obstetric care services (2).

Signal functions used to identify basic and comprehensive emergency obstetric care services		
Basic services	Comprehensive services	
(1) Administer parenteral antibiotics	Perform signal functions 1–7, plus: (8) Perform surgery (e.g., caesarean section) (9) Perform blood transfusion	
(2) Administer uterotonic drugs (i.e., parenteral oxytocin ²)		
(3) Administer parenteral anticonvulsants for preeclampsia and eclampsia (i.e., magnesium sulfate).		
(4) Manually remove the placenta		
(5) Remove retained products (e.g. manual vacuum extraction, dilation and curettage)		
(6) Perform assisted vaginal delivery (e.g. vacuum extraction, forceps delivery)		
(7) Perform basic neonatal resuscitation (e.g., with bag and mask)		
A basic emergency obstetric care facility is one in which all functions 1–7 are performed.		
A comprehensive emergency obstetric care facility is one in which all functions 1–9 are performed.		

EmOC services are assessed by a variety of indicators. These indicators are developed by international organizations mainly, WHO, UNFPA and UNICEF. It specifies the minimal acceptable level of EmOC services that should be available, to meet the need of emergency complications. In this regard, the availability of the minimal acceptable level is 5 EmOC facilities, at least one providing comprehensive services. This means that the facilities will be fully functioning. In terms of health cadres, drugs and equipment. In terms of time, it should be available all the time to women, nights, weekends, public holidays, it should be available 24/hour, 7days per week. In Yemen there is no assessment of the availability of EmOC

services nationally. NRHS 2011 -2015, indicated a severe shortage of reproductive health services including EmOC. The coverage of health services is 60% .It also reported that 26% of the health facilities were without drugs, 24% were without equipment, 7% were without health staff and 17% were without an operational budget(12).

Table 5 Public health facility in Yemen, 2009 (51).

Public health facility in Yemen, 2009.	
Facility	Number
Referral hospital	2
General Hospital	53
District Hospital	175
Health Center	791
Health Unite	2849
Total	3870

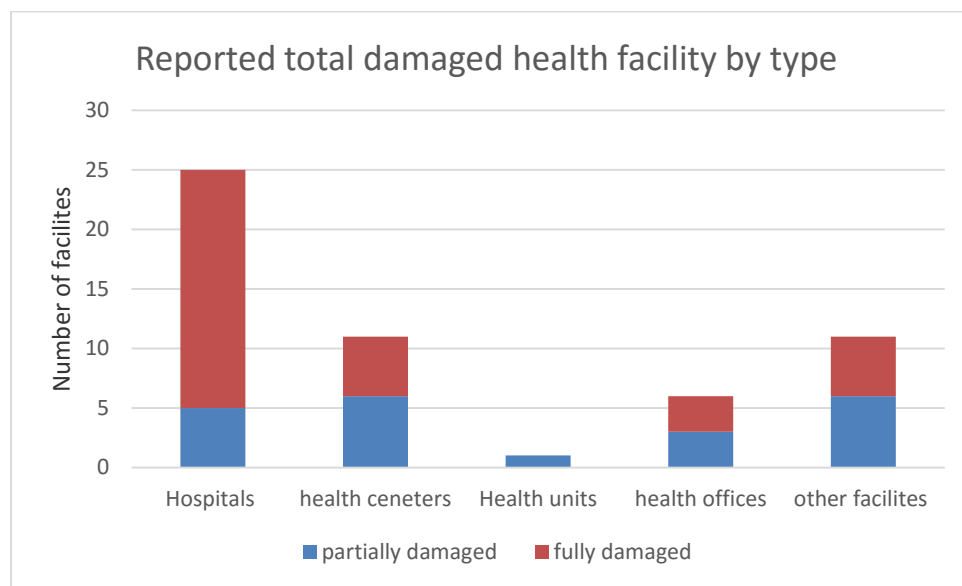
Health centers and health unites, which are present in the peripheral areas, provide only preventive services. Yemen has 333 districts and only 175 district hospitals, most of them not well functional and not providing the signal functions (12). Two assessments of EmOC services, carried out in 10 governorates in 2006, and the other in 2010, clearly stated that EmOC services are limited and the services are in underutilized.

