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Investigating the State of Maternal Mortality in Jamaica: A Scoping Review
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Investigating the State of Maternal Mortality in Jamaica: A Scoping Review

By

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Bachelor of Science
University of South Florida
2019

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An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Abstract

Investigating the State of Maternal Mortality in Jamaica: A Scoping Review
By Tianni Spence

Background: Maternal mortality is one of the world's most pervasive problems in low- and middle-income countries, with progress on reducing the maternal mortality ratio being slow in many nations. The maternal mortality ratio remains alarmingly high in Jamaica despite ongoing public health efforts.
Objectives: The purpose of this scoping literature review is to map the research on maternal mortality within Jamaica over the last two decades and identify any existing gaps in knowledge. Specific objectives of this review are to describe the accessibility and availability of maternal healthcare in Jamaica, describe the causes of maternal mortality in Jamaica over the past two decades and to describe the successes and challenges of maternal mortality surveillance in Jamaica over the past two decades.
Review Methods: PubMed, Web of Science, and EmBase were used to identify peer-reviewed articles. All full-text publications were entered using Zotero and Covidence, and then organized into a summary of findings table using Microsoft Excel.
Results: The literature search strategy identified 22 peer-reviewed articles related to maternal mortality in Jamaica over the past two decades. 10 full-text articles were included in this review. Studies fell into 4 themes: medical care (n=3), indirect causes (n=3), direct causes (n=2), and maternal mortality surveillance (n=2). It was found that approximately 90% of all pregnancy-related deaths on the island occur in hospital. While direct deaths decline, there has been an increase in indirect deaths. Successful interventions have worked to reduce maternal mortality from direct deaths; however, the indirect deaths have been trending upward, leading to no improvement in the overall maternal mortality ratio. Under and misreporting of deaths is a significant issue for the country.
Conclusion: Maternal mortality is a major public health concern for Jamaica. Several epidemiological research studies exist on direct and indirect causes of maternal mortality. Yet, minimal progress has been made in reducing the maternal mortality rate over the past two decades. Considering the obstetric and demographic shift that Jamaica is experiencing, an in-depth understanding of non-medical factors that contribute to the delay in reducing maternal mortality is needed.

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Lastly, thank you to my parents- Carolyn and Mark. Thank you for encouraging me to dream and reminding me that I can achieve them all. Please let this be a reminder that none of the sacrifices you made were in vain; this is for us.

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Acronyms and Abbreviations

AIDS:	Acquired Immune Deficiency Syndrome
HIV:	Human Immunodeficiency Virus
JBI:	Joanna Briggs Institute
JMMS:	Jamaica Maternal Mortality Surveillance
LAC:	Latin America and the Caribbean
LMIC:	Low- and middle-income countries
MMEIG:	United Nations Maternal Mortality Estimation Inter-Agency Group
MMR:	Maternal Mortality Ratio
MOH:	Ministry of Health
NCD:	Noncommunicable Disease
SDG:	Sustainable Development Goals
UN:	United Nations
UNFPA:	United Nations Population Fund
UNICEF:	United Nations Children's Fund
UWI:	University of the West Indies
WHO:	World Health Organization

Definitions

Direct deaths – maternal deaths resulting from obstetric complications of the pregnant state (pregnancy, labor, and puerperium), and from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above (*WHO Indicator Metadata Registry Details*, n.d.).

Indirect deaths – maternal deaths resulting from previous existing disease or disease that developed during pregnancy and not due to direct obstetric causes but were aggravated by the physiologic effects of pregnancy (*WHO Indicator Metadata Registry Details*, n.d.).

Maternal death – deaths from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy and childbirth or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy (*WHO Indicator Metadata Registry Details*, n.d.).

Maternal mortality – obstetric deaths that occur during pregnancy, childbirth, or within 42 days of delivery or end of a pregnancy (The DHS Program - Research Topics - Maternal Mortality, n.d.).

Maternal mortality ratio – the number of maternal deaths during a given period per 100,000 live births during the same period (*UNICEF Maternal Mortality Rates and Statistics*, n.d.).

Non-communicable Diseases (NCDs) – non-infectious and non-transmissible diseases that may be caused by genetic or behavioral factors and have a slow progression and long duration (WHO, 2021).

Chapter 1: Introduction

1.1: Thesis Overview

This thesis is a scoping review which will highlight the breadth of work on maternal mortality in the context of Jamaica. This thesis will identify the gaps in the existing literature and the subsequent need for future studies and interventions which address those gaps to understand the state of maternal mortality in Jamaica. Chapter one is an introduction to the thesis and describes the problem of maternal mortality globally and in Jamaica. This chapter also includes relevant contextual information about the Jamaican context. Chapter two reviews publicly available data relevant to the topic. Chapter three presents the methodology of the scoping review research, including the objectives of the research, the methodological approach, and the ethical considerations. Chapter four presents the results of the scoping review. Chapter five discusses the findings, including the strengths and limitations of this research and the implications for public health practice, research, and policy. Finally, Chapter six presents the conclusions of this scoping review and overall thesis.

1.2: Background and Significance

Maternal mortality, defined as obstetric deaths that occur during pregnancy, childbirth, or within 42 days of delivery or end of a pregnancy is a significant global health issue (The DHS Program - Research Topics - Maternal Mortality, n.d.). The United Nations Children's Fund (UNICEF) describes maternal mortality as one of the world's most neglected problems, with progress on reducing the maternal mortality ratio being too slow (UNICEF, 2008). Maternal mortality is a key indicator of a country's development because it has such a significant social and economic impact (Bauserman, et al., 2020). Maternal mortality illustrates a countries healthcare system,

including both the positive and negative aspects, and the sociocultural, political, and economic philosophy of a society (Sajedinejad et al., 2015). Additionally, maternal mortality is an indicator of inequality within a nation; Women who have been marginalized according to race, ethnicity, economic status, and age are often those with the least access to the necessary maternal health services (Castelazo-Morales, 2013).

Maternal mortality disproportionately affects women in many low- and middle-income countries (LMIC), including Jamaica. As a result, global maternal mortality remains alarmingly high despite ongoing public health efforts. According to the most recent data, in 2017, approximately 295,000 women died during and immediately following pregnancy and childbirth globally, with 94% of these deaths occurring in LMIC (WHO, 2019). The leading causes of global maternal death are postpartum hemorrhage, pre-eclampsia/eclampsia, infections after childbirth, complications during birth, and unsafe abortion; all of which are preventable with proper access to quality care from skilled birth attendants and trained healthcare workers (WHO, 2019).

Furthermore, McCarthy and Maine developed a framework for analyzing the determinants of maternal mortality in which they found that preventing pregnancy, reducing the incidence of complication, and having adequate facilities and well-trained staff reduced maternal mortality (McCarthy & Maine, 1992). This framework guided maternal mortality prevention interventions. The World Health Organization (WHO) has further added that participation in antenatal care, access to emergency obstetric care and the provision of family planning services prevent the incidence of maternal mortality as well (WHO, 2007).

High maternal death has several negative consequences to families and communities. Maternal death negatively affects families' physical and mental health, as there is an increase in child mortality among those whose mothers died during or after childbirth (Serruya, et al., 2020). The

risks of maternal deaths are not only increased by poverty, but maternal death can also perpetuate the cycle of poverty in poor communities between generations (WHO, 2019). Even with significant reductions in maternal mortality in the last decade, considerable efforts are required to achieve the United Nations (UN) Sustainable Development Goal (SDG) to reduce the global maternal mortality rate to less than 70 per 100,000 live births by 2030 in all Latin American and Caribbean (LAC) countries (Serruya, et al., 2020).

1.3: The Setting of Jamaica

Jamaica is the largest English-speaking country located in the Caribbean. The island is divided into three counties: Cornwall, Middlesex, and Surrey. The island is further subdivided into fourteen parishes. Jamaica's estimated population in 2019 was 2.9 million, with a median age of 30 years (PAHO, 2019). The life expectancy for Jamaican men is 72 years and 76 years for women (PAHO, 2019). Just over half (56.3%) of the population live in urban areas of the island (STATIN, 2019).

The original inhabitants of Jamaica are believed to be the Arawaks, otherwise known as Tainos. They came from South America approximately 2,500 years ago and named the island Xaymaca, which translated to the land of wood and water, to which the island is still commonly referred. Jamaica's official motto: "out of many, one people," illustrates the evolution of mixed ethnic groups, as Jamaican culture is presently understood to be an amalgamation of all racial and ethnic populations on the island (Kelly, 2020). Moreover, the Jamaican population is undergoing a demographic transition. The population is transforming from one with a high proportion of children to one with more working-age adults. The elderly population is the fastest-growing segment of the population. This results from changing mortality and fertility patterns, driven by

improvements in health care, education, and economic opportunities for women. These are areas that are significantly affected by movements towards gender equality (Haarr, 2021).

