



# A Systematic Review Investigating Rates of Maternal Mortality in African Countries

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## ABSTRACT

**Introduction:** The goal of this review is to investigate maternal mortality rates (MMR) in African countries. Because the MMR of Black women in the United States is 3-5x higher than in White women, this study aims to identify if a similar racial disparity is present in Africa. It also explores factors contributing to high MMR including socioeconomic status, age, comorbidities, ethnicity, and access to healthcare.

**Methods:** Four bibliographic databases were searched for a variety of terms including "maternal mortality", "ethnic groups", and "racial disparities". Inclusion criteria were manuscripts which discussed African countries; exclusion criteria included "wrong outcome" and studies only discussing maternal morbidity. An organized and structured approach was completed to evaluate the quality of papers. All studies included were rated as either "poor", "okay", "good", or "excellent".

**Results:** Tunisia (1,820/100,000), Sierra Leone (1,800/100,000), Somalia (1,600/100,000), and Guinea (1,600/100,000) have the highest average MMR. The most common factor associated with mortality was preeclampsia/eclampsia. HIV was correlated with higher mortality rates, as well as low socioeconomic status (SES) and/or advanced maternal age.

**Conclusion:** Southern African countries tend to have the lowest recorded MMR whereas countries in East Africa tend to have the highest MMRs on the continent. Many comorbidities contribute to mortality among pregnant women throughout Africa, including HIV, SES, extremes of maternal age, and access to trained healthcare professionals. This study shows a need for further research regarding differences in perinatal care across countries to help identify specific factors leading to the large differences in MMR across the continent.

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## BACKGROUND

- **Maternal mortality (MM)** is defined by the **World Health Organization (WHO)** as the **death of a person during pregnancy or within 42 days of delivery, miscarriage, termination, or ectopic pregnancy providing the death is associated with pregnancy or its treatment**
- Maternal death is a potentially preventable phenomenon that affects people who can become pregnant around the world
- Worldwide in 2017, 810 people died **every day** from a preventable pregnancy or childbirth related cause
- The United States national maternal mortality rate (MMR) in 2020 was calculated by the CDC to be **23.8 per 100,000** live births
- Black women in the United States are 3-5x more likely to die of pregnancy-related complications than White women
- Higher rates of MM are often associated with decreased access to trained health professionals and lower socioeconomic status
- A woman's lifetime risk of maternal death in high income countries is **1 in 5,400** compared to women in low-income countries with a lifetime risk of **1 in 45**

## METHODS

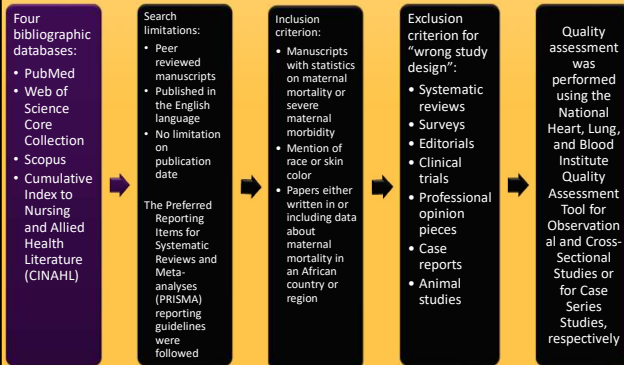
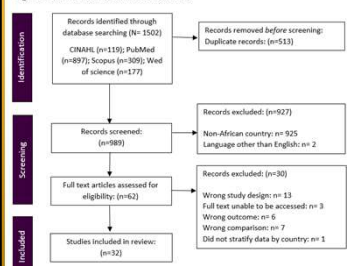


