

Maternal Mortality in Jamaica: A Quantitative Analysis using time-series data, 2002-2021

*Mortalidad materna en Jamaica:
Un análisis cuantitativo con datos de series temporales, 2002-2021*

Paul Andrew Bourne¹ , Chardonnay Forbes², Kacia Hayles², Keshanna Young²,
Sasha- Lee Bailey², Shenique Walch², James Fallah³, Calvin Campbell⁴,
Clifton Foster⁵, Caroline McLean², Tabitha Muchee⁶, Barbara Biira⁷

1. Department of Institutional Research, Northern Caribbean University, Mandeville, Manchester, Jamaica, WI

2. Department of Nursing, Northern Caribbean University, Mandeville, Manchester, Jamaica, WI

3. Department of Dental Hygiene, Northern Caribbean University, Mandeville, Manchester, Jamaica, WI

4. Department of Mathematics and Engineering, Northern Caribbean University, Mandeville, Manchester, Jamaica, WI

5. Department of Biology, Chemistry, and Environmental Sciences, Northern Caribbean University, Mandeville, Manchester, Jamaica, WI

6. Department of Nutrition and Dietetics, Northern Caribbean University, Mandeville, Manchester, Jamaica, WI

7. Department of Psychology, Northern Caribbean University, Mandeville, Manchester, Jamaica, WI

Corresponding author

Paul Andrew Bourne

E-mail: Paulbourne1@gmail.com

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Abstract

Introduction: Maternal Mortality Ratio (MMR) in Jamaica continues to be unavoidable in some cases. The pregnancy journey can be as unpredictable as the body undergoes many changes. The increase in maternal deaths can result from poor lifestyle choices and health service inequities. The Ministry of Health can implement mandatory antenatal care and encourage lifestyle programs to decrease maternal deaths in each community. This study assesses Jamaica's maternal mortality rate trend from 2000 to 2019.

Objectives: 1) To explore the trend of maternal ratio and 2) To determine the causes of maternal mortality. To establish some preventative measures for maternal mortality ratio.

Methods and material: Descriptive statistics, changes in percentages, and graphs were used to examine the incidence of maternal mortality ratio. Data collected from The World Health Organization and Statistical Institute of Jamaica was stored, retrieved, and analyzed using the Statistical Packages for the Social Sciences (SPSS) version 28.0 and Microsoft Excel.

Findings: The findings annually have been varied. However, a significant improvement since the year 2000. These findings show that the most annual change since 2000 was 53.05%, and the most minor was -25.03%.

Conclusion: The significant changes in maternal mortality since 2000 show that better health management and extra precautions can decrease maternal mortality annually.

Key words: Maternal, mortality, health, preeclampsia, preterm labor, depression, anxiety, eclampsia, hemorrhage.

Resumen

Introducción: La tasa de mortalidad materna (TMM) en Jamaica sigue siendo inevitable en algunos casos. Durante el embarazo el cuerpo experimenta muchos cambios. El aumento de las muertes maternas puede ser consecuencia de las malas elecciones de estilo de vida y de las desigualdades en los servicios sanitarios. El Ministerio de Sanidad puede implantar la atención prenatal obligatoria y fomentar programas de estilo de vida para disminuir las muertes maternas en cada comunidad. Este estudio evalúa la tendencia de la tasa de mortalidad materna en Jamaica desde 2000 hasta 2019.

Objetivos: 1) Explorar la tendencia de la tasa materna y 2) Determinar las causas de la mortalidad materna. Establecer algunas medidas preventivas para la tasa de mortalidad materna.

Material y métodos: Se utilizaron estadísticas descriptivas, cambios en los porcentajes y gráficos para examinar la incidencia de la tasa de mortalidad materna. Los datos recogidos de la Organización Mundial de la Salud y el Instituto de Estadística de Jamaica fueron almacenados, recuperados y analizados utilizando el Statistical Packages for the Social Sciences (SPSS) versión 28.0 y Microsoft Excel.

Resultados: Los hallazgos anuales han sido variados. Sin embargo, se observa una mejora significativa desde el año 2000. Estos hallazgos muestran que la mayor variación anual desde el año 2000 fue del 53,05%, y la menor del -25,03%.

Conclusión: Los cambios significativos en la mortalidad materna desde el año 2000 muestran que un mejor manejo de la salud y precauciones adicionales pueden disminuir la mortalidad materna anualmente.

Palabras clave: Maternidad, mortalidad, salud, preeclampsia, parto prematuro, depresión, ansiedad, eclampsia, hemorragia.

