MATERNITY WAITING HOMES AND THE IMPACT ON MATERNAL MORTALITY

IN DEVELOPING COUNTRIES: A RAPID EVIDENCE ASSESSMENT

by

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF PUBLIC HEALTH/MASTER OF SCIENCE IN NURSING

in

THE FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

October 2019

The following individuals certify that they have read, and recommend to the Faculty of Graduate and Postdoctoral Studies for acceptance, a thesis entitled:

Maternity Waiting Homes and the Impact on Maternal Mortality in Developing Countries:
A Rapid Evidence Assessment

submitted by   Stephanie Michelle Powell   in partial fulfilment of the requirements for

the degree of   Master of Public Health/Master of Science in Nursing

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Abstract

The World Health Organization estimates that nearly 830 women die each day from preventable causes related to pregnancy and childbirth, with 99% of all maternal deaths occurring in developing countries. Maternity waiting homes (MWHs) are an intervention dating back to the 1950s, aimed at improving access to emergency and specialized maternity care. Often a stand-alone health care facility located near a larger medical centre or hospital with emergency and high risk maternity services, they provide a safe place for women to stay towards the end of their pregnancies to await the onset of labour. Once a woman goes into labour, she can be quickly transferred to the local hospital for a safe delivery. The facilities have been viewed as a low cost solution to decentralize obstetrical services and improve access to skilled care. However, very limited research has been conducted examining MWHs and their impact on maternal mortality.

The purpose of this study was to examine previously published literature to identify the impact MWHs have had on reducing maternal mortality. This study also examined the factors that have been found to influence a woman's decision and ability to use a MWH. A Rapid Evidence Assessment was conducted examining literature published between 1994 and September 2018. A total of 16 studies were identified, analyzed and critically appraised using three appraisal tools.

The research evidence indicates that MWHs provide a protective effect against maternal mortality. Thematic analysis revealed six main factors that influenced a woman's decision and ability to access a MWH; 1) distance and accessibility; 2) transportation issues; 3) financial costs; 4) physical aspects of MWHs and the services provided; 5) cultural practices/restrictions; and 6) unfamiliarity about the existence of MWHs.

Findings from this REA add to a greater understanding of MWHs and their impact on maternal mortality, reaffirming the notion that MWHs continue to be a viable and effective intervention. However, further research is warranted to examine other health outcomes aside from maternal mortality, and ways that MWHs can be improved to better meet the needs of women.

Lay Summary

Maternity waiting homes (MWHs) are a low cost intervention aimed at improving access to maternity care in developing countries. Typically serving as a separate facility, within close proximity to a larger medical centre or hospital, MWHs offer a safe place for women to stay towards the end of their pregnancy to await the onset of labour. Once in labour, women can be quickly transferred to the local hospital to safely deliver their baby. Despite the existence of MWHs dating back to the 1950s, limited research has been carried out examining their impact. This REA analyzed and synthesized current research providing a greater understanding of the impact MWHs have on maternal mortality and offering insight into the factors that influence a woman's decision and ability to use a MWH. The findings suggest that MWHs remain a vital intervention, improving access to maternity care and reducing maternal deaths, in developing countries.

Preface

This thesis is original, unpublished, independent work by the author, Stephanie Michelle Powell. I identified a topic of interest and discussed with Dr. V. Susan Dahinten. Together, we identified the research design, narrowed the focus of my chosen topic and developed the two main research questions. I worked in close collaboration with UBC librarian Katherine Miller to develop an effective search strategy. I conducted the literature review, screened and critically appraised the selected studies, and wrote Chapters 1 to 5, with guidance and edits provided by my supervisory committee of Dr. V. Susan Dahinten, Dr. Geertje Boschma, and Dr. Wendy Hall.

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List of Abbreviations

CASP	Critical Appraisal Skills Programme
CRVS	Civil Registration and Vital Statistics
ICU	Intensive Care Unit
km	Kilometres
MDGs	Millennium Development Goals
MeSH	Medical Subject Headings
min	Minute(s)
MMR	Maternal Mortality Ratio
MSSM	Maryland Scale of Scientific Methods
MWA	Maternity Waiting Area
MWH	Maternity Waiting Home
NGO	Non-Governmental Organization
OR	Odds Ratio
RCT	Randomized Controlled Trial
SBA	Skilled Birth Attendant
SDGs	Sustainable Development Goals
TM	Traditional Midwife
UN	United Nations
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Emergency Fund
WHO	World Health Organization
WoE	Weight of Evidence

Acknowledgements

I wish to express my sincere appreciation to the members of my thesis supervisory committee, Dr. V. Susan Dahinten, Dr. Geertje Boschma, and Dr. Wendy Hall for their invaluable knowledge, guidance and support throughout this Master's thesis. A special thank you to my primary supervisor Dr. Dahinten, for her unwavering support of my graduate studies and career. She encouraged me to pursue my passion of global health, leading me to complete a Diploma in Tropical Nursing at the London School of Hygiene and Tropical Medicine while completing my MPH/MSN program at UBC. I am forever grateful for your flexibility in helping me to finish this thesis whether I was living in Vancouver, London, or Calgary. Your guidance, support and mentorship has been invaluable in challenging me throughout the research and writing phases. I am grateful for your insightful feedback, expert knowledge and attention to detail allowing me to grow as an academic scholar.

To Dr. Boschma and Dr. Hall, your timely, thorough, and highly useful feedback was instrumental in improving the quality of this thesis. Your knowledge, expertise, patience and ongoing support were vital in helping me to see the finish line of the thesis process. I would also like to thank Katherine Miller, who spent countless hours working with me to perfect my literature search.

I am extremely grateful for all the support I received from my friends and family. I want to thank my friends, in particular my MPH cohort (2017) with whom I shared many laughs and tears, as well as my LSHTM friends and my work colleagues who were relentless in their support and encouragement to finish this thesis! To my family, thank you for your continuous and unparalleled love, help and support, and for continuing to cheer me on, on what may have seemed like a never ending journey. A special thank you to my mom for her support as she listened to endless conversations about my thesis, made sure she always had time to read something over for me, providing input from a non-medical perspective and gave me invaluable advice along the way.

Finally, I wish to acknowledge the financial support from Alberta Health Services, the Alberta Registered Nurses Education Trust, Canadian Institute for Health Research, Dr. Beverly O'Brien, and the University of British Columbia. The scholarships I received allowed me to step away from my career for nearly three years, move to Vancouver and then to London to pursue graduate studies and my passion for global maternal health.

To my family,

for your unconditional love, support and

never ending encouragement throughout this journey.

Chapter 1: Background and Research Question

1.1   Introduction

The World Health Organization (WHO) estimates nearly 830 women around the world die from preventable causes related to pregnancy and childbirth each day (World Health Organization (WHO), 2015a). Maternal health has been a topic at the forefront of many large health initiatives over the last three decades, especially in developing countries. Despite the increased awareness and commitment from international organizations such as the United Nations (UN) and WHO to make maternal health a global priority, the number of women dying continues to remain high (United Nations Development Programme (UNDP), 2016; WHO, 2015a).

Approximately 75% of all maternal-related deaths occur as a result of complications during and after pregnancy and childbirth. The most common complications include severe bleeding/hemorrhage, infections including sepsis (typically after childbirth in the postpartum period), high blood pressure during pregnancy (pre-eclampsia and eclampsia), prolonged labour or complications from delivery, or complications as a result of an unsafe abortion (WHO, 2015a). Complications can be reduced with appropriate maternity care provided by trained health professionals, throughout all stages of a woman's pregnancy and birth (van Lonkhuijzen, Stekelenburg, & van Roosmalen, 2012; WHO, 2015a). Access to health care services, including specialized services at facilities equipped with the proper equipment and staff able to care for these conditions, is essential in treating complications and reducing the number of maternal deaths (Pan-American Health Organization (PAHO) Foundation, 2010). Numerous barriers can limit a woman's ability to access care, including poverty, geography/distance to medical care, lack of information, inadequate health services, and cultural practices or restrictions (Browne, 2010; WHO, 2015a).

Rural women face greater challenges in obtaining education and skilled jobs due to the local physical and geographic barriers (Annis & Patterson, 2015; United Nations (UN), 2012). Rural jobs tend to be shorter in length, more precarious, and lower paying than their urban counterparts which increases the risk of poverty (Food and Agriculture Organization of the United Nations, 2011; UN, 2012). Increased poverty among women living in rural and remote communities further hinders their ability to access care compared to women who live in urban settings. The inability to easily access timely medical care due to factors such as distance, lack

of transportation, or cost contribute to the increased rates of maternal mortality and morbidity among women living in poorer and more rural and remote locations (WHO, 2015a).

Distance to a health centre or hospital with specialized services, and physical geography play a large role in the ability to access preventative, routine, or emergency medical care. These physical barriers become an even larger issue in regions with poor road conditions and lack of public transportation systems. Although physical barriers to care are present in most countries around the world, they tend to predominately affect developing countries, where poor roads and infrastructure are common, and health care facilities are often working over capacity with limited staffing. The WHO reports that globally 99% of all maternal deaths occur in developing countries (WHO, 2015a).

The Safe Motherhood Initiative, established in 1987, illuminated the high rates of maternal mortality occurring around the world, but especially in Sub-Saharan Africa. The UN's Millennium Development Goals (MDGs), established in 2000, placed a significant emphasis on reducing the maternal mortality ratio by 75% over a 25 year period from 1990 and 2015 (UN, 2015). Significant strides were made in improving maternal health over the MDGs' timeline, although its end goal was not met. The Sustainable Development Goals (SDGs) set up to continue the work of the MDGs over the next 15 years, until 2030, aim to further improve maternal health and reduce the number of maternal deaths (UNDP, 2015). Many interventions and programs have been established at local community levels to help improve access to care and reduce complications during pregnancy and childbirth, in an attempt to improve maternal health and prevent deaths. Nonetheless, further evaluation of the effectiveness of such programs is needed.

Maternity Waiting Homes (MWHs) are an example of one intervention commonly used in many global programs dating back to the 1950s. They have been used in various settings and capacities around the world to allow women better access to specialized maternity care and to prevent women from remaining in hospital during their pregnancies (van Lonkhuijzen et al., 2012; WHO, 1996). They constitute a unique intervention that can be carried out within the community setting; their continued use suggests MWHs are an effective and low cost solution to decentralize obstetrical services in developing countries. Decentralization of obstetrical services allows women from rural or remote communities to improve access to specialized care, not previously accessible, due to factors such as physical geography and distance to care (WHO,

1996). Therefore, examining the evidence with regard to the effectiveness of MWHs could inform promotion of this approach to enhance access to maternity care for women in predominantly poor, underdeveloped, and remote areas. A Rapid Evidence Assessment is an appropriate approach to examine this evidence, which is the focus of this thesis.

1.2   Purpose

The purpose of this Rapid Evidence Assessment (REA) was to examine previously published studies, and grey literature pertaining to MWHs to indicate their effects on reducing maternal mortality and improving access to care in developing countries. Examining previously published literature permits better understanding of MWHs, previous research conducted, and gaps in research in this understudied area of maternity care. More specifically, the aim of this REA was to examine the effectiveness of MWHs on reduction of maternal mortality rates (often recorded as maternal mortality ratios) after implementation of a MWH. In addition, it examines factors that have been found to influence women's decisions and subsequent abilities to use a MWH. Understanding the use of MWHs within developing countries, and their impact, may assist policy makers and practitioners to make decisions regarding further implementation and continuity of MWHs, and inform quality improvement efforts. A greater understanding of MWHs could also provide evidence about potential alternatives that may be used to improve maternal health in developing countries.

1.3   Research Question

The two main research questions that are addressed in this REA are: 1) What impact do MWHs have on maternal mortality? and 2) What factors influence women's decisions and abilities to use a MWH in developing countries?

To conduct this REA, the author analyzed published evidence within existing peer-reviewed literature, as well as additional grey literature on the topic of MWHs in developing countries.

1.4   Thesis Organization

This REA report is organized into five chapters. Chapter one provided an introduction to the topic and identified the purpose and REA research questions.

Chapter two provides background information related to previous and ongoing global maternal health initiatives and an overview of MWH history. Identification of a gap in knowledge related to effects of MWH use and women's uptake is reported and provides the

context for the REA. The 'Three Delays Model' by Thaddeus and Maine (1994) is introduced as a theoretical framework to guide the analysis of published literature on the topic of MWHs.

Chapter three describes REA methodology and provides a justification for its use in this thesis. It explains the search strategy undertaken including search criteria, inclusion and exclusion criteria, search process, selection of studies, data collection, and critical appraisal and scoring methods.

Chapter four presents the key findings synthesized from the studies analyzed in this REA, and organized by research question and theme. Each theme is discussed, with support of the findings and identification of the context from which they were extracted. The chapter concludes with an exploration of the areas where gaps remain in the themes identified.

In chapter five, I summarize the key findings of the REA and discuss how the findings align with Thaddeus and Maine's 'Three Delays Model'. I identify the strengths and limitations of this REA and discuss how findings could be used to inform the work of clinicians, administrators, researchers, and policy makers in terms of addressing maternal health issues in areas where MWHs exist and areas where MWH use could be beneficial. I also suggest implications for future maternal health initiatives in an SDG era, summarize the conclusions drawn, and highlight areas for further consideration and future MWH research.

Chapter 2: Context for the Rapid Evidence Assessment

2.1   Maternal Mortality and the Safe Motherhood Initiative

Maternal mortality is defined as the death of a woman occurring during pregnancy, childbirth, or within 42 days after delivery or termination of pregnancy (WHO, 2015a). Maternal mortality affects people of all religions, races, and socioeconomic classes in all regions of the world, but tends to disproportionately affect women in developing countries. Maternal mortality is a broad topic in the field of global health.

The Safe Motherhood Initiative was the first large scale project aimed at raising awareness about the large number of women who die each year from complications related to pregnancy and childbirth. The program was established in 1987 at the Safe Motherhood Conference in Nairobi through a cooperative effort of three United Nations (UN) agencies, the United Nations Populations Fund (UNFPA), the World Bank, and the World Health Organization (WHO). The initiative challenged the world to reduce the maternal mortality rate by half by the year 2000 (Mahler, 1987; Rosenfield, 1997; Starrs, 2006; WHO, 1996). The initiative also led to the establishment of the Safe Motherhood Inter-Agency Group, a partnership of international and national agencies working together to raise awareness of the Safe Motherhood Initiative and promote improved maternal health in developing countries (Starrs, 2006).

In addition to access to life-saving emergency services should complications arise and an overall improvement in the quality of safe maternal care, access to care throughout the continuum of a woman's pregnancy and postpartum period was the major objective of the Safe Motherhood Initiative (Mahler, 1987; WHO, 1996). The initiative presented three realistic and possible ways to improve access to obstetrical services in many poor and underserved areas: 1) Bring medical services to women in need, 2) Bring women to medical services (emergency transport access for those in need), and 3) Decentralize care so women can have easier access to care. In particular, using MWHs to decentralize care was suggested as a viable option; they had been used in many low-income countries for a number of years as a low cost way to position women close to medical care during their pregnancies (WHO, 1996).

In the late 1990s, around the initiative's 10th anniversary, the inter-agency group found its stride, developing 10 action messages for safe motherhood and collaborating on a large advocacy campaign that markedly increased the awareness and support for maternal health (Starrs, 2006).

Despite the improved progress after a slow start, the initiative failed to reach its aim of reducing maternal mortality by 50%. A number of factors hindered its success including: a lack of support from donor organizations, a lack of a clear strategic focus, and lack of adequate leadership to oversee the development and implementation of certain projects (Maine & Rosenfield, 1999; Starrs, 2006). The Safe Motherhood Initiative encompassed four broad pillars of care including: 1) family planning; 2) antenatal care; 3) intrapartum and postpartum care including a clean and safe obstetrical delivery; and 4) access to high risk obstetrical care (Maine & Rosenfield, 1999; WHO, 1995). The four pillars of care were intended to be achieved through the improvement of basic maternity care as an extension of overall improvement to primary health care and the equity of women (Maine & Rosenfield, 1999; WHO, 1995). While all worthy objectives, the four pillars, plus the aim to improve primary health care and overall equity of women, proved to be too broad a focus for the initiative (Maine & Rosenfield, 1999). Furthermore, there does not seem to be a consensus on the number of deaths the initiative helped to reduce because maternal mortality data collection remained poor, which still plagues the international community (Alkema et al., 2016; Graham, & Hussein, 2007; Starrs, 2006; Zureick-Brown et al., 2013). The Safe Motherhood Initiative was instrumental in bringing maternal health issues to the forefront of international issues, leading to its inclusion under the fifth Millennium Development Goal (MDG) of "Maternal Health".

2.2   The Millennium Development Goals

United Nations Millennium Development Goals (MDGs) were a set of eight goals all 189 UN member states agreed to try to achieve by the end of 2015. The MDGs were established through the signing of the Millennium Declaration in September 2000. The Millennium Declaration is a global partnership among all member states and their leaders, aimed at improving health for all, over a 25 year span from 1990-2015 (WHO, 2016a). The 25 year timeline included a retroactive period dating back to 1990, 10 years before the Millennium Declaration was signed. The inclusion of a retroactive period, allowed for the use of global

baseline data from 1990, from which global and individual country targets could be created (Kumar, Kumar, & Vivekadhish, 2016)[1].

The MDGs aimed to combat poverty, hunger, and environmental degradation, in addition to eliminating discrimination against women and improving maternal and child health. A total of eight goals, 21 targets and 60 indicators measuring progress towards each goal were established (UNICEF, 2014). The eight MDGs were: 1) to eradicate extreme poverty and hunger, 2) to achieve universal primary education; 3) to promote gender equality and empower women; 4) to reduce child mortality; 5) to improve maternal health (reduce maternal mortality); 6) to combat HIV/AIDS, malaria, and other diseases; 7) to ensure environmental sustainability; and 8) to develop a global partnership for development (UN, 2015; WHO, 2016a).

Each goal and subsequent targets were interrelated; all eight goals were seen to be related to poverty. Thus, the underlying goal of the MDGs was to eliminate poverty which, in turn, was expected to improve other predominant global health issues (UNICEF, 2014). The MDG initiative also aimed to bring developed and developing countries together to work cooperatively to improve health and development at both a national and international level (UN, 2015; UNDP, 2015). One of the questions raised about the MDGs is whether the goals were truly intended to be global rather than national targets. Expecting each country to reach the same global target has been critiqued as unrealistic given the disparities in development among countries, particularly when there has been little aid or guidance to countries on how to achieve the outlined targets (Vandemoortele, 2011).

2.3   Millennium Development Goal #5: Improve Maternal Health

The fifth MDG, which was aimed at improving maternal health and access to care globally, consisted of two targets focused on the need to improve the overall reproductive health of women. The first target aimed to reduce maternal mortality, measured by the maternal mortality ratio (MMR), by 75%, from 1990 to 2015; the second target was to achieve universal access to reproductive health by 2015 (Sustainable Development Goals Fund, nd, p.5; UNICEF, 2014). Both were lofty targets to achieve over the timeframe. Neither of these targets was met

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[1] A series of UN led conferences in the 1990's was the precursor that led to the signing of the Millennium Declaration, introduction of the MDGs and resulted in the collaboration of several UN agencies including: the United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), World Health Organization (WHO), United Nations Children's Fund (UNICEF), and the United Nations Educational, Scientific and Cultural Organization (UNESCO), aimed at tackling global economic, social and environmental issues.

by the goal end date of September 2015, but substantial improvements to maternal health in all regions of the world were seen over the 25 year period. The global MMR declined from 380 deaths per 100,000 in 1990 to 210 per 100,000 in 2013, a decline of 45% worldwide; the major reduction occurred in the last 15 years, since 2000.

Southeast Asia had the largest decline in MMR with a 64% decrease, followed by Sub-Saharan Africa with a 49% decrease (UNDP, 2015). The number of births attended by skilled health personnel also increased from around 59% of births in 1990 to more than 71% of all births in 2014. Northern Africa saw the largest increase in antenatal care; the proportion of women receiving the WHO recommended four antenatal care appointments or more increased from 50% in 1990 to 89% in 2014. Finally, prevalence of contraceptive use among women aged 15-49 was reported to have increased from 55% to 64% between 1990 and 2015 (UNDP, 2015). All were significant gains in maternal health issues, yet room for continued improvement was identified. It is also important to the note the reported statistics are based on data supplied by each country; maternal mortality monitoring and reporting varies from country to country.

In 2016, the WHO reported that reliable civil registration and vital statistics (CRVS) systems are lacking in nearly 60% of countries around the world (WHO, 2016b). Even among countries that have registration and vital statistics monitoring, it is estimated that only 51% of countries have data on maternal causes of death (Maternity Worldwide, 2015). The WHO, UNICEF, UNFPA, the World Bank, and the United Nations Population Division - Trends in Maternal Mortality 1990-2013 Report acknowledged that data and monitoring of maternal mortality at the country level varied significantly in terms of reporting accuracy. For the 183 countries represented in the report and data used to calculate the global maternal mortality rate between 1990 and 2013, only 67 countries (37%) had provided data collected by a civil registration process that was characterized as complete, with good attribution of cause of death. Data from the civil registration or another monitoring source for 96 countries (52%) was categorized as incomplete, and 20 countries (11%) had no national data or method to monitor maternal mortality (WHO, 2014; WHO, 2016b). The ability of the UN to capture an accurate representation of the global maternal mortality rate is significantly hindered when approximately 63% of countries have poor or non-existent maternal mortality monitoring and/or reporting systems in place.

2.4   Sustainable Development Goals and Maternal Health

The end of 2015 brought a close to the MDGs, and the start of the United Nations Sustainable Development Goals (SDGs). A new set of 17 goals aimed to continue the progress achieved by the MDGs over the previous decade. The SDGs aim to broaden the scope of the MDGs and tackle larger global issues focusing on ending poverty, eliminating inequality and injustice, improving development for all global citizens, and slowing negative environmental effects and climate change by 2030 (UNDP, 2016). Improving maternal health is no longer a specific goal, but it is included under the third goal of "improving overall health and well-being" of all global citizens. Under SDG goal #3, the target to improve maternal health is listed as: reducing the global MMR to less than 70 deaths per 100,000 live births between 2016 and 2030, with no country having a rate more than twice the global average (WHO, 2015a).

2.5   Current State of Maternal Health

Since the start of the Safe Motherhood Initiative (over the past 30 years), numerous initiatives and projects have been carried out in many poor and underdeveloped regions to help reduce the number of women dying of preventable causes associated with pregnancy (van Lonkhuijzen et al., 2012; WHO, 1996). The WHO supported the implementation of MWHs as part of a package of essential obstetrical services aimed at improving women's access to maternity care in the early 1990's. Maternity waiting homes were introduced to expand services to women living in remote and rural communities, who would otherwise not have access to medical care (Wild, Barclay, Kelly & Martins, 2012). Maternity waiting homes are still commonplace in many communities today as viable, low cost solutions to help reduce the number of deaths associated with childbearing and improve access to care.

Despite significant improvements to maternal health over the past 25 years and a global commitment from the 189 member states of the United Nations to continue to improve the health of all global citizens, work still needs to be done. Maternal mortality remains unacceptably high with approximately 830 women dying of preventable causes related to pregnancy and childbirth every day (WHO, 2015a). Ninety-nine percent of maternal deaths occur in developing countries, reflecting the gap between the rich and the poor, and the inequities in health care and access to health care services in those countries (WHO, 2015a).

In 2015, the WHO estimated that a woman's risk of dying in childbirth or from a maternal health related cause was 1 in 4900 in the developed world, compared to 1 in 180 in the

developing world. In countries considered fragile states, where war, violence, and/or famine is present, the risk becomes even larger, to 1 in 54, resulting from the breakdown in appropriate health systems as well as other related factors such as starvation and trauma (WHO, 2015a). Approximately 73% of deaths are a result of direct complications that occur during and/or following pregnancy and childbirth, such as severe bleeding or hemorrhage, infections (mainly after childbirth and including sepsis), high blood pressure during pregnancy (pre-eclampsia or eclampsia), complications during childbirth, including obstructed labour, or unsafe abortion (WHO, 2015a). Indirect complications account for 27% of maternal deaths caused by or associated with other conditions such as malaria, pre-existing co-morbid conditions and HIV/AIDS (Say et al., 2014; WHO, 2015a). Most direct complications are preventable and treatable with appropriate health care services. Indirect causes can also be managed to reduce and/or prevent poor outcomes or complications associated with pregnancy and birth through appropriate and available antenatal care throughout a woman's pregnancy.

High income countries are classified by the World Bank as having a gross national income per capita of $12,376 or more. Nearly all pregnant women living in high income countries receive the WHO's recommended minimum of four antenatal care visits. They are also more likely to have a skilled health professional present at delivery, followed by postpartum care also overseen by a skilled health professional. In low-income countries, defined by the World Bank as having a gross national income per capita of $1,025 or less, only 40% of all pregnant women received the recommended four antenatal care visits (The World Bank, 2019; WHO, 2015a). The discrepancies in maternal care and access to specialized maternity care by country or region of residence continue to plague women, despite continued improvements to health and health care systems along with the continued promise of the international community to improve maternal health for all.

2.6   Barriers to Care

A barrier to care is anything that impacts an individual's ability to seek, use, and receive appropriate medical care (Caulford & Scarborough Academic Family Health Centre, 2014). Barriers to care exist in every country and health system around the world, although different barriers are more predominant in certain regions, affecting certain communities and regions more than others.

Systemic barriers, including cost and insurance coverage, often deter people from attempting to seek any sort of medical care. Even when health care services are offered free of charge, the cost of travel to access care or the cost for other out of pocket health care expenses, such as prescription medication or medical equipment may lead people to forgo seeking care (McNamee, Ternent, & Hussein, 2009). Often the cost is in the form of lost income from taking time off work to seek care (Titaley, Hunter, Heywood, & Dibley, 2010). Costs and loss of wages result in underutilization of health care services among those with lower socioeconomic status and care being over-utilized by more affluent populations, who are able to afford the extra costs associated with receiving health care services. The issue is further exacerbated in developing countries where the majority of citizens often live in poverty. The World Bank defines living in poverty as living on less than $1.90 USD/day (based on 2011 purchasing power parity) (The World Bank, 2016). In a 2009 report entitled "Women and Health", the WHO acknowledged that poverty and low socioeconomic status were associated with poor health outcomes (WHO, 2009).

Other significant barriers that influence the ability to access care include social and cultural barriers. Historically and traditionally defined gender roles and laws in some countries restrict a woman's ability to use medical care by requiring a male to accompany a female out of the community or to a medical appointment (Yargawa & Leonardi-Bee, 2015). Gender inequalities result in more access to medical care and other health resources for men compared to women (WHO, 2009). Many women believe that advice in the form of knowledge from elders in the community is sufficient; it is also much more accessible than medical care that could be a great distance away from home (Cham et al., 2005). In such situations, women were less likely to use routine medical care and significantly less likely to use maternity care. Populations that were mostly illiterate or only able to speak a local dialect were also found to be less likely to use medical care (Cant, 2012). Poor education or an inability to read or write often reduced a person's care utilization (McNamee et al., 2009).

Educated women have been more likely to seek care for themselves, as well as for their children and families. Education has been closely aligned with increased levels of comfort in interacting with health professionals and the health care system (Cant, 2012; McNamee et al., 2009; WHO, 2009). Complex social and cultural issues have made accessing basic health and

illness care challenging for women, which is amplified when trying to access basic or specialized maternity care during a pregnancy (Cant, 2012; Titaley et al., 2010; WHO, 2009).

Language barriers and lack of cultural sensitivity among health care professionals have been discussed widely in the literature. Women have reported feeling out of place, lost, and confused when trying to access medical care in regions unfamiliar to them, especially where health professionals did not speak the local dialect (Ganle, Parker, Fitzpatrick, & Otupiri, 2014). Language barriers have also led to delays in seeking treatment or receiving further medical care as a result of misunderstanding and confusion arising from instructions given by health care providers (Cham, Sundby, & Vangen, 2005).

Women with previous hospital or health care centre experiences also reported lack of compassion from health care providers; intimidation and fear of harsh treatment from nursing staff was suggested as a major reason to avoid using institutional care for any health concern (Byford-Richardson et al., 2013; Cham et al., 2005 Ganle et al., 2014). The disrespectful, unsupportive, and abusive behaviours exhibited by nurses and other health care providers may be influenced by the poor quality of their education and poor working conditions (Ishola, Owolabi, & Filippi, 2017; Jewkes, Abrahams, & Mvo, 1998; Mannava, Durrant, Fisher, Chersich, & Luchters, 2015). Negative health care provider behaviours have undermined women's overall utilization of health facilities, and discouraged women from using care during their pregnancies (Mannava et al., 2015). Reluctance among women to use antenatal, birth, and postnatal medical care from trained health care providers increases the risk of poor maternal and newborn outcomes (Kassebaum et al., 2014; Mannava et al., 2015).

Factors that have been found to negatively affect a woman's ability to use appropriate care included: lack of adequate health services; lack of availability of specialty services, such as advanced maternity care, cardiac care, or intensive care unit (ICU) services; sparsity of medical clinics and hospitals able to provide advanced lifesaving procedures; unequal distribution of facilities relative to the population; and limited staffing at health facilities (Titaley et al., 2010; Ganle et al., 2014). Physical barriers tend to predominately affect people living farther away from health care services (McNamee et al., 2009). Physical barriers have been described as factors which impede the ability to access care including: distance or proximity to health services; transportation infrastructure – or a lack there of; as well as the availability or absence of public transportation services (Cant, 2012; Cham et al., 2005; Ganle et al., 2014; Titaley et al.,

2010; WHO, 2009). Prolonged travel time was described by study participants including women, men, and health care providers as the biggest hurdle to overcome when trying to access medical care, especially if medical care was urgently needed (Cham et al., 2005; Titaley et al., 2010). The issue of travel time is further exacerbated by a lack of reliable motorized transportation. This was a particular problem identified by farmers and labourers living in rural communities, who only had access to wheelbarrows or scotch carts (ox-drawn carts) to travel long distances over the rough or mountainous terrain (Fawcus, Mbizvo, Lindmark, & Nystrom, 1996). The majority of people living in rural areas relied on walking as their main method of transportation. These individuals were further disadvantaged because, more often than not, emergency services, including ambulances, were unable to reach their small communities, making health care even more inaccessible. Transportation issues were reported to be avoidable barriers to accessing care; they were seen as problems that could be improved at community and national levels to reduce the rates of mortality caused by inaccessibility in accessing medical care (Cham et al., 2005; Fawcus et al., 1996). Geographical topography such as mountain ranges, lakes, rivers, and arid terrain were considered unavoidable barriers, not easily altered, but requiring accommodation in interventions aimed at improving access to care.