The international acceptable level of Caesarian section is 5%-15%(2), it is an indicator of provision lifesaving services for mothers and newborns(2). In Yemen, the caesarian section procedure, is still practiced very low and below the international standard. According to the national reproductive health strategy, five governorates out of 22 have a C-section above 2% and 13 governorates below 1%. That means that complicated cases, which need an emergency intervention, did not get it. One explanation for that is maybe under reporting from the health facilities, underutilization of the services, however, this situation is not acceptable(12). The case fatality rate, for complication cases is still high, more than 1%. The referral system for emergency cases is weak and not functioning. There is no link between community midwives and the health system and there is no referral system between different levels of health system. Even though, there is no transportation between health facilities and if the patient is referred to another health facility for a higher intervention, they have to manage the transportation by themselves(12). The

presence of an effective referral system to handle emergency cases from the communities is very crucial in reduction of the maternal mortality. In countries, which depend on home delivery, if there is no link with the health facility that provides comprehensive emergency care, this will lead to a situation that women die if complications rise while they are in pregnancy or delivery.

In the current situation, health facilities were affected by the conflict. The latest report from the WHO shows that a total of 54-health facilities were damaged. This includes 20 hospitals fully damaged and five partially damaged, which assumes that they provide CEmOC(52). Figure below shows the affected health facilities.

Figure 9 Reported total damaged health facility by type (52)



3.4.1 Staffed facilities

Human resources for health is the backbone of the health system. Yemen lags below the international average of the health worker ratio to the population. The total number of health workers is 63147, around 52,267 are working in providing services and the rest is working in management(53). There are 0.36 doctors per 1000 population, 0.29 midwives per 1000 and 0.53 nurses per 1000 population(12,53). In addition, to the shortage of the health workers there is mal-distribution (45). Scattered population in small villages makes the delivery of the services, including human resources, immensely difficult and expensive (54). A rapid assessment of human Emergency Obstetric and Neonatal care resources gaps and need, that was conducted in 2012, shows a severe shortage of maternal health cadres. Seven % of all health facilities totally lacked staff.

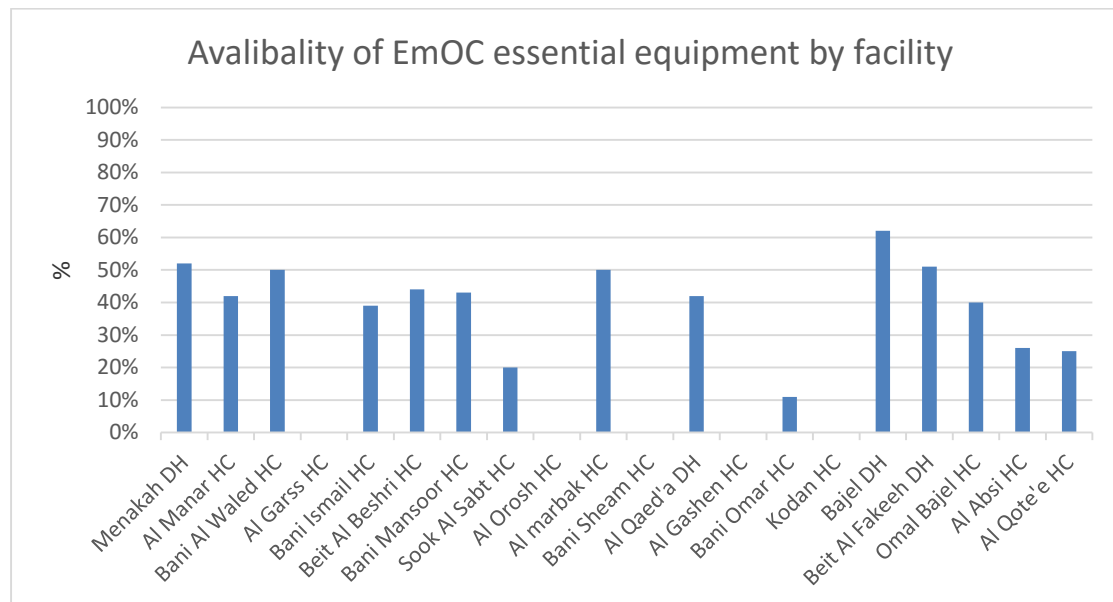
20% of human resources existed in rural areas were 80% of health facilities present and 80% of Human resource exist in urban areas were 20% of the health facility exist(12,45). According to WHO standards you need for every 175 births one midwife and for 3600 births, there is a need for a team with two doctors; one trained obstetric and other trained in neonatology/pediatric. Due to the culture, female cadres, mainly doctors, refuse to work in rural areas, sometimes it is difficult to find a female physician in night duty even in urban areas. This creates more challenges for hospital managers with limited financial resources, to recruit external female cadres. In general the male cadres represent 73% while females represent 27%(53). The new graduated cadres need to be trained in providing emergency obstetric care. Yemen has invested in training community midwives but this CMW needs continuous education and follow up. This shortage of the human resources for health, due to the absence of clear vision and decision, is not based on the information and data . There is no unified registration or licensing (55). High turnover of the staff, particularly high technical staff and staff at higher position like in director of the reproductive health department and at hospital management level. They moved to work in international organizations or migrated to neighbors countries. The training is not based on the needs or there are gaps and is done in randomized ways.