Healthcare in Jamaica

Jamaica abolished healthcare fees in the public health sector in 2008 (Ramsay et al., 2021). The National Health Services Act provides exemptions of fees for patients utilizing public health facilities and residing in Jamaica for all treatment modalities, including surgery, imaging, laboratory investigations, and pharmacy services (Ramsay et al., 2021). However, this system is not without flaws. The Medical Association of Jamaica reported many practical problems, such as deplorable working conditions and low resources (De La Haye & Alexis, 2012). Moreover, the disrespect and abuse of women during childbirth by medical staff appear to be widespread throughout the island, but its prevalence is not well documented. Stories of disrespect and abusive treatment in healthcare facilities are shared anecdotally within communities. They are only brought into the public domain when the outcomes are detrimental and traumatic for families (Pitter et al., 2017). While one of Jamaica's most successful initiatives to reduce maternal mortality is having a skilled birth attendant at every birth, anecdotal reports have indicated that many women in Jamaica are experiencing abusive care by skilled birth attendants (Pitter et al., 2017).

1.4: Rationale

The average maternal mortality ratio for LAC was 74 deaths per 100,000 live births in 2017 (WHO, 2019). Although the LAC region appears to have favorable statistics on maternal mortality compared to other regions, like Sub-Saharan Africa, the maternal mortality rate in Jamaica is still higher than the average for the LAC region overall (Smith, et al., 2021). The most recent statistics show that the maternal mortality ratio stood at 80 per 100,000 live births in 2017

in Jamaica (UNICEF, n.d.). Jamaica's maternal mortality ratio has remained between 77 to 80 per 100,000 for over twenty years since 2000 (UNICEF, n.d.).

Jamaica continues to face challenges to reduce maternal mortality. Maternal mortality in LMIC is often attributable to the "3 delays": delay in seeking care, delay in reaching care in time, and delay in receiving adequate treatment (Thaddeus & Maine, 1994). Although public health facilities are equitably distributed around the island, Jamaica's high maternal mortality ratio persists. The long wait times to receive services, inadequate quality of healthcare, and the frequent lack of supplies all adversely affect healthcare promotion (Jeong, et al., 2010).

Chapter 2: Literature Review

2.1: Maternal Mortality Overview

Women are at risk of developing severe morbidity and mortality during pregnancy, childbirth, and postpartum, especially women in LMIC, where 94% of all maternal deaths occur. Sub-Saharan Africa and Southern Asia accounted for approximately 86% of the estimated global maternal deaths in 2017 (WHO, 2019). The high number of maternal deaths often reflects inequalities in access to quality health services and highlights the gap between people of different socioeconomic statuses. For example, the maternal mortality ratio in low-income countries in 2017 was 462 per 100,000 live births compared to 11 per 100,000 live births in high-income countries (WHO, 2019).

Globally, hemorrhage remains the leading cause of maternal mortality, accounting for 27% of deaths. A similar proportion of maternal deaths were indirectly caused by pre-existing medical conditions aggravated by pregnancy. Hypertensive disorders of pregnancy, embolism, and complications of unsafe abortion are also prominent causes of maternal mortality (UNICEF, 2019). Moreover, the risk of maternal mortality is highest for adolescent girls under 15 years old.

Pregnancy and childbirth complications are higher among adolescent girls between the ages of 10 and 19 than women between the ages of 20 and 24. Women in developing countries tend to have more pregnancies than women in developed countries, thus, increasing their lifetime risk of death related to pregnancy. In high-income countries, this risk is 1 in 5,400, compared to 1 in 45 in low-income countries (WHO, 2019).

Pregnant women's lack of access to acceptable, affordable, fair, and high-quality health services violates their right to life, health, justice, and non-discrimination. Maternal mortality is generally preventable and is often the result of discriminatory laws and practices, failure to establish and maintain operational health systems and services, and lack of accountability (GTR, 2017). Most maternal deaths can be prevented if skilled birth attendants are present with the necessary equipment and supplies and who can refer women promptly to emergency obstetric care when complications occur. Obstetric complications require prompt access to quality obstetric care, life-saving drugs, and the ability to provide blood transfusions needed to perform Caesarean sections or other surgical interventions (UNICEF, 2019).

2.2: Maternal Mortality in Latin America and the Caribbean

Over the past decade, some countries in the LAC region have incorporated rights-based principles and standards in their constitutions and laws. 18 of the 33 countries in LAC refer specifically to the right to health and 5 include social protection in health as a basic principle of their healthcare system. Countries that have prioritized maternal mortality have demonstrated significant and sustained reductions in their corresponding mortality rates (GTR, 2017). Despite the requirements established by the SDG to reduce maternal mortality, preventing maternal mortality remains a low priority for several countries in the LAC region (Barcena & Byanyima, 2016).

Between 1990 and 2015, the maternal mortality ratio in Latin America decreased by 52% from 124 to 69 per 100,000 live births, and in the Caribbean by 37%, from 276 to 175 per 100,000 live births (UNICEF Panama, 2016). This progress has been attributed to national and regional efforts in expanding access and quality of maternal and reproductive health services and improvements in sanitation, nutrition, education, and other determinants of health. Despite these efforts, the UN Maternal Mortality Estimation Inter-Agency Group (MMEIG) estimated that 7,300 women still died of maternal causes in Latin America and the Caribbean in 2015 (UNICEF Panama, 2016). Furthermore, progress towards reducing maternal mortality has been uneven between and within LAC countries. Specifically, the Bahamas, Bolivia, the Dominican Republic, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Suriname, and Venezuela all have a maternal mortality ratio above the regional average—between 89 and 359 per 100,000 live births, as of 2015 data (WHO, 2019).

It has been found that most maternal deaths throughout LAC are preventable with access to quality obstetric care during pregnancy, delivery, and postpartum. Access to high-quality maternal health care would prevent 54% of these deaths, and universal access to family planning could prevent another 29% of maternal deaths in the region (Chou, et al., 2015). The most frequent causes of maternal mortality in the region have been found to be hemorrhage (23.1%), pregnancy-induced hypertension (22.1%), indirect causes (18.5%), other direct causes (14.8%), complications associated with unsafe abortion (9.9%), and sepsis (8.3%) (Say, et al., 2016). Additionally, unsafe abortions are a significant source of maternal mortality in the LAC region (UNICEF Panama, 2016). Among the estimated 3.6 million adolescent pregnancies in the region in 2016, 1.4 million, or 39%, of them resulted in abortion. Many of which being clandestine and unsafe (Darroch, et al., 2016). The maternal mortality ratio due to abortions in high-risk

situations is three times higher in the LAC region than in more developed regions, with 10 and 3 maternal deaths per 100,000 live births, respectively (WHO, 2011). The safety level of the procedure is related to the socioeconomic status of the woman, the capacity of the service provider, and the conditions in which the abortion is performed. Thus, access to abortion is also affected by the inequality in health care. In 2012, it was found that the Caribbean is the region with the highest abortion rate, with 6.5 abortions for every 1,000 women between the ages of 15 and 44 (Sedgh, et al., 2014).

An important gap in maternal mortality in the LAC region is related to income inequality. In 2015, there was on average an excess of 134 maternal deaths per 100,000 live births in countries with the lowest 20% of the income distribution as compared to countries in the highest 20% of the income distribution in LAC. Thus, in relative terms, the risk of dying in 2015 due to a maternal related cause in countries in the lowest 20% of the income distribution was 3.9 times as high as that in the group of countries in the highest 20% of the regional income distribution (UNICEF Panama, 2016). It is important to note that though income inequality has been reduced in recent years, LAC remains one of the most unequal regions globally. In 2014, the wealthiest 10% of people in LAC had amassed 71% of the region's overall wealth (Barcena & Byanyima, 2016).

Moreover, women living in poverty and Indigenous and Afro-descendant women often experience inadequate and discriminatory care. These women often face geographical, economic, cultural, and social barriers to accessing quality healthcare (GTR, 2017). LAC countries with large populations of Indigenous or Afro-descendant peoples have higher levels of maternal mortality in the region. Within those countries, maternal mortality among Indigenous or Afro-descendant women is significantly higher than in the general population (GTR, 2017).

2.3: History of Maternal Care in Jamaica

Funded public healthcare was established in Jamaica in 1868 when medical officers were employed to care for 'indentured servants' (McCaw-Binns, et al., 2009). 1867 – 1897 was a period of development of public health regulations in Jamaica, where the foundation of the island's medical services was established (Sargent & Rawlins, 1992). However, the increase in centralized organization of island-wide public health services and regulations was not immediately extended to maternal and child health (Sargent & Rawlins, 1992). Eventually, in 1887, a midwifery school was established and began training community midwives. The local training of public health nurses began in 1944, and in 1949 the University of the West Indies (UWI) began training medical doctors in the Caribbean (McCaw-Binns, et al., 2009). In 1982, the Jamaican Ministry of Health (MOH) established a Maternal Mortality Committee tasked to review all maternal deaths to identify characteristics of the women dying, the causes of death, and avoidable features in their death (Walker, et al., 1986).

A 1986 study found that 1 death in 7 (15%) was associated with abortion, 59% of women died after delivery of a potentially viable child and 13% died before the delivery of a potentially viable child (Walker, et al., 1986). 68% of the deaths in the study were found to have one or more avoidable factors present. There were inadequacies in the antenatal care of many women, with much of the antenatal care being deficient. The seriousness of patients' conditions was not readily appreciated, and there were delays in providing the appropriate treatment (Walker, et al., 1986).

