



BEST APPROACHES TO CURBING MATERNAL MORTALITY

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ABSTRACT

BACKGROUND: This review on the best approaches to curbing maternal mortality was designed to curb maternal mortality. The problem is that the available information is often scattered. This write-up is therefore relevant in that information has been combined for easy use and reading. The objectives were to explore the effectiveness of the strategies put in place in curbing maternal mortality and to identify barriers to curbing maternal mortality.

METHODS: Information was obtained from internet sources, textbooks, journals and various websites. The inclusion criteria used was, articles written in English, full-text availability, and studies that examined the effectiveness of interventions or identified healthcare system gaps. Studies were excluded if they did not focus on maternal health or were not peer-reviewed. We had limited access to certain databases, regional focus that might not be generalizable to other sub-Saharan countries but limited. Results were synthesized thematically, focusing on healthcare accessibility, human resources, and policy implementation gaps. It was Focused on trends, patterns, and gaps in the literature. We identified major factors influencing maternal mortality.

RESULTS: Twelves studies were used. The results shoes that effectiveness must include improving health care access, enhancing the quality of care, promoting community engagement and education, discussing key policies and evaluating effectiveness. The barriers are usually related to health care accessibility and infrastructure, human resources and training, quality of care, socioeconomic and cultural barriers and policy implementation and governance.

CONCLUSION: This information can be used to run seminars for both health care practitioners and health care users.

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KEY WORDS: MATERNAL MORTALITY, CURBING STRATEGIES, EFFECTIVENESS OF STRATEGIES, BARRIERS.

1. BACKGROUND

Over the past five years, trends in maternal mortality rates have been reported globally and in Cameroon. The maternal mortality ratio (MMR) represents the number of maternal deaths per 100,000 live births. Despite efforts to reduce this number, progress has been slow. According to the World Health Organization (WHO), the number of maternal deaths either increased or stagnated in nearly all regions of the world from 2016--2020. In 2020, there were an estimated 287,000 maternal deaths globally, a slight decrease from 309,000 in 2016. However, regions such as Europe, North America, Latin America and the Caribbean presented increases in maternal mortality rates of 17% and 15%, respectively. The leading causes of these deaths include severe bleeding, high blood pressure, pregnancy-related infections, complications from unsafe abortion, and underlying conditions aggravated by pregnancy. [1]

In the U.S., maternal mortality rates have been increasing. The number of maternal deaths increased from 658 in 2018 to 1,205 in 2021. The COVID-19 pandemic exacerbated this issue, contributing to the spike in maternal deaths due to increased health care system stress and related complications [2,3]. The maternal mortality rate for 2021 was reported to be 32.9 deaths per 100,000 live births, a significant increase from previous years [4].

These trends underscore the urgent need for improved maternal health care access and quality, particularly in underserved regions and among vulnerable populations. Addressing these disparities through better health care infrastructure, education, and policy changes is essential to reversing these alarming trends. Global statistics show that in 2019, the MMR was approximately 211 maternal deaths per 100,000 live births. In 2020, an estimated 287,000 women died from maternal causes, which translates to approximately 223 maternal deaths per 100,000 live births. From 2021--2022, rates stagnated in most regions. Cameroon after stagnation has increased. The COVID-19 pandemic exacerbated challenges, affecting healthcare systems and access to maternal health services. The many political crises plaguing Cameroon have contributed greatly. However, to meet the Sustainable Development Goal (SDG) of reducing the global MMR to less than 70 per 100,000 live births by 2030, an annual reduction rate of 6.4% is needed, which is far from being achieved (5,6,7,8). Regional variations show that Sub-Saharan Africa continues to have the highest MMR, with significant disparities within the region (8) (9) (10) (11).