Often seen as a larger and more predominant problem in developing countries, given their larger populations and limited resources, many, if not all of these barriers to maternal care also exist in rural Canada. For example, the vast geography in northern communities in Canada can significantly impact the ability to access care. However, such barriers are often more challenging to address in rural areas of poorer, less developed countries where funding is very limited and other life-saving resources may simply not exist (e.g., flights to urban hospitals).

2.7   Access to Maternity Care in Developing Countries

Access to maternity care is an essential element for a woman's ability to have a healthy pregnancy and safe delivery experience.[2] It is crucial that women have the opportunity to access health care services throughout their pregnancies, during childbirth, and beyond, regardless of where they live. Residence should not determine a woman's ability to obtain timely care. Smaller communities might not have the expertise in specialized health disciplines, but they

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[2] Healthy babies start with healthy moms, and this focus on medical care does not negate the importance of other factors such as adequate nutrition, protection from violence, and appropriate and safe housing aid that also contribute to healthy pregnancies and healthy babies (WHO, 2008).

should have access to resources to transfer patients to more acute centres for advanced care as needed (Fawcus et al., 1996; Jacobs, Ir, Bigdeli, Annear, & Van Damme, 2012). According to the World Health Organization, factors that prevent women from using medical care during pregnancy and childbirth include, poverty, geography and distance to medical care, lack of information, inadequate health services and cultural practices/restrictions (WHO, 2009). In the developing world, barriers to care in some regions are so great that most women do not benefit from care, even if it is available (WHO, 1996). To reduce the levels of maternal and newborn mortality in these regions, an important step is ensuring women can access care throughout all stages of pregnancy, at delivery, and in the postpartum period in addition to access to emergency obstetric care if complications arise. Decentralization of specialty services, including maternity care would allow for better access to care in smaller communities, but is often not a feasible option in many developing countries where health care resources and funding are limited. An alternative solution adopted in some developing countries has been the establishment of MWHs; those structures allow for the decentralization of some obstetric services (WHO, 1996).

2.8   Maternity Waiting Homes

A maternity waiting home (MWH) is a stand-alone health care facility, often located near a larger medical centre or hospital, where women can stay during their pregnancies to be closer to emergency or high risk maternity services (van Lonkhuijzen et al., 2012). According to the Safe Motherhood Report published by the World Health Organization in 1996, the use of MWHs was not a new concept but an idea that had been around for several decades.

In the mid-20th century, waiting homes were established in northern European countries, as well as Canada and the United States of America, to support women living in remote areas, with limited access to obstetrical services (WHO, 1996). These homes were opened up by organizations working in Europe to provide shelter for single mothers in an effort to reduce the number of abortions and rates of infanticide. Variations of MWHs have been described in scientific literature dating back to the 1960's (WHO, 1996). The earliest documentation of MWHs, initially described as "Maternity Villages" was in Eastern Nigeria in the 1950s, followed by Uganda and Cuba in the 1960s (Lawson & Stewart, 1967). The establishment of waiting homes during the 1950s-1960s, allowed women with high risk pregnancies to stay in small buildings adjacent to a district hospital for the last 2-3 weeks of pregnancy, in an effort to reduce

maternal mortality from around 10 deaths per 1000 deliveries to less than 1 death per 1000 deliveries (WHO, 1996).

The typical client of a MWH is a woman who is classified as having a "high risk" pregnancy, requiring close and frequent monitoring. Being at a MWH allows for easy access to a larger obstetrical centre should an emergency or complication arise. Maternity waiting homes have also been essential in providing a place to stay for women from rural or remote communities who would otherwise not have access to specialized maternity care services. Close proximity to a larger medical centre helps to bridge the distance and geography that can impede a woman's use of routine obstetrical care and emergency services (WHO, 1996). Women with "low-risk" pregnancies often stay at MWHs towards the end of their pregnancies to await labour. After the onset of labour, they are transferred to a medical centre where they can be assisted during childbirth by a medical professional or skilled birth attendant, improving accessibility to care and aiming to reduce maternal mortality associated with childbirth (van Lonkhuijzen et al., 2012; Wild et al., 2012). Maternity waiting homes do not typically handle deliveries, but providers can do so in situations where there is not enough time to transfer the women to a hospital or nearby health centre.

In the literature, maternity waiting home was the most common term used, although maternity waiting house, waiting facility, waiting area, waiting shelter, and resting homes have also been terms used to describe the same concept of a stand-alone maternity residence closer to a larger hospital or health centre. The use of MWHs is well documented in less developed countries across Africa, Central and South America, Asia, and the Pacific, as a low cost solution to decentralize obstetrical services, making maternity care more accessible to women in rural or remote communities (WHO, 1996).

The type of structure, array of services, and number of women served varies among countries. Traditional style huts are more commonly used in Zimbabwe and Ethiopia, compared to modern style houses, equipped with a toilet, bathroom and kitchen facility, or old hospital wards found in other countries such as Cuba, Ghana, Papua New Guinea and Tanzania (van Lonkhuijzen et al., 2012; WHO, 1996). Services provided at a MWH differ based on resources, funding, and the MWHs' locations. Some facilities are completely self-catering, where women are required to provide their own food, water and firewood, while other facilities are fully catered (van Lonkhuijzen et al., 2012). Cultural practices also differ among facilities based on

location they cater to the population that they serve but welcome all faiths, and religions into a MWH (WHO, 1996). Some MWHs are also able to provide health education about pregnancy, giving birth, and neonatal care to women staying at the facility. Education is provided by community health workers or nurses who visit the facility to conduct assessments, often on high risk patients staying there (van Lonkhuijzen et al., 2012).

Many MWHs have been established through government initiatives or joint collaborations between large health organizations such as the WHO and countries' ministries of health. In regions where government established MWHs do not exist, various academic and community groups or other non-governmental organizations (NGOs) have helped to set up and establish MWHs for local women to use (WHO, 1996; Wild et al., 2012). Regardless of what organization helped to establish or continues to fund a MWH, all facilities have the same objective, which is to provide a safe place in the community for women to stay while pregnant, close to specialized services that may otherwise be inaccessible.

2.9   The Three Delays Model

The 'Three Delays Model', first conceptualized by Thaddeus and Maine (1994), identifies three phases of delay that occur in seeking out emergency obstetrical care. The first two delays identified in the framework examine the delays often associated with seeking out and accessing maternity care, while the third delay is associated with the delay in receiving care after arrival at a health care facility. The 'Three Delays Model' can help guide the analysis of literature examined in this REA. The first two delays, outlined by Thaddeus and Maine, are related to the REA questions examining the impact of MWHs on both maternal outcomes and the factors that influence a woman's ability to access and use a MWH.

The first delay pertains to delays by the individual, family, or both in seeking care (Thaddeus & Maine, 1994). Thaddeus and Maine (1994) identified previous experience with the health care system, status of women in the community, and financial costs associated with transportation or receiving care, as factors that play a large part in accessing maternity care. Women who are unaware of or uninformed about the concept of a MWH and its purpose are significantly less likely to use it during their pregnancies. The misconception that MWHs are to be used only by women experiencing high risk pregnancies may prevent other pregnant women from considering their use. Cost and accessibility are additional factors that impact a woman's

ability to access a MWH, especially among women living in communities where maternity care is limited or non-existent.

The second delay pertains to the ability to access care and reach an adequate health care facility in a timely manner (Thaddeus & Maine, 1994). This delay is attributed to geography and travel time from a person's community to a local community health centre, or distance to a larger hospital with specialized services. Distance, travel time, condition of local roads and transportation infrastructure, in addition to cost and availability of private or public transportation, can hinder or delay a woman's access to timely medical care and increase risk of poor maternal outcomes including mortality (Echoka et al., 2014; Holmes & Kennedy, 2010; Panciera et al., 2016). Proximity to a MWH is likely to play a role in women's use. Ideally, a MWH would be a support service that could bridge the gap in access to care for women who live farther away from specialized maternity medical services, or who live in communities where there is no access to any medical services (including maternity care). The onset and length of labour is often difficult to predict; challenges in trying to locate transportation while in labour and/or risk of delivering prior to arrival at a health facility could be avoided if a woman was already staying at a MWH. Maternity waiting homes are often located in close proximity to larger health centres or hospitals. Transportation issues and distance away from a woman's home community appear to be important factors influencing women's access to a MWH during her pregnancy.

The third delay outlined by Thaddeus and Maine (1994) is the delay in receiving appropriate and timely care even after arrival at a health centre. Arrival at a health centre may not result in receiving immediate care because shortages of supplies, equipment, and specialized health care staff, common in many developing countries, may delay attention from health care providers and lead to an increased risk of mortality (Thaddeus & Maine, 1994).

The 'Three Delays Model' identifies delays in the order at which they typically appear: recognizing a problem at the onset of a medical or obstetrical emergency; accessing help from trained health professionals at a health centre or hospital; and encountering delay in receiving adequate care. However, poor maternal outcomes are less commonly associated with one particular delay than they are with a combination of factors from each delay in the model (Thaddeus & Maine, 1994).

The use of the 'Three Delays Model' helped to inform my analysis of the literature included in this REA. I intend to examine the impact of MWHs on maternal mortality rates. Identification of the factors associated with the delay in receiving care after a woman presents at a health centre have not been well addressed within MWH literature. Therefore, only the first and second delays identified by Thaddeus and Maine (1994) were used to guide the analysis of studies collected. I used them to assist in identifying factors that influence a woman's use of a MWH and/or access to maternity care. The identification of factors that influence delays is anticipated to inform continued improvements in interventions and health practices to improve maternal health outcomes and reduce maternal mortality rates. The next chapter will outline the search strategy and methods undertaken in conducting this REA.

Chapter 3: Methods

The aim of MWHs is to provide better access to care for women living in rural and remote communities by providing women with a place to stay closer to maternity services (including emergency and high risk) at a hospital or health centre (van Lonkhuijzen et al., 2012; WHO, 1996). The dominant hypothesis is that women from remote communities would be more likely to give birth with assistance of a trained health professional if they had a comfortable place to stay while awaiting the onset of labour (Wild et al., 2012). It is important to understand the percentage of women using MWHs in the communities where they have been established, as well as the impact this intervention has had maternal health outcomes, including maternal mortality, where statistics are available. Careful consideration of the barriers to MWH use can provide meaningful information to help implement changes or improvements to the service and guide future maternal health projects. Using a rapid evidence assessment of the literature to explore the complexities of MWHs provides more evidence to make future decisions regarding the implementation of MWHs or other health interventions aimed at improving maternal health in developing countries and other remote locations around the world[3].

3.1 REA Approach and Justification

Systematic Reviews are often considered the gold standard because they provide the highest level and quality of research evidence on a particular topic (Polit & Beck, 2014). A systematic review is typically carried out by a group of researchers and requires a substantial amount of time; conducting a systematic review is beyond the scope of this thesis. An alternative, yet rigorous approach for assessing the literature, is a Rapid Evidence Assessment (REA).

Rapid Evidence Assessment is a structured method that allows for a comprehensive examination of available literature on a given topic of interest. This method allows a single researcher to explore a topic in depth by identifying prior research results and determining what aspects of the topic require further investigation (Boycott, Schneider, & McMurran, 2012). This method is more rigorous than a literature review or scoping review, but is less rigorous than a full systematic review (Government Social Research Service (GSRS), 2010). An REA is typically conducted over a shorter period of time, usually within a two to six month timeframe

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[3] This REA evidence can be used by researchers, health care professionals, policy makers and those working in public health.

and is often less comprehensive in breadth and depth than a larger systematic review (Curry, Nembhard, & Bradley, 2009; Garrett, 2015; Grant & Booth, 2009; GSRS, 2010; HLWIKI International, 2016). Figure 3.1 identifies the position of an REA on the hierarchical scale indicating confidence in the findings.

Figure 3.1 Increasing Confidence of Evidence Based Reviews
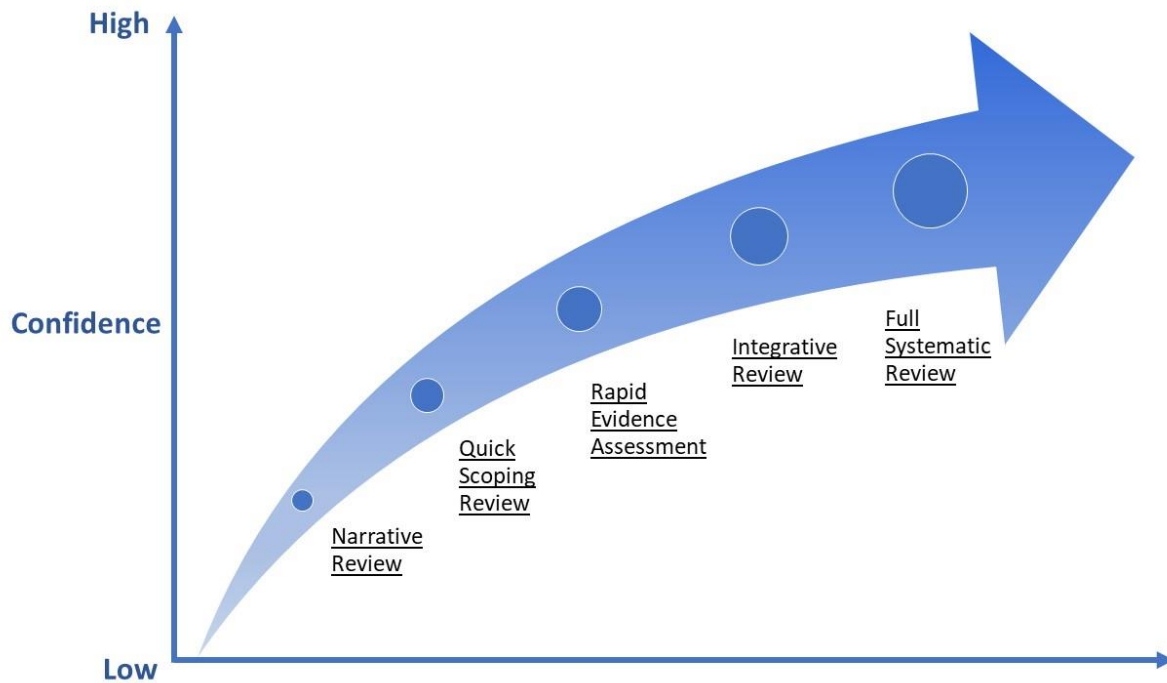
Rapid evidence assessments have become increasingly popular because they allow for in-depth analysis of a specific topic; they are usually used to examine urgent or emerging needs in the medical and public health fields (Crawford, Boyd, Jain, Khorsan, & Jonas, 2015). The shorter timeframe in which they are conducted enables timely and valid findings that can be used to inform policy and practice. Given the shorter timeframe and rigour of the method, REAs have become very useful in settings such as nursing, medicine, and public health, where there is an increased demand to use current evidence to guide clinical decision making and policy changes (Ganann, Ciliska, & Thomas, 2010; HLWIKI International, 2016; Watt et al., 2008). Conducting an REA on MWHs in developing countries provides an extensive and objective assessment on

what is currently known about their use, factors that influence their uptake, and their impact on maternal mortality in developing countries.

3.2   Steps in Conducting a Rapid Evidence Assessment

The United Kingdom's Government Social Research Service offers a guide for designing and conducting an REA. The authors suggest that formulating a research question and defining a theoretical framework or examining theoretical perspectives that will guide the literature search and analysis should be the starting point for any researcher. This is followed by data collection (i.e., locating relevant literature), the appraisal and analysis of the data found, and reporting the findings. The specific process identified in the United Kingdom's Government Social Research Service REA toolkit includes the following steps:

1. Select a research topic. Formulate the REA question and determine scope of question (impact vs. non-impact).
2. Establish a conceptual framework.
3. Determine search criteria including Medical Subject Heading (MeSH terms) that will be used and derive inclusion and exclusion criteria.
4. Develop a search process. Identify:
   a. The sources that will be searched (for example: books, journals, websites and electronic databases, etc.).
   b. How sources will be searched and studies screened.
   c. Length of search period.
5. Locate, screen and select relevant studies (data collection). Create a reference list to maintain organization.
6. Ensure data meets research objectives (full-text review). Extract findings. Use a data extraction form or matrix to maintain organization.
7. Conduct a quality appraisal of the data. Use a coding method if appropriate.
8. Synthesize findings and themes found.
9. Communicate findings in a written report.

These steps aim to guide the researcher through the process of conducting an REA, although they can be altered to fit the needs and requirements of the researcher, if and when required (Garrett, 2015; GSRS, 2010).

3.3   Research Questions in an REA

There are two types of questions commonly used in REAs: impact and non-impact questions. Impact questions are more common and are usually concerned with identifying the benefits of an intervention or uncovering "what works" (GSRS, 2010). Non-impact questions are less narrowly defined and can focus on answering a range of questions related to process: implementation of an intervention; how or why an intervention works; relationships between phenomena or; the attitudes, beliefs, and experiences of those who have received the intervention. A non-impact question might also address economic issues, such as cost/benefit analysis, or examine an intervention's benefit/harm ratio (GSRS, 2010). The type of the question chosen for analysis in the REA directs the selection of articles and their analysis and appraisal. A broad question may capture extensive and diverse data that is difficult to analyze, while an overly narrow focus may capture only a limited amount of data from a small number of studies. A research question can combine elements from both impact and non-impact types of questions, for example, by asking about the impact of an intervention, but also by examining the implementation process or the experience of those who have participated in the intervention (GSRS, 2010).

In this REA, I seek to combine elements from impact and non-impact questions by identifying the impact MWHs have on maternal mortality and factors that affect a woman's ability to use a maternity waiting home in developing countries.

3.4   Search Criteria

The search strategy for this REA aimed to be comprehensive and exhaustive in identifying published and unpublished primary studies relating to MWHs. A preliminary search strategy was developed with the assistance of a health sciences/nursing librarian at the University of British Columbia (UBC) during the proposal preparation stage, and follow up assistance was sought during the initial search in 2017 and a repeated search in 2018. The following search terms were used, in conjunction with Boolean logic using AND/OR/NEAR/ADJ to combine key words and subject headings, to expand or narrow down the search in each database:

1. matern^4* OR mother* OR "pregnant wom#n^5
2. home* OR shelter* OR hous* OR waiting
3. "birth centre*" OR "birth center*"
4. maternal mortality
5. maternal (mortality OR death*)
6. ("use of" or utiliz* or utilis* or access* or barrier*)

The use of subject headings in the literature search was limited to maternal mortality to ensure the most specific definition of the term "maternal mortality" was used to capture the concept of maternal deaths in the literature. Additional subject headings were deemed unnecessary due to the specificity of the topic of MWHs.

The search was conducted utilizing six UBC Library electronic bibliographic databases that focus on the nursing, medical, global health, and allied health sciences fields. The following databases were searched: CAB Direct, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Database of Systematic Reviews (Ovid platform), Conference Proceedings Citation Index – Science (CPCI-S) and Conference Proceedings Citation Index – Social Science and Humanities (CPCI-SSH) (Clarivate Analytics on the Web of Science platform), Medline (Ovid platform), and ProQuest Dissertations and Theses Global. CAB Direct was utilized to delve into literature pertaining to global health issues. CINAHL and Medline were included to ensure a broad representation of evidence and literature from current peer reviewed journals used to inform health science practice and knowledge. Cochrane database was searched for any previous systematic reviews examining maternal outcomes or the factors and barriers related to uptake and use of MWHs. Both ProQuest and the Conference Proceedings Citation Index for Science and for Social Science and Humanities were used to identify any electronically archived grey literature, including relevant studies that may not have been published in a journal.

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[4] The asterisk (*) indicates a wild card search, enabling a search engine to locate and include words that have alternate suffixes, resulting in a broader search. Matern* would yield results found in the literature, that could include alternate endings such as: maternity, maternal, maternalism, maternally or maternalistic, etc.

[5] The use of the pound sign (#) or question mark sign (?) within a keyword indicates a wild card search, enabling the search engine to locate and include words with alternate pluralization that cannot be identified with truncation (*) or that have alternate spelling. For example, wom#n would yield results found in the literature for both woman and women; utili?ation would yield both American and British spelling of the same word - utilization and utilisation.

3.5   Inclusion and Exclusion Criteria

Defining inclusion and exclusion criteria is imperative to any form of research or review. Specific inclusion and exclusion criteria help to clarify the intended research topic and facilitate a search strategy that is comprehensive yet focused. Inclusion and exclusion criteria also aid the intended audience to understand the exact focus of the topic under study. It is a similar approach to that used by a researcher to determine the target sample they intend to include as participants and draw inferences from in their study (GSRS, 2010).

Inclusion criteria for the literature search included:

- Research studies written and available in English.
- Any method of full-text, including electronic and printed versions/copies of studies.
- Studies examining countries meeting the World Bank's criteria of a low-income/developing country where the gross national income per capita is $1,025 or less.
- Unpublished studies or grey literature obtained through:
  - Electronic databases to which UBC subscribes
  - Hand searching of reference lists of published studies
  - Well-known global and national organization websites (such as: UN, WHO, UNICEF, Society of Obstetricians and Gynecologists of Canada [SOGC])

Exclusion criteria for the literature search included:

- Non-research based studies including opinion and discussion based narratives.
- Studies examining the development and implementation of MWHs, but not the impact of the MWH on maternal mortality.
- Studies examining maternal mortality in developing/low-income countries with no mention of MWHs.
- Studies not available in full-text.
- Studies not freely accessible on the World Wide Web or, through electronic databases to which UBC subscribes, or through UBC interlibrary loan services.

3.6   Search Process

A single author conducted an initial literature search from January 1-February 15, 2017 and a repeated literature search from September 10-17, 2018. The second literature search was conducted to locate any studies published since the initial search in 2017. A search strategy was developed to guide the search in a purposeful and comprehensive manner, combining various key words to obtain the most relevant data (GSRS, 2010). The search strategy aimed to find relevant studies matching the inclusion criteria, which were further screened and assessed by the author. Filters to limit the publication dates were not used. This was necessary to obtain the largest possible pool of evidence pertaining to the REA questions and because there was a dearth of published literature related to MWHs in general discovered at the outset of the literature search.

Studies that met the proposed inclusion criteria and had a title or abstract that seemed relevant to the proposed topic were flagged, saved, and exported to RefWorks™, an external citation manager, for further screening after completion of the literature search. The title and abstract were screened for the key term of "Maternity Waiting Home(s)" (or alternatively: House(s)/Room(s)/Shelter/Area(s)/Facility) in the title. Studies that did not include "Maternity Waiting Home" in the title, but did include or allude to other key terms such as "Maternal Mortality", "Maternal Morbidity" or "Access to Care" were also flagged as potentially relevant. Studies that did not contain any search terms in the title, but did contain key words in the abstract, were also saved for further evaluation of the full-text. Studies that did not contain any search terms in the title or abstract, did not meet the inclusion criteria, and did not seem relevant to the proposed research topic were eliminated from further review. Studies that were questionable or borderline in meeting the proposed inclusion criteria were included in the initial search findings to be more thoroughly reviewed by the author during the next phase of analysis.

I performed hand searching of reference lists of the studies saved to RefWorks™ that were identified as potentially relevant, to locate any additional literature that may have not been identified in the electronic database searches. One additional study was identified from hand searching and was screened in full-text before being subsequently included in the selection of 16 studies analyzed in this REA.

Publication bias exists within the scientific community, with neutral or negative findings often not reaching publication status; therefore, using only published studies for this REA had

the potential to lead to additional bias. Searching for published studies available only through electronic databases would have further limited the evidence I could find. To reduce this possible bias, I searched for additional grey literature using the Conference Proceedings Citation Index – Science (CPCI-S) and Conference Proceedings Citation Index – Social Science and Humanities (CPCI-SSH) via Clarivate Analytics on the Web of Science platform, as well as the ProQuest Dissertations and Theses Global database to search for theses, dissertations or conference proceedings related to MWHs, including the barriers to MWH use and associated maternal outcomes, that had neither been published in a journal nor referenced in a previous study. I also searched the UN, WHO, United Nations Children's Fund (UNICEF) and Society of Obstetricians and Gynecologists of Canada (SOGC) websites for any other grey literature that could be related to my two REA questions. Finally, I contacted experts in the field of global maternal health to help identify any other possible avenues where grey literature related to MWHs might exist. In spite of these approaches, no further publications were identified.

3.7   Data Collection, Selection of Studies and Extraction of Findings

The data collection stage of this REA consisted of two main steps: 1) locating relevant literature; and 2) extracting data from the selected literature using a data extraction form (spreadsheet) to organize descriptive findings (GSRS, 2010). Upon completion of the search period, studies were collected and saved to RefWorks^{TM}. Selected studies were further screened for relevance through deeper inspections of the abstracts. Studies that did not meet my REA inclusion criteria were eliminated; studies that appeared to be related to the topic but did not specifically address the study question were kept and included in the full text review to better judge their appropriateness for inclusion. A table was created (using an Excel spreadsheet) to identify the search terms used for each database and to keep track of the number of studies located and considered relevant. This spreadsheet was continually updated throughout the literature search period as additional studies were found, with repeated studies removed, if located in more than one database.

A second table was created in Microsoft Excel, to serve as a data extraction form, based on The Cochrane Consumers & Communication Review Group Data Extraction Template. This table (see Appendix A) was used to record and organize details of the retained studies including: authors, the year of publication and journal; purpose/aim of the study, setting (country of origin) and sample size; research design; strengths, weaknesses/limitations of the study, findings related

to maternal outcomes; and findings related to factors that influence use of a MWH (The Cochrane Collaboration, 2016).

3.8   Critical Appraisal

Three scoring tools were used for the critical appraisal of studies selected for this REA: the Weight of Evidence Assessment (WoE); Critical Appraisal Skills Programme (CASP); and Maryland Scale of Scientific Methods (MSSM). The WoE tool, developed by the Evidence for Policy and Practice Information and Coordinating Centre (EPPI) of the United Kingdom's Civil Service Governmental Social Research Service (GSRS), is used for all study methodologies (qualitative, quantitative, and mixed). The CASP tool is intended to evaluate qualitative evidence in both mixed methods and qualitative studies and the MSSM tool is used for evaluating quantitative evidence in mixed methods and quantitative studies. All tools rank the evidence as low, medium or high quality.

All studies analyzed in this REA received a minimum of two quality appraisal scores: one WoE score, and another score appropriate to the study design. Appraisal of mixed methods studies resulted in three appraisal scores; one for overall evidence as well as the components of quantitative and qualitative evidence presented in the study. The scoring tools are presented in Appendices B, C, D, and E[6]. Further description of the scoring tools is provided below.

The WoE tool was used to appraise the quality and relevance of evidence presented within each study. Each study was appraised by providing a score between 1 and 3 for three distinct dimensions: 1) Trustworthiness of the study for answering the REA study question(s); 2) Appropriateness of the research design and analysis for answering the REA study question(s); and 3) Relevance of the study focus and methods for addressing the REA study question(s). Appraisal scores of 1 indicate low evidence; 2 = medium evidence; and 3 = high evidence. The three scores are summed for a total possible score of 3 to 9, indicating whether the study and its findings are of low (3), medium (4-6) or high quality (7-9) (Garrett, 2015; Gough, 2007; GSRS, 2010). Section N of the GSRS WoE tool (see Appendices B and C) was utilized to guide the scoring of each dimension.

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[6] Section N.13-N.16 that comprises the WoE tool is found in Appendix C while Appendix D contains all components of Section N (N.1-N.16) of the EPPI-Centre Data Extraction and Coding Tool for Education Studies. The entire EPPI tool was not included in Appendix D - as only Section N was utilized for the purposes of coding within this REA.

The CASP tool (see Appendix D) was used to evaluate the quality and relevance of findings in qualitative studies as well as the qualitative research methods used in mixed methods studies in this REA. The CASP consists of 10 questions that are scored from 1 to 3, yielding a total possible score of 10-30. For each question in the checklist, a score of 1 is given if the study does not answer the question (No); a score of 2 is given if the appraiser is unable to tell if the study answered the question (Can't Tell); and a score of 3 is given if the study does answer the question (Yes). Table 3.1 identifies the 10 questions in the CASP tool.

Table 3.1 CASP Qualitative Checklist Questions

10 Questions of the CASP Qualitative Research Checklist
1. Was there a clear statement of the aims of the research?
2. Is a qualitative methodology appropriate?
3. Was the research design appropriate to address the aims of the research?
4. Was the recruitment strategy appropriate?
5. Was data collected in a way that address the research issue?
6. Has the relationship between researcher and participants been adequately addressed?
7. Have ethical issues been taken into consideration?
8. Was the data analysis sufficiently rigorous?
9. Is there a clear statement of findings?
10. How valuable is the research?