Introduction

The maternal mortality ratio represents the number of women who die from pregnancy-related causes per 100,000 live births. Jamaica's maternal mortality rate of 10.8 per 10 000 live births is considerably higher than the official rate of 4.8¹. Most maternal deaths in Jamaica result from several avoidable factors: non-use of and deficiencies in antenatal care; inadequacy in ensuring the delivery in hospitals of high-risk women; and delays in taking action when signs of complications developed before, during, and after delivery. The most common causes of death in 1981-1983 were hypertensive diseases of pregnancy (26%), hemorrhages (20%), ectopic pregnancy (10%), pulmonary embolism (8%), and sepsis (8%). The largest group of avoidable factors is the non-use of any deficiencies in antenatal care; inadequacy in ensuring the delivery in hospitals of women at high risk; and delays in taking action when signs of complications initially develop, during, and after delivery¹.

Jamaica has experienced increased cases of deaths due to non-communicable diseases and non-obstetric causes^{2,3}, which is equally the same across the Caribbean⁴. Diabetes and Hypertension are known risk factors for maternal morbidity and mortality, and in these cases, obesity may be classified as an indirect cause posing risks to maternal health⁵⁻⁸. The leading causes of death were hypertensive disorders in pregnancy (19%) and hemorrhage (18%) in 2014⁹.

Women who are obese account for 60% of death related to hypertension and all deaths from cardiac disease and diabetes¹⁰⁻¹². The Maternal Health Task Force called for the following actions to be taken to address maternal mortality: i) measures to encourage women to seek antenatal care early in pregnancy; ii) improvements in antenatal monitoring; iii) the referral of high-risk women for hospital delivery; iv) the definition of standard procedures for dealing with specific complications of pregnancy (for example, eclampsia and hemorrhage; regionalization of obstetric services and criteria for referring patients to the hospital), and v) review of the provision of blood and plasma for emergency transfusions¹³.

Literature review

"To improve maternal health, we have to focus on improving all women's health and access to care; not just during labor and delivery, but before and after pregnancy, and throughout their lives"¹⁴. Over the years, maternal death has robbed our nation of exceptional women with bright futures. The factors accounting for maternal mortality are similar across the globe^{2,15}. Some of the factors accounting for maternal mortality are hemorrhages, obstructed labor, abortions, hypertensive diseases, sepsis or infections, embolism, ectopic pregnancy, and anesthesia-related

deaths¹⁵⁻¹⁹. Other contributing factors are deficiency in the necessary medical care needed during childbirth and financial limitation to access medical care.

Approximately 700 women die yearly due to complications resulting from pregnancy in the United States²⁰. Worldwide, 529,000 women die yearly from complications during pregnancy, childbirth, and postpartum¹⁵. Most of these deaths occur in developing countries, where fertility rates are very high, and a woman's risk of dying during pregnancy and childbirth is over 400 times higher compared to developed countries²¹. It is estimated that 20 million women endure lifelong disabilities such as pelvic pain, anemia, obstetric fistula, infertility and incontinence²². Some of the main leading causes of maternal death in developing countries are unsafe abortion, eclampsia, obstructed labor, anemia, HIV, poor reproductive health care, such as not having access to severe bleeding, unsafe abortion, infection, eclampsia and obstructed labour; the indirect causes include anemia, malaria, heart disease, and HIV, poor reproductive health care, including not having access to proper health care during pregnancy and after childbirth, access to safe abortion where it legal, lack of education and poor nutrition.

According to a recent CDC report, the majority of maternal mortality deaths are related to cardiovascular conditions such as heart muscle disease (cardiomyopathy) (11%), blood clots (9%), high blood pressure (8%), stroke (7%), and a category combining other cardiac conditions (15%)²⁰. Infection (13%) and severe postpartum bleeding (11%) are also leading causes. However, early identification and diagnosis of these conditions with the appropriate clinical interventions can save many lives²³.

What happens when a mother dies? According to the Ministry of Wellness and Health Jamaica, research reveals that approximately 1 million children are left motherless each year, making them 3 to 10 times more likely to die within two years of life than children who live with both parents. It is estimated that almost half of the 8 million infant deaths yearly result from poor maternal health and inadequate care during delivery¹¹.

Based on a study done in Ethiopia, research shows that when a mother dies and the infant survives issues such as nutritional problems may occur due to lack of breastfeeding or inadequate artificial feed, which often results in the infant's death or increases the risk of infection²⁴. The older children often suffer from school dropouts, disrupted education and living arrangements, and girls fall victim to early marriages, early childbearing and an increased risk of maternal death²⁵.