3.4.2 Equipped facilities

Availability of drugs and equipment for emergency obstetric care is directly linked to maternal mortality. The national reproductive health strategy revealed that 24% of the health facilities are without equipment and drugs and 17% are without an operational budget.(12,56). The shortage of drugs and lack of equipment leads to a poor health outcome. A need assessment carried out in 2010, targeted three governorates; Amran, Marab and Shabwa. The assessment targeted 44 hospitals and 53 health centers. Basic EmOC services where assessed in the health centers and comprehensive EmOCs where assessed in district and governorates hospitals. The findings show poor EmOC services and a lack of the minimal requirements and standards. For instance, basic EmOC services such as administration of parenteral anticonvulsant were rendered only in 53% and 23% of health centers respectively. Only 12% of the surveyed hospitals performed the caesarian section and 59%

provided blood transfusion services. Study also shows severe shortage of equipment and drugs. Drugs were available only in 9% of hospitals and 3% of health centers. This means, that the referred cases to the health facilities will not receive the appropriate treatment and intervention and will be in high risk to die. Findings from assessments in Ibb, Taiz and Hodeidah revealed that most of the surveyed facilities are not able to provide basic EmOC services, and no one of the 20-surveyed hospitals were well prepared to provide comprehensive EmOC services. Basic and comprehensive EmOC services are crucial in any program addressing maternal mortality. Delaying or not receiving emergency obstetric care is one of the main factors that contributes to a high maternal mortality ratio.

Figure 10 Availability of EmOC essential equipment by facility (34).



If the emergency obstetric care is functioning well, it means any case that arrives in the health facility will be well received and adequately treated. This will highly impact on the perceived of quality of care among the patients and will lead to an increase of the utilization of the health services.

4 Chapter Four: Evidence based interventions that have reduced maternal mortality in low and middle-income countries

Yemen has to accelerate the action in order to reduce the maternal mortality ratio. The new development goal adopted by the WHO for maternal mortality is to reduce maternal mortality to two third from the baseline from 2010 to 2030. Yemen has to adopt strategies and interventions that have been approved and work in other countries.

According to a systemic review on maternal mortality interventions, there is no single intervention that can reduce maternal mortality, adopting multi sector approach is crucial to achieve substantial progress(57,58).