The maternal mortality rate between 1981 and 1983 was 11.8 per 10,000 live births (Walker, et al., 1986) and increased to 11.5 per 10,000 live births in 1990 (Fogarty, 1998). This is significantly high, especially when compared to the maternal mortality rate in the United States for the same period – 13 per 100,000 live births in 1983 and 6.6 per 100,000 live births in 1990

(Fogarty, 1998). The Jamaican MOH stated that the maternal mortality rate in Jamaica in 1994 was 11.5 per 10,000 live births. Some of the reported causes of maternal deaths of Jamaican women were hypertensive diseases of pregnancy, sepsis, and hemorrhage. Other related factors included poverty, inadequacies in health care, lack of prenatal care, and poor education (Fogarty, 1998).

Public reproductive care has been delivered through tertiary facilities, regional referral hospitals, and general hospitals that offer midwifery services (McCaw-Binns, et al., 2009). The Jamaican public health policy encourages prenatal care from the first trimester of pregnancy; however, many low-income women obtain prenatal care late in their pregnancy, if any care at all (Sargent & Rawlins, 1991). Healthcare was not accessible in all areas of the island. In 1994, over 10,000 petitioners from rural areas in Jamaica petitioned to establish healthcare centers in under-served areas with high incidences of maternal and neonatal deaths, such as St. Mary and Portland. The MOH was unable to grant this request due to a lack of trained professionals in the area (Fogarty, 1998).

2.4: Summary

Maternal mortality is a significant global health issue and is considered as one of the world's most neglected problems. Jamaica, like many other countries in LAC, continues to face challenges to reduce maternal mortality. Maternal health and mortality in the LAC region has often been under-researched and unattended to compared with other regions (Vargas-Riaño, 2017). The purpose of this scoping review is to map the research done on maternal mortality within Jamaica over the last two decades and to identify any existing gaps in knowledge. The maternal mortality ratio in Jamaica is still higher than the average for the LAC region overall (Smith, et al., 2021). Jamaica's maternal mortality ratio has been stagnant for over twenty years

(UNICEF, n.d.). This review highlights the discrepancies between the maternal mortality ratio between other countries in the LAC region and Jamaica. Thus, an opportunity exists to synthesize the knowledge on maternal mortality in the Jamaican context to guide further research and intervention needs.

Chapter 3: Methods

3.1: Objectives

This review aims to provide an overview of the state of maternal mortality in Jamaica to demonstrate the gaps in the existing literature and the need for future studies and interventions. Specific objectives of this review are to:

1. Describe the accessibility and availability of maternal healthcare in Jamaica.
2. Describe the causes of maternal mortality in Jamaica over the past two decades.
3. Describe the successes and challenges of maternal mortality surveillance in Jamaica over the past two decades.

Using UNICEF's conceptual framework for maternal and neonatal mortality and morbidity, the results of this scoping review map the research done in maternal mortality within Jamaica over the last two decades, allowing for the identification of any existing gaps in knowledge. This framework is advantageous when assessing and analyzing the causes of maternal mortality, and in planning effective actions to enhance maternal health (UNICEF, 2008). After reviewing the literature, potential public health recommendations are noted on how to address areas impacting maternal mortality in Jamaica that require further research.

3.2: Conceptual Approach

This scoping review is framed in reference to a conceptual framework for maternal and neonatal mortality and morbidity. UNICEF's conceptual framework for maternal and neonatal mortality and morbidity (Figure 1) proposes a model of the causes of maternal and newborn deaths while illustrating that health outcomes are determined by interrelated factors, such as quantity and quality of resources hygiene, health-care services, and disease control among others (UNICEF, 2008). These factors are defined as proximate (individual), underlying (household and community) and basic (societal) (UNICEF, 2008). This diagram illustrates how factors at one level can influence other levels. This framework illustrates that systems, including political, economic, cultural, religious, and social systems, can limit the utilization of potential resources. While inadequate or inappropriate knowledge and discriminating attitudes limit household access to actual resources, which then impacts health at the individual and the household/community level (UNICEF, 2008). This framework was developed to be useful in assessing and analyzing the causes of maternal and newborn mortality and morbidity, and in planning effective actions to enhance maternal and neonatal health (UNICEF, 2008).

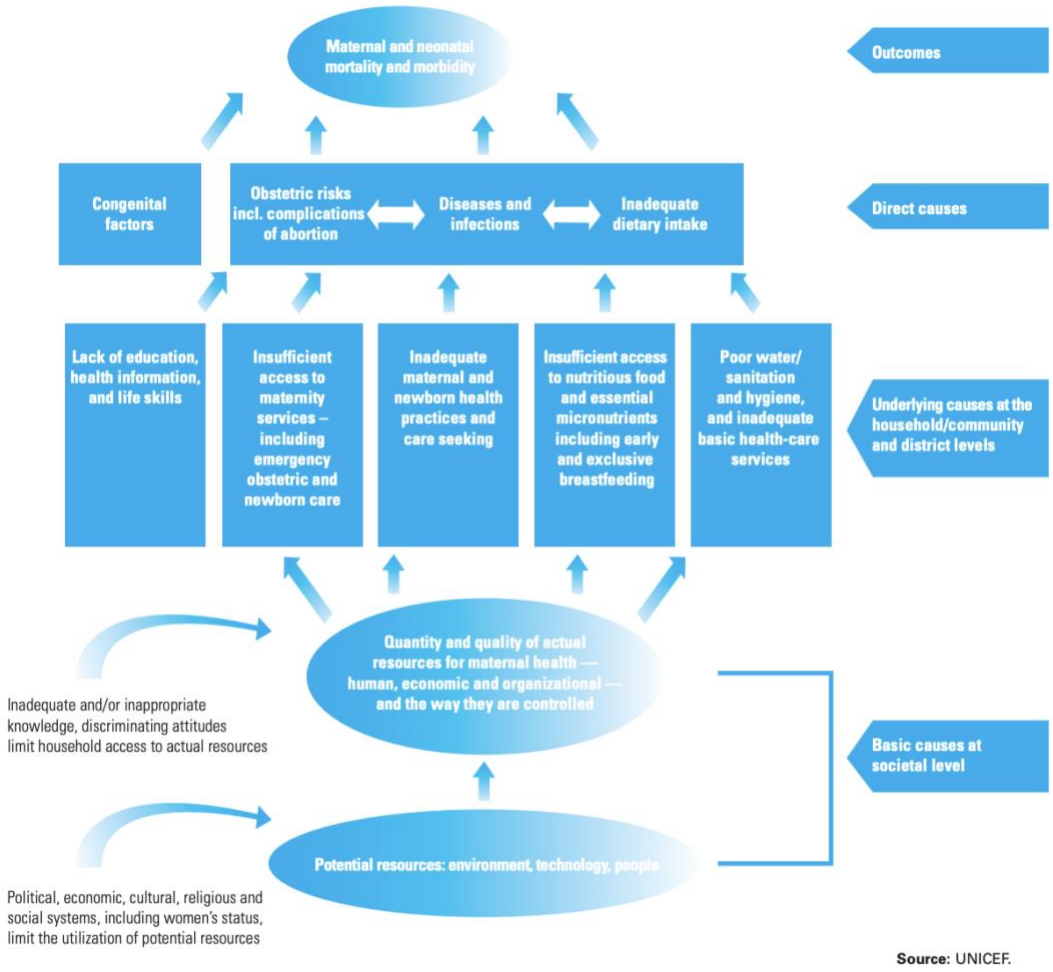

Figure 1: UNICEF conceptual framework for maternal and neonatal mortality and morbidity, 2008.

This conceptual framework is used as a guide for the development of categories and sorting of literature included in this scoping review. The outcome categories depicted in framework guide how the data is sorted based on how each topic is addressed in the literature. The broad outcome categories are 1) medical care, 2) indirect causes, 3) direct causes, and 4) maternal mortality surveillance. The conceptual framework provides a foundation for outlining how extracted literature discusses interrelated aspects of maternal mortality. For this review, medical care includes accessibility and quality of care; indirect causes include maternal deaths resulting from previous existing diseases or diseases that developed during pregnancy and not due to direct obstetric causes; direct causes include maternal deaths resulting from obstetric complications of

pregnancy, labor and puerperium, or as a result of interventions, omissions, or incorrect treatments; maternal mortality surveillance includes the monitoring and measuring of maternal outcomes, including death (*Indicator Metadata Registry Details*, n.d.).

3.3: Methodological Approach

A scoping review is the methodology of choice for this study. Although other forms of review are often used for maternal health and/or mortality research, a scoping review can widely accommodate literature from various sources that allow evidence to be synthesized (Peters et al., 2020). Scoping reviews can be used to map key themes and to clarify definitions and conceptual areas of a topic (Arksey & O'Malley, 2005). The benefits of the broad nature of a scoping review are the ability to incorporate a range of literature to comprehensively summarize and synthesize evidence with the aim of informing practice, programs, and policy and providing direction to future research priorities (Colquhoun et al., 2014).