Several methods have been implemented to reduce maternal death. One of the most effective means of preventing maternal health is to improve health systems, especially primary health care that would ensure the

availability of skilled attendance at all levels and access to 24-hour emergency obstetric care. Family planning services could reduce maternal deaths and morbidities by preventing unwanted pregnancies. Access to safe abortion as allowed by law and post-abortion care services could reduce maternal deaths and injuries caused by unsafe abortions. Approximately 68,000 women die from unsafe abortions annually²².

Methods and materials

The current study employed time series data for 20 years (2000-2019) collected from the United Nations Children's Fund (UNICEF) and the Statistical Institute of Jamaica (STATIN). The United Nations Maternal Mortality Estimation Inter-Agency Group (MMEIG) maintains an input database consisting of maternal mortality data from civil registration, population-based surveys, surveillance systems, censuses, and other specialized studies/surveys (WHO, 2019). The maternal mortality ratio can be calculated by dividing recorded or estimated maternal deaths by total recorded or estimated live births during the same period and multiplying by 100,000. Measurement involves material on the timing of death (during pregnancy, childbirth, or within 42 days of termination of pregnancy), pregnancy status, and cause of death. Maternal mortality ratio = (Number of maternal deaths / Number of live births) X 100,000. The maternal mortality ratio can be computed directly from data gathered via household surveys such as Demographic and Health Surveys attempt to measure maternal mortality by asking respondents about the survivorship of sisters, vital registration systems, national surveys and surveillance data such as the maternal mortality surveillance database or are derived from community and hospital records.

A quantitative approach was utilized. The data was collected and analyzed using the Statistical Packages for the Social Sciences (SPSS). Descriptive statistics change in percentages, and graphs were used to examine the incidence of maternal mortality ratio.

Findings

Figure 1 displays Jamaica's Maternal Mortality rates from 2000-2019. Jamaica has been seeing an increase in Maternal Mortality Rate since 2000, with 2019 being the year with the highest maternal Mortality Rate Jamaica has seen over the two decades. **Table I** shows the percentage change in maternal mortality, with the most significant increase in 2019 of 53.05%. The year 2006 had the most significant decrease of -25.03%; however, it was not the year with the lowest maternal mortality ratio.

In **figure 2**, it can be seen that there was an increase in Maternal Mortality rates in Jamaica from 2015, a

decrease in 2017 and 2018, after which a significant increase of 53.05% per cent in 2019.

Figure 3 displays the Frequency of the maternal death rates occurring in Jamaica between 2000-2019. The first Bar shows the number of deaths between 70 and 80 per 100,000 lives in the years 2001, 2003, 2006, 2007, 2008, 2009 and 2010. It further depicts that for four years, maternal mortalities occurred between 80 and 90 in 2004, 2005, 2013 and 2015. While for three years' maternal death was between 90 and 100 in the years 2011 2017 and 2018. It continues to show that for 2013, 2014, 2016, and 2019, the maternal deaths per 100 live births were over 100. The tale of the distribution indicates that the distribution is positively skewed, causing the mean to be greater than the median.

Figure 1: The Maternal Mortality Rate from 2000-2019.

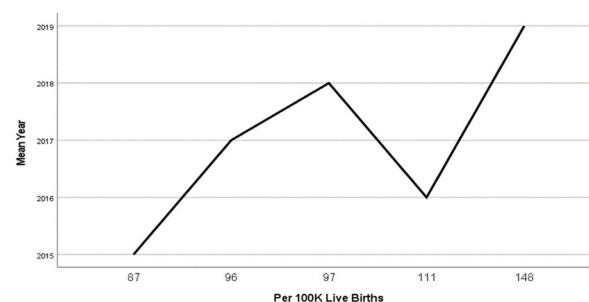


Figure 2: The Maternal Mortality Rate in Jamaica from 2015-2019.

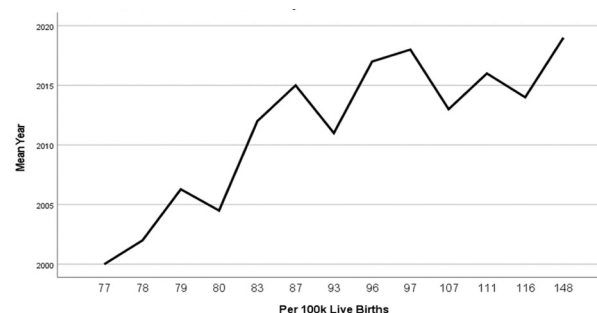


Figure 3: Frequency of Maternal Death Rates Occurring from 2000-2019.