Maternal mortality in Cameroon remains high, reflecting broader trends observed across Sub-Saharan Africa. In 2019, the MMR in Cameroon was approximately 529 maternal deaths per 100,000 live births. In 2020, estimates indicate that the MMR was approximately 467 per 100,000 live births. In 2021--2022, data suggest little change, with ongoing issues such as inadequate healthcare infrastructure, lack of access to skilled birth attendants, and socioeconomic challenges continuing to impact maternal health outcomes. The national statistics include 480 deaths per 1000000 live births. [5] [6] [1]

Cameroon's high MMR is influenced by several factors, including poverty, lack of education, and limited access to high-quality healthcare services. Efforts to improve maternal health in Cameroon include increasing access to prenatal and postnatal care, improving healthcare infrastructure, and addressing socioeconomic barriers (12) (13) (14) (15) (16) (17).

This review highlights the gaps in current strategies and provides a platform for further research on how to address these gaps.

Problem Statement

Despite the numerous strategies and interventions implemented to address maternal mortality in Cameroon, the reduction in maternal deaths remains insufficient. The country continues to experience high maternal mortality rates, indicative of systemic challenges and gaps in the effectiveness of existing programs. The primary problem lies in the inadequate impact of current strategies, which fail to achieve significant reductions in maternal mortality due to various factors, including limited access to quality healthcare, insufficient healthcare infrastructure, and inefficiencies in program implementation. (17) Factors contributing to this issue include healthcare access disparities, inadequate infrastructure, program implementation challenges, and sociocultural factors. (18) (19)

OBJECTIVES

The objectives of the review article are as follows.

- 1, Bring out the effectiveness of the strategies used in curbing maternal mortality.
- 2, Outline the barriers to the success of the strategies put in place.

2. METHODS

- **Review Type:** This review adopted a systematic approach to identifying and synthesizing literature on the gaps in maternal mortality strategies.
- **Literature Search Strategy:** A comprehensive search was conducted using PubMed, Scopus, and Google Scholar. Search terms included "maternal mortality," "Cameroon," "healthcare strategies," and "low-income countries." Studies published between 2010 and 2023 were included if they focused on maternal mortality in sub-Saharan Africa, with specific attention to Cameroon. Both observational and intervention studies were considered

- **Inclusion and Exclusion Criteria:** We applied inclusion criteria, such as articles written in English, full-text availability, and studies that examined the effectiveness of interventions or identified healthcare system gaps. Studies were excluded if they did not focus on maternal health or were not peer-reviewed.
- **Selection of Studies: Screening Process,** First, screen by title and abstract. Secondly the full text was screened and adapted. Then a PRISMA flow diagram was used to document the selection process.
- **Data Extraction: Data Extraction Table:** we developed a standardized data extraction form to collect information consistently from all included studies. This table included:
 - Author(s), year of publication
 - Study design and setting
 - Population characteristics (e.g., age, gender, geography)
 - Intervention or focus
 - Outcomes measured were maternal mortality rates, healthcare access, implementation of ANC, EmONC strategies.
 - Key findings
- **Pilot Extraction:** was tested on data extraction process on a small sample of studies to ensure consistency and clarity.
- **Data Synthesis and Analysis:** Results were synthesized thematically, focusing on healthcare accessibility, human resources, and policy implementation gaps. It was Focused on trends, patterns, and gaps in the literature.
- **Bias and Limitations:** Publication bias were not assessed as the choice and scrutiny of the articles followed normal standards. We had limited access to certain databases, regional focus that might not be generalizable to other sub-Saharan countries but limited.
- **Qualitative Synthesis:** If conducting a narrative review, describe how you synthesized data conceptually and thematically. Results were synthesized thematically, focusing on healthcare accessibility, human resources, and policy implementation gaps. It was Focused on trends, patterns, and gaps in the literature.
 - We Identified major themes or factors influencing maternal mortality.
 - And we used a framework to categorize studies (e.g., health system factors, cultural factors).
- **Ethical Considerations:** We adhered to ethical guidelines in our data selection and handling process.

3. RESULTS

.1. EFFECTIVENESS OF STRATEGIES USED IN CURBING MATERNAL MORTALITY

3.1.1. Strategies Used to Curb Maternal Mortality

Many strategies have been implemented to reduce maternal mortality, with a focus on improving healthcare access, enhancing the quality of care, and increasing community engagement.