A comprehensive scoping review involves investigating all published studies relevant to the research topic to determine all available evidence sources and synthesizing the key concepts (Arksey & O'Malley, 2005). The methodological framework for conducting a scoping review is based on the established framework for conducting systematic reviews (Arksey & O'Malley, 2005). The scoping review involves a comprehensive review and analysis of the existing literature. The review process requires considerable depth to ensure that the evidence collected reflects the current state of knowledge of the research topic.

Although they are similar methodologies, scoping reviews differ from systematic reviews in that the scoping study review does not concentrate on a strictly defined research question but is instead guided by a requirement to identify all appropriate literature related to a research topic (Arksey & O'Malley, 2005). This flexibility allows for the researcher to be able to modify search

methods throughout the review process. Conversely, a systematic review involves a more intensive and stringent process with less flexibility (Arksey & O'Malley, 2005). Although less stringent than the systematic review, the scoping review does follow a rigorous process.

The scoping review was chosen as the methodology for this study particularly because scoping reviews are an appropriate methodology when a study aims to summarize and disseminate research findings by describing the findings and range of research in particular areas of study in more detail (Arksey & O'Malley, 2005). This review will examine research in medical care and indirect and direct causes related to maternal mortality and maternal mortality surveillance in Jamaica to provide a concise overview of maternal mortality in Jamaica over the past twenty years and to demonstrate any gaps in the existing literature. Given that scoping reviews must be transparent and replicable, this review presents all search terms used to retrieve articles for this study and the databases from which they were retrieved.

3.4: Methods

Research Question

The purpose of this scoping literature review is to map the research done around maternal mortality within Jamaica over the last two decades and identify any existing gaps in knowledge. Thus, the following research question was formulated to guide this scoping review:

- What is known from the literature about the etiology and surveillance of maternal mortality in Jamaica over the last two decades, including the successes and the challenges in this area?

Identification of Literature

This scoping review involved following a systematic approach to mapping evidence and identifying key concepts, theories, sources, and knowledge gaps. The scoping review was

conducted following the JBI scoping review framework (Peters, et al., 2020). This methodology is appropriate because scoping reviews do not aim to determine the quality of the evidence, but, rather, the aim is to provide an overview of the evidence (Peters, et al., 2020). This approach was utilized to identify the range of existing literature that covered maternal mortality in the context of Jamaica.

The search used the following databases: PubMed, Web of Science, and EmBase. The search was limited to available full-text English-language articles published between 2000 and 2022. The following search terms were used: “maternal mortality,” “maternal death,” “pregnancy-related death,” AND “Jamaica.” All retrieved articles were saved into Zotero, a reference management program. All citations under these search terms were exported to Covidence, an online system that aids in organizing and extracting data for reviews, to be further screened. Citations that were identified were exported into Covidence (n = 63) where duplicate references were removed (n = 22). Then, with the remaining references, title/abstract (n = 40) and full-text screening (n = 26) were performed. Ultimately, 10 studies were deemed eligible to be included in this review.

Figure 1 shows a flow-chart detailing the source selection during each stage of the review process. The final flow-chart included was modified from the PRISMA flow diagram template. A detailed summary of the sources included in this scoping review is detailed in Table 1, located in Appendix A.

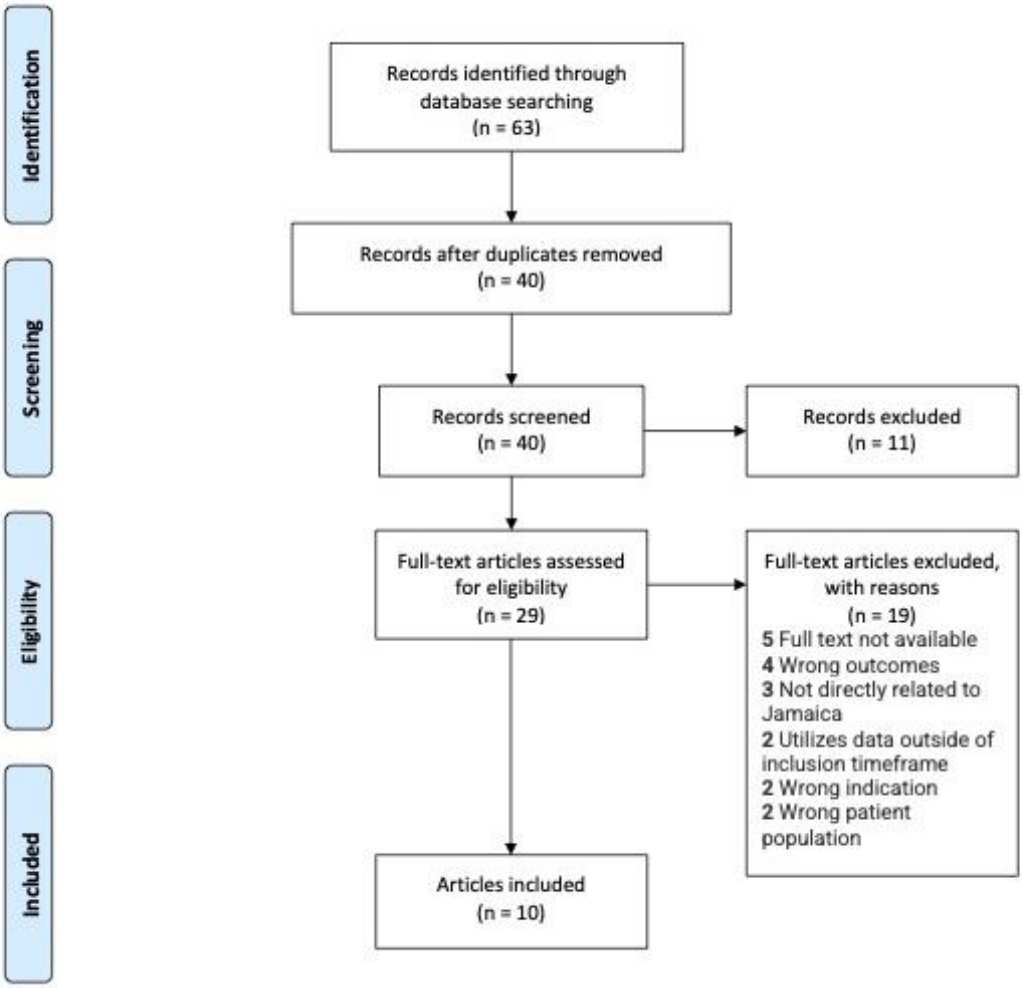

Figure 2: PRISMA flow diagram of review process

Inclusion and Exclusion Criteria

All citations were exported to Covidence, an online system that aids with organization and extraction of data for systematic reviews (*Covidence*, n.d.). Titles, abstracts, and full text articles were reviewed using the following inclusion and exclusion criteria:

Inclusion:

- Focused on adolescents and women of childbearing age (13 – 49 years old)
- Addressed maternal mortality
- Studies conducted in Jamaica or using Jamaican data
- Published in English language

- Published between the years 2000 and 2022
- Full text available

Exclusion:

- Maternal mortality was not a major concept of the article
- Study not directly related to the Jamaican population
- Full text not available
- Primarily utilizes data outside of the inclusion timeframe (before the year 2000)
- Article not written in English language

Data Collating and Comparison

To analyze the data, a spreadsheet was developed where key items were extracted from each source and charted — first in Covidence, then transferred to Excel, and then formatted into a table, located in the appendix, that is detailed further in the results section. The key items that were extracted from the sources included: the aim of the study, study population and/or sample size, study design, inclusion and exclusion criteria, and study outcome.

Eligible studies were grouped by various aspects related to maternal health in Jamaica, following UNICEF's conceptual framework for maternal and neonatal mortality and morbidity. The categories are 1) medical care, 2) indirect causes, 3) direct causes, and 4) maternal mortality surveillance. Included studies were further summarized by the focus of the articles, the study designs, the general measures being used, and the key findings.

3.5: Ethical Considerations

The research conducted in this scoping review relies exclusively on information that is publicly available. An Institutional Review Board (IRB) protocol was not submitted because this study did not involve human subjects.

Chapter 4: Results

4.1: Synthesis of Results

The purpose of this scoping literature review is to map the research done around maternal mortality within Jamaica over the last two decades and identify any existing gaps in knowledge. This scoping review includes 10 studies in English language published between 2000-2022. Following UNICEF's conceptual framework for maternal and neonatal mortality and morbidity, studies included in this review were categorized into four themes, 1) medical care (n=3), 2) indirect causes (n=3), 3) direct causes (n=2), and 4) maternal mortality surveillance (n=2). The eligible articles for review describe the availability of maternal healthcare on the island, the etiology of maternal mortality over the past two decades, and the successes and challenges of maternal mortality surveillance in Jamaica. The articles included were primarily quantitative cross-sectional epidemiological studies (n=8) and systematic reviews (n=2). All articles were published in various peer-reviewed journals, including the *International Journal of Gynecology & Obstetrics* (n=5), the *West Indian Medical Journal* (n=2), the *Lancet eClinicalMedicine Online Journal* (n=1), the *Biomedical Central Contraception and Reproductive Medicine Journal* (n=1) and the *Public Library of Science One Journal* (n=1).