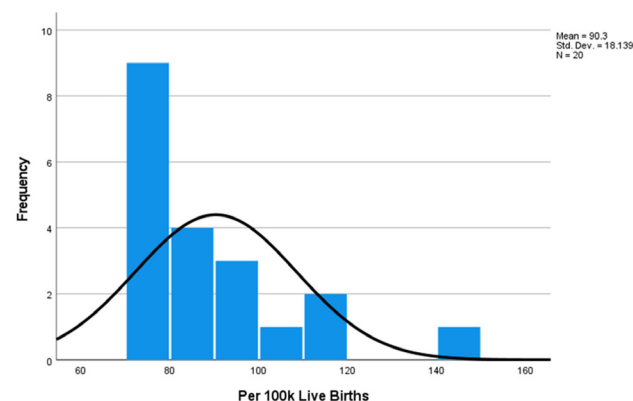


Table I below shows the maternal mortality ratio and the annual percentage change for 2000-2019. 2019 had the highest percentage change of 53.05% and the highest mortality ratio. The lowest per cent change was in 2015 at -25.03%.

Table I: Annual Per Cent Change and Maternal Mortality Ratio per 100k Live Births.

Year	Maternal Mortality Rate per 100K Births	Annual Percentage Change
2019	148	53.05%
2018	96.7	0.83%
2017	95.9	-13.29
2016	110.6	26.95
2015	87.1	-25.03%
2014	116.2	9.23%
2013	106.5	27.59%
2012	83.4	-10.51%
2011	93.2	17.97%
2010	79	0.00%
2009	79	0.00%
2008	79	0.00%
2007	79	0.00%
2006	79	-1.25%
2005	80	0.00%
2004	80	1.27%
2003	79	1.28%

Table II presents the main causes of maternal mortality. From the table, it can be deduced that over the two decades, Hypertensive disorders have been the leading cause of maternal mortality.

Table II: Causes of Maternal Deaths from 2000-2019.

Year	Maternal sepsis and other maternal infections	Maternal hypertensive disorders	Maternal hemorrhage	Ectopic pregnancy	Maternal abortion and miscarriage
2000	1	9	6	1	4
2001	1	8	5	1	4
2002	1	8	5	1	3
2003	1	7	4	1	3
2004	1	6	3	1	2
2005	1	7	3	1	3
2006	0	5	2	1	2
2007	0	5	2	1	2
2008	1	7	3	1	3
2009	0	4	2	1	1
2010	1	7	2	1	2
2011	0	6	2	1	2
2012	0	5	2	1	2
2013	0	6	2	1	2
2014	1	9	3	1	3
2015	1	7	2	1	2
2016	0	7	2	1	2
2017	0	6	2	1	2
2018	0	6	2	1	2

The maternal mortality ratio has been increasing in Jamaica (**Table III**). For the first decade (2000-2009), the average MMR was 79; for the other decade, 2010-2019, it increased to 101.6.

For the studied period (2000-2019), the average incidence of MMR for the two decades has been summarized in **figure 4**.

Table III: Average Incidence of Maternal Mortality Ratio (MMR) for the Periods 2000-2009 and 2010-2019.

Year	Maternal Mortality Rate per 100K Births	The average incidence of Maternal mortality
2019	148	101.6
2018	96.7	
2017	95.9	
2016	110.6	
2015	87.1	
2014	116.2	
2013	106.5	
2012	83.4	
2011	93.2	
2010	79	
2009	79	79
2008	79	
2007	79	
2006	79	
2005	80	
2004	80	
2003	79	
2002	78	
2001	79	
2000	77	

Figure 4: The Average Decade of Incidence of Maternal Mortality Ratio.

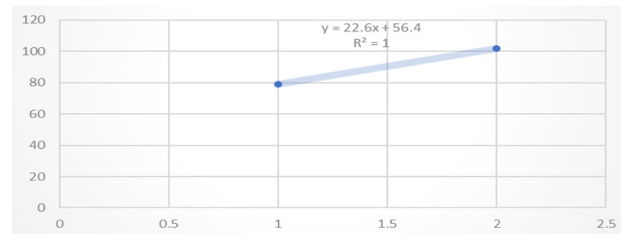
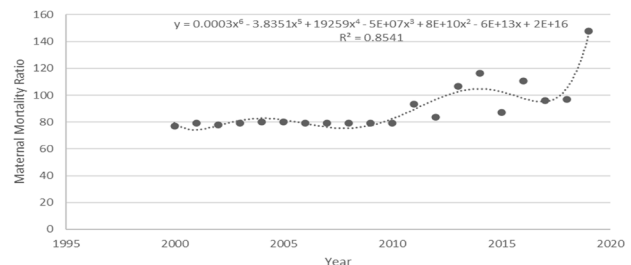


Figure 5: Annual Incidence of Maternal Mortality Ratio Per 100K Births.