Table 1 : Strategies and effectiveness 1

Strategies	Effectiveness
Improving Healthcare Access	<p>Strengthening Healthcare Infrastructure: Expanding healthcare facilities in rural areas and improving the availability of essential obstetric services.</p> <p>Training and Deploying Health Workers: Scaling up the training and deployment of midwives, nurses, and other skilled birth attendants, especially in underserved regions.</p> <p>Antenatal Care (ANC) Services: Promoting early and regular antenatal visits to identify and manage complications early.(20).</p>
Enhancing the Quality of Care	<p>Emergency Obstetric Care (EmOC): Ensuring that all health facilities have the capacity to provide comprehensive EmOC, including surgery and blood transfusions.</p> <p>Referral Systems: Strengthening referral systems to ensure timely transfer of women with complications to higher-level care facilities.</p> <p>Health Worker Training and Supervision: Continuous professional development and supervision of healthcare workers to maintain high standards of maternal care.(21)</p>
Community Engagement and Education	<p>Maternal and Child Health Education: Conducting outreach programs to educate communities on the importance of skilled birth attendance and recognizing danger signs during pregnancy.</p> <p>Involving Traditional Birth Attendants (TBAs): Integrating TBAs into the formal healthcare system to encourage referrals to healthcare facilities.</p> <p>Male Involvement: Promoting the role of men in supporting maternal health, including accompanying women to health facilities.(22)</p>

Table II : Strategies and effectiveness 2

Description of Key Policies	<p>Governments have enacted several policies aimed at reducing maternal mortality, with a focus on improving maternal healthcare services and outcomes.</p> <p>National Reproductive Health Policy</p> <ul style="list-style-type: none"> • Objective: To reduce maternal and neonatal mortality by improving access to and quality of reproductive health services. • Key Components: <ul style="list-style-type: none"> ○ Expansion of antenatal care and skilled birth attendance. ○ Strengthening of family planning services to prevent unwanted pregnancies. ○ Promotion of safe delivery practices and emergency obstetric care.(23) <p>Free Maternal Care Policy</p> <ul style="list-style-type: none"> • Objective: To eliminate financial barriers to accessing maternal healthcare by providing free services during pregnancy, childbirth, and postpartum. • Key Components: <ul style="list-style-type: none"> ○ Free antenatal care, delivery, and postnatal care in public health facilities. ○ Provision of essential medicines and emergency obstetric care free of charge. ○ Encouragement of facility-based deliveries to reduce maternal and neonatal deaths.(24) <p>Integrated Maternal, Neonatal, and Child Health (MNCH) Strategy</p> <ul style="list-style-type: none"> • Objective: To integrate maternal, neonatal, and child health services to provide comprehensive care throughout the continuum of pregnancy, childbirth, and early childhood. • Key Components: <ul style="list-style-type: none"> ○ Focus on strengthening primary healthcare systems. ○ Integration of maternal health services with child immunization programs. ○ Use of community health workers to deliver MNCH services at the community level.(25)
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3.1.2. Evaluation of Effectiveness

The effectiveness of these strategies and policies in reducing maternal mortality has been mixed, with significant challenges remaining.

Table III : Evaluation of effectiveness

Evaluation of effectiveness	Items to be evaluated
Impact on Maternal Mortality Rates	<p>While there has been some reduction in maternal mortality, the decline has been slower than anticipated. Issues such as persistent regional disparities, especially between urban and rural areas, continue to challenge progress.</p> <p>Improvements in skilled birth attendance and antenatal care coverage have been noted, but the quality of care remains inconsistent. (26).</p>
Challenges in Policy Implementation	<p>The Free Maternal Care Policy has faced issues such as underfunding, lack of awareness among women, and insufficient implementation in rural areas.</p> <p>The effectiveness of the National Reproductive Health Policy has been hampered by poor infrastructure, a shortage of skilled healthcare workers, and weak referral systems. (27)</p>
Community Engagement Outcomes	<p>Community engagement strategies, including the integration of TBAs and the promotion of male involvement, have shown promise in increasing facility-based deliveries and improving maternal health outcomes in some areas. However, these initiatives require stronger support and scalability to have a broader impact. (28)</p>