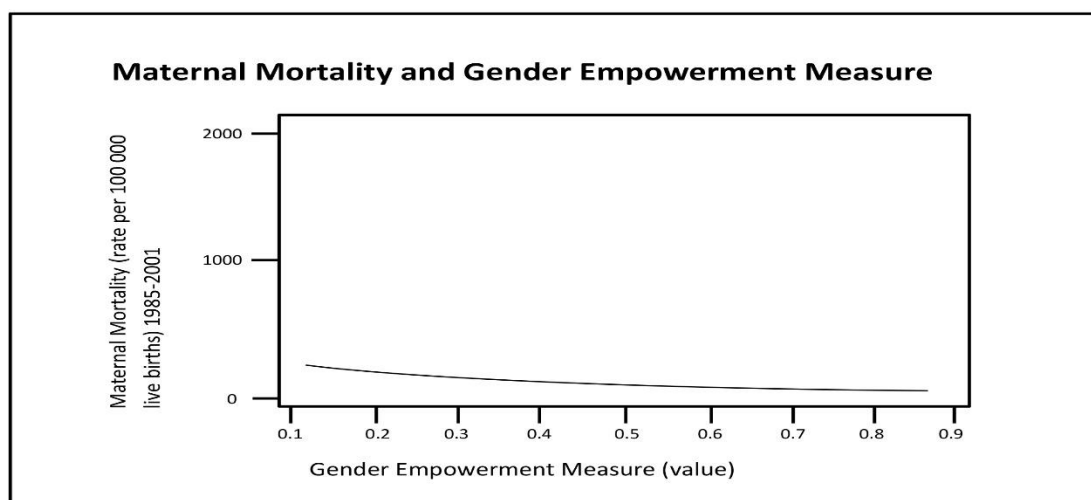
This chapter will review the main interventions from low and middle-income countries.

The selected interventions address the main findings in the three-delay model.

4.1 Empower women status: Eliminating inequities and disparities.

WHO in strategy toward ending preventable maternal mortality (EPMM) emphasized in investing in empowering women as ground ending the preventable causes(14). Empower women, girls, families, and communities is a guiding principle for this strategy(14). Different strategy used to empower women status education is in top of that. Here I will present the role of education in reduction maternal mortality. The figure below shows the correlation between gender empowerment and reduction in maternal mortality.

Figure 11 Maternal Mortality and Gender Empowerment Measure(59)

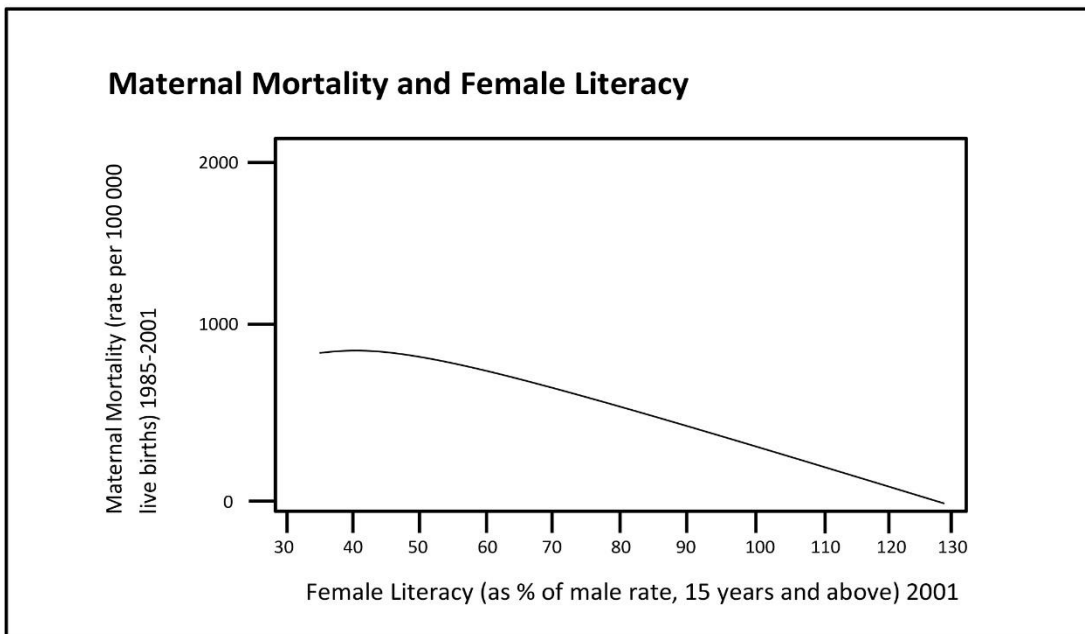


Best fit curve for data correlating maternal mortality and Gender-Empowerment Measure

Education:

Several studies have shown that enrolled women in education will positively affect the maternal situation. A worldwide survey named "Female education and maternal mortality" analyzed data from 148 countries. The study concluded that investing in education has a great impact in the reduction of maternal mortality(59). The figure below shows the correlation between maternal mortality and education.