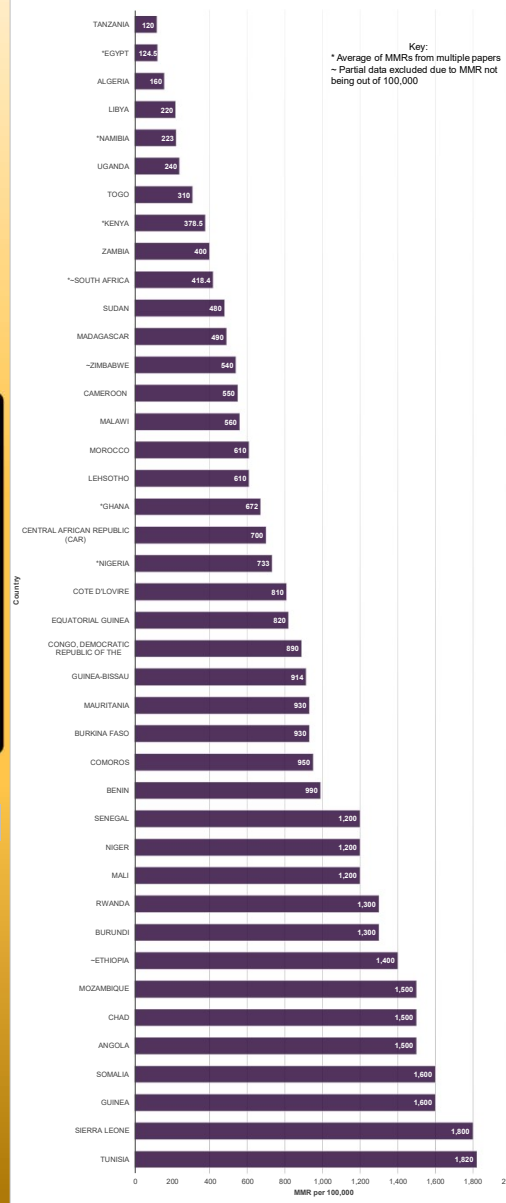
Figure 1: Identification of studies via databases



## RESULTS

- The timeframe of data analyzed for the included studies ranged from **1953-2020** with the publication dates ranging from 1979-2021
- 4 papers used the sisterhood method as their primary measure of maternal mortality
- 15 studies used the WHO definition for MM, 1 study used the CDC definition, and the other 16 either used their own definition or did not specify their definition of MM
- Not all studies had a calculated MMR in their results
- South Africa had the most extensive data, citing 11 papers, compared to many countries with 1-3 citations
  - The wide range of data availability makes some MMRs more reliable than others

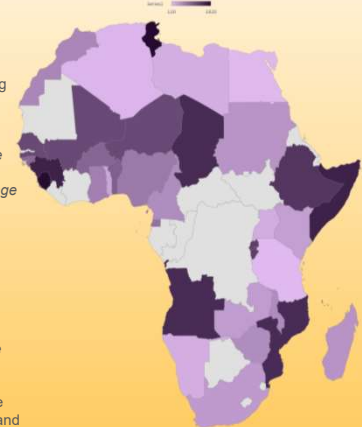
## MMR Per Country



## "The Sisterhood Method"

- A retrospective data collection method used to determine lifetime risk of maternal death and MMR
- Conducted via interviewing women in various regions and asking the following questions:
  - How many sisters have you ever had who reached reproductive age (15 years)?
  - How many of these sisters are alive?
  - How many of these sisters are dead?
  - How many of these sisters died during pregnancy, labor, or within 42 days after the delivery?
- Respondents must only report on sisters who were born to the same mother and reached reproductive age (15 years old)

MMR by Country



## DISCUSSION

- Tunisia, Sierra Leone, Guinea, Somalia had the highest recorded MMR
- The most common cause of maternal mortality across countries was **preeclampsia/eclampsia**
- Women over the age of 35 had the highest mortality rates
- HIV/AIDS remains a prevalent problem throughout Africa, and among HIV-positive patients who were also pregnant, cause of death was more likely related to **untreated disease** rather than obstetric etiology
- In one paper, COVID-19 was not found to significantly affect maternal death rates unless the patient also had HIV/AIDS
- Maternal mortality was higher among "unbooked" compared to booked patients in multiple hospital systems
  - Booked status = whether a patient was scheduled to receive antenatal care or not
- Very few studies discussed racial disparities among tribes or ethnicities within their country

## CONCLUSIONS

Data collection methods varied per study making it difficult to compare MMR across countries

Many studies identified factors contributing to higher MMR including large populations of low-SES patients, lack of access to trained medical professionals, and untreated comorbidities

The sisterhood method makes data subject to recall bias and withheld information due to cultural beliefs or fear of more negative events

This study identified a need for further MMR research to identify the healthcare differences across countries that has led to the higher death rates in some compared to others

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