4.2: Medical Care

Three articles included in this review discussed medical care. One article focused on evaluating the competence of health professionals that attend hospital and clinic-based births, another

focused on abortion attitudes, training, and experience among medical students in Jamaica, and a third focused on analyzing if research accelerated progress towards Millennium Development Goal 5 in Jamaica. Two of the articles included were based on quantitative research, and one was based on a systematic review.

McCaw-Binns, Campbell, and Spence (2018) found that between 1998 and 2015, approximately 90% of all pregnancy-related deaths on the island occur in hospitals. Twenty public hospitals facilitate deliveries; however, only nine provide comprehensive obstetric functions, and only eight can facilitate Caesarean-section deliveries. In the northeast and southern regions, referral hospitals offer the highest level of care, while the southeast and western regions offer referral and tertiary care (McCaw-Binns, Campbell, Spence, 2018).

As of 2003, McCaw-Binns (2008) documented that the women residing in parishes that only had access to Type C hospitals or hospitals where deliveries are attended by midwives and supervised by general surgeons were three times more likely to die from hemorrhage compared to those residing in parishes with obstetricians. In addition, it was found that the employment of more obstetricians in the northeast region resulted in a decline in mortality in that region (McCaw-Binns, 2008). It was previously found by McCaw-Binns (2008) that women residing in the western region of Jamaica were found to experience a lower risk of mortality. However, McCaw-Binns, Campbell, and Spence (2018) more recently discovered that there was an upward shift in the risk of maternal mortality among women residing in the western region since 2003.

Harvey et al. (2004) conducted a study that evaluated the competence of doctors, including residents and attendings, and certified midwives that attend hospital and clinic-based births in Benin, Ecuador, Jamaica, and Rwanda. This study evaluated knowledge with a written test and practical skills by performing procedures on anatomical models. It was found that doctors scored

higher than midwives regarding uncomplicated labor and delivery, postpartum hemorrhage, pregnancy-induced hypertension, and sepsis management. However, the study did not find significant differences regarding immediate newborn care or active management of third-stage labor (Harvey, et al., 2004).

4.3: Direct Causes of Deaths

Two articles included in this review discussed direct causes of death. One article focused on the epidemiological transition in maternal mortality in Jamaica, examining the direct causes of maternal mortality. The other study was a review that focused on summarizing the changing epidemiology of maternal mortality in Jamaica. One of the articles included were based on quantitative research, and the other was based on a systematic review.

Direct maternal deaths include obstetric complications such as hypertensive disorders, obstetric hemorrhage, abortion, obstetric embolism, as well as other direct causes (McCaw-Binns, Campbell, Spence, 2018). McCaw-Binns (2008) reports that in 2003, the most prevalent attributes of direct deaths were hypertension, hemorrhage, embolism, abortion, and infection. At this point, there was a significant decline in direct deaths. Particularly, there was a 24% decrease in deaths due to hypertension and 36% fewer deaths due to hemorrhage (McCaw-Binns, 2008). It is important to note that in Jamaica, abortion is legally restricted. Thus, unsafe and illegal abortion is highly prevalent on the island (Matthews, et al., 2020). The most recent data shows that over 22,000 abortions were presumably unsafe and unregulated in Jamaica in 2011. Abortion complications ranked as the eighth leading cause of maternal mortality in Jamaica (Singh, et al., 2018). Moreover, while induced abortion is not legalized in Jamaica, access to emergency contraception and medication abortion (misoprostol) for obstetric use in 2007 has

reduced the prevalence of maternal death resulting from invasive abortion methods (McCaw-Binns, Mullings, Holder, 2015).

McCaw-Binns et al. (2007) found in 2003 that although direct deaths were on the decline, there was simultaneously a significant increase in indirect deaths. The study found that direct deaths accounted for 69% of maternal deaths in 2003, compared to 83% in 1995 (McCaw-Binns, 2007). Successful interventions have worked to reduce maternal mortality from direct deaths; however, the indirect deaths have been trending upward, leading to no improvement in the overall maternal mortality ratio (McCaw-Binns, Campbell, Spence, 2018).

4.4: Indirect Causes of Deaths

Three articles included in this review discussed indirect causes of death. One article focused on maternal mortality among women with Sickle Cell Disease (SCD) in Jamaica, another focused on the excess risk of maternal death from SCD, and a third focused on the evolving contribution of non-communicable diseases (NCD) to maternal mortality. All three articles included were based on quantitative research.

Indirect maternal deaths include medical complications such as Human Immunodeficiency Virus, Acquired Immunodeficiency Syndrome (HIV/AIDS), respiratory infections, hepatitis, as well as any other infections and NCDs such as cardiovascular disease, immunologic disease, and other NCD (McCaw-Binns, Campbell, Spence, 2018). McCaw-Binns et al. (2007) found that in 2003 there was a 72% increase in indirect deaths from 1995. This increase was attributed to the introduction of HIV/AIDS into the Jamaican antenatal population (McCaw-Binns, 2007). More recently, as documented by McCaw-Binns, Campbell, and Spence (2018), one in four indirect deaths was attributed to non-obstetric infections, and of these, 61% were attributed to

HIV/AIDS. HIV is most prevalent in the western region and is associated with 19% of maternal deaths compared to 7% for Jamaica overall (McCaw-Binns, Campbell, Spence, 2018).

McCaw-Binns, Campbell, and Spence (2018) found that three in four indirect deaths were attributed to NCD. A third of the NCD maternal deaths were due to cardiovascular conditions, particularly rheumatic heart disease and cerebrovascular issues. Cardiovascular conditions were documented to be one of the most prevalent and increasingly significant components of NCD deaths among women in Jamaica (McCaw-Binns, Campbell, Spence, 2018). Hematological and immunological conditions are another significant cause of NCD maternal deaths. These primarily include Sickle Cell Disease (SCD) and Systematic Lupus Erythematosus (SLE) (McCaw-Binns, Campbell, Spence, 2018).

SCD affects 2.8% of pregnant Jamaican women (McCaw-Binns, et al., 2022). Approximately 10% of the population carries the gene that carries SCD, making it a widespread genetic disorder in Jamaica (Asnani, et al., 2011). It was found that between 1998−2007 the maternal mortality ratio of women with SCD was 7-11 times higher compared to women without SCD (McCaw-Binns, et al., 2022). SCD has been documented as a consistent cause of maternal mortality in Jamaica over the past two decades (Asnani, et al., 2011).

Maternal mortality rates resulting from SCD have remained consistent and have not varied significantly since 1998 (McCaw-Binns, Campbell, Spence, 2018). However, the number of direct deaths has been increasing for women with SCD (McCaw-Binns, et al., 2022). In addition, the prevalence of overweight and obesity among Jamaican women with SCD is also increasing, requiring close surveillance of potential effects on pregnancy-related morbidity and mortality (McCaw-Binns, et al., 2022).

4.5: Jamaica Maternal Mortality Surveillance

Two articles included in this review discussed maternal mortality surveillance in Jamaica. One article focused on factors associated with under-reporting of maternal deaths and the other focused on identifying why vital registration under-reports maternal deaths in Jamaica a cross-sectional study. Both articles were based on quantitative research.

Jamaica's vital registration system was established in 1877, and the country has been monitoring maternal mortality for over 30 years (McCaw-Binns, Lindo, Lewis-Bell, et al., 2008). While Jamaica's birth registration has been found to be relatively complete, McCaw-Binns, Mullings, and Holder (2015) suggest that the under-reporting of deaths is a significant issue for the country. For example, while approximately 95% of Jamaican women deliver in hospital facilities, data suggests that 70% of maternal deaths are missed and not included in the vital registration system (McCaw-Binns, Mullings, Holder, 2015).

The under-reporting of maternal deaths by the vital registration system contributed to the MOH's establishment of the Jamaica Maternal Mortality Surveillance System (JMMS) in 1998 (McCaw-Binns, Campbell, Spence, 2018). At this point, maternal deaths became a Class 1 notifiable event, and continuous surveillance was implemented (McCaw-Binns, Lindo, Lewis-Bell, et al., 2008). Through JMSS, auditing took place, which then provided guidelines to improve the country's overall quality of obstetric care. This increased awareness of the issues surrounding maternal mortality and identified areas that required improvement and interventions while addressing deficiencies systematically (McCaw-Binns, Lindo, Lewis-Bell, et al., 2008). It is documented that Jamaican maternal health staff welcomed the JMMS and responded positively to the subsequent policy changes (McCaw-Binns, Lindo, Lewis-Bell, et al., 2008).

An evaluation conducted by Asnani et al. (2011) in 2004 suggests that after the implementation of JMMS, a greater number of cases were accurately reported. However, even with this success,

there were still discrepancies in reporting. They found that first trimester deaths and late maternal deaths, particularly those occurring on non-obstetric wards and in Emergency Departments, were more likely to be misreported (Asnani, et al., 2011). To remedy misreporting, this information was used to further improve the JMMS by explicitly including the reporting of late maternal deaths and instituting surveillance in non-obstetric wards of public and private health facilities (Asnani, et al., 2011). Coding maternal death is a specialized skill. McCaw-Binns, Mullings, and Holder (2015) suggest that there is a need for quality control personnel to review all deaths among women of reproductive age for potential misclassification by utilizing probabilistic matching methods.