Figure 12 Maternal Mortality and Female Literacy(59)



Best fit curve for data correlating maternal mortality and female literacy

Another cross sectional study, conducted in three countries; Kenya, Nigeria and Zimbabwe, is consistent with the previous study(60).

4.2 Financial support

Evidence from systemic reviews have shown that user fees reduce utilization of services(61). When the introduced fees are not accompanied by an improvement of the quality of services this will lead to underutilization of services(62). As shown in the findings, the cost of the maternal services is one of the main determinants that deter women from taking decisions to seek health care. Some

initiatives aimed to address and overcome the financial obstacles that deter women from utilizing the health services.

There are different ways to support women. Here we will present some of these approaches implemented in other countries.

Free fees policy:

In Burkina Faso, evidence shows that when introduced, the free fees policy, for maternal services, has a positive effect on the health seeking behavior. The utilization of maternal services increased from 49% before the free policy up to 84% after the policy was put in to place(63). Another study stated that the introduction of the free services may compromise the quality of the health services.

A study In Senegal shows that the rate of the caesarian section increased from 4.6 % to 5.6 % after one year of fee exemption .

In contrast, some studies have shown that free fees policy may lead to reduced utilization if it goes not hand in hand with an improved quality of services.

Demand-side Financing Maternal Health Voucher Scheme

In Bangladesh, the government adopted different strategies to increase the utilization of the health. A pilot project called "Demand-side Financing Maternal Health Voucher Scheme' (MHVS) (64) aimed to overcome the financial barriers among the poorest women in accessing health services. The MHVS is implemented in 33 sub districts in Bangladesh, and introduced two mechanisms to select the beneficiaries. In nine sub districts, all pregnant women enrolled in the project. In 24 sub districts, women have been selected based on criteria. The criteria are as follow; resident in the target area, first or second pregnancy, household income less than 38,5 \$ per month, functionally landless (less than 6543 square feet of land) and do not have other assets. Table below shows the services that are covered by the voucher.

Table 6 List of services covered by the vouchers and the reimbursement rate (64).

List of services covered by the vouchers and the reimbursement rate	
Voucher service components	Reimbursement rate (US\$)
Registration	0.15
Lab test for 3 ANC visits : 2 blood and 2 urine tests	2.15
Consultation fees for 3 ANC visits and 1 PNC visit	3.07
Conduct of safe delivery and safe delivery	4.61
Medicine	1.54
Forceps/ Manual removal of placenta /vacuum extraction	15.38
Eclampsia management	15.38
Caesarean section with medicine	92.3
Transportation to referral facility	7.7
Referral fee from sub -district to district level	
Gift to pregnant women and baby after delivery at facility	7.7
Incentive to mother after delivery at facility	30.76

It is explicit that the vouchers cover all the services that women may need to safely deliver, and it covers the transportations cost as well. The voucher scheme has a positive impact on the public health sector. It encourages the public sector to improve the quality of health services(64).

4.3 Maternal Waiting Home (MWH)

Second delay determinants include the transportation, travel distance to overcome this delay. We have two options. First option to bring the health facility close to the women, this will be discussed in combination with the third delay. Second option is to bring the women or potential patients near the health facility.

Maternity waiting home are designed to bring the pregnant women near the health facility just days prior to delivery. Women stayed in the MWH until the labor starts, then they move to the health facility. There are different strategies to select the women. Some are based on screen for high risk during antenatal care, others consider the

distance from the health facility as criteria for selection(65). In Zimbabwe, use of MWH increased the opportunity of women to deliver under skilled health personal to six times(65). However, women complained about a crowded and unclean place.

There is no strong evidence on the impact of the MWH in the reduction of the maternal mortality. Nevertheless, this could be a short-term strategy to overcome the geographical barriers in accessing obstetric care(65).