CASP 10 Questions Tool for Qualitative Research (CASP UK, 2013)
http://www.casp-uk.net/#!checklists/cb36

The Maryland Scale of Scientific Methods (MSSM) is a tool developed in 1997, by Sherman and colleagues at the University of Maryland, to assess the internal validity of quantitative research studies (Sherman et al., 1997). The MSSM was used to appraise quantitative studies and the quantitative research methods of mixed method studies included in this REA. The scale identifies 5 levels of study quality; Level 1 refers to a single-group post-test only design and Level 5 refers to an experiment with randomized assignment (see Appendix E) (GSRS, 2010). Given the nature of the population and level of development of the countries examined in this REA, it is important to acknowledge the potential for limitations to the research conducted in these regions. Therefore, it would be unreasonable to assume that most of the

research literature would meet the criteria for a Level 4 or 5 quality score on the MSSM scale. Lower MSSM levels do not negate the utility of evidence presented from the countries under study, but the score should be understood within the context being studied using this REA.

Table 3.2 summarizes the scoring classification system for the three appraisal tools used in this REA. The division of WoE scoring was identified in Section N.16 (Weight of Overall Evidence) in the EPPI-Centre Data Extraction and Coding Tool. Division of overall scoring for the CASP and MSSM tools was developed by the author. The author divided the scoring scale for both the CASP Tool and MSSM tool into thirds (or approximate thirds), to determine the cut-off point between a low versus medium versus high quality ranking. Although it may not be the optimal method, dividing scores into thirds was chosen to enhance simplicity given that quality scoring and ranking remains a subjective process. Because of the limited number of research studies on the topic of MWHs, all the appraised studies were included within this REA, irrespective of their quality scores.

Table 3.2 Summary of Scoring for Appraisal of Literature

Literature Scoring Classification
WoE Score: Low Quality = 3, Medium Quality = 4-6, High Quality = 7-9   • Used for quantitative research, qualitative research and mixed methods studies   **CASP Score**: Low Quality = 10-16, Medium Quality = 17-22, High Quality = 23-30   • Used for qualitative research and mixed methods studies   **MSSM Score**: Low Quality = 1, Medium Quality = 2-3, High Quality = 4-5   • Used for quantitative research and mixed methods studies

3.9 Identification of Themes

Because the first research question sought to understand the impact of MWHs on maternal mortality and was answered by analyzing maternal mortality rates and ratios, identification of themes was only required to address the second research question. The findings from each study retained in this REA were analyzed for themes and subthemes related to the second research question: What factors influence a woman's decision and ability to use a MWH in developing countries? The factors identified in the various studies were recorded and then grouped according to similarity. This resulted in identification of six main themes, which are

discussed in Chapter 4. Analysis of the main factors that influence a woman's decision and ability to use a MWH (research question two) was guided by the 'Three Delays Model' (Thaddeus & Maine, 1994). The 'Three Delays Model' proposes that there are three main delays associated with maternal mortality, delay in deciding to seek out care, delay in reaching care, and delay in receiving care after arrival at a health care facility. This model was used to examine the factors that influenced delays in seeking out and reaching care, particularly among women from rural and remote communities, where access to care and delays in seeking care present the most significant challenges.

3.10 Synthesis of Findings

The synthesis stage generates findings from the appraised literature to answer the research questions of the REA (GSRS, 2010). Synthesis of findings includes attention to the WoE, CASP and MSSM appraisal scores. Findings and themes noted in the selected studies, along with the appraisal scores, were used to assess whether MWHs reduce maternal mortality in developing countries (research question one) and the factors affecting a woman's ability to use them (research question two). Figure 3.2 outlines the stages of synthesis that were conducted and carried out throughout this REA.

Figure 3.2 Stages of Synthesis Diagram

Stages of Synthesis

| Review questions and conceptual work[1]

 Theories and assumptions in the review question. | → | Initial organization of the data[1]

 By addressing review question according to conceptual framework. | → | Identify and explore patterns in the data[2,3] | → | Integration of the data (synthesis)

 To address the question. Often by testing or developing a theory. |

New research questions

Develop the conceptual framework[1]

Checking the synthesis[4]

For quality, sensitivity, coherence & relevance.

Finalize synthesis

Conclusion

Similar to Narrative Synthesis (Popay et al., 2006) distinction; 1) Developing a theory; 2) Preliminary synthesis; 3) Exploring relationships; 4) Testing robustness.

Adapted from: Government Social Research Service (GSRS). (2010). Rapid Evidence Assessment Toolkit. *UK Government: National Archives: Civil Service: Government Social Research Service.* Retrieved from: http://webarchive.nationalarchives.gov.uk/20140305122816/http://www.civilservice.gov.uk/networks/gsr/resources-and-guidance/rapid-evidence-assessment

This chapter outlined the methodology associated with conducting a REA and the steps undertaken in the search process including data collection, critical appraisal and identification of themes. The next chapter presents the findings synthesized from the studies analyzed in this REA.

Chapter 4: Findings of the Rapid Evidence Assessment

This chapter describes the results of the search undertaken to locate literature pertaining to the concept of MWHs in developing countries, identifies the literature selected for inclusion in this REA, and presents the quality appraisal carried out for the 16 selected studies. This is followed by an analysis of the extracted data and synthesis of the findings to answer the two REA questions. Identification and construction of major themes and sub-themes associated with REA question two is also provided.

4.1   Search Results and Selection of the Literature

The search of six databases, listed in Table 4.1, resulted in 1,674 possible studies related to maternal outcomes and the barriers associated with uptake and use of MWHs (or similar facility). Hand searching of previous reference lists resulted in the inclusion of one additional study by Sundu et al. (2017), for a total of 1,675 studies. Duplicate studies (n=296) were removed leaving 1,379 studies. Screening of the titles and abstracts led to the removal of another 1,336 studies that did not meet the REA inclusion criteria or address either of the two main REA questions. That process resulted in 43 studies read in full text. Of those studies, seven were excluded as their main focus did not pertain to MWHs; eighteen were excluded because they did not address either of the REA questions: maternal mortality or barriers/access to care issues; and the focus of two studies was not on developing countries. The remaining 16 studies were retained for analysis in this REA.

Hand searching of the UN, WHO, United Nations Children's Fund (UNICEF), and Society of Obstetricians and Gynecologists of Canada (SOGC) websites for grey literature did not yield any additional articles (three articles were found on the WHO website but those papers were duplicates of the 16 selected studies). I also contacted a well-known national public health/global health leader and nursing professor to help identify any grey literature or studies related to MWHs in developing countries that had not been published, but no further literature was identified.

Table 4.1 shows the systematic search strategy used to identify studies for inclusion within this REA, and the number of hits for each data base. Figure 4.1 presents a PRISMA chart showing the article selection process.

Table 4.1 Search Strategy and Number of Resulting Hits in Each Database or Search Engine Used

Source	N	Strategy
CAB Direct	361	CAB Direct was searched on September 17, 2018 for the period of 1989 to present 1. title:((matern* or mother* or "pregnant wom?n") near/1 (home* or shelter* or hous* or waiting)) OR ab:((matern* or mother* or "pregnant wom?n") near/1 (home* or shelter* or hous* or waiting)) (792) 2. title:("birth center*" or "birth centre*") OR ab:("birth center*" or "birth centre*") (136) 3. 1 or 2 (928) 4. subject:("maternal mortality") (4,113) 5. title:(maternal near (mortality OR death*)) OR ab:(maternal near (mortality OR death*)) (9,611) 6. 4 or 5 (9,834) 7. title: ("use of" or utiliz* or utilis* or access* or barrier*) OR ab: ("use of" or utiliz* or utilis* or access* or barrier*) (1,525,272) 8. 3 and 6 (133) 9. 3 and 7 (300) 10. 8 or 9 (361)
CINAHL	469	Cumulative Index to Nursing and Allied Health Literature (CINAHL) was searched on September 17, 2018 for the period of 1982 to present. 1. TI ((matern* OR mother* OR "pregnant wom#n") N1 (home* OR shelter* OR hous* OR waiting)) OR AB ((matern* OR mother* OR "pregnant wom#n") N1 (home* OR shelter* OR hous* OR waiting)) (1,043) 2. TI ("birth centre*" OR "birth center*") OR AB ("birth centre*" OR "birth center*") (613) 3. S1 OR S2 (1,653) 4. (MH "Maternal Mortality") (4,918) 5. TI (maternal N0 (mortality OR death*)) OR AB (maternal N0 (mortality OR death*)) (4,099) 6. S4 OR S5 (6,900) 7. TI (("use of" or utiliz* or utilis* or access* or barrier*)) OR AB (("use of" or utiliz* or utilis* or access* or barrier*)) (733,210) 8. S3 AND S6 (44) 9. S3 AND S7 (443) 10. S8 OR S9 (469)

Source	N	Strategy
Cochrane Database	1	Cochrane Database of Systematic Reviews was searched on September 17, 2018 for the period of 2005 to September 12, 2018. 1. ((matern* or mother* or "pregnant wom#n") adj1 (home* or shelter* or hous* or waiting)).ti,ab. (2) 2. ("birth centre*" or "birth center*").ti,ab. (1) 3. 1 or 2 (3) 4. (maternal adj (mortality or death*)).ti,ab. (39) 5. ("use of" or utiliz* or utilis* or access* or barrier*).ti,ab. (338) 6. 3 and 4 (0) 7. 3 and 5 (1) 8. 6 or 7 (1)
CPCI-S and CPCP-SSH (Web of Science)	27	Conference Proceedings Citation Index – Science (CPCI-S) and Conference Proceedings Citation Index – Social Science and Humanities (CPCI-SSH) was searched using Clarivate Analytics on the Web of Science platform on September 17, 2018 for the period of 1990-2018. 1. TOPIC: ((matern* OR mother* OR "pregnant wom#n") NEAR/1 (home* OR shelter* OR hous* OR waiting)) (119) 2. TOPIC: (("birth centre*" OR "birth center*")) (11) 3. #1 OR #2 (130) 4. TOPIC: (maternal NEAR/0 (mortality OR death*)) (553) 5. TOPIC: ("use of" or utiliz* or utilis* or access* or barrier*) (1,056,449) 6. #3 AND #4 (5) 7. #3 AND #5 (22) 8. #6 OR #7 (27)
Medline (OVID)	538	MEDLINE was searched using the Ovid interface on September 17, 2018 for the period of 1946 to September 14, 2018. 1. ((matern* or mother* or "pregnant wom#n") adj1 (home* or shelter* or hous* or waiting)).ti,ab. (1,175) 2. ("birth centre*" or "birth center*").ti,ab. (554) 3. 1 or 2 (1,728) 4. Maternal Mortality/ (9,520) 5. (maternal adj (mortality or death*)).ti,ab. (12,988) 6. 4 or 5 (16,992) 7. ("use of" or utiliz* or utilis* or access* or barrier*).ti,ab. (3,389,742) 8. 3 and 6 (82) 9. 3 and 7 (495) 10. 8 or 9 (538)

Source	N	Strategy
ProQuest	278	ProQuest Dissertations & Theses Global was searched on September 17, 2018 for the period of 1981 to 2017. 1. ti((matern* OR mother* OR "pregnant wom#n") NEAR/1 (home* OR shelter* OR hous* OR waiting)) OR ab((matern* OR mother* OR "pregnant wom#n") NEAR/1 (home* OR shelter* OR hous* OR waiting)) (993) 2. ti(("birth centre*" OR "birth center*")) OR ab(("birth centre*" OR "birth center*")) (60) 3. 1 OR 2 (1,052) 4. ti(maternal NEAR/0 (mortality OR death*)) OR ab(maternal NEAR/0 (mortality OR death*)) (489) 5. ti(("use of" or utiliz* or utilis* or access* or barrier*)) OR ab(("use of" or utiliz* or utilis* or access* or barrier*)) (832,490) 6. 3 AND 4 (3) 7. 3 AND 5 (277) 8. 6 OR 7 (278)

Figure 4.1 Systematic Search and Article Selection Process

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┌─────────────────────────────┐
│      CAB Direct n=361       │
│       CINAHL n=469          │
│       Cochrane n=1          │
│  CPCI-S and CPCP-SSH n=27   │
│    Medline (OVID) n=538     │
│       ProQuest n=278        │
│     Hand Searching n=1      │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ Total citations from databases │      ┌──────────────────────────┐
│         N=1,675             │─────────▶│ Duplicate citations removed │
└─────────────────────────────┘         │          n=296           │
              │                          └──────────────────────────┘
              ▼
┌─────────────────────────────┐
│  Unique citations screened  │         ┌──────────────────────────┐
│          n=1,379            │─────────▶│ Exclusions based on title and │
└─────────────────────────────┘         │      abstract review      │
              │                          │         n=1,336          │
              ▼                          └──────────────────────────┘
┌─────────────────────────────┐
│ Full text literature assessed │
│           n=43              │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Literature included in REA │
│           N=16              │
└─────────────────────────────┘
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Exclusions based on full text assessments
n=27

Primary reason for exclusion:
- Focus was not on MWHs (n=7)
- Did not address REA Question #1 (maternal mortality) or REA Question #2 (barriers/access to care issues) (n=18)
- Focus was not on developing countries (n=2)

4.2   Summary of the Selected Literature

A total of 16 studies was identified for inclusion within this REA. The 16 research studies include: seven quantitative studies, five qualitative studies and four studies that utilized a mixed methods approach - incorporating both quantitative and qualitative data collection and analysis. A brief overview of the 16 selected studies included in this REA is provided in Table 4.2 below, listed by author, in alphabetical order.

Table 4.2 List of Selected Research Studies

Author (Publication Year)	Journal/ Source	Country Sample Size	Title of Article	Methodology (Study Design)
Braat, F., Vermeiden, T., Getnet, G., Schiffer, R., van den Akker, T., & Stekelenburg J. (2018)	International Health	Ethiopia N = 703	Comparison of pregnancy outcomes between maternity waiting home users and non-users at hospitals with and without a maternity waiting home: retrospective cohort study	Quantitative Retrospective Cohort Study
Chandramohan, D., Cutts, F., & Chandra, R. (1994)	International Journal of Gynecology & Obstetrics	Zimbabwe N = 4,488	Effects of a maternity waiting home on adverse maternal outcomes and the validity of antenatal risk screening	Quantitative Prospective Cohort Study
Chibuye, P. S., Bazant E. S., Wallon, M., Rao, N., & Fruhauf, T (2018)	BMC Pregnancy and Childbirth	Zambia Quantitative Component: N = 17 health facilities Qualitative Component: N = 323	Experiences with and expectations of maternity waiting home in Luapula Province, Zambia: a mixed methods, cross-sectional study with women, community groups and stakeholders	Mixed Methods Quantitative: Cross-Sectional Descriptive Study; Qualitative: Exploratory Descriptive Study

Author (Publication Year)	Journal/ Source	Country Sample Size	Title of Article	Methodology (Study Design)
Eckermann, E., & Deodato, G. (2008)	Journal of Obstetrics and Gynecology Research	Lao People's Democratic Republic (PDR) Quantitative Component: N = 7,876 Qualitative Component: N = unknown	Maternity waiting homes in Southern Lao PDR: The unique 'silk home'	Mixed Methods Quantitative: Prospective Descriptive Study; Qualitative: Exploratory Descriptive Study
Kelly, J., Kohls, E., Poovan, P., Schiffer, R., Redito, A., Winter, H., & MacArthur, C. (2010)	BJOG: An International Journal of Obstetrics and Gynecology	Ethiopia N = 24,148	The role of a maternity waiting area (MWA) in reducing maternal mortality and stillbirths in high-risk women in rural Ethiopia	Quantitative Retrospective Cohort Study
Lori, J. R., Munro-Kramer, M., Mdluli, E. A., Musonda, G. K., & Boyd, C. J. (2016)	Midwifery	Zambia N = 546	Developing a community driven sustainable model of maternity waiting homes for rural Zambia	Qualitative Exploratory Descriptive Study
Lori, J. R., Munro, M. L., Rominski, S., Williams, G., Dahn, B. T., Boyd, C. J., Moore, J. E., & Gwenegale, W. (2013)	International Journal of Gynecology & Obstetrics	Liberia Quantitative Component: N = 500 Qualitative Component: N = 46	Maternity waiting homes and traditional midwives in rural Liberia	Mixed Methods Quantitative: Prospective Cohort Study; Qualitative: Exploratory Descriptive Study

Author (Publication Year)	Journal/ Source	Country Sample Size	Title of Article	Methodology (Study Design)
Mramba, L., Nassir, F. A., Ondieki, C., & Kimanga, D. (2010)	International Journal of Gynecology & Obstetrics	Kenya Quantitative Component: N = 461 Qualitative Component: N = 30	Reasons for low utilization of a maternity waiting home in rural Kenya	Mixed Methods Quantitative: Cross-Sectional Descriptive Study Qualitative: Exploratory Descriptive Study
Ruiz, M., van Dijk, M., Berdichevsky, K., Munguia, A., Burks, C., & Garcia, S. (2013)	Culture, Health & Sexuality	Guatemala N = 48	Barriers to the use of maternity waiting homes in indigenous regions of Guatemala: a study of users' and community members' perceptions	Qualitative Grounded Theory
Sialubanje, C., Massar, K., Kirch, E. M., van der Pijl, M. S. G., Hamer, D. H., & Ruiter, R. A. C. (2016)	International Journal of Gynecology & Obstetrics	Zambia N = 24	Husbands' experiences and perceptions regarding the use of maternity waiting homes in rural Zambia	Qualitative Exploratory Descriptive Study
Sialubanje, C., Massar, K., van der Pijl, M. S. G., Kirch, E. M., Hamer, D. H., & Ruiter, R. A. C. (2015)	Reproductive Health	Zambia N = 32	Improving access to skilled facility-based delivery services: Women's beliefs on facilitators and barriers to the utilization of maternity waiting homes in rural Zambia	Qualitative Exploratory Descriptive Study
Singh, K., Speizer, I., Kim, E. T., Lemani, C., & Phoya, A. (2016)	International Journal of Gynecology & Obstetrics	Malawi N = 553	Reaching vulnerable women through maternity waiting homes in Malawi	Quantitative Cross-Sectional Descriptive Study
Sundu, S., Mwale, O. G., & Chirwa, E. (2017)	Women's Health & Gynecology	Malawi N = 15	Antenatal mothers' experience of staying in a maternity waiting home at Malamulo Mission Hospital in Thyolo District Malawi: A qualitative, exploratory study	Qualitative Exploratory Descriptive Study

Author (Publication Year)	Journal/ Source	Country Sample Size	Title of Article	Methodology (Study Design)
van Lonkhuijzen, L., Stegeman, M., Nyirongo, R., & van Roosmalen, J. (2003)	African Journal of Reproductive Health	Zambia N = 520	Use of maternity waiting homes in rural Zambia	Quantitative Exploratory Descriptive Study
Vermeiden, T., Braat, F., Medhin, G., Gaym, A., van den Akker, T., & Stekelenburg, J. (2018)	BMC Pregnancy and Childbirth	Ethiopia N = 428	Factors associated with intended use of a maternity waiting home in Southern Ethiopia: a community-based cross-sectional study	Quantitative Cross-Sectional Descriptive Study
Wild, K., Barclay, L., Kelly, P., & Martins, N. (2012)	World Health Organization Bulletin	Timor-Leste N = 2,235	The tyranny of distance: maternity waiting homes and access to birthing facilities in rural Timor-Leste	Quantitative Quasi-Experimental Historical comparison study (i.e., before and after implementation of MWHs)

4.2.1 Publication Dates

Publication dates ranged from 1994 to 2018, with the majority of studies (13/16 = 81%) published in the last 10 years. Although publication years date back only to 1994, some data collection periods reported in the selected studies date back to 1989. Eight of the 16 studies (50%) were published between 2015 and 2018, suggesting an increasing trend in the examination of MWHs.

4.2.2 Geographical Focus of Literature

The majority of the selected studies focused on countries located in Sub-Saharan Africa, with a significantly smaller proportion from other regions with low-income countries. Thirteen of the 16 studies (82%) were conducted in Sub-Saharan Africa, two (13%) were conducted in South East Asia, and one study (6%) was conducted in Guatemala in Central America. Among the studies carried out in Sub-Saharan Africa, further clustering was noted, with five of the 16 studies (31%) being conducted in Zambia, three studies (19%) being conducted in Ethiopia and two studies (13%) being conducted in Malawi.

4.2.3 Sample Sizes of Selected Literature

Determination of appropriate sample size depends on the study methodology utilized. In quantitative studies, sample size is ideally sought based on consideration of power, effect size and statistical significance level (Polit & Beck, 2014). Often large sample sizes are sought, to better reflect representation of the population under study and ensure that there is enough statistical power to detect relationships among variables and avoid statistical error; this reduces the likelihood of misleading or inconclusive results that can be found if sample sizes are too small (Polit & Beck, 2014). In qualitative studies, sample size is often guided by usual practice for various qualitative approaches, or capped at the point of data saturation (Polit & Beck, 2014).

Sample sizes among the studies examined within this REA ranged from 15 women in a qualitative study conducted in Malawi by Sundu et al. (2017) to 24,148 women in a quantitative study conducted in Ethiopia by Kelly et al. (2010). Sample sizes of the quantitative studies and quantitative components of the mixed methods studies ranged from 428 to 24,148 participants, while qualitative study sample sizes and the qualitative components of the mixed methods studies ranged from 15 to 546 participants.

4.2.4   Study Design and Methods of Selected Studies

The following three sub-sections examine the study designs and methods of the studies included in this REA, organized by overall approach (quantitative, qualitative and mixed methods). Detail on potential biases and limitations of each study are also provided. This information was used to determine an appropriate quality appraisal score for each study, which is described in further detail in Section 4.3.

4.2.4.1   Study Design and Methods of Quantitative Studies

Among the seven quantitative studies analyzed in this REA, two were retrospective cohort studies, one was a prospective cohort study, three were exploratory descriptive studies, and one was a quasi-experimental study. The lack of any true experimental studies which would allow for the determination of causality is unsurprising, given that the randomization of women to MWH intervention and non-intervention groups would be considered unethical (Polit, & Beck, 2014).

Braat et al. (2018) conducted a retrospective cohort study comparing pregnancy outcomes among MWH users and non-users. Two hospital sites were included: one with an attached MWH and the other without a MWH. The researchers calculated the statistical power required for a 95% confidence interval with 5% margin of error based on the annual number of MWH users and non-users who gave birth at the MWH hospital in 2012. These calculations were used to determine sample size. A structured questionnaire was applied to hospital records to gather data from 2011-2014. Bivariate logistic regression was used to calculate crude odds ratios (ORs) to compare the sociodemographic characteristics of MWH users and non-users at one hospital site, and non-users at the second hospital site. Pearson's Chi Square test was used to analyze maternal deaths, because ORs could not be calculated due to an absence of maternal deaths occurring within the MWH group. The authors noted the possibility of sampling bias associated with the differences in sociodemographic characteristics found among women who attended each hospital site. Women who gave birth at the hospital without a MWH were found to be more educated, wealthier and lived closer to the hospital than women who gave birth at the second hospital with the attached MWH. As noted by Braat et al. (2018), there could also have been differences in the way labour was managed by health care practitioners at each site, which may have confounded findings.

Chandramohan et al. (1994) conducted a prospective hospital-based cohort study to examine the effect of a MWH stay on adverse maternal outcomes including maternal death. Bivariate analysis was used to compare risk for adverse maternal outcomes between MWH users and non-users, as the number of adverse outcomes reported by both MWH users and non-users was too small to support multivariate analysis to estimate the effect of a MWH after controlling for other variables. The authors noted that during the study period, 31 deaths were reported by the district maternal deaths registrar. Only four of those deaths had occurred among the study population (three deaths among MWH users and one death among MWH non-users). The study population was restricted to women (MWH users and non-users) who delivered in hospital and did not include women who delivered at home or primary health centres. Restricting the study population to only women who delivered in hospital may have resulted in an overestimation of the effect of a MWH on maternal mortality.

Kelly et al. (2010) utilized a retrospective cohort design to compare rates of maternal mortality, stillbirth, and intrapartum interventions such as forceps, vacuum, or caesarean section delivery among women who attended a MWH before delivering at the local hospital and women who presented directly to hospital in labour. The study drew on routinely collected data from all women who delivered at Attat Hospital, in rural Ethiopia over a 22 year period, from 1987 to 2008. A limitation acknowledged by the authors is that despite the study's large sample size of 24,148 deliveries over a 22 year period, a more accurate comparison of maternal mortality would have included all non-users, that is, all women who delivered within the catchment area, including the women who delivered at home. The authors did not address whether additional factors such as multiple pregnancy or grand-multiparity were controlled for within the study; these potential covariates could have further impacted study findings[7].

Singh et al. (2016) sought to understand whether two new MWHs were reaching vulnerable women during the early stages of pregnancy following implementation in two rural communities in Malawi. The researchers used a cross-sectional descriptive study design, collecting data through interviews with MWH users and non-users in the two communities. Women who were leaving the health centre within 48 hours of delivery or were attending a postpartum or well child appointment at the health centre were recruited to participate in the

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[7] Grand-multiparity is defined as greater than or equal to five births, including both live births and stillbirths (greater than 20 weeks gestation) (Simonsen & Varner, 2017).

study. Bias may have been unknowingly introduced during the selection of the study population, as women who attended a postpartum or well child appointment may have been of a higher socio-economic class than women who did not attend an appointment at the health centre. In addition to participant interview data, the researchers collected data from the intake and discharge surveys administered to MWH users at one site to triangulate data and increase study validity. Information gathered from the intake and discharge surveys captured data on the women's sociodemographic characteristics, decision making regarding MWH use, knowledge of MWHs, and satisfaction with MWH services/stay. However, the use of survey data from only one of the two MWH sites could have biased the findings. Respondent bias may have also been introduced by asking women to rate their satisfaction with the services they received immediately upon discharge; women may have felt hesitant to give negative feedback at the time, possibly leading to an over-reporting of positive feedback. Interview data were analyzed using Chi Square and t-test statistical methodology to compare the sociodemographic characteristics of MWH users and non-users in each of the two communities studied.

Van Lonkhuijzen et al. (2003) conducted an exploratory descriptive study to compare the pregnancy outcomes of women who stayed at a MWH and delivered at the Nyanje RCZ Hospital with women who presented for direct admission to the same hospital in labour (MWH non-users). Data collection took place over a 7-month period in 1994. Bivariate analysis was used to compare pregnancy outcomes (until hospital discharge) among MWH users and non-users using Chi Square and t-tests. Additional analysis was performed to explore possible cofounding variables related to the socioeconomic status and maternal pregnancy risk factors among women in both groups. While the analysis was able to compare maternal mortality for MWH users and non-users, the findings may not be generalizable to women beyond this study setting.

Vermeiden et al. (2018) sought to better understand the facilitating factors and perceived barriers associated with potential MWH use among pregnant and recently pregnant women in Southern Ethiopia. A community-based cross-sectional descriptive study was undertaken using a structured questionnaire to gain insight into barriers to MWH utilization as well as the socioeconomic and sociodemographic characteristics of MWH users and potential users in four districts of the Eastern Gurage Zone in Southern Ethiopia. Study participants included pregnant women and women who had had a baby in the three years preceding the start of the study in March 2014. Convenience sampling was used to recruit study participants from every third

household, in each of the four districts in the Eastern Gurage Zone to obtain a total study sample size of 428. Power analysis suggested that a sample of 428 would provide for the calculation of 95% confidence intervals with a 5% margin of error. Bivariate and multivariate logistic regression were used to calculate unadjusted and adjusted odds ratios (ORs) for various sociodemographic factors and perceived barriers associated with MWH use. The authors noted that there was an underrepresentation of women from rural areas in the study sample (49%) compared to the general population in the Eastern Gurage Zone (89%). Other sociodemographic characteristics of study participants aligned with national averages from the most recent national Demographic and Health Survey (DHS). The convenience sampling strategy may also have contributed to inflated numbers of facility-based births compared to the wider population because study participants were recruited in the vicinity of a local health centre. In addition, the authors reported that those who met inclusion criteria, but were not home at the time of initial recruitment, were not re-visited due to financial constraints. An alternative substitution procedure was used, which may have introduced bias. Unintentional bias may have also been introduced in soliciting the perceptions of two different groups of women (pregnant women and women who had given birth three years prior). Additionally, the perceptions among women who had already given birth may have changed over time. For example, women may have perceived certain barriers while pregnant, different barriers in the immediate postpartum period, and again different barriers three years later. One final limitation of the study is the wide confidence intervals that were obtained despite basing sample size on power calculations for a 5% margin of error.

Wild et al. (2012) conducted a quasi-experimental study to compare the number of facility-based births among women who lived at different incremental distances (0-5 km, 6-25 km, 26-50 km, and >50 km) from their health centres (where deliveries occur), before and after the implementation of a MWH in two remote districts of Timor-Leste. Data were collected from birth registration books and de-identified to maintain anonymity. Bivariate analysis was performed using a Chi Square test to measure the difference in the distribution of births within each distance category. In addition, the authors calculated the total population in each distance category, matching village sizes and distance to the health centre among the two districts, to calculate the expected number of births. The observed number of facility-based births was then compared to the estimated expected number of births, using bivariate analysis (Pearson's Chi

Square) to estimate the percentage of women who were accessing facility-based births, at each distance category, in each of the two districts after implementation of a MWH. The use of a single arm historical comparison (before and after) study design does have some drawbacks; without a concurrent comparison group, it is not possible to draw causal conclusions about the effects of a MWH. For example, there may have been other changes in the districts that contributed to changes in the rate of facility-based births (e.g., greater awareness about the benefits of facility-based births or changes in available transportation).