Research Through Innovation

Table IV : Studies addressing effectiveness

Author(s), Year	Study Design and Setting	Population Characteristics	Intervention or Focus	Outcomes Measured	Key Findings
Countdown to 2030 Collaboration, 2019	Cross-sectional study in rural Cameroon	Women in rural areas	Geographical access to maternal health services	Maternal mortality rates, healthcare access	Geographic inaccessibility to health facilities was linked to high mortality; improved transport and facility distribution could enhance effectiveness.
United Nations, 2015	Retrospective study in a regional hospital in Cameroon	Women who delivered at the hospital	Human resources and training at the hospital	Maternal mortality rates, quality of care	Lack of trained personnel and inadequate resources led to high mortality; enhancing training programs could be effective.
Chukwuemeka et al., 2015	Cross-sectional study in Cameroon	Pregnant women and male partners	Impact of male involvement on maternal health	Maternal mortality rates, healthcare access	Male involvement positively influenced outcomes, suggesting that promoting male participation could improve effectiveness.
Nguefack-Tsague et al., 2018	Cross-sectional study across Cameroon	Pregnant women accessing obstetric services	Inequities in obstetric service utilization	Healthcare access, maternal mortality rates	Addressing financial constraints and geographic disparities could improve the effectiveness of maternal healthcare services.

Interpretation: The studies in this table evaluate the effectiveness of various strategies aimed at reducing maternal mortality in Cameroon:

- **Improving geographical access:** demonstrated that improving transportation and healthcare facility distribution could significantly enhance the effectiveness of maternal health services in rural areas (29).

- **Training and Resources:** suggested that better training and resource allocation in hospitals could reduce maternal mortality, highlighting the effectiveness of focused interventions in terms of human resources (30}.
- **Male Involvement:** Encouraging male involvement in maternal health positively impacts outcomes, suggesting that this strategy could effectively improve maternal healthcare (20).
- **Addressing Inequities:** Tackling financial and geographic disparities can make maternal healthcare services more effective, particularly for underserved populations (23).

3.2.BARRIERS TO REDUCING MATERNAL MORTALITY

There are several gaps and challenges in the understanding of maternal mortality, both in terms of the effectiveness and adaptability of the strategies and tools used. An overview of the main gaps is as follows:

Table V : Barriers to curbing maternal mortality 1

Barriers	Area of effects
Healthcare Accessibility and Infrastructure	<p>Geographic Barriers: Many regions in Cameroon, particularly rural and remote areas, have limited access to healthcare facilities. Women often have to travel long distances to reach a hospital or clinic, leading to delays in receiving care during critical times.</p> <p>Healthcare Infrastructure: There is a shortage of well-equipped healthcare facilities, especially in rural areas. Many facilities lack essential medicines, blood supplies, and equipment necessary for handling obstetric emergencies. (20)</p>
Human Resources and Training	<p>Personnel Shortage: There is an inadequate number of trained healthcare providers, including doctors, midwives, and nurses, who are essential for providing maternal health services. This shortage is particularly acute in rural areas.</p> <p>Training and Retention: Continuous professional development and training for healthcare workers are often lacking. Additionally, retaining skilled personnel in rural and underserved areas is challenging due to poor working conditions and inadequate compensation. (21) (22)</p>