Chapter 5: Discussion

The principal findings of this scoping review, strengths and limitations, public health implications, and recommendations are discussed in this chapter. In this scoping review, the evidence from the literature focused on medical care, the direct and indirect causes, and surveillance relating to maternal mortality in Jamaica. The publication dates of the included articles ranged from 1990 to 2022 and captured various aspects pertaining to maternal mortality among women in Jamaica.

5.1: Findings

Direct Deaths

The evidence from the literature demonstrated a consistency among direct causes of maternal mortality over the past two decades. Overall, hypertensive disorders, obstetric hemorrhage, abortion, and obstetric embolism remain the primary direct causes of death for women in Jamaica. It is important to note that some causes of direct deaths are more likely to occur outside of the hospital, such as ectopic pregnancy, complications of abortion, and violence are more

likely to be underreported (McCaw-Binns & Lewis-Bell, 2009). Additionally, there is a large gap in data around sensitive causes of maternal death, namely violence from an intimate partner and unsafe abortion.

Due to underreporting, there is a lack of literature surrounding maternal mortality from violence although this is a prevalent issue on the island. The 2016 Jamaican Women's Health Survey found that one in four women have experienced physical violence by a male partner (Williams, 2018). It was found that approximately 5% of women experienced physical violence while pregnant and for 86% of these women, the perpetrator was the father of the child (Williams, 2018). For more than 20% of women who experienced intimate partner violence during their pregnancy, the harm involved kicking or punching in the abdomen (Williams, 2018). While intimate partner violence is a very prevalent issue for many Jamaican women during pregnancy, it is regularly underreported as a cause of maternal death. A study conducted in the U.S. Virgin Islands (USVI) identified a need for additional research to investigate variations in resource utilization by abused women in the USVI and other Caribbean islands. The researchers also recognized that there is a need for more studies that examine political and cultural differences within the contexts of different Caribbean islands and how this affects community response and the needs of women who have experienced intimate partner violence (Lucea et al., 2013).

Moreover, illegal and unsafe abortions are prevalent cause of direct maternal deaths in Jamaica. Studies have shown that 72% of practicing Jamaican physicians reported that they did not have adequate training in abortion care (Matthews, et al., 2020). While the training is not available, Jamaican General Practitioners and Obstetrician-Gynecologists report that there should be more availability of induced abortions to reduce maternal mortality from unsafe abortion (Matthews, et al., 2020). A study conducted to understand Jamaican medical students' attitudes and training

towards abortion discovered that students felt Jamaican women should have legal access to abortion and that there is a need for changes in the existing anti-abortion laws (Matthews, et al., 2020). Many of the students in the study reported that they consider themselves to be women's health advocates with the potential to implement effective women's health policies and evidence-based care practices for women in Jamaica (Matthews, et al., 2020). Accurate reports on the prevalence of abortion, the conditions under which it occurs, and the experiences women have in obtaining abortions are essential to addressing unsafe abortion globally. However, given that abortion is often controversial and stigmatized, it is difficult to obtain accurate and reliable reports on attitudes and practices (Gipson et al., 2011). To improve the understanding and measurement of abortion, abortion researchers must work to establish local partnerships, increase knowledge of local culture, and integrate innovative methodologies and approaches that may facilitate better reporting (Gipson et al., 2011).

Indirect Deaths

Notably, while direct deaths have declined, there has been an obstetric shift from maternal deaths due to direct causes to an increase in indirect deaths (McCaw-Binns, 2007). Specifically, NCDs are now one of the primary indirect causes of maternal mortality among Jamaican women (McCaw-Binns, Campbell, Spence, 2018). Considering this obstetric shift there is also a need for Jamaica to make a shift in its maternal mortality interventions. There is a need to better manage indirect deaths, while continuing the existing focus on the reduction of direct deaths (McCaw-Binns, et al., 2022). In Jamaica, approximately four out of every five individuals die from an NCD-related causes, with 31% of NCD deaths occurring before the age of 70 (Hutchinson et al., 2019). In 2012, Jamaica put approximately 15% of its health budget towards four prevalent

NCDs: cardiovascular diseases, diabetes, cancer, and pulmonary diseases (Hutchinson et al., 2019).

It has been found that 63% of women in Jamaica between the ages of 15 - 49 are obese. Among this population of women, approximately 6% are diabetic, 19% have a hypertensive disorder and 3% are both diabetic and hypertensive (Kanguru et al., 2017). The study also found that one in every ten women who died during or after childbirth were found to have been overweight, with the majority also having developed complications such as hypertension, cardiovascular disorders, and diabetes (Kanguru et al., 2017). Kanguru et al. also noted that although there is evidence that clearly demonstrates that obese women face greater health risks, it was observed that during the fieldwork for the study that medical providers and the community members did not view obesity as an issue. Thus, weight was found to be often overlooked and not reported as a contributing cause of death (Kanguru et al., 2017).

The MOH is working towards shifting the framing of NCDs away from being a personal responsibility or a byproduct of culture through health promotion efforts. These efforts focus on fostering environments and contexts that promote health education and accessible healthy choices (Hutchinson et al., 2019). There is an emphasis on understanding that NCD burdens are rooted in social inequities and worsened by other societal factors (Hutchinson et al., 2019).

Maternal Mortality Surveillance

The evidence from the literature has found that Jamaica has established an adequate national maternal mortality surveillance system (the JMMS). However, the evidence suggests that while there have been improvements, there are consistent findings of under-reporting and misreporting maternal mortality within the JMMS. In addition, it has been documented that the JMMS lacks critical contextual information like BMI, education, and socioeconomic status (Asnani, et al.,

2011). Therefore, further research is needed to develop a reliable social risk indicator demonstrating how various social risk factors relate to maternal mortality (McCaw-Binns, Mullings, Holder, 2015). For example, socioeconomic status reflects a person's position in a socially stratified society, illustrating their access to resources (National Academies of Sciences et al., 2017). Education is another essential factor for health because it shapes future employment and economic resources and can therefore affect health indirectly through other indicators of socioeconomic status—employment, occupation, and income. Education can also affect health by enabling individuals to access and comprehend health information and health care, allowing them to make decisions that promote health and reduce health risks. Overall, education contributes to an individual's ability to advocate for themselves in a health care setting (National Academies of Sciences et al., 2017).

Maternal mortality surveillance and response is essential to understanding the causes of maternal deaths, who is being affected, and how to prevent future deaths. The United Nations Population Fund (UNFPA) has observed that several countries in the LAC region have shown progress in the implementation of maternal mortality surveillance systems (*Overview of the Situation of Maternal Morbidity and Mortality*, 2017). Countries in the LAC region should decentralize the evaluation and analysis of maternal mortality data in sub-national and local contexts to help identify local determinants and propose solutions specific to the population (*Overview of the Situation of Maternal Morbidity and Mortality*, 2017). For example, Colombia has launched a web-based surveillance system that is linked with the countries vital records registration system. This web tool presents health and maternal care indicators and is disaggregated nationally and regionally and prioritized at the municipal level (*Maternal Health for All*, 2021). This tool aims

to promote maternal health by addressing social determinants and improving equity in Colombia to accelerate progress toward reducing maternal mortality (*Maternal Health for All*, 2021).

5.2: Strengths

A major strength of this review is that, to date, this is the first scoping review that focuses on mapping the landscape of maternal mortality research in Jamaica. This scoping review is current and presents relevant findings over the past two decades, including wide-reaching studies encompassing various aspects of maternal mortality research in Jamaica. In addition, this review identifies gaps in the existing literature that are crucial to better understanding all aspects of maternal mortality in the Jamaican context.

5.3: Limitations

This scoping review is not free from limitations. A major limitation pertains to the scope of this review. Given the broad scope and considering the feasibility of the review in terms of the manageability of the data, this review focused on research related to maternal mortality in Jamaica since 2000. During the search process, it was discovered that a large number of studies in this area were conducted prior to the year 2000, which were not included in this review. There is a limited number of studies in this area. There may also be studies that are not available for online access that were not found in the search effort.

It is important to note that most of the literature included in this review has come from one author. Additionally, majority of the existing research is quantitative epidemiological studies that characterize maternal mortality in Jamaica at a population level. While this type of research is incredibly important to understanding maternal mortality, other study types are not being thoroughly represented, thus, there are gaps in what is known about maternal mortality in Jamaica. The research has primarily been cross-sectional epidemiological research, and there is a

need for more longitudinal studies, qualitative studies, health-services, and community engaged studies that align with UNICEF's conceptual framework for maternal and neonatal mortality and morbidity illustrating how health outcomes are determined by interrelated factors (UNICEF, 2008).