4.2.4.2 Study Design and Methods of Qualitative Studies

Among the five qualitative studies, four utilized an exploratory descriptive study design (Lori et al., 2016; Sialubanje et al., 2016; Sialubanje et al., 2015; Sundu et al., 2017), while one study used a grounded theory design (Ruiz et al., 2013). Lori et al. (2016) carried out an exploratory descriptive study to examine the beliefs of community members in two districts in the Eastern province of Zambia regarding the acceptability, feasibility and sustainability of MWHs. A convenience sample was used to recruit participants in the two districts and data were collected over a two month period. Individual interviews were conducted with 46 community leaders, while 47 focus groups were held with women of childbearing age, their husbands and members of Safe Motherhood Action Groups, for a total sample size of 546. Verbal consent was obtained prior to data collection as literacy levels in the region were low. The interviews were audio recorded, translated and transcribed verbatim. Latent content analysis was used to analyze data, from which six main themes were constructed related to the acceptability, feasibility, and sustainability of MWHs. The presence of members of Safe Motherhood Action Groups may have influenced the focus group discussions, resulting in biased data. Another limitation of the study is potential bias may have also been introduced when the authors collected and translated the interview audio recordings from the local dialect to English. The lack of an additional back translation, from English to the local dialect may have led to the omission of small nuances lost during the initial translation. The authors made no note of why such a large sample size (n=546) was used for a qualitative study, leading the reader to question the trustworthiness of the findings.

Sialubanje et al. (2015) also utilized an exploratory descriptive study design to explore women's beliefs and experiences related to the utilization of MWHs in rural Zambia. Purposeful sampling was used to recruit women of reproductive age with similar experiences regarding the

utilization of MWHs. Demographic differences among study participants, including their age, number of children, marital status, and education level, were compared to gain insight into the similarities and differences of their MWH experiences.

The researchers initially identified 15 research sites where women would be recruited: ten health centres with an attached MWH and five health centres without a MWH. Data saturation was achieved after 25 interviews had been conducted (15 interviews with women from five health centres with a MWH and 10 with women from two health centres without a MWH), and the research team decided to not conduct any interviews at the remaining eight health centres that had been initially identified. However, seven additional interviews were conducted with women at two mission-owned health centres which had not been part of the original study sample. This was to gain further insight on women's MWH experiences because MWHs at mission-run facilities were thought to be of higher quality – offering more space, better supplies and more social services – and therefore, data from respondents at these facilities, may have differed. However, no mention was made, as to how the data obtained from women at the two mission-run health centres compared with the data from the initial 25 interviews. The authors noted that, because interviews took place in two different settings (with and without a MWH), two interview guides were developed and used. Although most of the interview questions were the same, a few questions differed in the interview guide used in settings without a MWH, to help gain a better understanding of the participants' perspective of MWHs. The authors reported that member-checking was not carried out due to logistical challenges, which may have affected the trustworthiness of the findings. Recruitment of women attending a health centre limits the transferability of the findings, as it may not reflect the beliefs and experiences of women who did not attend a health centre, for example, women who gave birth at home. The authors also noted that their individual judgment and previous experience may have influenced the interpretation of the findings from the conducted interviews, but did not elaborate.

A second exploratory descriptive study by Sialubanje et al. (2016) was carried out over an overlapping eight week time period to his previous study and aimed at exploring the beliefs of men regarding the use of MWHs in rural Zambia. Study recruitment was carried out at a clinic for children under five years of age, at a health centre with an attached MWH in the Kalomo District in Zambia. In-depth interviews were conducted with husbands/partners of women attending the health centre. Inclusion criteria limited participants to men aged 18-50, who had

lived in the area for more than 6 months, and whose partner/wife was of reproductive age. Twenty-four men were interviewed in Tonga (the local language) using a semi-structured interview guide. Data collection continued only until data saturation was achieved. Voice recordings of the interviews were transcribed from Tonga to English, and then 20% were re-transcribed back to Tonga to check the translation accuracy. Without knowing the accuracy found, it is difficult to judge the adequacy of a 20% sample. Because the experiences of men whose partner/wife was not attending the clinic during the two-month study period would not have been solicited, the findings would only be applicable to husbands/partners in communities where MWH services are available.

Sundu et al. (2017) conducted an exploratory descriptive study to explore the experiences of antenatal women staying at a MWH in the Thyolo District in Malawi. Initially, 10 antenatal mothers were recruited to participate in the study; however, the sample was increased until data saturation occurred, for a final sample size of 15. Interviews were tape recorded and transcription was conducted immediately following the interview, and then translated to English. Interview transcriptions and field notes were compared during data analysis. Data analysis was conducted by the researchers and compared to that conducted by an expert in qualitative research, to increase the trustworthiness of the findings. An alternative method to enhance trustworthiness of the findings would have been the use of member-checking. Recruitment through the use of purposive sampling at a single MWH may have introduced selection bias, as the sample may not have been reflective of the experiences of all women staying at the MWH.

Ruiz et al. (2013) utilized a grounded theory approach to identify barriers that women face before, during, and after their stays in a MWH in order to better understand the factors behind the low utilization of MWHs in Guatemala. The authors envisioned distance and accessibility, along with financial costs and cultural restrictions, as the main barriers inhibiting use of MWHs by women in the local community. Forty-eight participants were recruited using a combination of convenience and snowball sampling to participate in individual interviews. Twenty participants were recruited from Cuilco and 28 from a second site in Huehuetenango, where Guatemala's two MWHs are located. A varied group of participants was recruited including 18 MWH users, five family members of a MWH user, four community leaders, five MWH administrative/medical staff, seven local midwives (known as comadronas), eight medical staff/personnel from the local health centre and hospital, and one member of the Guatemalan

Ministry of Health and Public Assistance. The authors did not specify whether they were seeking such a varied group of interviewees, noting only that recruitment was done primarily through snowball sampling. Inclusion of a wide variety of stakeholders from various backgrounds and levels of power and authority provided the authors with an array of differing viewpoints, strengthening the comparisons of variations in interviewee data. Interview transcripts were compared and contrasted noting common thematic patterns reported by participants. Although the study sample contained a diverse group of participants, MWH non-users were not included; inclusion of this group could have provided additional information related to barriers that prevent access to and use of MWH facilities in Guatemala. It remains unknown as to whether MWH non-users would have alternate views of barriers to MWH use and as a result, limits the transferability of the findings.

4.2.4.3   Study Design and Methods of Mixed Methods Studies

Each of the four mixed methods studies included in this REA utilized an exploratory descriptive study design for the qualitative component; however, the quantitative components varied. One used a prospective cohort study design (Lori et al., 2013), two used cross-sectional descriptive study designs (Chibuye et al., 2018; Mramba et al., 2010) and one used a prospective descriptive study design (Eckermann & Deodato, 2008) for the quantitative component.

The mixed methods study by Chibuye et al. (2018) examined the experiences and expectations associated with MWH use in the Luapula Province in Zambia to enhance understanding of the facilitators and barriers to MWH use. Secondary aims of the study were to understand how expectations of MWHs among women and other community members shaped current use, and the long-term sustainability of MWHs within the country. Qualitative data were collected from 21 focus groups which included 210 pregnant women, mothers (identified as women who had delivered at home in 2012 [one year prior to the study period]), elderly women, and Safe Motherhood Action Group/Neighborhood Health Committee members from the four districts within Luapula Province that had operational MWHs. Additional data were collected from 79 interviews conducted with local health care workers, traditional healers, district community medical and nursing officers, couples attending their first antenatal care visit, and partner agency staff also working in the province to promote reproductive, maternal, and neonatal/child health. Quantitative data were collected from the registries of 17 health facilities with MWHs in the same four districts. Information was gathered about the structures and

amenities of the MWHs, and the number of annual deliveries. Unfortunately, the authors noted that only five of the 17 health facilities had registries containing data on the number of women who had stayed at the MWHs over the three preceding months.

To facilitate accuracy of the qualitative findings, interviews were recorded and transcribed in Bemba (local dialect). The data were then translated to English and back translated to Bemba to ensure accuracy of the initial translation. The authors attempted to address the male perspective of MWHs by including husbands in the qualitative sample; however, the sample included only 10 men, accounting for just 3% of the qualitative sample. The exclusion of MWH health care workers from qualitative focus groups and interviews was another limitation of this study. Health care workers may have differing perspectives on both the facilitators and barriers to MWH use and could have provided additional insight about the facilitators and barriers that were identified in the study. One final limitation of the study was the lack of clarity around the quantitative data that was collected and analyzed. Two of the tools were used to collect data and report descriptive statistics on structure and amenities at each of the 17 MWHs. The third tool sought to collect data on the number of annual deliveries amongst MWH users at the attached health facility; however, data were only available from five registries (out of 17) for the three preceding months. It is also unclear whether certain MWHs were busier than others. The average number of MWH users reported by the authors should be interpreted cautiously, given it is an average calculated from three months of registry data from only 29% of health facilities with attached MWHs, in four districts of Luapula Province.

Eckermann and Deodato (2008) sought to develop a deeper understanding of maternal and infant health outcomes associated with MWH use in Southern Lao PDR, and the challenges women face when trying to access or use MWH facilities. The study used a triangulated approach by analyzing epidemiological reproductive health outcome data collected by the Thateng District the previous year, and qualitative data obtained from focus group and individual interviews carried out in 18 (33%) villages in the Thateng District. The total number of participants interviewed (individual interview and focus groups) in the qualitative component remains unclear as only the total population (N=7,876) of the 18 villages was provided. The authors did note that both men and women in each village were included in the focus group and individual interviews, along with traditional birth attendants, midwives, and village health committee members. No information was provided about when the epidemiologic data was

collected and which timeframe it represents. A lack of detail was provided about the qualitative data collection methods and timeframe. The limited detail in relation to the study methods leaves numerous questions unanswered as to the overall quality of the study and subsequent findings, especially because the authors noted that there were large discrepancies between reported maternal and infant mortality by villagers and what was noted in the official epidemiologic data.

Lori et al.'s (2013) mixed methods study sought to examine several aspects of MWH use in rural Liberia including: whether MWHs increase the use of skilled birth attendants (SBAs) at rural primary health clinics; whether MWHs reduce maternal and child morbidity and mortality; and whether traditional midwives (TMs) work with SBAs and the perceptions about their collaborations. Quantitative data were obtained from the mid-point of a larger ongoing prospective cohort study in which five communities saw the establishment of a MWH and five other communities did not. Data related to health outcomes were collected by midwives following each delivery and recorded in logbooks. Logbook data were analyzed to examine outcomes over a two year period (midpoint of the cohort study), using logistic regression and controlling for any clustering within communities. The proportion of team births was compared to the proportion of non-team births in communities with and without a MWH using a logistic regression model[8]. The dependent variables in the logistic regression included the number of maternal and perinatal deaths (controlling for the estimated number of women of childbearing age in each community). Initial matching of communities in terms of population size, demographic characteristics, and location in the larger cohort study adds to the confidence and strength of the findings. In addition to the quantitative analysis, qualitative data were collected from in-depth focus group interviews with 46 TMs from the communities served by health care facilities with MWHs. The authors noted that focus group interviews were audio recorded and transcribed verbatim prior to transcripts being translated from Kpele to English but no back translation was carried out, which may have introduced bias or resulted in key phases being lost in translation.

Mramba et al. (2010) sought to examine the reasons for low utilization of a MWH, built two years prior, located 50 metres away from the maternity unit at the Kilifi District Hospital in rural Kenya. The authors utilized a mixed methods approach and undertook an exploratory

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[8] Team births were identified by Lori et al. (2013), as a birth attended by both a SBA and TM.

descriptive design for both the quantitative and qualitative study components. Quantitative data were collected from interviews with 134 healthcare workers and 327 pregnant women over a two-month period, while qualitative data were collected from in-depth interviews with 30 randomly selected women who had used the MWH over the same two-month period (May to June) in 2006. Numerous questions arise about the sampling strategies used for the quantitative component of the study including sample size determination and recruitment procedures. Details of the data analysis methods untaken by the authors for the qualitative component of the study are sparse. A failure to acknowledge any limitations of the study, possible biases, or what techniques were used to enhance validity of the findings, leaves the reader to question the trustworthiness of the findings reported.

4.3   Study Appraisal

All 16 studies included in this REA were appraised using the Evidence for Policy and Practice Information and Coordinating Centre (EPPI) data extraction and coding tool and given an overall score for their weight of evidence (WoE) in relation to how each study answered the REA questions. Each study also received at least one other appraisal score according to the study methodology. The Critical Appraisal Skills Programme (CASP) scoring tool was used to appraise qualitative studies and the Maryland Scale of Scientific Methods (MSSM) tool to appraise quantitative studies. Mixed-method studies were given three scores, as the CASP and MSSM tools were used to appraise the qualitative and quantitative aspects of the studies, respectively. (See Table 4.3 for a summary of the quality appraisal scores, grouped by study design.)

Overall, 11 of the 16 studies were assessed with WoE scores between 7 and 9, indicating a high overall quality and applicability and five studies were given scores of 5 or 6, indicating a medium level of overall quality and applicability in addressing the REA questions. Studies were carefully chosen for inclusion based on whether they addressed at least some aspect of one of the two REA questions posed; therefore, I anticipated higher overall WoE scores. Among the seven quantitative studies, four were given high WoE scores and three were given a medium score (5 or 6). Four high WoE scores and one medium score characterized the five qualitative studies analyzed. Among the four mixed methods studies – two studies were given high WoE scores, while the other two studies received a medium quality score.

CASP scores for the five qualitative studies ranged from 23 to 29 (out of a total possible score of 30); they were considered to be of high quality. Three of the four mixed methods studies received medium CASP scores (19-23/30) and one study received a high CASP score (25/30) for the qualitative component.

MSSM scores of 1 (low), 3 (medium) or 4 (high) were assigned to the seven quantitative studies and the quantitative component of the four mixed methods studies. Scores of 5 were not expected among any of the studies included, because all of the studies were cohort-based or quasi-experimental rather than randomized controlled trials. The MSSM scoring tool suggests that top quality appraisal be given to studies with random assignment and analysis of comparable units to intervention and control groups, such as randomized control trials – which were uncommon given the nature of the intervention and ethical concerns about assigning women to a control group when MWHs were already thought to have a positive effect on health outcomes. Among the seven quantitative studies, two studies received high scores of 4 – one utilized a retrospective cohort design, while the other employed a prospective cohort design. Four studies received medium quality scores of 3 – two carried out a cross-sectional descriptive study, while the other two studies included a retrospective cohort study and a quasi-experimental historical comparison study. The remaining study by Vermeiden et al. (2018) utilized a cross-sectional descriptive study design receiving a low quality MSSM score of 1. Among the four mixed methods studies, three studies received low MSSM scores of 1 for the quantitative component, while the fourth study received a medium MSSM score of 3.

An analysis of the scoring across the different tools used showed that only six of the 16 studies (38%) received the same scoring level (high, medium or low) across all applicable measures. There was more consistency amongst qualitative studies, with four of the five qualitative studies (80%) receiving high quality scores across the two appraisal tools. For the quantitative studies, only two of the seven studies (29%) received the same scoring levels in the WoE and MSSM tools. The greatest inconsistency was noted among the mixed methods studies, where all four studies had a mix of scoring levels across the three appraisal measures. Each of the four mixed methods studies (100%) received the same level of appraisal scores for the WoE and CASP tools, while the MSSM quality score for each study was lower than the WoE and CASP scores. The lower MSSM scores for the mixed methods studies and the quantitative study by Vermeiden et al. (2018) were a result of research design utilized. The MSSM tool assesses

internal validity of quantitative research studies; thus, studies that utilized a descriptive study design would have lower quality scores. Other than the Vermeiden et al. (2018) study, the remaining six quantitative studies (86%) received medium or high quality MSSM scores.

Despite the inconsistencies, where different quality levels were noted, the quality appraisal scores generally fell close to the predetermined arbitrary cut-off point for quality levels and hence, an extra point or two could have swung the score into the same quality level. Had a study received low evidence scores across all applicable appraisal tools, I might have deemed it as too low-quality to include within this REA and subsequently removed it; however, I did not make such an assessment during the quality appraisal. All 16 studies were considered useful in addressing the two main REA questions. Table 4.3, on the following two pages, provides a summary of the quality appraisal scores given to each of the 16 studies, grouped by research design.

Table 4.3 Summary of Quality Appraisal of Selected REA Studies

Study Author (Year)	Study Methodology	WoE Quality Level & Score	MSSM Quality Level & Score	CASP Quality Level & Score
Braat, F., Vermeiden, T., Getnet, G., Schiffer, R., van den Akker, T., & Stekelenburg J (2018)	Quantitative	High (9)	High (Level 4)	N/A
Chandramohan, D., Cutts, F., & Chandra, R. (1994)	Quantitative	Medium (6)	High (Level 4)	N/A
Kelly, J., Kohls, E., Poovan, P., Schiffer, R., Redito, A., Winter, H., & MacArthur, C. (2010)	Quantitative	High (9)	Medium (Level 3)	N/A
Singh, K., Speizer, I., Kim, E. T., Lemani, C., & Phoya, A. (2016)	Quantitative	Medium (6)	Medium (Level 3)	N/A
van Lonkhuijzen, L., Stegeman, M., Nyirongo, R., & van Roosmalen, J. (2003)	Quantitative	High (7)	Medium (Level 3)	N/A
Vermeiden, T., Braat, F., Medhin, G., Gaym, A., van den Akker, T., & Stekelenburg, J. (2018)	Quantitative	Medium (7)	Low (Level 1)	N/A
Wild, K., Barclay, L., Kelly, P., & Martins, N. (2012)	Quantitative	High (8)	Medium (Level 3)	N/A
Lori, J. R., Munro-Kramer, M., Mdluli, E. A., Musonda, G. K., & Boyd, C. J. (2016)	Qualitative	High (8)	N/A	High (27)
Ruiz, M., van Dijk, M., Berdichevsky, K., Munguia, A., Burks, C., & Garcia, S. (2013)	Qualitative	High (7)	N/A	High (23)
Sialubanje, C., Massar, K., Kirch, E. M., van der Pijl, M. S. G., Hamer, D. H., & Ruiter, R. A. C. (2016)	Qualitative	High (8)	N/A	High (27)
Sialubanje, C., Massar, K., van der Pijl, M. S. G., Kirch, E. M., Hamer, D. H., & Ruiter, R. A. C. (2015)	Qualitative	High (8)	N/A	High (29)
Sundu, S., Mwale, O. G., & Chirwa, E. (2017)	Qualitative	Medium (5)	N/A	High (23)
Chibuye, P. S., Bazant E. S., Wallon, M., Rao, N., & Fruhauf, T. (2018)	Mixed methods	High (8)	Low (Level 1)	High (25)
Eckermann, E., & Deodato, G. (2008)	Mixed methods	Medium (6)	Low (Level 1)	Medium (21)

Study Author (Year)	Study Methodology	WoE Quality Level & Score	MSSM Quality Level & Score	CASP Quality Level & Score
Lori, J. R., Munro, M. L., Rominski, S., Williams, G., Dahn, B. T., Boyd, C. J., Moore, J. E., & Gwenegale, W. (2013)	Mixed methods	High (7)	Medium (Level 3)	High (23)
Mramba, L., Nassir, F. A., Ondieki, C., & Kimanga, D. (2010)	Mixed methods	Medium (6)	Low (Level 1)	Medium (19)

Note: The following score cut off points were used to determine the quality level for each appraisal tool:

WoE Score: 3 = Low Quality, 4-6 = Medium Quality, 7-9 = High Quality

CASP Score: 10-16 = Low Quality, 17-22 = Medium Quality, 23-30 = High Quality

MSSM Score: 1 = Low Quality, 2-3 = Medium Quality, 4-5 = High Quality.

4.4   REA Question 1: What impact do MWHs have on maternal mortality?

Mortality is a common health measure used to evaluate health status at an individual or population level. Mortality refers to death as a result of a medical condition or exposure (Gordis, 2014; John Hopkin's University & Mosley, 2006; Thomas, 2016). Mortality data are an important tool that can be used to identify health problems, monitor the health status of a population, and monitor health programs at local and national levels (Centers for Disease Control and Prevention (CDC), 2012; WHO, 2017b). Mortality data can provide a basis to calculate other health outcome measures such as life-expectancy and burden of disease (Ortiz-Ospina & Roser, 2019). Mortality data may be gathered through community and/or hospital reporting, health surveys or surveillance systems which can be both costly and impractical in some contexts, such as in countries where no national surveillance system exists (Johns Hopkins University & Mosley, 2006; WHO, 2017b). This REA focuses on the impact of MWHs on maternal mortality and improving access to care in developing countries. Therefore, the reported findings for research question one focus only on maternal mortality associated with MWHs.

Among the 16 studies included in this REA, only four studies (25%) examined maternal mortality associated with MWH use. Of the four studies, the quantitative study by Braat et al. (2018) received high-high (WoE-MSSM) appraisal scores, while the other two quantitative studies by Kelly et al. (2010) and van Lonkhuijzen et al. (2003) received medium-high (WoE-MSSM) appraisal scores and the mixed methods study by Lori et al. (2013) received high-medium-high (WoE-MSSM-CASP) quality appraisal scores.

The four studies examined maternal mortality using either a maternal mortality rate (number of [maternal] deaths per the number of women of reproductive age) or maternal mortality ratio (number of [maternal] deaths per number of live births) to express measurable findings (Wilmoth, 2009). It is important to note that the WHO defines a maternal death as: "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" (WHO, 2004, p. 3). This definition provides clarity to the outcomes reported by Braat et al. (2018), Kelly et al. (2010), Lori et al. (2013) and van Lonkhuijzen et al. (2003). Braat et al. (2018) and Kelly et al. (2010) measured maternal mortality using a maternal mortality ratio, while Lori et al. (2013) and van Lonkhuijzen et al. (2003) measured maternal mortality using a maternal mortality rate.

Braat et al. (2018) examined the impact of a MWH in rural Ethiopia by comparing maternal deaths between MWH users and non-users. Two hospital study sites were used, of which one had a MWH (Attat Hospital) and the other hospital did not (Butajira Hospital). In addition to examining the number of maternal deaths the authors also compared sociodemographic characteristics among MWH users (Attat Hospital) and non-users (Attat Hospital and Butajira Hospital). Their results showed that no maternal deaths occurred in the MWH user group, while 20 deaths (0.4%) were noted among non-users at the same hospital (Attat) ($p = 0.001$) and 31 (0.3%) at the Butajira Hospital ($p = 0.003$); reflecting a maternal mortality ratio of 0, 368.8, and 327.3 per 100,000 births.

Kelly et al. (2010) examined the maternal mortality rates among women who delivered in hospital, either by presenting directly to the hospital or by referral from a MWH where they had been staying prior to the onset of labour. They calculated maternal mortality ratio of MWH users and non-users. The maternal mortality ratio for MWH users was 89.8/100,000 live births (95% CI: 41.1-195.7), compared to 1,331.1/100,000 live births (95% CI: 1,156.2-1,536.7) for non-users. Statistical significance was not reported, but the ratios and confidence intervals are substantially different for the two groups suggesting a protective effect – that MWHs allow for more timely and appropriate access to emergency obstetric treatment among women using the facility. Lori et al. (2013) obtained similar findings when comparing maternal deaths for five communities with a MWH and five communities without a MWH over an 18 month period. There were 3 maternal deaths among the 8,477 women living in a community with a MWH, compared to 12 maternal deaths among 9,567 women living in a community without a MWH (Wald $\chi^2 = 4.22$, df = 1, $p = 0.040$), indicating MWH use was associated with lower maternal mortality.

Van Lonkhuijzen et al. (2003) compared risk status and pregnancy outcomes among MWH users and non-users in rural Zambia. Their results indicated that women who had stayed at a MWH tended to have more maternal risk factors than non-users. Therefore, one would predict an increased number of maternal deaths among MWH users compared to non-users. However, despite the differences in risk status, no difference was found between the two groups in number of maternal deaths or overall maternal mortality rate using bivariate analysis (Chi Square and t-tests), suggesting that the MWH could provide some protection against maternal mortality for women with higher risk status.

4.5 REA Question 2: What factors influence a woman's decision and ability to use a MWH in developing countries?

The 'Three Delays Model', first conceptualized by Thaddeus and Maine (1994), identifies three phases of delay that occur in seeking out emergency obstetrical care. The conceptual framework identifies obstacles and factors that contribute to the inability to access timely, high quality obstetrical care and that can lead to maternal mortality. Thaddeus and Maine's (1994) conceptual framework was used to guide the analysis of research question two and is further discussed in Chapter 5.

Each of the 16 studies included in this REA examined at least one factor that influenced a woman's decision and subsequent ability to use a MWH. Analysis from the 16 studies revealed a variety of factors, which were grouped into six main themes. Overall, the findings indicate that more often a combination of factors, rather than a single factor, precludes a woman from deciding to access and subsequently use a MWH. Table 4.4 below provides a summary of the 16 studies that comprise this REA, and which factors that influenced a woman's decision and subsequent ability to use a MWH were discussed within each study.

Table 4.4 Factors that Influence a Woman's Decision and Ability to Use a Maternity Waiting Home

	Distance/ Accessibility	Transportation	Financial Costs	Physical Aspects of MWH & Services Provided	Cultural Restrictions	Lack of Awareness Related to MWHs
Braat et al. (2018)	✓		✓			
Chandramohan et al. (1994)						✓
Chibuye et al. (2018)	✓		✓	✓		
Eckermann & Deodato (2008)	✓		✓		✓	✓
Kelly et al. (2010)	✓	✓	✓			
Lori et al. (2016)	✓		✓			
Lori et al. (2013)					✓	
Mramba et al. (2010)					✓	✓
Ruiz et al. (2013)	✓		✓	✓	✓	✓
Sialubanje et al. (2016)	✓	✓	✓	✓	✓	
Sialubanje et al. (2015)	✓	✓	✓	✓	✓	
Singh et al. (2016)			✓			
Sundu et al. (2017)				✓		
van Lonkhuijzen et al. (2003)			✓	✓		
Vermeiden et al. (2018)	✓	✓	✓	✓		
Wild et al. (2012)	✓	✓				

Note: ✓ = Topic was examined

4.5.1 Distance and Accessibility

Evans, Hsu and Boerma (2013) defined physical accessibility in a 2013 Bulletin of the World Health Organization as "the availability of good health services within reasonable reach of those who need them and of opening hours, appointment systems, and other aspects of service organization and delivery that allow people to obtain the services when they need them" (p. 546). Accessibility is also defined as: the ease with which a person is able to seek out and obtain needed medical care (Levesque, Harris, & Russell, 2013). For the purpose of this REA, accessibility refers to the ease with which a person is able to seek out and obtain needed medical care via MWH use, taking into consideration geographic characteristics that may hinder the ability to reach medical care at a health care facility, such as a hospital.

Ten of 16 studies (63%) identified distance and/or accessibility as a factor that influenced a woman's ability to decide to and subsequently access a MWH. The ten studies included two mixed methods studies, four quantitative studies and four qualitative studies. Appraisal scores of the two mixed methods studies were high-low-high and medium-low-medium (WoE-MSSM-CASP). Mixed appraisal scores were noted among the quantitative studies, with two studies (50%) by Kelly et al. (2010) and Wild et al. (2012) receiving high-medium WoE-MSSM scores, while the study by Braat et al. (2018) received high-high (WoE-MSSM) scores and the study by Vermeiden et al. (2018) received medium-low (WoE-MSSM) appraisal scores. All four qualitative studies received high WoE and CASP appraisal scores.

Among the ten studies that identified distance as a barrier, seven studies (70%) reported that distance either impeded or inhibited a woman's ability to access a MWH (Chibuye et al., 2018; Eckermann & Deodato, 2008; Lori et al., 2016; Ruiz et al., 2013; Sialubanje et al., 2015; Vermeiden et al., 2018; Wild et al., 2012). Eckermann and Deodato (2008) used a mixed methods study to examine geographic, social and cultural barriers associated with MWH use in Southern Lao PDR. The authors noted that villages in the Thateng District of Sekong Province ranged from 3 to 29 km away from the district hospital and adjacent MWH and walking times ranged from 30 minutes to 8 hours. Large distance and travel times made accessing any type of medical care, including maternity care difficult. Access to the hospital and MWH was further hindered in the rainy season, with high river levels cutting off road access to several villages. Similar findings were obtained in three studies conducted in Zambia. Two qualitative studies (Lori et al., 2016; Sialubanje et al., 2015) found that long walking distances to reach a MWH

negatively affected use of available facilities; the third, a mixed methods study (Chibuye et al., 2018) found difficulties related to the rainy season. Chibuye et al. (2018) noted that access to one MWH in the Luapula Province in Zamia was significantly hampered in the rainy season when a river crossing became impassable without a bridge, resulting in over-crowding of a second MWH that remained accessible.

Ruiz et al. (2013) used qualitative research methods to identify barriers before, during, and after a woman's stay in a MWH in Guatemala. Study participants included MWH users, family members, comadronas (Mayan midwives), community leaders, MWH staff, and health center/hospital staff including physicians and nurses. The authors noted that the women lived 30 minutes to 3 hours away from the MWH via public transportation, but that most MWH users came from the city where the MWH was located or the sub-urban area, suggesting distance impeded MWH use. Among the two different MWH sites in the study, both were under-utilized by women from more remote communities.

Vermeiden et al. (2018) explored factors and barriers associated with potential MWH utilization in Southern Ethiopia. The authors reported that women who envisioned fewer barriers to staying at a MWH had higher odds of being a potential MWH user. Data analysis revealed that women who faced travel time greater than 60 minutes were less likely to utilize a MWH. When adjusted for potential confounding variables, a travel time less than 30 minutes was associated with higher potential MWH use (OR = 1.49 [95% CI: 0.24-9.14]). Similar results were found by Wild et al. (2012) who examined the impact of MWHs on the use of facility-based birthing services in Timor-Leste. Their findings revealed that women who lived in close proximity to the hospital were more likely to stay at the adjacent MWH than women who lived further away. Despite the establishment of a MWH adjacent to the local hospital in two communities, women from remote communities were no more likely to use the facility nor have a facility-based birth than before the MWH existed, suggesting that distance was a barrier to MWH use.