Discussion

The impact of healthcare, even maternity care, takes place at a less fundamental level. At the outset of pregnancy, the health of some women and their babies is already disadvantaged through social inequalities based on class, ethnic background and residence. Such factors have been shown to influence the access to care and quality of care received by women from the lower class in society so that maternity care may compound rather than help alleviate existing social inequalities in health²⁶.

In Jamaica, the maternal mortality rate affects homes as the loss of this individual, who is said to be the primary caregiver at home, can undermine a family's ability to

gain necessities and vital life skills that only can be taught by a mother's perspective. Some factors that affect the mortality rate among expecting mothers in Jamaica are women of older age and lifestyle factors such as smoking and alcohol consumption. Despite these factors, Jamaica has been experiencing a slow and steady increase in maternal deaths and is slowly declining.

There have been some consequences of being overweight and obese for Jamaican women of reproductive age. This has been happening despite maternal health care services, including antenatal visits, postnatal care, and immunization coverage Kanguru et al. concluded that 63% of Jamaicans, aged 15-49 were obese; 6% were diabetic, 19% were hypertensive, and 3% were both⁷. These conditions are risk factors for morbidity and mortality; thus, obesity poses risks to maternal health in these cases. Research also showed that one in every ten women who died during or after childbirth happened to be overweight or obese.

Researchers found that in 2019, 1,125 or 3.3 per cent of the 33,462 mothers experienced pre-eclampsia in their deliveries, while the other hand, 1,219 or 3.6 per cent experienced postpartum hemorrhage. Pre-eclampsia and postpartum hemorrhage were the leading cause of illness and death among pregnant women in Jamaica in 2019²⁷. The year 2019 also had the most significant percentage change of 53.05%.

From 2000-2019 the maternal mortality rate in Jamaica has stayed within the same range but slowly increased as the years went by, with 2019 reporting the highest; this research, therefore, offers some understanding and awareness of the maternal mortality rate present in Jamaica.

Conclusion

The Maternal mortality rate and its effect on our society from 2000 to 2019 has increased significantly in 2019 with a percentage of 53.05%. The leading cause of maternal mortality was hypertensive disorder in women, which increases the risk of death. However, with efficient monitoring during the antenatal visit and follow-up postpartum, the risk of pregnancy-related death may decrease. Thus, better management of health and taking the necessary precautions can help manage these rates.

Recommendations

Improving the quality of care offered to maternal mothers is founded on a holistic, human rights-based tactic for reproductive, sexual, and maternal health and is based on implementation efficiency. Firstly, the inequities in access to quality sexual, maternal and reproductive

health care need to be tackled by intensifying efforts to reach vulnerable populations. Existing disparities must be identified and analyzed to tackle and reduce them²⁸.

They are secondly improving health systems to respond to the needs and priorities of women and girls. This strengthening will comprise hardware, for example safeguarding the availability of vital health infrastructure, commodities and amenities "software" such as the organization and management of service delivery, enhancing transparency and counteracting corruption. Priorities involve increasing health promotion and preventative services and improving the incorporation of all forms of care for women and adolescents. Governments should aid in providing resources to deploy health care providers such as midwives, doctors, and other skilled maternity care providers in ample numbers to meet population demands. Do professional associations play a crucial role in confirming norms for regulating healthcare workers and establishing professional standards for their education and core competencies?

Thirdly, ensure accountability to improve the quality of care and equity. They are planning for accountability highlights two equally significant dimensions: the enhanced capacity to measure and report progress towards ending preventable maternal mortality (EPMM) and the range of actions that citizens and civil society actors take to hold government and health system leaders accountable for their obligations in the area of maternal health care. Facility-level accountability promotes better maternal outcomes due to the creation of quality standards and performance measures that are appraised at the point of service through continuous quality enhancement activities. Lastly, monitoring and liability are fundamental human rights principles and critical aspects of the right to health that can help lower maternal mortality. Monitoring is key to assessing the scale of maternal mortality, its origins, and whether actions are being taken to deal with the difficulty. Indicators can be used to assist in monitoring progress and to emphasize where policy alterations may be necessary. The maternal mortality ratio is a standard indicator. Thus, the right to health necessitates that such indicators are disaggregated on grounds involving urban/rural, race and ethnicity²⁹.

Conflict of Interest

The authors declare that no competing interests exist.

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