Furthermore, another limitation is that there was not enough evidence in the found literature to describe the diverse sociodemographic context of women living in Jamaica. The country is extremely diverse, with several different ethnicities and cultural practices throughout the island. Therefore, it is extremely important to encourage diverse sampling within future studies to contextualize the sociodemographic impacts on maternal mortality, and the disproportionate impacts maternal mortality may have on vulnerable groups on the island.

Given these limitations, future research should further explore maternal mortality within the context of Jamaica's various sociodemographic and sociocultural practices not currently reported in the literature. A clear gap exists in the literature regarding existential sociodemographic and sociocultural practices. Additionally, these diverse population groups should be coupled with varied study designs to interrogate how maternal mortality risks are associated with interrelated social and identity factors.

5.4: Public Health Implications

There are implications for policy makers, public health researchers, healthcare professionals, and government and non-governmental organizations. The findings of this scoping review point to some of the challenges that Jamaica is facing to reduce its maternal mortality rate. First, indirect maternal deaths account for most maternal deaths yet the interventions designed to reduce maternal mortality primarily concentrate on obstetric complications and prenatal and postpartum care. Less attention is paid to the indirect causes of maternal mortality and fewer interventions

target indirect issues. Current trends point to the need to address the complex indirect causes of maternal mortality and all the underlying risk factors that impact the development of NCDs. Reducing indirect deaths requires better data documentation systems, appropriate patient education on health signs and symptoms, and support for evidence-based and culturally appropriate interventions (Barnes, Ramanarayanan, Amin, 2020). Jamaican public health professionals should continue to advocate for the implementation of interventions that tackle NCDs holistically.

Dr. Jacquiline Bisasor-McKenzie, Jamaica's Chief Medical Officer, stated that "Jamaica is committed to re-orienting, re-strategizing, prioritizing and implementing impactful evidence-based interventions tailored to the local context and strengthening surveillance monitoring and research through the development and adoption of digital solutions" (Ministry of Health & Wellness, Jamaica, 2022). Particularly, the MOH plans to revamp the island's '*Jamaica Moves Programme*.' This program includes initiatives in communities, schools and workplaces that promote physical activity as well as healthy eating and lifestyle (Ministry of Health & Wellness, Jamaica, 2022). The Jamaica Moves Programme employs a settings approach that aims to increase primary and secondary NCD prevention in different environments- where people are born, live, grow, work and age (Ministry of Health & Wellness, Jamaica, 2022).

Moreover, factors associated with heightened maternal mortality from unsafe abortion in countries in the LAC region include inadequate access to contraception, restrictive abortion laws, stigmatizing cultural and religious attitudes towards abortion, and inadequate health infrastructures for managing abortion complications and surveillance (Okonofua, 2006). Therefore, enforcing a multifaceted public health approach is necessary to reduce mortality associated with unsafe abortion. This approach includes promoting increased access and use of

contraception, liberalization of abortion laws, and developing programs to increase access to safe abortion care in Jamaica (Okonofua, 2006). In addition, institutionalizing post-abortion care for incomplete abortion is also necessary (Okonofua, 2006).

The widespread nature of intimate partner violence in Jamaica also requires a multifaceted approach. Intimate partner violence affects women's physical and mental health directly and indirectly. Direct pathways, such as injury, and indirect pathways, such as a prolonged stress leading to chronic health issues, influence a woman's quality of life and can potentially increase the chance of mortality (Dutton et al., 2015). Violence has been found to contribute to poor health outcomes, including an increased risk of spontaneous abortion and fetal loss due to physical trauma to the mother (Alhusen et al., 2015). Physical trauma is a significant predictor of mortality in women and is a leading cause of death in pregnancy (Alhusen et al., 2015). Additionally, the impact of abuse can persist long after the violence has stopped. Therefore, successfully addressing the complicated issue of intimate partner violence requires multifaceted prevention approaches that target specific factors across individual, interpersonal, institutional, community, and societal levels (Dutton et al., 2015).

Furthermore, a more accurate surveillance system can better support Jamaica’s efforts to determine the cause of death to further influence decision makers, funders, and other stakeholders toward evidence-based interventions. More accurate data from the JMMS can provide valuable information to identify opportunities to improve the quality of clinical obstetric care, care that takes place outside of healthcare facilities and other external factors that influence maternal health. Policy makers must have a thorough understanding of the overall scope of maternal mortality in Jamaica before developing policies that may contribute to maternal mortality. With this information, decision-makers can better allocate resources to build health

system capacity more strategically. The increased awareness of policy makers about the state of maternal mortality may also be beneficial when evaluating existing strategies and policies.

5.5: Recommendations

The results from this scoping review make it evident that there is much work to be done towards reducing maternal mortality in Jamaica. Thus, the following recommendations consider the evidence that was gathered from the findings of this scoping review. These recommendations underscore how the understanding of the current state of maternal mortality in Jamaica is impacted by the lack of diversity in the literature and the need for improvement within the current surveillance system.

The lack of diversity in the maternal mortality literature impacts the understanding of the full scope of the issue in Jamaica. Much of the literature comes from one source and follows one style of research- quantitative epidemiological studies that characterize maternal mortality at the population level. Other study types are not adequately being represented, contributing to gaps in contextualizing maternal mortality in Jamaica. Though the existing research is important, there is also a need for more longitudinal studies, qualitative studies, health-services and community-engaged studies to allow for better understanding and, thus, better interventions.

There is also a need to strengthen Jamaica's maternal mortality surveillance system. It has been found that the existing surveillance system, the JMMS, has a history of consistently under-reporting and misreporting cases of maternal mortality. Without proper surveillance, it is difficult to accurately understand the risk factors and causes of pregnancy-related and maternal deaths that occur on the island. Systematic analyses of overall mortality trends and the events and factors that lead to individual deaths can identify barriers to health systems and inspire local solutions to prevent future maternal deaths (World Health Organization, 2021). The JMMS

currently also lacks important contextual information like BMI, education, and socioeconomic status (Asnani, et al., 2011). Therefore, there is a need for further research and work to develop a reliable social risk indicator that encompasses this information (McCaw-Binns, Mullings, Holder, 2015). Information on deaths should be documented and coded using consistent criteria and definitions throughout the entire island. Key indicators should be collected, including maternal health information and sociodemographic information. Moreover, Jamaica must also decentralize the evaluation and analysis of maternal mortality data in sub-national and local contexts to help identify local determinants and propose solutions specific to the different communities and sub-populations (Overview of the Situation of Maternal Morbidity and Mortality, 2017).

Chapter 6: Conclusion

In Jamaica, maternal mortality is a major public health concern. Several epidemiological research studies exist on etiology, direct and indirect causes, of maternal mortality. Yet, minimal progress has been made in reducing the maternal mortality rate over the past two decades. Considering the obstetric and demographic shift that Jamaica is experiencing, an in-depth understanding of non-medical factors that contribute to the delay in reducing maternal mortality is needed. This scoping review focused on medical care, direct and indirect causes, and surveillance of maternal mortality over the last two decades and identified any existing gaps in knowledge. Using the JBI methodological framework for scoping reviews (as discussed in Chapter 3), this scoping review aimed to provide a snapshot of the state of maternal mortality in Jamaica to demonstrate the gaps in the existing literature and the need for future studies and interventions following UNICEF's conceptual framework for maternal and neonatal mortality and morbidity.

The literature searches completed in this scoping review were comprehensive and wide-reaching. This scoping review includes 10 studies in the final review. Following UNICEF's conceptual framework for maternal and neonatal mortality and morbidity, studies were categorized into four themes, 1) medical care (n=3), 2) indirect causes (n=3), 3) direct causes (n=2), and 4) maternal mortality surveillance (n=2). The eligible articles described the availability of maternal healthcare on the island, the etiology of maternal mortality over the past two decades, and the successes and challenges of maternal mortality surveillance. Findings from this scoping review will contribute to the public health body of evidence and provide insight on gaps in the literature that, if filled, can potentially contribute to the overall goal of reducing maternal mortality in Jamaica. To date, this is the first scoping review study on maternal mortality that focused on mapping the landscape of maternal mortality research in Jamaica.

This scoping review contributes to the knowledge base for future research and the growing body of evidence on factors impacting maternal mortality in Jamaica. Hypertensive disorders, obstetric hemorrhage, abortion, and obstetric embolism remain the primary direct causes of death for women in Jamaica. While intimate partner violence is a very prevalent issue for many women during pregnancy, it is regularly underreported as a cause of maternal death and not adequately explored in the literature. Illegal and unsafe abortions are another prevalent cause of direct maternal deaths, although it has been found that many Jamaican healthcare providers report that there should be more availability of induced abortions to reduce maternal mortality from unsafe abortion (Matthews, et al., 2020). Although direct deaths have been declining, there has been a significant increase in indirect deaths. Specifically, NCDs are now one of the primary indirect causes of maternal mortality among Jamaican women (McCaw-Binns, Campbell, Spence, 2018). Additionally, the evidence from the literature has demonstrated that while Jamaica has

established an adequate national maternal mortality surveillance system, there are consistent findings of under-reporting and misreporting maternal mortality within the JMMS.