The remaining three studies did not find that distance was a barrier to MWH use. Braat et al.'s (2018) comparison of pregnancy outcomes among MWH users and non-users in Ethiopia revealed that MWH users had significantly longer travel times to reach a hospital than non-users. Maternity waiting home users travelled an average of 2.5 hours away from home to stay at a MWH attached to the local hospital, while non-users travelled an average of only 1 hour away

from home to reach a hospital. The authors noted that travel times were impacted by both traffic and poor road conditions but they suggested that distance was not a barrier to MWH use. A similar study in Ethiopia (Kelly et al., 2010) found that MWH users and non-users lived, on average, an equal distance (40 km) away from the hospital. Additionally, because the MWH was located on the grounds of the hospital, the MWH did not bridge the distance between a woman's home and hospital. Sialubanje et al.'s (2016) study in rural Zambia found that the average walking time from a woman's home to the local hospital was 160 minutes (±20 min). Interviews with men (husbands/partners) revealed that MWHs were viewed as mitigating long travel distances to hospital when a woman goes into labour. Women who stayed at a MWH were significantly closer to a hospital than women who were at home, as the MWH was often located on the hospital grounds.

4.5.2 Transportation

Being closely aligned with distance, transportation played a vital role in women's ability to use medical facilities and MWHs. The absence of available and timely transportation to take a woman from her home to a MWH or hospital, as well as from a MWH to a hospital significantly reduced use of available MWH facilities. Women who sought to utilize a MWH attached to or located in close proximity to the local hospital faced the same challenges as trying to access the hospital directly. In cases where a MWH was not located next to the local hospital but a significant distance away, the absence of available transportation remained an issue not solved by the existence of the MWH itself.

Five studies discussed transportation issues which prevented women from accessing maternity care or using a MWH; all reported consistent findings (Kelly et al., 2010; Sialubanje et al., 2016; Sialubanje et al., 2015; Vermeiden et al., 2018; Wild et al., 2012). The five studies included three quantitative studies and two qualitative studies. Two of the three quantitative studies received high-medium (WoE-MSSM) appraisal scores, while the third study by Vermeiden et al. (2018) received medium-low appraisal scores. Both qualitative studies received high-high (WoE-CASP) appraisal scores.

Kelly et al. (2010) reported that transportation options in rural Ethiopia ranged from walking, to a donkey or mule, to a motorized vehicle. Women who did not live near a road were required to walk or to be carried by stretcher to the roadside, where they were able to access motorized transportation. Motorized transportation was the preferred method of travel, as

distances from a woman's home to a MWH or to the attached hospital reached upwards of 212 km. Transportation costs varied based on time of travel as well as distance, with night journeys costing up to six times more than day journeys.

Sialubanje et al. (2015) examined women's experiences and beliefs around MWH utilization, while Sialubanje et al. (2016) examined men's perspectives related to MWH utilization. Women interviewed in Sialubanje et al.'s (2015) study noted that the main reason for utilizing a MWH was to mitigate long distances and lack of transportation from a woman's home to the hospital. Men interviewed in Sialubanje et al.'s (2016) study also viewed MWHs as mitigating long distances and transportation costs associated with getting to a hospital. The authors noted that MWHs were located next to an antenatal clinic and often closer to the local hospital than a woman's home. However, the absence of an ambulance that could transport a woman to the local hospital from the MWH, led men to discourage MWH use, fearing safety concerns (Sialubanje et al., 2016). Both studies concluded that a lack of transportation prevented women from utilizing MWHs in rural Zambia.

Vermeiden et al. (2018) reported that, if transportation to and from the MWH was available and affordable, the odds of potential MWH use by pregnant women was significantly increased (OR = 14.41 [95% CI: 8.62-24.09], $p < 0.05$), and remained statistically significant when adjusted for possible confounding variables such as availability of affordable transportation to and from a MWH (OR = 3.61 [95% CI: 1.04-12.46], $p < 0.05$).

Wild et al. (2012) noted that women faced the same transportation challenges in accessing the MWH as they would when accessing care at the hospital because the two facilities were located next to each other. Kelly et al. (2010) reported similar findings in that 73% (807/1099) of MWH non-users reported that the cost of transportation was the cause of their delay in seeking out medical care at the local hospital.

4.5.3   Financial Costs

Ten studies reported that the decision and ability to access a MWH was influenced by the direct and indirect costs associated with staying at the MWH (Braat et al., 2018; Chibuye et al., 2018; Eckermann & Deodato, 2008; Kelly et al., 2010; Lori et al., 2016; Ruiz et al., 2013; Sialubanje et al., 2016; Sialubanje et al., 2015; van Lonkhuijzen et al., 2003; Vermeiden et al., 2018). The 10 studies included four quantitative studies, four qualitative studies and two mixed methods studies. The four quantitative studies received high-high, high-medium, high-medium

and medium-low (WoE-MSSM) appraisal scores. All four qualitative studies received high-high (WoE-CASP) appraisal scores, while the two mixed-method studies received high-low-high and medium-low-medium (WoE-MSSM-CASP) appraisal scores.

Six studies (60%) reported that the direct financial costs associated with staying at a MWH, including a user fee, and/or the cost of transportation to and from the facility, negatively affected the woman's decision to stay at a MWH (Braat et al., 2018; Chibuye et al., 2018; Eckermann & Deodato, 2008; Ruiz et al., 2013; Sialubanje et al., 2015; Vermeiden et al., 2018). Eckermann and Deodato (2008) reported that the direct financial costs associated with staying at a MWH were the most significant barrier that prevented women from using a MWH. User fees of approximately $2 USD were identified in three studies: two conducted in Ethiopia (Braat et al., 2018; Vermeiden et al., 2018), and one in Zambia (Chibuye et al., 2018). The MWH user fee included the cost of the MWH stay as well as the cost of delivery at the local hospital (Braat et al., 2018). These user fees were in place until 2014 when the Ethiopian and Zambian governments introduced legislation providing free delivery services for women through their respective national health systems, thus, eliminating most of the direct costs associated with using a MWH (Braat et al., 2018; Chibuye et al., 2018; Vermeiden et al., 2018).

Indirect costs that were found to negatively impact a woman's decision or ability to use a MWH include the costs associated with lost income if the woman was working outside the home, and indirect costs associated with staying at a MWH, such as childcare costs. Women in Ruiz et al.'s (2013) study reported that the health benefits of staying at a MWH during the last few weeks of pregnancy did not compensate for the lost income. Vermeiden et al. (2018) reported similar findings: women perceived the financial burden associated with taking time off work as a major inhibiting factor associated with staying at a MWH but they were also concerned about the burden on the support person accompanying the woman during her stay at a MWH. The costs associated with childcare also posed a significant barrier to women's use of MWHs when a woman did not have other family members that could care for her children while she was staying at a MWH (Ruiz et al., 2013; Sialubanje et al., 2016; Vermeiden et al., 2018).

Six of the 10 studies (60%) discussed the indirect financial burden associated with supplies that women were required to bring when staying at a MWH (Chibuye et al., 2018; Lori et al., 2016; Ruiz., 2013; Sialubanje et al., 2016; Sialubanje et al., 2015; Vermeiden et al., 2018). Women interviewed in Lori et al.'s (2016), Ruiz et al.'s (2013) and Sialubanje et al.'s (2015)

studies expressed concern over their inability to afford the needed supplies they were required to bring with them. This concern was amplified among women who were considered to be living in poverty. Supplies included basic supplies for infant care, such as baby blankets and clothing, and cooking and cleaning materials. Chibuye et al. (2018), Ruiz et al. (2013), and Sialubanje et al. (2015, 2016) reported women were required to bring enough food from home with them for the duration of the MWH stay. If a woman was allowed to have a support person stay with her at the MWH, they also needed to bring enough food for their support person (Chibuye et al., 2018). Women in Sialubanje et al.'s (2015) study and men in Sialubanje et al.'s (2016) studies reported that, a lack of basic provisions at the MWH (requiring women to bring food and supplies from home for the duration of the MWH stay), affected their decisions to stay at a MWH. The requirement to bring supplies from home was financially challenging because women often had limited food supplies at home (Sialubanje et al., 2015).

Studies by Kelly et al. (2010) and van Lonkhuijzen et al. (2003) reported that financial incentives were offered to reduce the direct and indirect financial costs associated with staying at a MWH, and to encourage women to use the facilities. Kelly et al. (2010) noted that MWHs in rural Ethiopia offered reduced hospital fees for women who stayed at a MWH or offered no additional fees to have a family member or partner stay at a MWH to help the woman and cook for her. Van Lonkhuijzen et al. (2003) reported that while there was a fee to stay at a MWH, the fee included the cost of the hospital birth and was half of the fee typically charged to a woman who presented directly to the hospital in labour. In contrast to these subsidies, Chibuye et al. (2018) reported that in an effort to motivate women to use a MWH and increase usage of MWHs in one province in Zambia, financial and/or livestock penalties were imposed on women who had a home delivery.

Despite the direct and indirect financial costs associated with staying at a MWH, analysis of sociodemographic data of MWH users and non-users by Singh et al. (2016) revealed that MWH users were poorer than non-users in Malawi. Similar findings were reported by Braat et al. (2018) who noted that MWH users were more likely to be to be poorer than non-users in Ethiopia (OR = 8.94 [95% CI: 5.13-15.61], $p < 0.05$).

4.5.4   Physical Aspects of MWHs and Services Provided

Descriptions of the characteristics of MWH facilities in this review showed substantial variation with regard to structural aspects and level and type of services provided. Some studies noted that a MWH was a simple structure that provided shelter and a place to rest, requiring women to bring their own supplies and food, while other MWHs were described as all-encompassing facilities that provided food, water, a place to sleep, medical care, and social support services for pregnant women.

Eight studies detailed the physical aspects of a MWH and the amount of care a woman could expect while staying at a facility, and discussed their influence on a woman's decision to use a MWH (Braat et al., 2018; Chibuye et al., 2018; Ruiz et al., 2013; Sialubanje et al., 2016; Sialubanje et al., 2015; Sundu et al., 2017; van Lonkhuijzen et al., 2003; Vermeiden et al., 2018). The eight studies included three quantitative studies, four qualitative studies and one mixed methods study. Appraisal scores of the three quantitative studies were high-high, high-medium and medium-low (WoE-MSSM). Three of the four qualitative studies received high-high (WoE-CASP) appraisal scores, while the fourth study by Sundu et al. (2017) received medium-high (WoE-CASP) appraisal scores. The mixed methods study by Chibuye et al. (2018) received high-low-high (WoE-MSSM-CASP) appraisal scoring.

4.5.4.1   Living Conditions

The living conditions of MWH facilities were discussed in six studies with mixed findings regarding their influence on a woman's decision to use or not use a MWH. Among the six studies, five studies reported poor living conditions at a MWH (Braat et al., 2018; Chibuye et al., 2018; Sialubanje et al., 2016; Sialubanje et al., 2015; Sundu et al., 2017).

Study participants in Sialubanje et al.'s (2015, 2016) studies reported that conditions at MWHs in rural Zambia were deplorable. Maternity waiting homes were viewed as a free standing empty structure that provided shelter from the elements but required women to bring their own food and supplies from home for the length of their stay. Participants described MWHs as lacking basic services such as running water and washroom facilities, as well as any sort of sleeping space. Braat et al. (2018) and Sialubanje et al. (2016) reported that women were required to bring basic household supplies with them for the duration of their stay because many MWHs did not provide any beds/mattresses, bedding or blankets for women to use. Participants in Sundu et al.'s (2017) study also reported poor sanitary conditions at MWHs, exacerbated by

the presence of pests such as mosquitoes, ants, and fleas. Sundu et al. (2017) noted that poor sanitation and hygiene at MWHs in Malawi prevented women from using available facilities. Poor sanitation combined with a lack of water and electricity, inhibited MWH use among women in Zambia (Chibuye et al., 2018). Chibuye et al. (2018) also reported that MWHs failed to meet the needs and expectations of community members; most MWHs did not provide food or basic living supplies, and lacked the transportation needed to transfer women to the hospital when they went into labour. The exceptions were mission run hospitals, which had better living conditions providing beds, mattresses, and linens (Chibuye et al., 2018). While van Lonkhuijzen et al.'s (2003) study did not address any physical aspects of the MWH facility, it did note that meals were provided to MWH users, which likely encouraged MWH use; a second MWH in the region lacked this service and was rarely used. In addition to the physical living conditions described above, Chibuye et al. (2018) reported that a lack of safety and privacy at the MWH influenced women's decisions about whether to stay at the facility.

4.5.4.2 Medical Care

Three studies investigated participants' perceptions of the medical care provided at MWHs and the influence of those perceptions on decisions to use a MWH (Sialubanje et al., 2015; Sialubanje et al., 2016; Sundu et al., 2017). Their findings were consistent. Women in Sialubanje et al.'s (2015) study and men in Sialubanje et al.'s (2016) study expressed concern over the lack of medical services provided at MWHs in Zambia; nurses and midwives did not routinely visit women who were staying at the facilities. Maternity waiting home users interviewed in Sundu et al.'s (2017) study also reported that midwives did not routinely assess the welfare of women during their stay at a MWH or consistently provide assistance to women in labour – leaving some women to deliver on their own. The partners and husbands of MWH users and non-users in Sialubanje et al.'s (2016) study also noted the absence of ambulance services at MWHs to transport a woman from the MWH to the local hospital should an emergency occur, which negatively influenced their decisions to allow their partners to stay at a MWH facility. In regard to MWHs that did provide medical care and supervision, there was concern about the poor quality of that care (Chibuye et al., 2018; Sialubane et al, 2015; Sundu et al., 2017). Maternity waiting home users interviewed in Sundu et al.'s (2017) study reported that there were poor relationships between antenatal mothers and midwives.

4.5.4.3   Family Accommodation

Two of the 16 studies discussed the challenges associated with staying at a MWH for women with children and how family accommodation at MWHs can improve uptake of the facilities. Vermeiden et al. (2018) reported that being away from home for 2-4 weeks (the average length of a MWH stay) prior to a woman's due date, negatively affected a woman's willingness to use a MWH. Having previous children, also negatively affected women's decisions to stay at a MWH because women were required to leave their children in the care of other family or community members while away from home. A second study by Sialubanje et al. (2016) reported that the availability of family accommodation facilities at a MWH in the Kalomo district in Zambia improved uptake of MWH use among women with other children as it reduced the burden of finding childcare.

4.5.4.4   Activities at the MWH

The study by Ruiz et al. (2013) noted that a lack of available activities, while staying at a MWH, influenced women's decisions to stay at a facility. Study participants indicated that, if women had the opportunity to receive health education or participate in social activities with other women at the MWH, it would boost their morale and make them feel less isolated. One proposed suggestion was the idea of having a craft group where women could make crafts that could be sold for profit. A craft group was regarded as preventing social isolation, keeping MWH users occupied as they awaited the onset of labour, and offering the possibility of providing women with a modest income while staying at a MWH facility. Another proposed activity was operating a vegetable garden that could be maintained by MWH users who were physically able to perform certain tasks. A vegetable garden would provide women with an activity to partake in, as well as provide food for MWH users, which could be used help to offset costs associated with operating a MWH, making the facility more self-sufficient (Ruiz et al., 2013).

4.5.5   Cultural Practices/Restrictions

Cultural restrictions were found to influence the decision to access care at a MWH in six studies (Eckermann & Deodato, 2008; Lori et al, 2013; Mramba et al., 2010; Ruiz et al., 2013; Sialubanje et al., 2016; Sialubanje et al., 2015). The six studies included three qualitative studies and three mixed methods studies. All three qualitative studies received high-high (WoE-CASP)

appraisal scores, while two of the three mixed methods studies received medium-low-medium (WoE-MSSM-CASP) appraisal scores and the third study received high-medium-high scores.

Four studies reported that the decision to use a MWH was not up to the woman but was her husband's decision (Mramba et al., 2010; Ruiz et al., 2013; Sialubanje et al., 2016; Sialubanje et al., 2015). Mramba et al. (2010) reported that 28% (91/327) of pregnant women in their study knew about a MWH but 95% (310/327) of them reported that they would require their husbands' permission to use them. Similar findings were reported by Ruiz et al. (2013) and Sialubanje et al. (2015, 2016) who noted that, due to cultural gender inequities, men in the community made decisions for women. Husbands determined the extent to which their wives could seek out care in their pregnancies and during their deliveries, including accessing or staying at a MWH (Ruiz et al., 2013). Without permission from their husbands, women were not able to leave their homes to stay at a MWH during the last few weeks of their pregnancies to await the onset of labour (Sialubanje et al., 2015).

Two other studies by Lori et al. (2013) and Ruiz et al. (2013) examined how cultural preferences influenced birthing practices, and how strong cultural values could affect how MWHs were viewed by pregnant women and other community members, although they did not specifically examine the impact cultural preferences had on a woman's decision and subsequent ability to use a MWH.

4.5.6   Lack of Awareness Related to MWHs

Four of the 16 studies attributed low utilization of MWHs to a general lack of awareness about the nature of a MWH, services provided, and how MWHs improve access to medical care (Chandramohan et al., 1994; Eckermann & Deodato, 2008; Mramba et al., 2010; Ruiz et al., 2013). The four studies comprised one quantitative study, one qualitative, and two mixed methods studies. The quantitative study by Chandramohan et al. (1994) received medium-high (WoE-MSSM) appraisal scores, the qualitative study by Ruiz et al. (2013) received high-high (WoE-CASP) appraisal scores, and the two mixed methods studies by Eckermann and Deodato (2008) and Mramba et al. (2010) received medium-low-medium (WoE-MSSM-CASP) appraisal scores.

Mramba et al. (2010) reported that only 28% of pregnant women knew of the existence of the MWH in their local community. The authors also reported that 83% of health care workers could identify the nature and purpose of a MWH, but only 64% had made a referral to the local

MWH at least once a month (Mramba et al., 2010). Varied understanding as to the purpose of MWHs was noted among members of the lay public (including MWH users and non-users) and health care providers (Eckermann & Deodato, 2008; Ruiz et al., 2013). Most physicians, nurses, hospital staff, and comadronas (Mayan midwives), interviewed in Ruiz et al.'s (2013) study, were aware of the concept of a MWH but not all were familiar with the purpose of a MWH. Community leaders were similarly aware of the existence of MWHs but were not familiar with the functioning of the facility, which led them to forgo promoting the facilities, negatively affecting use among pregnant women in their community.

Chandramohan et al. (1994) noted that only one-third of women, with risk factors who delivered at the district hospital, had stayed at a MWH in Zimbabwe, and attributed the poor uptake to the absence of a clear referral process. The effectiveness of a MWH is dependent upon its ability to reach the intended target group. This requires not only an awareness of the local MWH and the ability to identify women who could benefit from staying at such facilities but also knowledge of how to refer women to the facility or even how women can self-refer (Chandramohan et al., 1994; Mramba et al., 2010). Findings from this REA revealed variations in the MWH referral process among different countries. Chandramohan et al. (1994) and Ruiz et al. (2013) reported that, in Zimbabwe and Guatemala, women could access a MWH through self-referral or by referral from a health care provider, such as a physician or midwife. In rural Liberia, women did not have to be referred by a health care provider, and generally self-referred (Lori et al., 2013), while, in rural Kenya, the majority of women who attended a MWH were referred by a health care provider (no mention was made whether women could also self-refer) (Mramba et al., 2010).

4.6 Chapter Summary

Sixteen studies were selected to answer the two REA questions: 1) What impact do MWHs have on maternal mortality; and 2) What factors influence a woman's decision and ability to use a MWH in developing countries? A range of quantitative, qualitative and mixed methods studies were analyzed using the WoE, CASP and MSSM evaluation tools to assess the quality of research presented. Each of the 16 studies received a minimum of two appraisal scores. Appraisal scores included a mix of high, medium, and low scores but, in general, all 16 studies were appraised as medium or high quality. Medium and high quality appraisal scores

provide confidence that the study design and research methodology used to address the intended research question were appropriate.

Four of the 16 studies examined maternal mortality associated with MWH use. Two studies compared the maternal mortality ratio among MWH users and non-users, while the other two studies compared maternal mortality rates among MWH users and non-users. Three of the four studies found that MWHs provided a protective effect against maternal mortality. The fourth study found no significant differences between MWH users and non-users or a difference in maternal mortality rates, but the authors interpreted their results as indicating a positive effect given that MWH user group was at higher maternal risk. Findings of the four studies suggest that, overall, MWHs provide a protective effect against maternal mortality by bridging the gap between a woman's home and health care services and allowing for more timely access to care should an emergency or complication arise in pregnancy, during labour and delivery, or in the postpartum period.

Each of the 16 studies included in this REA examined at least one factor that influenced a woman's decision and subsequent ability to use a MWH. Analysis from the 16 studies revealed a variety of factors which were grouped into six main themes: 1) Distance/Accessibility, 2) Transportation, 3) Financial Costs, 4) Physical Aspects of MWHs and Services Provided, 5) Cultural Restrictions, and 6) Lack of Awareness Related to MWHs.

Ten studies (63%) investigated distance as a barrier that impacted a woman's ability to decide and subsequently access a MWH. Among the 10 studies, seven studies (70%) reported that distance either impeded or inhibited a woman's ability to access a MWH, while the remaining three studies (30%) did not find that distance was a barrier to MWH use. Perhaps the most interesting finding related to distance was that, in three studies, the majority of women who stayed at/or accessed services at a MWH lived within close proximity to the MWH (Ruiz et al., 2013; Vermeiden et al., 2018; Wild et al., 2012).

Transportation was closely aligned with distance/accessibility – playing a vital role in a woman's ability to reach a MWH in a timely manner. Transportation challenges remained an issue regardless of whether a MWH was located adjacent to the local hospital or a significant distance away. The absence of available and timely transportation prevented women from utilizing available MWHs. Husbands and partners were less likely to let a woman stay at a MWH if there was no transportation available, viewing it as unsafe.

Ten studies (63%) reported that the decision and ability to access a MWH was made based on the direct and indirect costs associated with staying at the MWH. Direct costs included a MWH user fee and the cost associated with transportation to get to a MWH, while indirect costs comprised the cost of food and supplies a woman was required to bring with her for the duration of her stay at a MWH, as well as the financial costs associated with taking time off work or obtaining child care.

Eight of the 16 studies (50%) examined living conditions and the provision of medical services provided at MWHs to explore how they affected a woman's decision to use available MWH facilities. Poor living conditions, a lack of medical care provided to women at many MWHs, and the absence of family accommodations negatively impacted use of available MWH facilities.

Cultural practices were noted to influence a woman's decision and subsequent ability to access a MWH in six studies. Four of the six studies (67%) reported that while women knew about the existence of MWHs, they often required their husbands' permission to use them, a result of long-standing cultural gender inequalities, whereby men make decisions for women.

The final theme noted to influence a woman's decision and subsequent ability to use a MWH was a general lack of awareness about the nature and purpose of MWHs, including the services provided and how the facilities improved access to medical care. A lack of awareness was noted not only among women and members of the general public, but also among health care providers in communities with existing MWHs. A lack of knowledge and awareness, as well as the absence of a clear referral program, led to low utilization of MWHs.

The next chapter will provide a discussion of the major findings, including how the findings can be used by clinicians, administrators, researchers, and policy makers in addressing maternal health issues in developing countries. Suggestions for future research are provided and strengths and limitations of this REA identified.

Chapter 5: Discussion and Conclusion

The purpose of this REA was to examine the impact of MWHs on maternal mortality and to understand what factors influence a woman's decision and subsequent ability to access and use a MWH in developing countries. Although the topic of maternal health has received increased attention through the MDGs and the SDGs, and has been at the forefront of many large global health initiatives, maternal mortality remains high (UNDP, 2016; WHO, 2015). Dating back more than 60 years, MWHs have been one intervention used in a variety of settings around the world that have been aimed at improving women's access to maternity care and providing women with a safe place to stay while awaiting the onset of labour (van Lonkhuijzen et al., 2012; WHO, 1996). The development and use of MWHs predominates in developing countries where access to skilled maternity care can be a challenge. Maternity waiting homes have garnered support from many NGOs along with the UN and WHO, yet studies examining their overall impact on maternal health, and in particular maternal mortality are rare.

Rapid evidence assessments utilize systematic review methods to search and critically appraise existing research on a particular topic (Grant & Booth, 2009). This REA provides a synthesis of current literature on MWHs, their impact on maternal mortality, and factors that influence a woman's ability to access and stay at a MWH. Sixteen studies, published between 1994 and 2018, were analyzed. They examined the impact of MWHs in nine developing countries, located in three different geographic regions. Thirteen studies examined the impact of MWHs in Sub-Saharan Africa, two in South-East Asia and one in Central America. Among the 16 studies analyzed, seven studies used quantitative methodology, five used qualitative methodology and four utilized a mixed methods approach.

In this final chapter, key findings are presented, along with a discussion of how the findings address aspects of Thaddeus and Maine's (1994) 'Three Delays Model'. The implications of the findings for clinicians, administrators, researchers, and policy makers, who are addressing maternal health issues in developing countries, are also presented. Gaps in current maternal health and MWH literature are identified, directions for future MWH research are offered, and strengths and limitations of this REA are noted.

5.1   Key Findings

Maternity waiting homes have been viewed as an effective intervention that has allowed for the decentralization of obstetrical services, and resulted in improved access and uptake of maternity care among women in many developing countries (van Lonkhuijzen et al., 2012; WHO, 1996). Despite the increasing popularity of MWHs, and their continued presence in many developing countries since the mid 1950's, evidence of their direct impact on maternal mortality has been limited. The paucity of published literature pertaining to MWHs, in general, hinders the ability to accurately assess effects of MWHs on improving access to care and reducing maternal mortality. The REA findings not only provide evidence about effectiveness and factors influencing access to MWHs but also identify areas where further investigation is warranted.

Findings from the four studies that examined maternal mortality all suggest a protective effect of MWHs. Three of the studies (Braat et al., 2018; Kelly et al., 2010; Lori et al., 2013) found fewer maternal deaths among MWH users compared with non-users. The fourth study (van Lonkhuijzen et al., 2003) found no difference in maternal deaths between MWH users and non-users. Because the MWHs users in the fourth study comprised a higher risk group, their findings may also be cautiously interpreted as a positive effect. Researchers (Braat et al., 2018; Kelly et al., 2010; Lori et al., 2013) have suggested that the close proximity of MWHs to hospitals permits more timely access to emergency care for MWH users compared to women attempting a home delivery, without any medical supervision, – common practice among women in rural regions of developing countries.

Analysis of the 16 studies of this REA revealed multiple factors that influenced a woman's decision and subsequent ability to use a MWH. I grouped those factors into six main themes: 1) Distance/Accessibility, 2) Transportation, 3) Financial Costs, 4) Physical Aspects of MWHs and Services Provided, 5) Cultural Restrictions, and 6) Lack of Awareness Related to MWHs. Among the six main themes, several factors were interrelated. For example, women struggled to access timely and affordable transportation to circumvent long distances to reach a MWH. A MWH user fee or the requirement to bring food and/or supplies from home was an additional financial burden associated with staying at a MWH. Living conditions, services provided, and the availability of family accommodations varied among MWHs and influenced use. Distance between a woman's home and MWH, as well as a lack of reliable transportation between a woman's home and the MWH, or a MWH and hospital influenced MWH use. Long-

standing cultural gender inequalities exist in many countries that have MWHs. While many women knew about the existence of MWHs, they often required their husbands' permission to use them. Additionally, the absence of a clear referral program and a lack of awareness as to the purpose of MWHs among health care providers often led to underutilization. The most interesting finding was that in three studies, the majority of women who stayed at/or accessed services at a MWH lived within close proximity to the MWH itself (Ruiz et al., 2013; Vermeiden et al., 2018; Wild et al., 2012).

5.2   Findings and 'The Three Delays Model'

Thaddeus and Maine (1994) sought to understand the factors that contribute to the delay in seeking, reaching and receiving obstetrical care amongst women in developing countries, resulting in maternal mortality. Their literature review and subsequent analysis highlighted three phases of delay in seeking out emergency obstetrical care: 1) the delay by the individual, family, or both in seeking care; 2) the delay in the ability to access care and reach an adequate health care facility in a timely manner; and 3) the delay in receiving appropriate and timely care after arrival at a health centre. Thaddeus and Maine (1994) noted that, to prevent maternal deaths, women must overcome barriers to access high quality, timely obstetrical care. Barriers identified by Thaddeus and Maine (1994) included accessibility issues, such as distance, cost and transportation, and quality of care concerns. Thaddeus and Maine (1994) suggested that MWHs could offer a solution by bringing women closer to maternity care services. Women who stay at a MWH located within close proximity to a larger health centre or hospital with specialized maternity care services are less likely to experience a delay in obtaining emergency care when needed. Thaddeus and Maine (1994) noted that MWHs could be a practical solution to reducing the delay associated with seeking and accessing obstetrical care in some developing countries (the second delay), but also noted that MWHs are not the solution to uneven distribution of current obstetrical services.

Thaddeus and Maine's 'Three Delays Model' (1994) provided a conceptual framework to analyze the factors that influenced a woman's decision and ability to use a MWH in developing countries (research question two). The findings of this REA reveal that a woman's decision and subsequent ability to stay at a MWH were affected by a variety of physical, social, and cultural factors. Among the 16 studies examined in this REA, many factors influenced a woman's decision and ability to use a MWH during her pregnancy. I grouped factors into six main

themes: 1) Distance/Accessibility, 2) Transportation, 3) Financial Costs, 4) Physical Aspects of MWHs and Services Provided, 5) Cultural Restrictions, and 6) Lack of Awareness Related to MWHs. Each of the six themes addressed the first and/or second delay of Thaddeus and Maine's 'Three Delays Model' – the delay in the decision to access a MWH, and the delay in accessing and/or reaching a MWH in a timely manner, which in turn, is thought to contribute to a delay in reaching emergency obstetrical care should it be needed. Factors related to Thaddeus and Maine's third delay; the delay in receiving appropriate and timely care after arrival at a health centre, were not directly examined among the studies included in this REA, but may be inferred from some of the findings pertaining to Thaddeus and Maine's first and second delays (i.e., women's perceptions of the quality of care at MWHs). Moreover, a woman's perception of the provision and quality of care provided at a MWH may also influence her perception of the ability to reach emergency care in a timely manner, and the quality of care she would receive after she arrived at a hospital/health centre.