4.4 Improve the quality of EmOC.

A systemic review and international organizations emphasize that EmOC services are the foundation and corner stone in reduction of maternal mortality. Interventions should guarantee availability, accessibility, acceptability and quality of EmOC services. There are many projects implemented in different countries that opted different strategies to improve EmOC. I will present one example from Nepal.

The women's right to live and health project, implemented in Nepal. It is aimed to improve the quality, availability and utilization of EmOC (66). In other words overcome the phase III delay. The project activities focused in upgrading the existing health facilities, in order to meet the need. The targeted area lacks the essential EmOC and is low ranking in development. Therefore, eight health facilities have been selected; four hospitals and four primary health care centers. The following activities have been implemented(66).

Baseline assessment of EmOC according to UN indicators equipped the health facilities with the essential infrastructures and in some facilities construction of laboratory, delivery rooms. Recruiting health staff to bridge the gaps and providing training in EmOC for different health professionals(66). Advocacy for the project took place at local and national level. Targeted communities were involved through raising awareness, establishing of a revolving fund for transportation. Also trained midwives from the community. The result of the project after 5 years are as follows. The need for EmOC has been met from 1.9 % to 16.9%(66). The proportional of birth that took place in EmOC facilities has increased from 3.8% to 8.3%(66). The case fatality rate has dropped from 2.7% to 0.3 %. In conclusion, the project adopted a holistic approach to overcome the barriers that led to three delays.

4.5 Minimal Initial Services Package (MISP) in conflict situation.

Minimal Initial Service Package (MISP) for reproductive health in conflict situation. The MISP is guiding the provision of reproductive health services in conflict areas. It's aimed to reduce mortality, morbidity and disability at an early phase of crises, targeting most vulnerable groups particularly, women and girls(21). It is composed of a cluster of activities within five components. In regard to maternal mortality MISP focused on providing emergency obstetric care to the people affected by conflict. The MISP has been implemented in many areas affected by conflict. For instance, it has been implemented in Zaatari camp and Irbid city for Syrian refugees in Jordan(67). An assessment conducted in Zaatari and Irbid, shows that adopting the MISP approach led to secure funding to implement the activities and made the services available (67).

5 Chapter Five: Discussion

This study sought to explore the determinants that contribute to high maternal mortality in Yemen. We used the three-delay model to examine the main determinants that contribute to maternal deaths. The three delay attributes maternal mortality to delay. This delay could be at the level of the community or at the level of the health system.

We have found that the determinants are strongly related to each other. Maternal mortality from obstetric complications is the result of the three delays. Here I will present the main findings; the author decided to present the findings into two sections. Section one will discuss the determinants related to social culture and economic at community level and section two will discuss health system determinants.

Limitations of the three-delay model should be taken into account while reading the discussion.

5.1 Socio – Cultural and Economic Determinants

The Literature shows an array of determinants affecting the decision-making at the community level, which led to phase one delay. Generally, gender inequity and the lower position of the women in the social hierarchy is a main determinant in delaying. The illiteracy rate is still high among girls in Yemen. Inequity between urban and rural area is explicit. Women in rural areas have less chance to enroll in schools, to get jobs. Seventy percent of the population lives in rural areas. Therefore, eighty percent of maternal deaths occur in rural areas compared to 20% in urban areas.

Although obstetric complication is an urgent issue and the window to get treatment in some cases is very short, like in hemorrhage; two hours between the onset and death. Women still need permission from their husbands or others family members. Women are not allowed to go to the health facility alone, or without a male companion what is called "Mahram". The Low status of women in the family and the power relationship is influenced by other factors. Studies have shown that education of the women is a main determinant in the decision making process. Educated women have a better

environment in terms of taking decisions regarding place of delivery. Confidently, from the literature it's become clear that when women are enrolled in the education, this will contribute to reduction of the maternal mortality ratio.

Interestingly, a good percentage of women can recognize the danger signs of pregnancy, but still they are not going to the health facility. This means we have to pay attention to the level of knowledge, or power of other factors in decision to seek care. About 25% of the women cannot afford the costs of the maternal health services. The financial barrier plays a role in delay or prevents women from seeking health care. Cost sharing policy, which was adopted in 1999 leads to underutilization of the services. There is no national health insurance, only 1% of women covered by private insurance companies. The demand side supply financial support such as, Voucher scheme is one of the interventions that, if adopted in underserved areas, will help in increase utilization of maternal health services.