There are implications for policy makers, public health researchers, healthcare professionals, and government and non-governmental organizations. Policy makers must have a thorough understanding of the state of maternal mortality in Jamaica before developing policies that may contribute to maternal mortality. The increased awareness of policy makers about the state of maternal mortality may also be beneficial when evaluating existing strategies and policies. Access to care is a major contributor to maternal mortality; therefore, it is essential for the federal government to increase access to comprehensive obstetric care throughout the island, particularly in the southeast and western regions where only tertiary care is offered (McCaw-Binns, Campbell, Spence, 2018).

The understanding of the state of maternal mortality in Jamaica is also impacted by the lack of diversity in the literature and the need for improvement within the current surveillance system. Thus, there is a need for more diversity in the research study types to allow for better understanding and better policy changes and interventions. There is also a need to strengthen Jamaica's maternal mortality surveillance system. To combat misreporting, all data should be documented and coded using consistent criteria and definitions throughout the island. Universal indicators should also be collected, including maternal health information and sociodemographic information.

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Appendix

Table 1: Review of Eligible Studies

Author(s), year	Title	Aim of study	Study Type	Population description	Study outcome
Indirect Deaths					
M. Asnani, A. McCaw-Binns, M. Reid, 2011	Excess Risk of Maternal Death from Sickle Cell Disease in Jamaica: 1998-2007	Decreases in direct maternal deaths in Jamaica have been negated by increasing indirect deaths. Sickle cell disease (SCD) is a consistent underlying cause. This study aims to describe the epidemiology of maternal deaths in the population of women with SCD in Jamaica. This study also aims to determine the immediate and underlying causes of death among women with and without SCD. It aims to show whether the causes have changed over two 5-year periods of observation.	Quantitative study	A secondary analysis of the JMMS database	Women with SCD experience an excess risk of dying in pregnancy and childbirth. Universal SCD screening during pregnancy in populations of African and Mediterranean descent is needed as are guidelines for managing SCD pregnancies and educating families with SCD.

		The study also aims to identify access to health service factors that may be associated with the risk of dying			
A. McCaw-Binns, L. Campbell, S. Spence, 2018	The evolving contribution of non-communicable diseases (NCDs) to maternal mortality in Jamaica, 1998-2015: a population-based study	Describe trends in indirect cause-specific pregnancy-related mortality from 1998-2015 through secondary analysis of annual, national cross-sectional database of maternal and late maternal deaths, identified through active surveillance of deaths among women 10-50 years of age.	Quantitative study	A secondary analysis of the JMMS database	Over 18 years, 31% of indirect but 11% of direct deaths occurred more than six-weeks after parturition. Health service utilization was compared among women who died from NCDs, non-obstetric infections, and direct complications. There were no variations in median age, parity, antenatal visits, or antenatal admission rates.

A.McCaw-Binns, L. Campbell, A. Harris, L. James, M. Asnani, 2022	Maternal mortality among women with sickle cell disease in Jamaica over two decades (1998-2017)	Describe the socio-demographic and obstetric experience of SCD women experiencing maternal death compared to non-SCD women who also died. Determine the immediate and underlying causes of death (COD) and whether these have changed among these two groups of women over the decades 1998-2007 and 2008-2017. Identify whether access to health service factors may be associated with the risk of dying.	Quantitative study	A secondary analysis of the JMMS database	Pregnancy outcomes have not improved for Jamaican women over two decades regardless of sickle cell status, with direct deaths trending upward for women with SCD. Women who died from SCD in Jamaica were more likely to be admitted antepartum than women in the previous decade. Compared to women without SCD, they were at higher risk of death from direct causes such as preeclampsia/eclampsia and obstetric embolism and both obstetric and non-obstetric infections, despite access to high-risk clinics, delivery in referral hospitals, and greater access to ICU/HDU care.
Direct Deaths					

A. McCaw-Binnsa, S.F. Alexander, J.L.M.Lindo, C. Escoffery, K. Spence, K. Lewis-Bell, G. Lewis, 2007	Epidemiologic transition in maternal mortality and morbidity: new challenges for Jamaica	1. Determine the maternal mortality ratio for Jamaica and the 4 health regions for 1998-2000 and 2001-2003. 2. Determine and compare cause specific mortality ratios with previous studies. 3. Identify areas for further intervention and training of healthcare providers to reduce the incidence of maternal deaths.	Quantitative study	Births in public hospitals across the island	The 72% increase in indirect deaths (from 16.7 to 29.0/100,000) is primarily due to the introduction of HIV/AIDS into the antenatal population, from zero before 1995 to 7.8/100,000 in 2001-2003. Complications in pregnant or recently delivered women not aggravated by pregnancy (co-incidental deaths), and late maternal deaths are monitored for completeness. Of special interest are accidents, violence and suicide, and a growing number of cases of non-hormone-dependent cancers.
Small Victories, New Challenges Two Decades of Maternal Mortality Surveillance in Jamaica, 2009	A. McCaw-Binns, K. Lewis-Bell	This review summarizes the changing epidemiology of maternal mortality and the new challenges as Jamaica seeks to contribute to MDG5 to reduce maternal mortality by 75% worldwide by 2015.	Systematic review	Published work and data covering the period of 1981-2003	Jamaica's vital registration underestimates maternal mortality by 76%. Deaths were less reported in the western and southern regions of the island. Jamaica has demonstrated its ability to establish a maternal mortality system, however, there is a need for the development/revision of clinical guidelines for reporting complications.
Medical care					

S.A. Harvey, P. Ayabaca, M. Bucagu, S. Djibrina, W.N. Edson, S. Gbangbade, A. McCaw-Binns, B.R. Burkhalter, 2004	Skilled birth attendant competence: an initial assessment in four countries, and implications for the safe motherhood movement	To evaluate the competence of health professionals that attend hospital and clinic-based births in Benin, Ecuador, Jamaica, and Rwanda.	Quantitative study	Healthcare workers responsible for health facility-based births	Some participants completed the knowledge test in 90 min as anticipated, while others took up to 4hrs. The mean overall knowledge score was 55.8%. Doctors outscored midwives by 7.7%. Doctors scored 7.2% better on uncomplicated labor and delivery, 9.6% better on postpartum hemorrhage, 16.4% better on pregnancy-induced hypertension, and 14.7% better on sepsis.
A. McCaw-Binns, 2008	Can Research Accelerate Progress Toward Millennium Development Goal 5 (Maternal Health) in Jamaica?	To consider how Jamaica could team with the wider society to accelerate toward developed nation status using their maternal mortality prevention model, provide an accurate estimate of the burden of disease, and identify evidence-based practices to improve outcomes.	Systematic review	Published work	By 2003, total mortality was trending down, with the improvement in direct deaths highly significant but negated by rising indirect deaths. Indirect deaths increased mainly due to AIDS, which moved from zero cases in 1995 to become the fourth-ranked cause of maternal death. Heart disease, sickle cell disease, and diabetes are the other major problems.

G. Matthews, J. Atrio, H. Fletcher, N. Medley, L. Walker, N. Benfield, 2020	Abortion attitudes, training, and experience among medical students in Jamaica, West Indies	To define abortion attitudes, training, and experience among medical students in Jamaica, a restricted environment for legal abortion.	Quantitative study	Anonymous online cross-sectional survey of medical students	Most participants reported limited training or exposure to abortion care. Most respondents (N = 1113, 80%) agree that they would be willing to advocate for women's health. 41% stated they would be willing to advocate for abortion access and care in Jamaica.
Surveillance					
A. McCaw-Binns, J.L.M. Lindo, K.N. Lewis-Bell, D.E.C. Ashley, 2008	Maternal mortality surveillance in Jamaica	To assess factors associated with under-reporting of maternal deaths from 1998, when maternal deaths became a Class I notifiable event in Jamaica and continuous maternal mortality surveillance was introduced, through 2003.	Quantitative study	The deaths of all women between 15 and 49 years of age	Late direct and indirect deaths in hospitals also increased from 4% (n=6), to 6%(n=9), to 8% (n=14). Since surveillance began, there was a decline in total hospital mortality, from 115 to 95 per 100,000 live births, but a significant reduction in direct mortality, from 99 to 66 per 100,000 live births. This reduction was due to fewer cases of gestational hypertension, hemorrhage, and puerperal infection. Accounting for 31% of all maternal deaths, owing to the introduction of HIV/AIDS, and increasing obesity among the population with associated hypertension, cardiac disease, and gestational diabetes.

A. McCaw-Binns, J. Mullings, Y. Holder, 2015	Vital registration and under-reporting of maternal mortality in Jamaica	To identify why vital registration under-reports maternal deaths in Jamaica a cross-sectional study was conducted to identify all maternal deaths (during pregnancy or â‰¤ 42 days after pregnancy ended) occurring in 2008.	Quantitative study	Electronic records of all deaths from vital registration records, police reports, and Ministry of Health records.	The analysis demonstrated how under-reporting of maternal deaths occurs in Jamaica. Under-reporting of maternal deaths in Jamaica in 2008 was attributable to decreasing order of misclassification, nonregistration, and certification errors. There is a need for how maternal deaths are counted and classified by the vital registration system to change.