Among the 16 studies analyzed in this REA, Thaddeus and Maine's first delay – the delay in decision to access care – was influenced by distance, cost and perceived quality of care. Financial costs associated with accessing care such as MWH user fees, as well as the costs associated with transportation to and from the MWH were seen as major barriers to a woman using a MWH (Braat et al., 2018; Chibuye et al., 2018; Eckermann & Deodato, 2008; Kelly et al., 2010; Sialubanje et al., 2016; Sialubanje et al., 2015; Vermeiden et al., 2018). The provision of medical care at the MWH or lack thereof, as well as the perceived quality of care a woman would receive also influenced decisions to use a MWH. Some MWHs were supervised by visiting nurses and midwives, while others were not (Sialubanje et al., 2015; Sialubanje et al., 2016; Sundu et al., 2017). Where medical services were provided, concern over the quality of care provided by medical staff was identified as a reason to forgo using a MWH facility (Chibuye et al., 2018; Sialubane et al, 2015; Sundu et al., 2017). A lack of routine monitoring and the absence of available ambulance services at MWHs were two additional concerns, identified by both women and their partners, as influencing their decisions to stay at a MWH (Sialubanje et al., 2016). Cultural practices, such as requiring their husband's permission, also significantly affected the women's access to a MWH (Mramba et al., 2010; Ruiz et al., 2013; Sialubanje et al., 2016; Sialubanje et al., 2015).

Although not specifically identified under Thaddeus and Maine's first delay, the physical aspects of MWHs and the services provided influenced women's decisions and ability to stay at available MWH facilities. Poor sanitation and living conditions, along with requirements to bring food and supplies from home, deterred many women from staying at a MWH (Braat et al., 2018; Chibuye et al., 2018; Sialubanje et al., 2016; Sialubanje et al., 2015; Sundu et al., 2017). Restrictions on accompanying family members played a significant role in a woman's decision and ability to use a MWH. Maternity waiting homes that did not have family accommodations or allow family members to stay, forced women to leave their children in the care of other family or community members while away from home (Vermeiden et al., 2018). A lack of awareness regarding the nature of MWHs and services provided to women at the facilities was not a barrier previously identified by Thaddeus and Maine (1994), but my REA identified that factor as influencing utilization of MWHs.

Thaddeus and Maine's second delay – the delay in the ability to access and reach care in a timely manner, was influenced by distance from a woman's home to a MWH and the availability of transportation. The REA challenged the view that women from rural and remote communities are particularly disadvantaged in terms of their ability to access MWHs and maternity care in a timely manner. Findings of this REA revealed that, while in some instances MWH use was more common among women from local and nearby communities, in other studies, MWH users had longer travel times than non-users, which reflected greater distances travelled to reach care. Although not identified by Thaddeus and Maine, cultural restrictions influenced both the delay in deciding to access care and the delay in reaching care in a timely manner, as women often required their husbands' permission to leave home and to stay at a MWH (Sialubanje et al., 2016).

The use of Thaddeus and Maine's 'Three Delays Model' (1994) provided a framework for factors that influenced a woman's decision and ability to use a MWH. Several factors identified within with REA aligned with factors previously identified by Thaddeus and Maine (1994) including distance from the health facility, financial costs, experience with the health care system and perceived quality of care, as well as the status of women. These factors provide useful information in the identification of areas for continued improvement related to MWHs, including how to reduce or eliminate current barriers and how to improve conditions at existing MWHs to increase MWH uptake and reduce maternal mortality.

5.3   Implications for Public Health Policy and Practice

This REA provided a comprehensive examination of available literature pertaining to MWHs as an intervention to improve and enhance access to maternity care for women living in predominantly poor, underdeveloped, and remote areas of many developing countries. Findings from this REA have important implications for public health policy in terms of implementation and continued support of MWHs in developing countries. Overall, the evidence suggests that MWHs provided a protective effect for maternal mortality by bridging the gap between a woman's home and health care services, and allowing for timely access to care should an emergency or complication arise. There is no evidence of additional risk associated with staying at a MWH, despite some facilities having less than ideal living conditions. The findings also revealed several factors that influence a woman's decision and subsequent ability to use a MWH including distance and transportation challenges, direct and indirect financial costs, living conditions, the availability of family accommodation, the availability of medical care at a MWH, and the perceived quality of care. Strong cultural preferences to follow traditional birth practices, along with cultural restrictions that required women to receive permission from their husband to stay at a MWH also influenced use of available MWH facilities. A lack of awareness about the purpose of MWHs and the services they provide evidenced by both the lay public and health care providers contributed to low referral rates to MWHs and overall low utilization.

Public health policy and practice need to account for factors related to the effectiveness of MWHs to improve a woman's access to emergency and specialized maternity care. These factors include a functioning MWH located in close proximity to a hospital with operational emergency and obstetrical care capabilities, the availability of transportation (to be able to transfer a woman in labour or suffering a complication in a timely manner), and the ability of health care providers to recognize and refer women who could benefit from staying at a MWH (Chandramohan et al., 1994; Mramba et al., 2010). The need for a standardized referral system emerged from the findings as a way to facilitate timely access to available MWH facilities. A standardized referral system would allow for a streamlined approach; providing all health care providers (i.e. midwives, nurses, and physicians who may interact with women during some aspect of their pregnancy) with knowledge about MWHs and offering a systematic approach to identify women antenatally, who could benefit from staying at a MWH.

The development of a referral checklist, alongside a standardized referral form, would aid health care providers in identifying women who could benefit from staying at a MWH, especially women identified as having antenatal risk factors, which elevate their risk of having an adverse maternal or perinatal health outcome. A standardized referral form could be used at a regional or national level, simplifying the overall referral process and reducing discrepancies in current referral practices at local and regional levels. A referral checklist could provide additional guidance to health care providers for screening women antenatally. The development and use of a referral checklist could act as a screening tool to assess each woman's cultural beliefs and family situation, which would influence her consideration, willingness, and ability to access and stay at a MWH during her pregnancy. The implementation of a standardized referral system combined with education in the local community about the purpose and role MWHs was identified as early as 1994 as a means of increasing uptake and overall utilization of existing MWHs but appears not to have been pursued systematically (Chandramohan et al., 1994; Mramba et al., 2010). Ideally, grassroot education about MWHs in the local community would precede the implementation of a standardized referral system (checklist and form). Health care providers working in regions with MWHs, as well as MWH administrators, are ideally situated to help establish a standardized referral program and aid in the promotion of MWH use among the local community. Education about MWHs should target community leaders who could effectively promote use of MWHs to their local communities, expanding knowledge of MWHs among all members of the community.

Maternity waiting homes were envisioned as an intervention to bridge the gap in access to maternity care for women living in rural and remote communities by decentralizing obstetrical services; however, the three studies identified the majority of women who stayed at or accessed services at a MWH as living in close proximity to the MWH itself – a striking finding. Most MWH users lived in the same community or sub-urban region as the local MWH, suggesting that distance and the ability to reach a MWH influenced subsequent use (Ruiz et al., 2013; Vermeiden et al., 2018; Wild et al., 2012). This finding may indicate that women who lived in close proximity to a MWH were more aware of the facility and its benefits, such as more frequent monitoring (at MWHs where medical care was provided) or faster access to obstetrical care at the local hospital.

Logically, close proximity of a MWH to the local hospital reduces the time it takes to transfer a woman to needed obstetrical and/or emergency care (overcoming Thaddeus and Maine's second delay). Ten studies[9] reported that the local MWH was built next to, or adjacent to the local hospital; however, none of the studies indicated whether this influenced use of the facilities. This information would be helpful in assessing whether MWH locations play a role in utilization and informing their positioning. The finding that the majority of women who stayed at a MWH lived close to the MWH, raises the question about whether locating MWHs further away from local hospitals would lead to increased uptake? Although the initial concept of MWHs was about bridging the geographical gap associated with accessing medical care in a timely manner, having MWHs at some distance from hospitals could offer improved access to emergency and specialized maternity care if rapid transfer and transportation to emergency care facilities at a hospital were available. The effectiveness of this model would be dependent on where a MWH is located relative to population density.

Another way to address distance and transportation challenges affecting women from rural and remote communities is assessing whether these women may be better served by other maternity care models. For example, a modified model of current MWH care could involve the monitoring of high risk women at home in the second and early third trimester of a woman's pregnancy, prior to having a woman relocate to a MWH in the final weeks of her pregnancy to be closer to a hospital. In this hypothetical model, a woman could still receive close monitoring (if medically indicated), yet remain in the comfort of her home, where she could continue to support and care for her family during the majority of her pregnancy. That model may ease the inconvenience of being away from home for prolonged periods. Vermeiden et al. (2018) indicated that a woman's length of a stay at a MWH often ranged from two to four weeks. It would also allow a woman to still benefit from the close proximity of the MWH to a hospital, while, mitigating some of the direct and indirect costs associated with staying at a MWH for prolonged periods, such as cost of food and supplies, lost income, and childcare costs. However, providing care in a woman's home comes with its own challenges; this includes recruitment, training and subsequent retention of skilled health care professionals capable of providing care

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[9] The ten studies included: Braat et al., 2018; Chandramohan et al., 1994; Chibuye et al., 2018; Kelly et al., 2010; Mramba et al., 2010; Ruiz et al., 2013; Singh et al., 2016; van Lonkhuijzen et al., 2003; Vermeiden et al., 2018; Wild et al., 2012.

and offering health services to women living in rural and remote communities, where access to emergency services may be severely limited. This model of care may not be feasible within communities where medical care is not currently offered at MWHs, as it would require funding and oversight to hire and train health care providers (i.e. nurses or midwives), as well as funding to purchase and maintain portable medical equipment. Geographical and infrastructure considerations may also present significant challenges to this proposed model of care, whereby vast distances with non-existent roads may inhibit or prevent the consideration of this type of care model.

Community involvement will be necessary to increase knowledge and understanding of MWHs among all members of the community, which could improve uptake and utilization of existing MWHs and may help garner support for future MWHs (WHO, 2015b). Community involvement could also play a vital role in ensuring that the establishment of future MWHs meets the needs and preferences of women in the local community. This may in turn help communities to take a more active role in the management and sustainability of the facilities, which in the past have been established and maintained with the assistance of the government or outside organization (Lori et al., 2016).

5.3.1   Future of Maternal Health – From MDGs to SDGs

With the end of the Millennium Development Goals (MDGs) period in 2015, came the end of a global goal specifically aimed at improving maternal health. While the Sustainable Development Goals (SDGs) aim to continue where the MDGs left off, the expanded list of global goals no longer contains a specific maternal health goal. Improvement to maternal health now falls under SDG Goal #3: Good Health and Well-Being. Targets 3.1 and 3.7 under Goal #3 aim to "reduce the global maternal mortality ratio to less than 70 per 100,000 live births", and "ensure universal access to sexual and reproductive health-care services, including family planning, information and education, and the integration of reproductive health into national strategies and programmes" by 2030 (UN, 2017; UNDP, 2016; United Nations Women, 2017). It is important that improvement to maternal health remains a targeted priority under the SDGs; however, the absence of a specific maternal health goal may reduce attention to maternal health issues and decrease funding for current and future maternal health projects.

A decrease in attention to current maternal health issues, or a shift away from currently funded maternal health care projects, could have extremely negative effects for women's health,

and their children and families. It is important for maternal health clinicians, researchers, and policy makers to continue to raise awareness of ongoing maternal health issues, especially in developing countries. Keeping attention focused on global maternal health trends will help to ensure maternal health remains at the forefront of global health initiatives in the SDG era.

5.4   Recommendations for Future Research

The literature search for this REA revealed a limited number of published studies related to MWHs, particularly regarding the impact of MWHs on maternal mortality. The surge in the number of publications related to MWHs in the last 10 years is promising, and offers insight into the effectiveness of this intervention and factors that influence their use in developing countries. Unfortunately, existing evidence remains limited by weaknesses in design. Moreover, gaps remain in understanding the impact MWHs have on health outcomes, and barriers to MWH use.

Among the studies that examined maternal mortality and associated MWH use, I identified only non-experimental observational studies. Although these studies provide important insights about the impact of MWHs on maternal mortality, conclusions about the causal effects of MWHs cannot be drawn (Gordis, 2014; Polit & Beck, 2014). A clustered randomized controlled trial would be a stronger design, and may be best suited to assess the effectiveness of a MWH. A clustered RCT would allow for the randomization of entire communities rather than individuals and may be more feasible in the context of remote communities in developing countries. A clustered RCT might also be more ethically acceptable, if there were plans to implement a MWH in the control community following the impact study. Conducting a quasi-experimental study to assess the effectiveness of MWHs on health outcomes may be more practical, avoiding randomization (Polit & Beck, 2014). Since MWHs have demonstrated some benefits to those women who use them, a quasi-experimental study may pose fewer ethical concerns compared to an RCT, such as withholding an effective intervention from one group of participants (Handley, Lyles, McCulloch, & Cattamanchi, 2018). The use of an experimental research study to examine the impact of MWHs on maternal outcomes (research question one) would increase both internal and external study validity and improve the overall quality of the findings (Hadley et al., 2018).

To date, MWH research has mainly focused on barriers associated with MWH use, as well as the acceptability of MWHs among women and other community members. Only a handful of studies have sought to examine the effect of MWHs on maternal mortality. Most

studies that examined MWH use and associated maternal mortality occurred within a single community and examined outcomes for a small sample size, limiting the generalizability of findings. Another limitation of the existing evidence is that, among the studies included in this REA, mortality data were only examined for facility-based births. Home births are often the norm for women considered to have low risk pregnancies in many developing countries where access to maternity care is limited (Kelly et al., 2010; Sialubanje et al., 2015; Vermeiden et al., 2018). Understandably obtaining mortality data associated with home births would be extremely challenging, but the exclusion of this data introduces bias into reported findings by underestimating rates of mortality in non-MWH or hospital settings.

This REA revealed a gap in the knowledge pertaining to the ideal location of a MWH. Three studies identified the majority of women who stayed at or accessed services at a MWH lived in close proximity to the MWH facility, yet none of the studies identified reasons for this finding, which warrants further investigation (Ruiz et al., 2013; Vermeiden et al., 2018; Wild et al., 2012). Further research could explore why women living in close proximity to a hospital or health centre capable of performing deliveries are more likely to stay at or access care at a MWH compared to women who lived further away. Additional research examining whether the location of the MWH affects uptake and use of the facilities, would offer insight into the ideal location of MWHs and could be useful in the consideration of future MWHs.

Finally, an important problem for MWH research is the unknown reliability of the collected and reported data. Incomplete data and poor quality data introduce threats to study validity. Improvements in data collection and reporting can contribute to improved demographic and epidemiological data which can be used for research purposes, and aid governments in improving health and social services, including maternal health services. Researchers can improve data reporting within their studies by determining how data are both collected and reported, in addition to carefully screening data to ensure it is error free. Researchers can also contribute to improved data reporting by advocating for women, with local governments and community organizations, about the importance of ongoing development of data collection and reporting methods that facilitate better health service planning.

Although MWHs were implemented almost seven decades ago, there is a need for better understanding of their impact on other health outcomes aside from maternal mortality. More research is required to examine MWH uptake, use, and effectiveness to further the global

understanding of how MWHs can improve access to care for women in both rural and urban settings. Additional research will help to guide continued development of maternal health initiatives in many developing countries, including the establishment of new MWHs, the continued financial support and maintenance of current MWHs, and upgrades to aging MWH facilities.

5.5   Strengths and Limitations of the REA

This REA enhances understanding and knowledge of MWHs, specifically the impact MWHs have had on maternal mortality. The inclusion of studies that have used a variety of research methodologies, quantitative, qualitative and mixed methods research, supported a broad examination of the research topic, in a relatively overlooked area of maternity care. The main limitation of this REA stems from the nature of conducting an REA; REAs are often conducted by a single researcher over a shorter timeframe than a standard systematic review and typically involve a less extensive and rigorous search of the literature (Grant & Booth, 2009; Varker et al., 2015). Rapid evidence assessments can also be prone to selection bias, as they tend to locate and review only previously published and readily available literature (GSRS, 2010; HLWIKI International, 2016). Publication bias is a concern when it comes to REAs because academic journals tend to publish positive findings, excluding studies that failed to support hypotheses (GSRS, 2010). Locating published literature that may not necessarily show a positive effect can be difficult and is a greater challenge with a short literature search period. A number of steps were taken to reduce the impact of these known limitations.

With the assistance of a librarian, a comprehensive search strategy was developed and used to gather data in the form of published scholarly papers. Six databases were used to search for literature pertaining to MWHs and their impact on maternal mortality. To obtain the largest number of relevant studies, the literature search was not limited by publication date. Additional hand searching of previously used reference lists, UN, WHO and other NGO websites was carried out to elicit grey literature that might not have otherwise be found through the initial comprehensive electronic database search strategy. I also contacted other experts in the field of global maternal health to help identify any other possible avenues where grey literature related to MWHs may exist, although nothing further was identified.

I intended to include only studies within this REA dating back 10 years to keep the findings as relevant as possible; however, given the paucity of literature pertaining to MWHs, I

included articles dating back to 1994. That decision was important to include enough literature to identify themes and gain an understanding that could answer the two REA questions posed. Literature was collected over an initial 6-week search period from January 1-February 15, 2017, followed by a repeated literature search from September 10-17, 2018. The repeated literature search was conducted to locate any recent published studies since the initial search period in 2017. Literature published after September 17, 2018 was not included, which could limit the findings.

The scarcity of MWH literature affects the generalizability of findings because most studies included within this REA examined MWHs in countries within Sub Saharan Africa, and may not be applicable to developing countries in other regions. The majority of studies (n = 10) included within this REA were conducted in countries where English is an official or commonly spoken language; MWHs are not limited to only English-speaking countries. Limiting included studies, to full-text articles published in English, could have added to publication bias. Allowing the inclusion of articles in other languages may have identified additional studies in other geographic areas where MWHs exist. The inclusion of studies dating back 24 years also has an impact on the transferability of findings to the current global context; significant globalization has occurred since 1994, which has affected financial costs, transportation methods, cultural norms, living conditions, and technology.

This REA was limited by the biases and limitations of the selected studies, in particular, the known limitations associated with incomplete and inaccurate global health data reporting. In general, the use of existing health and administrative data, rather than data collected for the purpose of research, raises questions about the reliability of the data and accuracy of study findings; it is particularly problematic in this study context. Many developing countries do not have accurate civil and vital registration systems (CVRS) in place (The World Bank & WHO, 2014; WHO, 2017b). In low and low-middle income countries with CRVS, significant variations in CRVS exist. Some systems are rudimentary and only able to support basic analysis; other systems are more advanced but lack skilled employees able to compile data for analysis and dissemination (Mikkelsen et al., 2015). The WHO (2014) noted that 20 out of 183 member countries/territories (11%) had no national maternal mortality data over the majority of the Millennium Development Goals period from 1990-2013, while 96 countries (52%) had incomplete maternal mortality data. The 20 countries with absent maternal mortality data

included 16 developing countries, identified as low or low-middle income countries by The World Bank as of 2018 (The World Bank, 2019; WHO, 2014). Further complicating research on MWHs is that the WHO only publish mortality data on deaths that receive medical certification. Deaths that are not medically certified or where a lay person indicates the cause of death are not included in the mortality data published in the World Health Statistics Report (WHO, 2017b). Other issues affecting the accuracy and reliability of global health data include the failure to report data, particularly, in remote communities and regions (WHO, 2016b), and the intentional or unintentional reporting of inaccurate data. The existence of a well-designed CRVS does not necessarily result in accurate data. Consistent and complete data, combined with proper data analysis by trained personnel, are necessary to ensure accurate data reporting. The problems associated with accurate data reporting add to the risk of bias, and serve as a limitation to the overall findings of this REA.

5.6   Conclusion

This REA offers insight into research that has examined the impact of MWHs on maternal mortality, as well as factors that influence a woman's decision and subsequent ability to use a MWH. Maternity waiting homes appeared to provide a protective effect against maternal mortality. In regard to factors that influence use of MWHs, in addition to a lack of awareness about MWHs, distance, financial costs, concerns about the physical aspects of MWHs including the availability and quality of care, and cultural restrictions were found to influence women's decisions and abilities to use a MWH, aligning with Thaddeus and Maine's first delay. Transportation along with distance influenced a woman's ability reach maternity care at a MWH in a timely manner, aligning with Thaddeus and Maine's second delay.

Small changes such as providing women with food and basic supplies for the duration of their stay, while ensuring basic sanitation, running water, and electricity could help to improve current MWH usage. The education of women, health care providers, and community leaders about MWHs, followed by the creation of a standardized referral system may also help to improve uptake and use of current MWH facilities. Community involvement will be necessary to aid in uptake and utilization of existing MWHs and garnering support for future MWHs. Further research is warranted to examine other health outcomes aside from maternal mortality. Experimental studies, such as a randomized controlled trial (RCT), clustered RCT, or quasi-experimental study, would be best suited to assess the effectiveness of MWHs on improving

health outcomes, because research to date has predominately utilized weak non-experimental observational study designs. Future research examining ways in which MWHs can be improved to better suit the needs of women in the communities is also needed. This information will help to improve uptake and utilization of current facilities and inform planning for future MWH projects and initiatives.

The findings of the REA illuminate understanding of the impact of MWHs within developing countries, thus aiding policy makers and practitioners to make informed decisions regarding the implementation and continuity of MWHs and quality improvement efforts. Overall, MWHs appear to be a viable and effective intervention improving access to maternity care and subsequent maternal mortality in developing countries.

References

Alkema, L., Chou, D., Hogan, D., Zhang, S., Moller, A., Gemmill, A., Ma Fat, D., Boerma, T., Temmerman, M., Mathers, C., & Say, L. (2016). Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: A systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. *The Lancet, 387*(10017), 462-474. doi:10.1016/S0140-6736(15)00838-7

Annis, R., & Patterson, L. (2015). Rural Poverty in Canada. *Rural Development Institute.* Retrieved from: https://www.brandonu.ca/rdi/files/2015/09/Rural_Poverty_in_Canada.pdf

Boycott, N., Schneider, J., & McMurran, M. (2012). Additional interventions to enhance the effectiveness of individual placement and support: a rapid evidence assessment. *Rehabilitation Research and Practice, 2012*, 382420. doi:10.1155/2012/382420

Braat, F., Vermeiden, T., Getnet, G., Schiffer, R., van den Akker, T., & Stekelenburg I. (2018). Comparison of pregnancy outcomes between maternity waiting home users and non-users at hospitals with and without a maternity waiting home: retrospective cohort study. *International Health, 10,* 47-53. doi: 10.1093/inthealth/ihx056

Browne, A. (2010). *Issues Affecting Access to Health Services in Northern, Rural and Remote Regions of Canada*. Retrieved from: http://www.unbc.ca/assets/northern_studies/northern/issues_affecting_access_to_health_services_in_northern.pdf

Byford-Richardson, L., Walker, M., Muckle, W., Sprague, A., Fergus, S., Rennicks White, R., & Dick, B. (2013). Barriers to access of maternity care in Kenya: a social perspective. *Journal of Obstetrics and Gynaecology Canada/Journal d'Obstétrique et Gynécologie du Canada*, *35*(2), 125-130. doi:10.1016/S1701-2163(15)31016-1

Cant, B. (2012). Barriers to accessing care: impact on maternal and neonatal morbidity and mortality. *British Journal of Midwifery, 20*(8), 599-600. doi:10.12968/bjom.2012.20.8.599

CASP UK. (2013). CASP Tools and Checklists. *Critical Appraisal Skills Programme (CASP): Making Sense of Evidence.* Retrieved from: http://www.casp-uk.net/

Caulford, P., & Scarborough Academic Family Health Centre. (2014). Helping newcomers overcome barriers to health care. *Paediatrics & Child Health*, *19*(8), 400.

Centers for Disease Control and Prevention. (2012). Lesson 3: Measures of Risk. In: *Self Study Course SS1978: Principles of Epidemiology in Public Health Practice, Third Edition: An Introduction to Applied Epidemiology and Biostatistics.* Retrieved from: https://www.cdc.gov/ophss/csels/dsepd/ss1978/lesson3/section2.html

Cham, M., Sundby, J., & Vangen, S. (2005). Maternal mortality in the rural Gambia, a qualitative study on access to emergency obstetric care. *Reproductive Health, 2*(1), 1-8. doi:10.1186/1742-4755-2-3

Chandramohan, D., Cutts, F., & Chandra, R. (1994). Effects of a maternity waiting home on adverse maternal outcomes and the validity of antenatal risk screening. *International Journal of Gynecology and Obstetrics, 46*(3), 279-284. doi:10.1016/0020-7292(94)90406-5

Chibuye, P. S., Bazant, E. S., Wallon, M., Rao, N., & Fruhauf, T. (2018). Experiences with and expectations of maternity waiting homes in Luapula Province, Zambia: a mixed–methods, cross-sectional study with women, community groups and stakeholders. *BMC Pregnancy and Childbirth, 18*(42), 1-10. doi: https://doi.org/10.1186/s12884-017-1649-1

Crawford, C., Boyd, C., Jain, S., Khorsan, R., & Jonas, W. (2015). Rapid Evidence Assessment of the Literature (REAL(©)): Streamlining the systematic review process and creating utility for evidence-based health care. *BMC Research Notes, 8*, 631.

Curry, L., Nembhard, I., & Bradley, E. (2009). Qualitative and mixed methods provide unique contributions to outcomes research. *Circulation, 119*(10), 1442-1452. doi:10.1161/CIRCULATIONAHA.107.742775

Echoka, E., Makokha, A., Dubourg, D., Kombe, Y., Nyandieka, L., & Byskov, J. (2014). Barriers to emergency obstetric care services: Accounts of survivors of life threatening obstetric complications in Malindi District, Kenya. *The Pan African Medical Journal, 17 (Suppl 1)*, 4.

Eckermann, E., & Deodato, G. (2008). Maternity waiting homes in Southern Lao PDR: The unique 'silk home'. *Journal of Obstetrics and Gynaecology Research, 34*(5), 767-775. doi:10.1111/j.1447-0756.2008.00924.x

EPPI-Centre (2007). *Review Guidelines for Extracting Data and Quality Assessing Primary Studies in Educational Research, Version 2.0*. London: EPPI-Centre, Social Science Research Unit.

Evans, D. B., Hsu, J., Boerma, T. (2013). Universal health coverage and universal access. *Bulletin of the World Health Organization, 91*, 546–546A. doi: http://dx.doi.org/10.2471/BLT.13.125450

Evidence for Policy and Practice Information and Coordinating Centre (EPPI). (2010). EPPI-Centre Methods for Conducting Systematic Reviews. *Governmental Social Research Service.* Retrieved from: http://eppi.ioe.ac.uk/cms/Portals/0/PDF%20reviews%20and%20summaries/Methods.pdf?ver=2012-03-13-084040-433

Fawcus, S., Mbizvo, M., Lindmark, G., & Nystrom, L. (1996). A community-based investigation of avoidable factors for maternal mortality in Zimbabwe. *Studies in Family Planning, 27*(6), 319-327.

Fogliati, P., Straneo, M., Mangi, S., Azzimonti, G., Kisika, F., & Putoto, G. (2017). A new use for an old tool: maternity waiting homes to improve equity in rural childbirth care. Results from a cross-sectional hospital and community survey in Tanzania. *Health Policy and Planning, 32*(10), 1354-1360. doi: https://doi.org/10.1093/heapol/czx100

Food and Agriculture Organization of the United Nations. (2011). *The State of Food and Agriculture: 2010-11.* Retrieved from: http://www.fao.org/docrep/013/i2050e/i2050e.pdf

Ganann, R., Ciliska, D., & Thomas, H. (2010). Expediting systematic reviews: methods and implications of rapid reviews. *Implementation Science, 5*(1), 10-19. doi:10.1186/1748-5908-5-56

Ganle, J. K., Parker, M., Fitzpatrick, R., & Otupiri, E. (2014). A qualitative study of health system barriers to accessibility and utilization of maternal and newborn healthcare services in Ghana after user-fee abolition. *BMC Pregnancy and Childbirth*, *14*(1), 425. doi:10.1186/s12884-014-0425-8

Garrett, B. (2015). Rapid Evidence Assessment Thesis Option. UBC School of Nursing, Faculty of Applied Science, pp. 1-7.

Goldie, S. J., Sweet, S., Carvalho, N., Natchu, U. C. M., & Hu, D. (2010). Alternative strategies to reduce maternal mortality in India: a cost-effectiveness analysis. *PLoS Medicine, 7*(4), e1000264. doi:10.1371/journal.pmed.1000264

Gordis, L. (2014). *Epidemiology* (5th ed.). Philadelphia, PA: Elsevier Saunders.

Gough, D. (2007). Weight of Evidence: a framework for the appraisal of the quality and relevance of evidence. *Research Papers in Education, 22* (2), 213-228.