5.2 Health System Determinants

Studies have shown, that Yemen has a poor health system. The health services coverage is only 60%. Inequality in distribution between rural and urban areas is a major concern. There is mal-distribution of health facilities and human resources between rural and urban areas. Poor governance, lack of monitoring and evaluation, improper use of the available resources and ignoring the role of the private sector, all together contribute to the poor outcome. About 39% of maternal deaths occurred in the health facilities that are supposed to save lives. This means the quality of the services need to be improved.

The minimal requirement for EmOC set by the WHO, UNFPA and UNICEF are not met. An assessment has shown, that the majority of the health facilities, that are supposed to provide EmOC services, are not function. Shortage of staff and lack of equipment are the main determinants that account for inadequate treatment in the emergency obstetric care. An assessment shows that 80% of the health cadres are present in the urban areas. This requires adoption of policies that attract health cadres to work in rural areas, and

coordinate with educational institutions to enroll students from rural areas. Increasing the production of female cadres is also very important to increase the utilization of the emergency obstetric care. Scale up of the existing health facilities can bridge the gaps on providing emergency obstetric care. The current conflict aggravated the poor situation of the health services. About 54 of health facilities were affected by conflict, add more challenges and barriers to health system.

5.3 Limitations of the Study

The Thaddeus and Maine three delays model (1994) helped in analyzing the influencing factors of maternal mortality in Yemen. It studies factors both at individual and community and at the health services level. However, the three delay model applies only to the emergency situation of pregnancy related complications. The other contributing factors, like early marriage, abortion, family planning and policies and governance issues could have been studied by adapting the framework accordingly, which has not been done in this thesis.

Conflict is an emerging issue related to the health system in Yemen. The effect of the current conflict on the determinants could not be studied separately and has been included in the findings as and when relevant. The security situation, conflict and loss of communication tools hampers collecting some of the data from the Ministry of Health and others sectors.

6 Chapter Six: Conclusions and Recommendations

Conclusions:

Maternal mortality is not only a health problem; it is a result of a variety of determinants. Studying the main determinates contributing to maternal mortality in Yemen is crucial in understanding the root causes and adopting appropriate strategies. Findings show that women's status is the main social factor, lack of female power and gender inequity leads to phase I delay. Poor emergency obstetric care plays a dual role in delays. It affects the decision among women due to poor perception of the quality of care. At the same time, it leads to delay in receiving adequate treatment when women arrived to the health facility. In order to overcome the main barriers leading to the three delay a multi sector approach should be adopted, involvement of the community and NGOs.

At policy level:

1. The government should work on increasing the enrollment of girls in education and increase employment opportunities for women.
2. The Ministry of Health should conduct a national assessment of emergency obstetric care. The best way to conduct the assessment is to closely coordinate this with international development partners, namely WHO, UNFPA, and USAID.
3. The Ministry of Health should review the current strategies, and policies addressing the maternal mortality, and subsequently adapt them as needed.
4. There is an urgent need to integrate the maternal services into the primary health care service at management level. This could be done by: restructuring or establishing a committee from both sectors; population and primary health care. The committee should be responsible for coordinating/harmonizing and making a link between both sectors.
5. Update the civil registration system and include maternal deaths in the system; this should preferably be done by the Ministry of the Interior.
6. The Ministry of Health should conduct assessments of human resources in maternal health, and should address the gaps between rural and urban areas. This could be done by adopting

strategies to attract and retain health workers to work in rural areas.

7. Investments in health should move toward rural areas and the most vulnerable population.
8. Involve different stakeholders; mainly local NGOs working in maternal health and the private sector. Involvement should not only be limited to the policy level. It should also involve in the whole process.
9. The Ministry of Health should conduct assessments of the effects of the current conflict on maternal health. This includes health services targeting women and human resources.