Government Social Research Service (GSRS). (2010). Rapid Evidence Assessment Toolkit. *UK Government: National Archives: Civil Service: Government Social Research Service.* Retrieved from:
http://webarchive.nationalarchives.gov.uk/20140305122816/http://www.civilservice.gov.uk/networks/gsr/resources-and-guidance/rapid-evidence-assessment

Graham, W. J., & Hussein, J. (2007). Ethics in public health research: Minding the gaps: A reassessment of the challenges to safe motherhood. *American Journal of Public Health, 97*(6), 978-983. doi:10.2105/AJPH.2005.073692

Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal, 26*(2), 91-108. doi:10.1111/j.1471-1842.2009.00848.x

Gülmezoglu, A. M., Lawrie, T. A., Hezelgrave, N., Oladapo, O. T., Souza, J. P., Gielen, M., Lawn, J. E., Bahl, R., Althabe, F., Colaci, D., & Hofmev, G. J. (2016). Interventions to reduce maternal and newborn morbidity and mortality. In Black, R. E., Laxminarayan R., Temmerman M., & Walker, N. (Eds.), *Reproductive, Maternal, Newborn, and Child Health: Disease Control Priorities (3rd ed.)* (Chapter 7). Retrieved from:
https://www.ncbi.nlm.nih.gov/books/NBK361904/

Handley, M. A., Lyles, C. R., McCulloch, C., & Cattamanchi, A. (2018). Selecting and improving quasi-experimental designs in effectiveness and implementation research. *Annual Review of Public Health, 39*(1), 5-25. doi:10.1146/annurev-publhealth-040617-014128

Holmes, W., & Kennedy, E. (2010). *Reaching emergency obstetric care: overcoming the 'second delay' - Briefing Paper.* Melbourne: Burnet Institute on behalf of Compass.

HLWIKI International. (2016). *Rapid Reviews.* Retrieved from:
http://hlwiki.slais.ubc.ca/index.php/Rapid_reviews

Ishola, F., Owolabi, O., & Filippi, V. (2017). Disrespect and abuse of women during childbirth in Nigeria: A systematic review. *PLoS One, 12*(3) doi:10.1371/journal.pone.0174084

Jacobs, B., Ir, P., Bigdeli, M., Annear, P., & Van Damme, W. (2012). Addressing access barriers to health services: an analytical framework for selecting appropriate interventions in low-income Asian countries. *Health Policy and Planning, 27*(4), 288-300. doi:10.1093/heapol/czr038

Jewkes, R., Abrahams, N., & Mvo, Z. (1998). Why do nurses abuse patients? Reflections from South African obstetric services. *Social Science & Medicine, 47*(11), 1781-1795. doi:10.1016/S0277-9536(98)00240-8

John Hopkin's University & Mosley, H. (2006). *Mortality and Morbidity - Data Sources for Measuring Mortality Module 6a* [pdf document]. Retrieved from: http://ocw.jhsph.edu/courses/PopulationChange/PDFs/Lecture6.pdf

Kassebaum, N. J., Bertozzi-Villa, A., Coggeshall, M. S., Shackelford, K. A., Steiner, C., Heuton, K. R., … Lozano, R. (2014). Global, regional, and national levels and causes of maternal mortality during 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet, 384*(9947), 980-1004. doi:10.1016/S0140-6736(14)60696-6

Kelly, J., Kohls, E., Poovan, P., Schiffer, R., Redito, A., Winter, H., & MacArthur, C. (2010). The role of a maternity waiting area (MWA) in reducing maternal mortality and stillbirths in high-risk women in rural Ethiopia. *BJOG: An International Journal of Obstetrics & Gynaecology, 117*(11), 1377-1383. doi:10.1111/j.1471-0528.2010.02669.x

Khan, K. S., Wojdyla, D., Say, L., Gülmezoglu, A. M., & Van Look, P. F. (2006). WHO analysis of causes of maternal death: a systematic review. *The Lancet, 367*(9516), 1066-1074. doi:10.1016/S0140-6736(06)68397-9

Kumar, S., Kumar, N., & Vivekadhish, S. (2016). Millennium development goals (MDGs) to sustainable development goals (SDGs): Addressing unfinished agenda and strengthening sustainable development and partnership. *Indian Journal of Community Medicine, 41*(1), 1-4. doi:10.4103/0970-0218.170955

Lawson, J. B., & Stewart, D. B. (1967). *Obstetrics and Gynaecology in the Tropics and Developing Countries*. London: Edward Arnold.

Levesque, J., Harris, M. F., & Russell, G. (2013). Patient-centred access to health care: conceptualising access at the interface of health systems and populations. *International Journal for Equity in Health, 12*(1), 18. doi:10.1186/1475-9276-12-18

Lori, J. R., Munro-Kramer, M. L., Mdluli, E. A., Musonda, G. K., & Boyd, C. J. (2016). Developing a community driven sustainable model of maternity waiting homes for rural Zambia. *Midwifery, 41*, 89-95. doi:10.1016/j.midw.2016.08.005

Lori, J. R., Munro, M. L., Rominski, S., Williams, G., Dahn, B. T., Boyd, C. J., Moore, J. E., & Gwenegale, W. (2013). Maternity waiting homes and traditional midwives in rural Liberia. *International Journal of Gynecology & Obstetrics, 123*(2), 114-118. doi:10.1016/j.ijgo.2013.05.024

Mahler, H. (1987). The safe motherhood initiative: a call to action. *The Lancet, 1*(8534), 668.

Maine, D., & Rosenfield, A. (1999). The Safe Motherhood Initiative: why has it stalled? *American Journal of Public Health, 89*(4), 480-482. doi:10.2105/AJPH.89.4.480

Mannava, P., Durrant, K., Fisher, J., Chersich, M., & Luchters, S. (2015). Attitudes and behaviours of maternal health care providers in interactions with clients: a systematic review. *Globalization and Health, 11*(1), 36. doi:10.1186/s12992-015-0117-9

Maternity Worldwide. (2015). Millennium Development Goal 5 – Results. *Maternity Worldwide: The Issues: Millennium Development Goal 5 – Results*. Retrieved from: http://www.maternityworldwide.org/the-issues/achieving-mdg-5-the-facts/

McNamee, P., Ternent, L., & Hussein, J. (2009). Barriers in accessing maternal healthcare: evidence from low-and middle-income countries. *Expert Review of Pharmacoeconomics & Outcomes Research, 9*(1), 41.

Mikkelsen, L., Phillips, D. E., AbouZahr, C., Setel, P. W., de Savigny, D., Lozano, R., & Lopez, A. D. (2015). A global assessment of civil registration and vital statistics systems: monitoring data quality and progress. *The Lancet, 386*(10001), 1395-1406. doi:10.1016/S0140-6736(15)60171-4

Mramba, L. Nassir, F. A., Ondieki, C., & Kimanga, D. (2010). Reasons for low utilization of a maternity waiting home in rural Kenya. *International Journal of Gynecology and Obstetrics, 108*(2), 152-153. doi:10.1016/j.ijgo.2009.08.029

Ortiz-Ospina, E., & Roser, M. (2019). Global Health. Retrieved from: https://ourworldindata.org/health-meta

Panciera, R., Khan, A., Rizvi, S., Ahmed, S., Ahmed, T., Islam, R., & Adam, A. (2016). The
influence of travel time on emergency obstetric care seeking behavior in the urban poor
of Bangladesh: a GIS study. *BMC Pregnancy and Childbirth, 16*(1), 240.
doi:10.1186/s12884-016-1032-7

Polit, D. F., & Beck, C. T. (2014). *Essentials of Nursing Research: Appraising Evidence for
Nursing Practice* (8th ed.). Philadelphia: Wolters Kluwer Health/Lippincott Williams &
Wilkins.

Rosenfield, A. (1997). The history of the Safe Motherhood Initiative. *International Journal of
Gynecology & Obstetrics, 59*, S7-S9. doi:10.1016/S0020-7292(97)00141-0

Ruiz, M. J., van Dijk, M. G., Berdichevsky, K., Munguía, A., Burks, C., & García, S. G. (2013).
Barriers to the use of maternity waiting homes in indigenous regions of Guatemala: a
study of users' and community members' perceptions. *Culture, Health & Sexuality, 15*(2),
205-218. doi:10.1080/13691058.2012.751128

Say, L., Chou, D., Gemmill, A., Tuncalp, O., Moller, A., Daniels, J., & Alkema, L. (2014).
Global causes of maternal death: a WHO systematic analysis. *The Lancet Global Health,
2*(6), E323-E333. doi:10.1016/S2214-109X(14)70227-X

Sherman, L. W., Gottfredson, D., Mackenzie, D., Eck, J., Reuter, P., & Bushway, S.
(1997). *Preventing Crime: What Works, What Doesn't, What's Promising*. Report to the
U.S. Congress. Washington, D.C. U.S. Dept. of Justice.

Sialubanje, C., Massar, K., Kirch, E. M., van der Pijl, Marit S.G, Hamer, D. H., & Ruiter, R. A.
C. (2016). Husbands' experiences and perceptions regarding the use of maternity waiting
homes in rural Zambia. *International Journal of Gynecology and Obstetrics, 133*(1), 108-
111. doi:10.1016/j.ijgo.2015.08.023

Sialubanje, C., Massar, K., van der Pijl, Marit S. G., Kirch, E. M., Hamer, D. H., & Ruiter, R. A.
C. (2015). Improving access to skilled facility-based delivery services: Women's beliefs
on facilitators and barriers to the utilisation of maternity waiting homes in rural
Zambia. *Reproductive Health, 12*, 61. doi:10.1186/s12978-015-0051-6

Simonsen, S. E., & Varner, M. W. (2017). Grand multiparity. In V. A. Barss (Ed.), *Uptodate.*
Retrieved from: https://www.uptodate.com/contents/grand-multiparity#H122650247

Singh, Speizer, I., Kim, E. T., Lemani, C., & Phoya, A. (2017). Reaching vulnerable women through maternity waiting homes in Malawi. *International Journal of Gynecology & Obstetrics, 136*(1), 91-97. doi:10.1002/ijgo.12013

Starrs, A. M. (2006). Safe motherhood initiative: 20 years and counting. *The Lancet, 368*(9542), 1130-1132. doi:10.1016/S0140-6736(06)69385-9

Sundu, S., Mwale, O. G., & Chirwa, E. (2017). Antenatal mothers' experience of staying in a maternity waiting home at Malamulo Mission Hospital in Thyolo district Malawi: a qualitative, exploratory study. *Women's Health & Gynecology*, 3(1), 1-10.

Sustainable Development Goals Fund. (nd). From MDGs to SDGs. *Sustainable Development Goals Fund: Home: About Us.* Retrieved from: http://www.sdgfund.org/mdgs-sdgs

Thaddeus, S., & Maine, D. (1994). Too far to walk: maternal mortality in context. *Social Science & Medicine, 38*(8), 1091-1110. doi:10.1016/0277-9536(94)90226-7

Thomas, R. K. (2016). *In Sickness and In Health: Disease and Disability in Contemporary America.* New York, NY: Springer.

Titaley, C., Hunter, C., Heywood, P., & Dibley, M. (2010). Why don't some women attend antenatal and postnatal care services? A qualitative study of community members' perspectives in Garut, Sukabumi and Ciamis districts of West Java Province, Indonesia. *BMC Pregnancy and Childbirth*, *10*(1), 61-73. doi:10.1186/1471-2393-10-61

The Cochrane Collaboration. (2016). Data Extraction Template. *Communication Review Group Cochrane Consumers.* Retrieved from: http://cccrg.cochrane.org/author-resources

The World Bank. (2019). World Bank Country and Lending Groups. *The World Bank: Data: Country Classification.* Retrieved from: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

The World Bank. (2016). Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population). *The World Bank: Data: Indicators: Poverty.* Retrieved from: http://data.worldbank.org/indicator/SI.POV.DDAY

The World Bank & World Health Organization (WHO). (2014). *Global Civil Registration and Vital Statistics Scaling up Investment Plan 2015–2024.* Retrieved from: http://www.worldbank.org/content/dam/Worldbank/document/HDN/Health/CRVSScaling-upoverview5-28-14web.pdf

UNICEF. (2014). Millennium Development Goals (MDG) Monitoring. *UNICEF: Statistics and Monitoring*. Retrieved from: http://www.unicef.org/statistics/index_24304.html

United Nations. (2017). Sustainable Development Knowledge Platform. *United Nations: Department of Economic and Social Affairs.* Retrieved from: https://sustainabledevelopment.un.org/

United Nations. (2015). The Millennium Development Goals and Beyond 2015. *United Nations: Millennium Development Goals.* Retrieved from: http://www.un.org/millenniumgoals/

United Nations. (2012). Rural Women and the Millennium Development Goals. Retrieved from: http://www.un.org/womenwatch/feature/ruralwomen/documents/En-Rural-Women-MDGs-web.pdf

United Nations Development Programme. (2016). Sustainable Development Goals (SDGs). *United Nations Development Programme: Sustainable Development Goals (SDGs).* Retrieved from: http://www.undp.org/content/undp/en/home/sdgoverview/post-2015-development-agenda.html

United Nations Development Programme. (2015). The Millennium Development Goals Report 2015. *United Nations Development Programme: Research and Publications: Millennium Development Goals.* Retrieved from: http://www.undp.org/content/undp/en/home/librarypage/mdg/the-millennium-development-goals-report-2015.html

United Nations Women. (2017). SDG 3: Ensure healthy lives and promote well-being for all at all ages. *UN Women: In focus: Women and the Sustainable Development Goals*. Retrieved from: http://www.unwomen.org/en/news/in-focus/women-and-the-sdgs/sdg-3-good-health-well-being

Vandemoortele, J. (2011). The MDG story: intention denied. *Development and Change, 42*(1), 1-21. doi:10.1111/j.1467-7660.2010.01678.x

van Lonkhuijzen, L., Stegeman, M., Nyirongo, R., & van Roosmalen, J. (2003). Use of maternity waiting home in rural Zambia. *African Journal of Reproductive Health/La Revue Africaine De La Santé Reproductive, 7*(1), 32-36.

van Lonkhuijzen, L., Stekelenburg, J., & van Roosmalen, J. (2012). Maternity waiting facilities for improving maternal and neonatal outcome in low-resource countries. *Cochrane*

Database of Systematic Reviews, 10(10), CD006759. doi:10.1002/14651858.CD006759.pub3

Varker, T., Forbes, D., Dell, L., Weston, A., Merlin, T., Hodson, S., & O'Donnell, M. (2015). Rapid evidence assessment: Increasing the transparency of an emerging methodology. *Journal of Evaluation in Clinical Practice, 21*(6), 1199-1204. doi:10.1111/jep.12405

Watt, A., Cameron, A., Sturm, L., Lathlean, T., Babidge, W., Blamey, S., & Maddern, G. (2008). Rapid reviews versus full systematic reviews: An inventory of current methods and practice in health technology assessment. *International Journal of Technology Assessment in Health Care, 24*(2), 133-139. doi:10.1017/S0266462308080185

Wild, K., Barclay, L., Kelly, P., & Martins, N. (2012). The tyranny of distance: maternity waiting homes and access to birthing facilities in Rural Timor-Leste. *Bulletin of the World Health Organization, 90*(2), 97-103. doi:10.2471/BLT.11.088955

Wilmoth, J. (2009). The lifetime risk of maternal mortality: concept and measurement. *Bulletin of the World Health Organization, 87*(4), 256.

World Health Organization. (2017a). Maternal and perinatal health. *Programmes: Maternal, newborn, child and adolescent health: Maternal health.* Retrieved from: http://www.who.int/maternal_child_adolescent/topics/maternal/maternal_perinatal/en/

World Health Organization. (2017b). WHO Mortality Database. *Programmes: Health statistics and information systems.* Retrieved from: http://www.who.int/healthinfo/mortality_data/en/

World Health Organization. (2016a). Millennium Development Goals. *Health Topics: Millennium Development Goals (MDGs).* Retrieved from: http://www.who.int/topics/millennium_development_goals/en/

World Health Organization. (2016b). Time to respond: A report on the global implementation of maternal death surveillance and response (MDSR). *World Health Organization: Programmes: Maternal, newborn, child and adolescent health: Data, statistics and epidemiology*. Retrieved from: http://www.who.int/maternal_child_adolescent/documents/maternal_death_surveillance_implementation/en/

World Health Organization. (2015a). Maternal Mortality. *World Health Organization: Media Centre: Maternal Mortality Fact Sheet N°348*. Retrieved from: http://www.who.int/mediacentre/factsheets/fs348/en/

World Health Organization. (2015b). *WHO recommendations on health promotion interventions for maternal and newborn health*. Geneva: World Health Organization.

World Health Organization. (2014). *Trends in maternal mortality: 1990 to 2013. Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division.* Geneva: World Health Organization.

World Health Organization. (2009). *Women and health: today's evidence tomorrow's agenda*. Geneva: World Health Organization.

World Health Organization. (2008). *The Right to Health – Fact Sheet 31.* Geneva: World Health Organization.

World Health Organization. (2006). *Neonatal and Perinatal Mortality: Country, Regional and Global Estimates*. Geneva: World Health Organization.

World Health Organization. (2004). *Maternal mortality in 2000: estimates developed by WHO, UNICEF and UNFPA*. Geneva: World Health Organization.

World Health Organization. (1996). *Maternity Waiting Homes: A review of experiences.* Geneva: World Health Organization.

World Health Organization. (1995). *Mother-baby package: Implementing safe motherhood in developing countries.* Geneva: World Health Organization.

Yargawa, J., & Leonardi-Bee, J. (2015). Male involvement and maternal health outcomes: systematic review and meta-analysis. *Journal of Epidemiology and Community Health, 69*(6), 604-612. doi:10.1136/jech-2014-204784

Zureick-Brown, S., Newby, H., Chou, D., Mizoguchi, N., Say, L., Suzuki, E., & Wilmoth, J. (2013). Understanding global trends in maternal mortality. *International Perspectives on Sexual and Reproductive Health*, *39*(1), 10.1363/3903213. doi:10.1363/3903213

Appendices

Appendix A Data Extraction Form

Author (Year), Title, *Journal*	Purpose/ Aim	Setting and Sample Size	Design & Methods	Strengths of Study	Weaknesses/ Limitations of Study	Findings: Maternal Outcome(s)	Findings: Factors that Influence Use of a MWH
Braat, F., Vermeiden, T., Getnet, G., Schiffer, R., van den Akker, T., & Stekelenburg J. (2018) Comparison of pregnancy outcomes between maternity waiting home users and non-users at hospitals with and without a maternity waiting home: retrospective cohort study *International Health*	To examine the impact of a maternity waiting home (MWH); comparing pregnancy outcomes among MWH users and non-users.	Ethiopia N = 703	Quantitative -Retrospective cohort study. -Study period: May-December 2014.	-To reduce possible selection bias, the two study sites selected were comparable in location, services offered, labour staffing levels, number of labour ward beds, average number of annual deliveries. -Inclusion of MWH non-users from two sites was also done to reduce selection bias – as non-users typically only sought hospital care when a complication occurred.	-Data were collected from hospital records; which often have missing or incomplete data. -No data kept on high risk vs low risk pregnancies, therefore unable to compare maternal outcomes among varying risk status. -Unable to calculate odds ratio (OR) for maternal deaths, as one group at 0 maternal deaths. -Possible sampling bias associated with differences in the socioeconomic status between MWH users and non-users. -The way in labour is managed by health care providers at each of the two hospital sites (possible confounding variable) may have influenced the findings seen.	-No maternal deaths were noted among MWH users. Maternal mortality ratio of (0 vs. 368.8 & 327.3 per 100,000 live births among MWH users vs. non-users). -The number of stillbirths was significantly lower among MWH users than non-users (38 vs. 393 & 717). -Proportion of caesarean sections among MWH users was higher than non-users, but likely associated with the high risk status of women staying at the MWH.	-**Distance/Accessibility:** MWH users had significantly longer travel times to reach a hospital than non-users. MWH users travelled an average of 2.5 hours, while MWH non-users travelled an average of 1 hour. -**Financial Costs**: Despite a MWH user fee in place (up until 2014), MWH users were found to be poorer (lower relative household wealth) than non-users.
Chandramohan, D., Cutts, F., & Chandra, R.	"To evaluate the effect of a maternity	Zimbabwe N = 4,488	Quantitative	-Women excluded from analysis if missing data present, or if they did not	-Possible bias from human error in recording of data into logbook at	-No statistical difference in intrapartum interventions (vacuum &	-**Lack of Awareness:** Only 31% of women with high risk pregnancies

Author (Year), Title, *Journal*	Purpose/ Aim	Setting and Sample Size	Design & Methods	Strengths of Study	Weaknesses/ Limitations of Study	Findings: Maternal Outcome(s)	Findings: Factors that Influence Use of a MWH
(1994) Effects of a Maternity Waiting Home on Adverse Maternal Outcomes and the Validity of Antenatal Risk Screening *International Journal of Gynecology & Obstetrics*	waiting home (MWH) on adverse maternal outcomes and the validity of antenatal risk criteria in predicting dystocia". (pg. 279)		-Prospective hospital-based cohort study. -Study period: January 1, 1989 – December 31, 1991.	meet inclusion criteria (twin deliveries, <37 weeks gestation, referred to a hospital for treatment of a medical condition outside the scope of a MWH).	hospital, or missing data and possible transcription errors when analyzing the data. -The numbers of adverse outcomes were too small to conduct multivariate analysis to estimate the effect of MWH after controlling for other factors. -Control group did not include women who delivered at home or at primary health centres (only included women who presented to the hospital for delivery), thus under-estimation of the effect of a MWH on maternal deaths is likely.	forceps) among MWH users and non-users. -Higher proportion of caesarean sections among MWH users than non-users (18% vs. 15%, p = 0.004). On sub-analysis of women with known obstetrical risk factors – there was no difference in the risk of caesarean section among MWH users and non-users (23.7% vs. 22.4%).	stayed at a MWH (utilization = low). No clear referral program. -Important for MWHs to ensure they have the capacity to accommodate women who live far away.
Chibuye, P. S., Bazant E. S., Wallon, M., Rao, N., & Fruhauf, T. (2018) Experiences with and expectations of maternity waiting home in Luapula Province, Zambia: a mixed methods, cross-sectional study with women, community	To identify facilitators and barriers of MWH use and understand the experience and expectations of MWH users, community groups and stakeholders.	Zambia Quantitative Component: N = data collected from 17 health facilities Qualitative Component: N = 323 (21 focus groups comprising 236 participants & 87 key informant interviews). Participants included MWH	Mixed Methods Quantitative: cross-sectional descriptive study Qualitative: exploratory descriptive study -Study period: September - December 2013. -Quantitative data were collected using 3 assessment tools	-The 4 study sites were similar in terms of population, road access and poverty levels. -Focus group discussions and key informant interviews were conducted until data saturation was reached. -Data collection tools were piloted and revised before being used in the study. -Thematic analysis of qualitative data and	-Small scope of the study: only examined 21/68 health facilities in 4 of the 9 districts in Luapula Province. - Exclusion of MWH health care workers from qualitative focus groups and interviews - may have had differing perspectives on both the facilitators and barriers to MWH use. -Lack of clarity around the quantitative data that was collected and analyzed. Two of the	- Not Examined -	-**Distance/Accessibility**: difficulty in accessing MWHs – distance and impassible bridges in rainy season. -**Financial Costs**: associated with transportation to get to the MWH, as well as the cost of supplies and food a woman is required to bring with her to the MWH. -**Living Conditions**: poor living conditions at the MWH (lack of privacy,

Author (Year), Title, *Journal*	Purpose/ Aim	Setting and Sample Size	Design & Methods	Strengths of Study	Weaknesses/ Limitations of Study	Findings: Maternal Outcome(s)	Findings: Factors that Influence Use of a MWH
groups and stakeholders *BMC Pregnancy and Childbirth*		users and non-users, senior women in the community, village chiefs and headmen, district community nurses/officers, partners and agency staff supporting maternal and child health projects.	at each of 17 health facilities. -Qualitative data collected through focus group discussions and key informant interviews in each of the 4 study districts.	descriptive statistics of quantitative data carried out.	tools were used to collect data and report descriptive statistics on structure and amenities at each of the 17 MWHs. The third tool sought to collect data on the number of annual deliveries amongst MWH users at the attached health facility, yet, data were only available from 5 registries (out of 17) for the three preceding months.		lack of water and electricity, poor sanitation). Variations exist among current MWHs, in terms of number of rooms, supplies and food provided.
Eckermann, E., & Deodato, G. (2008) Maternity Waiting Homes in Southern Lao PDR: The Unique 'Silk Home' *Journal of Obstetrics and Gynecology Research*	Identify potential barriers to usage of MWHs and other health services in one remote province of southern Lao (PDR); and establish what adaptations to previous models of MWHs need to be altered to overcome current barriers.	Lao People's Democratic Republic (PDR) Quantitative Component: N = 7,876 (total population of 18/54 villages (33.33%) in the Thateng District of the Province of Sekong) Qualitative Component: N = unknown	Mixed Methods Quantitative: prospective descriptive study Qualitative: exploratory descriptive study -Triangulated strategy consisting of semi-structured interviews and focus group discussions (qualitative data) analyzed with epidemiological health outcome data obtained for the Thateng District (quantitative data).	-The study allowed for the identification of barriers to MWH usage by community members themselves – allowing for information on what adaptations could be made to reduce or eliminate current barriers and increase MWH use.	-The total number of participants interviewed (individual interview and focus groups) unclear as only the total population (N=7,876) of the 18 villages was provided (quantitative component). -No mention was made as to when interviews and focus groups took place, if interviews were recorded or transcribed and if data saturation occurred, or whether the sample size was simply an arbitrary number decided upon by the research team. -The authors noted large discrepancies between reports of maternal and infant deaths by villagers and the official	-One maternal death among the 18 villages in the previous 12 months. -31 infant deaths were reported among the 18 villages in the previous 12 months – most occurred shortly after birth as a result of malaria, diarrhea or pneumonia.	-**Distance/Accessibility:** Villages were 3-29 km away from the district hospital, with an average walk time to get there from 30 minutes to 8 hours. Another concern was the inability to access the MWH during the rainy season – due to poor roads & washed out bridges. -**Financial Costs:** Seen as the biggest factor preventing women from using an available MWH. Transportation costs played a factor in the decision to use a MWH. -**Cultural Restrictions:** Women were worried they would not be allowed to freely choose their desired birthing position

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			-Qualitative data collected through interviews and focus groups with villagers, chiefs, village committee members and a variety of medical staff ranging from traditional birth attendants, to doctors, nurses, midwives and voluntary health workers.		epidemiological health outcome data for the Thateng District.		when it came time to deliver (wanted to use a traditional birth position). -**Lack of Awareness:** Need to inform the larger community about the benefits of MWHs so that MWH use is more widely accepted (need for cultural shift in the community).
Kelly, J., Kohls, E., Poovan, P., Schiffer, R., Redito, A., Winter, H., & MacArthur, C. (2010) The Role of a Maternity Waiting Area (MWA) in Reducing Maternal Mortality and Stillbirths in High-Risk Women in Rural Ethiopia *BJOG: An International Journal of*	To describe maternal mortality and stillbirth rates among MWH users and non-users who delivered at the same hospital in rural Ethiopia over a 22 year period from 1987-2008.	Ethiopia N = 24,148 deliveries over the study period. -6,805 MWH users (28.2%); and 17,343 non-users (71.8%).	Quantitative -Retrospective cohort study using extracted hospital records. -Study period: 1987-2008.	-A large retrospective study (N = 24,148) over a 22 year period – allows for a more precise and accurate estimate of maternal mortality and stillbirth rates. The findings are also less likely to be biased given the long study period.	-Use of a MWH was shown to be associated with lower maternal mortality, stillbirth rates and intrapartum interventions; however, it is unclear how much of the decreased mortality is accounted for in the differences between MWH users and non-users (demographic characteristics, risk factors, socioeconomic factors, etc.) vs. the effects of staying at a MWH. -Unclear whether possible confounding variables were accounted for, such as multiple pregnancy or grand multiparity.	-Maternal mortality ratio (MMR) among MWH users was 89.8/100,000 live births (95% CI, 41.1-195.7), compared to the MMR of non-users at 1,331.1/100,000 live births (95% CI, 1,156.2-1,536.7). -Stillbirth rate among MWH users was 17.6 per 1000 births (95% CI, 14.8-21.0), compared with 191.2 per 1000 births (95% CI, 185.4-197.1) among non-users. -Higher proportion of vacuum deliveries among MWH non-users (30.0%) than MWH users (18.4%). This was attributed to an	-**Distance/Accessibility:** Distance did not influence MWH use (MWH users and non-users both lived an average of 40km away from the local hospital). -**Transportation**: Reliable transportation was difficult to ascertain. Transportation costs varied based on time of travel as well as distance, with night journeys costing up to six times more than day journeys. -**Financial Costs:** Financial incentives were offered to encourage the use of MWH facilities. MWHs offered reduced hospital fees for MWH

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Obstetrics and Gynecology						increased rate of intrauterine fetal deaths among MWH non-users, where vacuum delivery was typically conducted to avoid further complications that could result with waiting for the onset of labour. -Higher proportion of forceps-assisted deliveries among non-users (1.1%) compared to MWH users (0.3%) – statistical significance not calculated. -Higher proportion of caesarean sections among MWH users (38.4%) compared to non-users (17.7%) – statistical significance not calculated.	users and no additional costs associated with a family member or partner staying with a woman at the MWH.
Lori, J. R., Munro-Kramer, M., Mdluli, E. A., Musonda, G. K., & Boyd, C. J. (2016) Developing a Community Driven Sustainable Model of Maternity Waiting Homes for Rural Zambia	To examine the beliefs of community members in two districts in the Eastern province of Zambia, regarding the acceptability, feasibility and sustainability of MWHs.	Zambia N = 546 -Individual interviews with community leaders (n = 46). -Focus group interviews with Safe Motherhood Action Groups, husbands and women of childbearing age	Qualitative -Exploratory descriptive study. -Study period: Two-month period in 2013.	-Semi-structured interview guide used for both individual interviews and focus groups. -Communities that had health care facilities with and without MWHs were targeted to gain insight into limitations of existing MWHs. -Findings were presented to the larger community (data validation) – done to	-Unclear why such a large sample size was used (N = 546) – leads to questions around applicability and transferability of the findings. -Potential bias may have been introduced when the authors collected and translated the interview audio recordings from the local dialect to English. No back translation was performed and may have	- Not Examined -	-**Distance/Accessibility:** MWHs were seen as a positive intervention that addressed distance issues/reduced the delay in seeking care. MWHs were viewed as a safe place for women to stay closer to a hospital facility with higher level of maternity care services. -**Financial Costs:** Concern was expressed over the requirement of women to bring supplies

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Midwifery		in two rural districts in Zambia (n = 500).		increase trustworthiness of the findings.	resulted in the omission of small nuances lost during the initial translation.		with them for the length of their stay at a MWH. The inability to afford needed supplies was seen as inhibiting uptake and use of the facility, especially among women who lived in poverty.
Lori, J. R., Munro, M. L., Rominski, S., Williams, G., Dahn, B. T., Boyd, C. J., Moore, J. E., Gwenegale, W. (2013) Maternity Waiting Homes and Traditional Midwives in Rural Liberia *International Journal of Gynecology & Obstetrics*	To determine whether MWHs increase the use of skilled birth attendants (SBAs) at rural primary health clinics in Liberia and in turn reduce maternal morbidity and mortality.	Liberia Quantitative Component: N = 500 Qualitative Component: N = 46	Mixed Methods Quantitative: prospective cohort study Qualitative: exploratory descriptive study -Study period: between March 1, 2011 and September 30, 2012. -Quantitative data were obtained from the mid-point of a larger ongoing prospective cohort study in which 5 communities saw the establishment of a MWH and 5 other communities did not.	-Mixed methods study was undertaken to examine both inductive (qualitative) and deductive (quantitative) data. -Initial matching of communities in terms of population size, demographics and location carried out in the larger cohort study adds to the confidence and strength of the findings noted in this study. -Open-ended questioning was used in the focus group discussions to reduce bias. -The authors controlled for the estimated number of women of childbearing age in each community during the logistic regression.	-Quantitative data were collected from log books that had been completed by the certified midwives following each delivery – therefore missing data, and transcription errors are possible factors which could have biased the quantitative findings noted. -Qualitative interviews were audio-recorded and transcribed verbatim from Kpelle to English (where the interviews were not conducted in English). The absence of a back translation from English to Kpellle, may have led to the omission of small nuances lost during the initial translation.	-Lower rates of maternal and perinatal mortality reported in communities with a MWH, compared to communities without a MWH [only the maternal mortality findings were noted to be statistically significant (*p* = 0.04)].	-**Cultural Restrictions:** Strong cultural preferences for traditional midwives (TMs) compared to hospital/ institutional births still exist in Liberia.
Mramba, L., Nassir, F. A.,	To examine reasons for the low utilization of	Kenya	Mixed Methods	-Sought a mixed methods approach to find reasons why women in the local	-The authors did not acknowledge any limitations of the findings.	- Not Examined -	-**Cultural Restrictions:** 95% of women reported that they would need their

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Ondieki, C., & Kimanga, D. (2010) Reasons for Low Utilization of a Maternity Waiting Home in Rural Kenya *International Journal of Gynecology and Obstetrics*	a MWH near the Kilifi District Hospital in rural Kenya.	Quantitative Component: N = 461 Qualitative Component: N = 30	Quantitative: cross-sectional descriptive study Qualitative: exploratory descriptive study -Study period: May-June 2006	community did not use the MWH and which factors inhibited uptake and use of the facility.	-The authors made no mention of how they analyzed collected data; appears as only descriptive statistical analysis was performed.		husbands' permission to stay at the MWH. -**Lack of Awareness:** Only 28% of women knew of the existence of the MWH. 83% of health care workers knew about the local MWH and its purpose, yet only 64% had made a referral to the MWH at least once per month. Recommended the need for a standardized referral program going forward to help improve utilization.
Ruiz, M., van Dijk, M., Berdichevsky, K., Munguia, A., Burks, C., & Garcia, S. (2013) Barriers to the use of Maternity Waiting Homes in Indigenous Regions of Guatemala: A Study of Users' and Community Members' Perceptions *Culture, Health & Sexuality*	To explore the experiences and opinions of stakeholders regarding the barriers before, during and after a woman's stay at a MWH in rural Guatemala.	Guatemala N = 48 (Participants came from two study sites: Cuilo and Huehuetenango).	Qualitative -Grounded theory study design. -Study period: September-October 2008. -Collected data were de-identified prior to performing thematic analysis.	-A variety of stakeholders were interviewed including MWH users, family members, community leaders, MWH staff, Mayan midwives and health centre and hospital medical staff.	-Transferability of findings may be limited – as study was conducted in two small communities in rural Guatemala.	- Not Examined -	-**Distance/Accessibility:** Majority of MWH users came from the local community (urban & sub-urban area); MWHs were underutilized by women from rural and remote communities. -**Financial Costs:** High transportation costs and lost income associated with staying at a MWH and not working were reasons that impacted a woman's decision to stay at a MWH. Costs associated with food and supplies a woman was required to bring with her for the duration of her stay at a MWH were also seen as a barrier to staying at a MWH.

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							-**Physical Aspects of MWH & Services Provided:** Women indicated that there were no activities to partake in at the MWH. The idea of a craft group was suggested as an activity to prevent social isolation, and the crafts could be sold to help offset costs associated with running the MWH. -**Cultural Restrictions:** Stigma associated with staying at a MWH – as older generations did not see the need for the facilities. Women were also worried about receiving culturally appropriate care (or lack of) at the MWH. This included: allowing women to follow family traditions, speak their native language/local dialect. Women were also worried about not being able to understand health care workers, if they did not speak their local dialect. Concern was expressed by MWH users over the feeling of social isolation, as family members were not allowed to stay at the

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							MWH and strict visiting hours were imposed. -**Lack of Awareness:** MWH users perceived the facility as a place to rest and obtain medical care, whereas health care providers viewed MWHs as a place to monitor women with high risk pregnancies who lived further away from a health centre. Community leaders were not familiar with the purpose of a MWH, and therefore did not promote their use.
Sialubanje, C., Massar, K., Kirch, E. M., van der Pijl, M. S. G., Hamer, D. H., & Ruiter, R. A. C. (2016) Husbands' Experiences and Perceptions Regarding the Use of Maternity Waiting Homes in Rural Zambia *International Journal of Gynecology & Obstetrics*	To examine the beliefs, perceptions and experiences of men regarding the use of MWHs in rural Zambia.	Zambia N = 24 -Twenty-four in-depth interviews conducted with husbands/partners of women attending seven different clinics (for children <age 5) at a health centre with a MWH. -Interviews conducted over a two-month	Qualitative -Exploratory descriptive study. -Study period: April 1-May 31, 2014.	-Semi-structured interview guide was used to elicit similar type answers and data from participants. The interview guide was developed based on a conducted literature review and the researchers' experiences and findings from a previous study conducted in the local area. -Respondents were selected from different health centres, villages and families to allow researchers to obtain a variety of viewpoints and as diverse a sample as possible.	-Interviews were voice-recorded and transcribed from Tonga to English, however, only 20% were back-translated from English back to Tonga. -Husbands of women that had children over the age of 5, or those who did not attend one of the seven health clinics were not able/had no chance to be selected for participation in the study (possible selection bias).	- Not Examined -	-**Distance/Accessibility:** MWHs seen as mitigating long distances to reach health care facilities. -**Transportation:** MWHs seen as mitigating transportation long challenges associated with trying to reach a health care facility while in labour. -**Financial Costs:** Most families had limited resources – the cost of staying at a MWH was seen as too expensive. Fear that health centre staff would not help a woman if she could not pay for necessities associated with childbirth,

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		period (April 1 – May 31, 2014).		-Interviews were continued until data saturation was achieved.			usually led to delays in a husband's decision to allow their wives to access care or use MWHs. -**Physical Aspects of MWH & Services Provided:** MWHs lacked basic services such as running water and washroom facilities. They also did not have a dedicated sleeping space, nor any beds/mattresses, bedding or blankets. There was no routine monitoring of women staying at the MWH and the absence of an ambulance that could transport women from the MWH to the local hospital was seen as a negative aspect of using a MWH. -Positive aspects of MWHs included the presence of family accommodation facilities at the MWHs, allowing a woman to have a family member or her young children stay with her – which was seen as an appealing factor to using a MWH. -**Cultural Restrictions:** Women required their husbands' permission to stay at a MWH.

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Sialubanje, C., Massar, K., van der Pijl, M. S. G., Kirch, E. M., Hamer, D. H., & Ruiter, R. A. C. (2015) Improving access to skilled facility-based delivery services: Women's beliefs on facilitators and barriers to the utilization of maternity waiting homes in rural Zambia *Reproductive Health*	To explore women's beliefs and experiences related to the utilization of MWHs in rural Zambia.	Zambia N = 32	Qualitative -Exploratory descriptive study. -Study period: March-May 2014.	-In-depth interview were carried out of a 10 week period with women between the ages of 17-44, at which point data saturation was reached. -Semi-structured interview guide was used to elicit similar type answers and data from participants at the two study sites (health care facility with a MWH and a health care facility without a MWH).	-Interviews were voice-recorded and transcribed from Tonga to English, however, only 20% were back-translated from English back to Tonga. -Recruitment of participants was done at the local health centre during a routine clinic visit for children under age 5. Most participants had given birth at the clinic or hospital (and were selected as they had experience with MWH and a clinic delivery). However, their experiences may not be representative of the views of other women in the community – especially among those who delivered at home. -The authors noted that focus groups could not be carried out to compare and confirm findings due to logistical challenges.	- Not Examined -	-**Distance/Accessibility:** Long distances to reach the MWH and health facilities were seen as barriers to seeking care during pregnancy and childbirth. -**Transportation**: A lack of transportation prevented women from using available MWH services. -**Financial Costs:** A lack of money was the reason to forgo staying at a MWH during a woman's pregnancy. Women often could not afford the costs of food and supplies they were required to bring with them for the duration of their stay. -**Physical Aspects of MWH & Services Provided:** Women expressed concern over a lack of supervised care while staying at a MWH, as well as poor sanitary conditions at the facility and the absence of meals provided to MWH users. -**Cultural Restrictions:** Women required their husbands' permission to stay at a MWH.

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Singh, K., Speizer, I., Kim, E. T., Lemani, C., & Phoya, A. (2016) Reaching Vulnerable Women Through Maternity Waiting Homes in Malawi *International Journal of Gynecology & Obstetrics*	"To determine whether MWHs (supported by the Safe Motherhood Initiative) are reaching vulnerable women during the early phase of their implementation" in rural Malawi (pg. 91).	Malawi N = 553	Quantitative -Cross-sectional descriptive study. -Study period: April 1-June 30, 2015.	-Recruited participants from two sites with attached MWHs – one site was in an urban centre and the other in a rural district. The two MWHs also provided different services to users – one provided food/meals and the other did not. -Data collected from intake and discharge surveys administered to MWH users over a 6-month period was analyzed against data collected from the in-depth interviews with MWH users and non-users to increase validity of the findings.	-Survey data were only collected from one study site (not both study sites where interview participants were recruited from). -Respondent bias may have been introduced by asking women to rate their satisfaction with the services they received immediately upon discharge from the MWH facility. -The authors did not acknowledge any limitations related to their study or findings.	- Not Examined -	-**Financial Costs:** The authors reported little to no financial burden was associated with staying at a MWH.
Sundu, S., Mwale, O. G., & Chirwa, E. (2017) Antenatal Mothers' Experience of Staying in a Maternity Waiting Home at Malamulo Mission Hospital in Thyolo District Malawi: A Qualitative, Exploratory Study	To explore the experiences of women staying at a MWH in the Thyolo District of Malawi.	Malawi N = 15	Qualitative -Exploratory descriptive study. -Study period: February-March 2010.	-Study sought to find the experiences of current MWH users, to help make MWHs more user-friendly. -Authors used a semi-structured interview approach, asking each participant the same questions but through conversational style questing to encourage participants to share their experiences in their own words. -Thematic analysis was carried out to identify	-Conflicting statements in the study about sample size. It appears initially 10 participants were sought, but the sample size grew to include a total of 15 participants – at which data saturation was achieved. -The authors translated interview transcriptions from Chichewa to English, but it is unclear if any back-translation occurred to ensure small nuances were not lost during the initial translation.	- Not Examined -	-**Physical Aspects of MWH & Services Provided:** MWHs had poor sanitary conditions, worsened by the presence of pests such as mosquitoes, ants, and fleas. MWH users expressed concern over a lack of privacy, stated MWHs were staffed by rude midwives who allowed the practice of witchcraft to occur. -MWH users reported inconsistent care with some midwives not routinely coming by the facility to check on the

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Women's Health & Gynecology				themes and sub-themes related to the benefits and challenges of staying at a MWH.	-An expert in qualitative research was used to analyze the collected data, however, not mention was made as to who the expert was or what their qualification(s) were. -Participants recruited from a single MWH (near a single health facility) and transferability of results is limited.		welfare of women staying at the facility.
van Lonkhuijzen, L., Stegeman, M., Nyirongo, R., & van Roosmalen, J. (2003) Use of Maternity Waiting Home in Rural Zambia *African Journal of Reproductive Health*	To evaluate risk status and health outcomes among MWH users attending the RCZ Hospital in the Eastern Province of Zambia.	Zambia N = 520	Quantitative -Exploratory descriptive study. -Study period: May-November 1994.	-Study compared health outcome data among MWH users and non-users who gave at the same hospital, to determine the impact MWHs had on maternal and perinatal health outcomes. -Participants with missing data were removed from the study population and data analysis.	-Reported perinatal mortality may be an underrepresentation, as the authors had no knowledge if additional deaths occurred in the remainder of the perinatal period (up to 28 days of age) following hospital discharge, or the number of perinatal deaths which occurred to mothers who delivered at home. -Gestational age of MWH users and non-users was not known, bias may have been unknowingly introduced to the findings, if one group had more preterm deliveries, as premature newborns have a greater risk of poor health outcomes including perinatal mortality.	-Despite MWH users having more antenatal risk factors, no difference in maternal mortality was noted between MWH users and non-users. -No difference noted in perinatal mortality among MWH users and non-users. -Higher rate of forceps-assisted deliveries noted among MWH users (2.3%) than non-users (0.3%). -Higher rate of vacuum assisted deliveries noted among MWH users (2.3%) compared to non-users (1.4%) ($p = <0.01$). -Higher rates of caesarean section among MWH	-**Financial Costs:** Financial incentives were offered to encourage the use of MWH facilities. For example, the MWH fee included the cost of the hospital birth and was half of the fee typically charged to a woman who presented directly to the hospital in labour. -**Physical Aspects of MWH & Services Provided:** Meals were provided to MWH users (an incentive to using the MWH). The authors noted a second MWH in the region lacked this service.

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						users (1.8%) compared to non-users (0.3%) ($p = <0.05$).	
Vermeiden, T., Braat, F., Medhin, G., Gaym, A., van den Akker, T., & Stekelenburg, J. (2018)

Factors associated with intended use of a maternity waiting home in Southern Ethiopia: a community-based cross sectional study

BMC Pregnancy and Childbirth | To examine the facilitating factors and perceived barriers associated with potential MWH use among pregnant or recently pregnant women in Sothern Ethiopia. | Ethiopia

N= 428 | Quantitative

-Cross-sectional descriptive study.

-Study period: March-November 2014. | -The questionnaire used was piloted and further revised prior to use in the study.

-Systematic convenience sampling was used to recruit participants. Participants were selected every *n*th household.

-When more than one eligible participant was identified at a household, only one was randomly selected to participate. | -The authors acknowledged that convenience sampling led to an underrepresentation of women from rural areas. Representing 49% of the study population, but accounting for 89% of the general population in the Eastern Gurage Zone.

-Possible introduction of bias, through an unknown data substitute procedure to collect data from women who met inclusion criteria but were away when researchers returned to the participants house to collect data.

-Wide confidence intervals may have resulted from a sample size that was too small and has implications in the confidence of the true effect size noted. | - Not Examined - | -**Distance/Accessibility:** Women who faced a travel time of greater than 60 minutes were less likely to utilize a MWH.

-**Transportation:** Potential MWH use increased if transportation to and from the MWH was both available and affordable.

-**Financial Costs:** Prior to 2014, a $2 USD MWH user fee was in effect. The financial burden associated with taking time off work to stay at a MWH was seen as a barrier to MWH use. Lost income of the support person who accompanied a MWH user during her stay at a MWH was seen as an additional factor that inhibiting MWH use.

-**Physical Aspects of MWH & Services Provided:** Women found it difficult to be away from home for 2-4 weeks (the average length of a MWH stay) prior to their due date. Women found it difficult to rely on family or other community |

Author (Year), Title, *Journal*	Purpose/ Aim	Setting and Sample Size	Design & Methods	Strengths of Study	Weaknesses/ Limitations of Study	Findings: Maternal Outcome(s)	Findings: Factors that Influence Use of a MWH
							members to watch and care for their other children while they were away. Therefore, MWH users were more likely to be women who did not have children/those who did not have to worry about finding childcare for the duration of their MWH stay.
Wild, K., Barclay, L., Kelly, P., & Martins, N. (2012) The Tyranny of Distance: Maternity Waiting Homes and Access to Birthing Facilities in Rural Timor-Leste *World Health Organization Bulletin*	To examine the "impact of MWHs on the use of facility-based births in two remote districts in Timor-Leste" (pg. 98).	Timor-Leste N = 2,235	Quantitative -Quasi-experimental historical comparison study. -Study period: 2004-2007.	-This study sought to examine whether women from rural and remote areas were more likely to use a hospital if there was an available MWH to stay at. -Data were collected from birth registration books and de-identified to maintain anonymity. Ambiguous records were clarified with the midwives who attended the birth. Distance to MWH was collected from UN police offices (located in each district and have mapped road distances) as well as other information (population figures, maps and service targets).	-Without a concurrent control group, it is difficult to say whether the findings were a result of the establishment of the MWH. -Problems with record keeping in the country was an issue noted by the authors, which led to an exclusion of 18% data on births in one district to be excluded from analysis.	- Not Examined -	-**Distance/Accessibility:** Distance was seen as a barrier to MWH use. This was noted by the fact that women who lived within close proximity to the hospital were the most likely to stay at the adjacent MWH than women who lived further away. The number of facility-based births and distance to the health centre were inversely related. -**Transportation**: The establishment of a MWH did not reduce transportation barriers associated with accessing maternity care at the hospital, as the MWH was built next to the hospital.

Appendix B WoE Appraisal Tool

Weight of Evidence A: Taking account of all quality assessment issues, can the study findings be trusted in answering the study question(s)? High Evidence Score of 3 Medium Evidence Score of 2 Low Evidence Score of 1
Weight of Evidence B: Appropriateness of research design and analysis for addressing the question, or sub-questions, of this specific REA. High Evidence Score of 3 Medium Evidence Score of 2 Low Evidence Score of 1
Weight of Evidence C: Relevance of particular focus of the study (including conceptual focus, context, sample and measures) for addressing the research question, or sub-questions, of this specific REA. High Evidence Score of 3 Medium Evidence Score of 2 Low Evidence Score of 1
Weight of Evidence D: Overall weight of evidence High Evidence Score of 7 - 9 Medium Evidence Score of 4 - 6 Low Evidence Score of 3

Source: Government Social Research Service (GSRS). (2010). Rapid Evidence Assessment Toolkit. UK Government: National Archives: Civil Service: *Government Social Research Service.* Retrieved from: http://webarchive.nationalarchives.gov.uk/20140305122816/http://www.civilservice.gov.uk/networks/gsr/resources-and-guidance/rapid-evidence-assessment

Appendix C EPPI-Centre Data Extraction and Coding Tool for Education Studies

Purpose and use of this tool

This tool is designed to help those conducting systematic reviews on educational topics identify extract and code information about a particular research study that is to be included in a systematic review.

It is designed to help the reviewer obtain all the necessary information to
- Assess the quality of the study or its internal validity
- Identify the relevant contextual information that may have affected the results obtained in the specific study
- Identify the contextual information about a study that will be relevant to any assessment of the generalizability of findings in the individual study
- Identify relevant information about the design, execution and context of a study for the purpose of synthesizing (bringing together) results from all the studies that are included in a particular review

The tool is designed to be used to extract data from a single primary study. That is the report(s) of a piece of research i.e. not a review (systematic or otherwise), a scholarly paper, treatise or opinion piece.

The study may be reported in more than one paper for which a single data extraction is completed.

Section N: Quality of the Study - Weight of Evidence

N.1 Are there ethical concerns about the way the study was done? *Consider consent, funding, privacy, etc.*	N.1.1 Yes, some concerns (please specify) N.1.2 No (please specify)
N.2 Were students and/or parents appropriately involved in the design or conduct of the study? *Consider your answer to the appropriate question in module B.1.*	N.2.1 Yes, a lot (please specify) N.2.2 Yes, a little (please specify) N.2.3 No (please specify)
N.3 Is there sufficient justification for why the study was done the way it was? *Consider answers to questions B1, B2, B3, B4.*	N.3.1 Yes (please specify) N.3.2 No (please specify)
N.4 Was the choice of research design appropriate for addressing the research question(s) posed?	N.4.1 yes, completely (please specify) N.4.2 No (please specify)

N.5 Have sufficient attempts been made to establish the repeatability or reliability of data collection methods or tools? *Consider your answers to previous questions:* *Do the authors describe any ways they have addressed the reliability or repeatability of their data collection tools and methods? (K7)*	N.5.1 Yes, good (please specify) N.5.2 Yes, some attempt (please specify) N.5.3 No, none (please specify)
N.6 Have sufficient attempts been made to establish the validity or trustworthiness of data collection tools and methods? *Consider your answers to previous questions:* *Do the authors describe any ways they have addressed the validity or trustworthiness of their data collection tools/methods? (K6)*	N.6.1 Yes, good (please specify) N.6.2 Yes, some attempt (please specify) N.6.3 No, none (please specify)
N.7 Have sufficient attempts been made to establish the repeatability or reliability of data analysis? *Consider your answer to the previous question:* *Do the authors describe any ways they have addressed the repeatability or reliability of data analysis? (L7)*	N.7.1 Yes (please specify) N.7.2 No (please specify)
N.8 Have sufficient attempts been made to establish the validity or trustworthiness of data analysis? *Consider your answer to the previous question:* *Do the authors describe any ways they have addressed the validity or trustworthiness of data analysis? (L8, L9, L10, L11)*	N.8.1 Yes, good (please specify) N.8.2 Yes, some attempt (please specify) N.8.3 No, none (please specify)
N.9 To what extent are the research design and methods employed able to rule out any other sources of error/bias which would lead to alternative explanations for the findings of the study? *e.g. (1) In an evaluation, was the process by which participants were allocated to, or otherwise received the factor being evaluated, concealed and not predictable in advance? If not, were sufficient substitute procedures*	N.9.2 A little (please specify) N.9.3 Not at all (please specify)

employed with adequate rigour to rule out any alternative explanations of the findings which arise as a result? *e.g. (2) Was the attrition rate low and, if applicable, similar between different groups?*	
N.10 How generalizable are the study results?	N.10.1 Details
N.11 In light of the above, do the reviewers differ from the authors over the findings or conclusions of the study? *Please state what any difference is.*	N.11.1 Not applicable (no difference in conclusions) N.11.2 Yes (please specify)
N.12 Have sufficient attempts been made to justify the conclusions drawn from the findings, so that the conclusions are trustworthy?	N.12.1 Not applicable (results and conclusions inseparable) N.12.2 High trustworthiness N.12.3 Medium trustworthiness N.12.4 Low trustworthiness
N.13 Weight of evidence A: Taking account of all quality assessment issues, can the study findings be trusted in answering the study question(s)? *In some studies, it is difficult to distinguish between the findings of the study and the conclusions. In those cases, please code the trustworthiness of these combined results/conclusions.*	N.13.1 High trustworthiness N.13.2 Medium trustworthiness N.13.3 Low trustworthiness
N.14 Weight of evidence B: Appropriateness of research design and analysis for addressing the question, or sub-questions, of this specific systematic review.	N.14.1 High N.14.2 Medium N.14.3 Low
N.15 Weight of evidence C: Relevance of particular focus of the study (including conceptual focus, context, sample and measures) for addressing the question, or sub questions, of this specific systematic review.	N.15.1 High N.15.2 Medium N.15.3 Low
N.16 Weight of evidence D: Overall weight of evidence *Taking into account quality of execution, appropriateness of design and relevance of focus, what is the overall weight of evidence this study provides to answer the question of this specific systematic review?*	N.16.1 High N.16.2 Medium N.16.3 Low

Adapted from: EPPI-Centre (2007). Review Guidelines for Extracting Data and Quality Assessing Primary Studies in Educational Research, Version 2.0. London: EPPI-Centre, Social Science Research Unit.

Appendix D Critical Appraisal Skills Programme (CASP) Tool

This assessment tool has been developed for those unfamiliar with qualitative research and its theoretical perspectives. This tool presents a number of questions that deal very broadly with some of the principles or assumptions that characterise qualitative research. It is not a definitive guide and extensive further reading is recommended.

How to use this appraisal tool

Three broad issues need to be considered when appraising the report of qualitative research:
- Rigour: has a thorough and appropriate approach been applied to key research methods in the study?
- Credibility: are the findings well-presented and meaningful?
- Relevance: how useful are the findings to you and your organisation?

The 10 questions on the following pages are designed to help you think about these issues systematically.

The first two questions are screening questions and can be answered quickly. If the answer to both is "yes", it is worth proceeding with the remaining questions.

A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

<u>**Screening Questions**</u>

1. Was there a clear statement of the aims of the research?   Yes   No
Consider:
- What the goal of the research was.
- Why it is important?
- Its relevance.

2. Is a qualitative methodology appropriate?   Yes   No
Consider:
- If the research seeks to interpret or illuminate the actions and/or subjective experiences of research participants.

Is it worth continuing?

<u>Appropriate Research Design</u>

3. Was the research design appropriate to address the aims of the research?
Consider:
- If the researcher has justified the research design (e.g. have they discussed how they decided which methods to use?)

4. Was the recruitment strategy appropriate to the aims of the research?
Consider:
- If the researcher has explained how the participants were selected.
- If they explained why the participants they selected were the most appropriate, to provide access to the type of knowledge sought by the study.
- If there are any discussions around recruitment (e.g. why some people chose not to take part)

Data Collection

5. Were the data collected in a way that addressed the research issue?
Consider:
- If the setting for data collection was justified.
- If it is clear how data were collected (e.g. focus group, semi-structured interview etc).
- If the researcher has justified the methods chosen.
- If the researcher has made the methods explicit (e.g. for interview method, is there an indication of how interviews were conducted, did they used a topic guide?).
- If methods were modified during the study. If so, has the researcher explained how and why?
- If the form of data is clear (e.g. tape recordings, video material, notes etc).
- If the researcher has discussed saturation of data.

Reflexivity (Research Partnership Relations/Recognition of Researcher Bias)

6. Has the relationship between researcher and participants been adequately considered?
Consider whether it is clear:
- If the researcher critically examined their own role, potential bias and influence during:
  - Formulation of research questions.
  - Data collection, including sample recruitment and choice of location.
- How the researcher responded to events during the study and whether they considered the implications of any changes in the research design.

Ethical Issues

7. Have ethical issues been taken into consideration?
Consider:
- If there are sufficient details of how the research was explained to participants for the reader to assess whether ethical standards were maintained.
- If the researcher has discussed issues raised by the study (e. g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study).
- If approval has been sought from the ethics committee.

<u>Data Analysis</u>

8. Was the data analysis sufficiently rigorous?
Consider:
- If there is an in-depth description of the analysis process.
- If thematic analysis is used. If so, is it clear how the categories/themes were derived from the data?
- Whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process
- If sufficient data are presented to support the findings.
- To what extent contradictory data are taken into account.
- Whether the researcher critically examined their own role, potential bias and influence during analysis and selection of data for presentation.

<u>Findings</u>

9. Is there a clear statement of findings?
Consider:
- If the findings are explicit.
- If there is adequate discussion of the evidence both for and against the researcher's arguments.
- If the researcher has discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst.).
- If the findings are discussed in relation to the original research questions.

<u>Value of the Research</u>

10. How valuable is the research?
Consider:
- If the researcher discusses the contribution the study makes to existing knowledge or understanding (e.g. do they consider the findings in relation to current practice or policy, or relevant research-based literature?)
- If they identify new areas where research is necessary
- If the researchers have discussed whether or how the findings can be transferred to other populations or considered other ways the research may be used.

Source: CASP UK. (2013). CASP Tools and Checklists. *Critical Appraisal Skills Programme (CASP): Making Sense of Evidence.* Retrieved from: http://www.casp-uk.net/

Appendix E Maryland Scale of Scientific Methods (MSSM)

Level 1	Observed correlation between an intervention and outcomes at a single point in time. A study that only measured the impact of the service using a questionnaire at the end of the intervention would fall into this level.
Level 2	Temporal sequence between the intervention and the outcome clearly observed; or the presence of a comparison group that cannot be demonstrated to be comparable. A study that measured the outcomes of people who used a service before it was set up and after it finished would fit into this level.
Level 3	A comparison between two or more comparable units of analysis, one with and one without the intervention. A matched-area design using two locations in the UK would fit into this category if the individuals in the research and the areas themselves were comparable.
Level 4	Comparison between multiple units with and without the intervention, controlling for other factors or using comparison units that evidence only minor differences. A method such as propensity score matching, that used statistical techniques to ensure that the programme and comparison groups were similar would fall into this category.
Level 5	Random assignment and analysis of comparable units to intervention and control groups. A well conducted Randomised Controlled Trial fits into this category.

Note: Increasing methodological quality

Source: Government Social Research Service (GSRS). (2010). Rapid Evidence Assessment Toolkit. UK Government: National Archives: Civil Service: Government Social Research Service. Retrieved from: http://webarchive.nationalarchives.gov.uk/20140305122816/http://www.civilservice.gov.uk/networks/gsr/resources-and-guidance/rapid-evidence-assessment