At services level:

1. Ministry of health should increase the coverage of emergency obstetric care to meet the minimal standard. This can better be done by scaling up the current health facilities.
2. Qualified midwives in the rural areas by implementing training programs, which takes into account the quality of the training based on the training needs assessment.
3. Strengthen the referral system between the midwives and health system, and between the different levels of the health system.

At community level:

1. Raise the awareness of communities on women's rights, empower the women's decision making power regarding her maternal health.
2. Encourage the community led initiatives such as the livelihood projects to increase the generation of income, in preparedness for delivery transportation, financial support to deal with emergency obstetric care.
3. Strengthening the role of the community leaders, root organizations, local authorities and other stakeholders to play a role in dealing with the main obstacles, such fuel shortage and lack of means of transportation.

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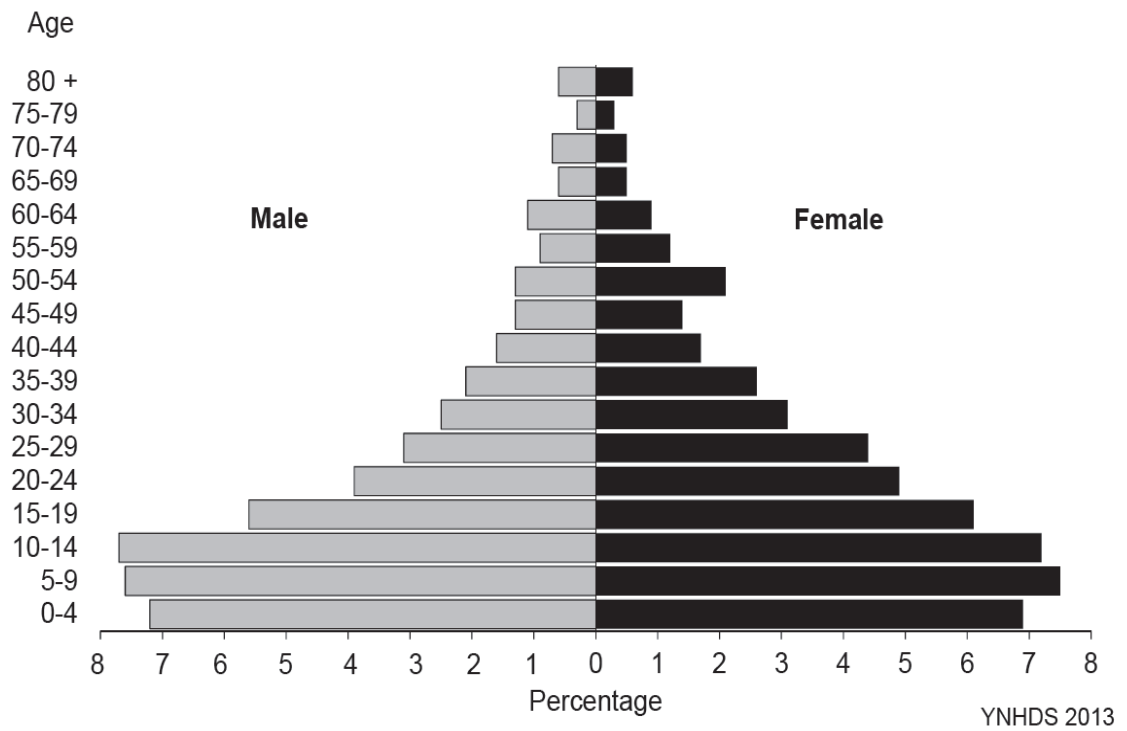
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8 Annexes

Annex I: population Pyramid



Annex II: Burden of disease in Yemen, 2010.

NO	Disease	Years Of Life Lost (%) of total
1	Lower respiratory Tract Infections	1,496 (19.1%)
2	Diarrheal Disease	1,120 (14.5%)
3	Congenital anomalies	720 (9.4%)
4	Preterm birth complications	637 (8.5%)
5	Ischemic heart disease	319 (4.2%)
6	Stroke	270 (3.6%)
7	Malaria	276 (3.6%)
8	Road Injuries	207 (2.7%)
9	Neonatal encephalopathy	152 (2%)
10	Protein energy malnutrition	146 (2%)