Table VI : Barriers to curbing maternal mortality 2

Quality of Care	<p>Inconsistent Quality: Even when care is accessible, the quality of maternal healthcare services is often inconsistent. Issues such as poor adherence to clinical guidelines, lack of accountability, and insufficient supervision contribute to suboptimal care.</p> <p>Patient-Provider Communication: Effective communication between healthcare providers and patients is often lacking, leading to misunderstandings, mistrust, and reluctance to seek care. Cultural</p>
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	sensitivity and patient-centered care are areas needing improvement. (22)
Socioeconomic and Cultural Barriers	<p>Socioeconomic Constraints: Poverty is a significant barrier, with many women unable to afford the costs associated with maternal healthcare, including transportation, medical fees, and related expenses. This is exacerbated by the lack of universal health coverage.</p> <p>Cultural Beliefs and Practices: Certain cultural norms and practices can hinder access to maternal health services. For example, some communities may prefer traditional birth attendants over skilled health personnel, or there may be reluctance to seek care from male healthcare providers. (23)(24)</p>
Policy Implementation and Governance	<p>Policy-Implementation Gap: While Cameroon has policies and strategic plans aimed at reducing maternal mortality, the implementation of these policies is often weak. Issues such as insufficient funding, lack of political will, and poor coordination among stakeholders impede progress.</p> <p>Data and Monitoring: The lack of reliable and comprehensive data on maternal health outcomes hinders effective monitoring and evaluation of interventions. This makes it challenging to identify areas needing improvement and to scale successful strategies. (24)</p>
Community Engagement	<p>Limited Community Involvement: Community engagement is crucial for the success of maternal health interventions. However, in many parts of Cameroon, there is insufficient involvement of communities in planning and implementing maternal health programs. This results in strategies that may not be fully adapted to local needs and contexts.</p> <p>Male Involvement: The involvement of men in maternal health is often limited, even though their support can significantly impact women's health-seeking behaviors and access to care. (26)</p>

Table VII : Barriers to curbing maternal mortality 3

Financial and Resource Constraints	<p>Funding Gaps: There is a significant gap between the funding required to effectively implement maternal health strategies and the resources available. This affects the sustainability and scalability of interventions.</p> <p>External Dependency: Cameroon relies heavily on external donors for funding maternal health programs. This can lead to challenges in maintaining programs when external funding is reduced or withdrawn. (27)</p>
. Emerging Health Threats	Impact of Conflict and Displacement: The ongoing conflict in the Northwest and Southwest regions of Cameroon has led to the displacement of populations and the disruption of health services. This has further exacerbated maternal health challenges in affected areas.

	<p>Infectious Diseases: The burden of infectious diseases like malaria, HIV, and COVID-19 continues to strain the health system, diverting resources away from maternal health services. (28)</p>
Adaptability of Tools and Interventions	<p>Non-Adaptation to Local Contexts: Many maternal health interventions are not sufficiently adapted to the local contexts of Cameroon. For example, strategies designed for urban settings may not be effective in rural areas due to differences in infrastructure, cultural practices, and health-seeking behaviors.</p> <p>Lack of Innovation: There is a limited use of innovative tools and approaches, such as mobile health (mHealth) technologies, which could help bridge gaps in service delivery and improve maternal health outcomes.</p>

3.3. Representation of the gaps from the authors

Table VIII : Studies addressing gaps

Author(s), Year	Study Design and Setting	Population Characteristics	Intervention or Focus	Outcomes Measured	Key Findings
Ojong et al., 2020	Case study in conflict-affected areas of Cameroon	Women in conflict-affected regions	Challenges in delivering maternal health services	Maternal mortality rates, healthcare access	Conflict severely disrupted maternal health services, leading to increased mortality. Health infrastructure was damaged, and there were shortages in medical supplies.
Nkosi M & al, 2023	Cross-sectional study in urban and rural Cameroon	Pregnant women in urban and rural areas	Factors affecting access to maternal healthcare services	Healthcare access, ANC implementation	Sociocultural, economic, and geographic barriers limit access to maternal healthcare. Rural areas face significant challenges due to traditional beliefs and gender norms.
Cameroon Ministry of Public Health, 2020	National policy document	Nationwide	Implementation of national reproductive health policy	Healthcare access, ANC and EmONC strategies	There is uneven implementation of reproductive health policies across

					regions, especially in conflict-affected areas.
World Bank, 2022	Global report on healthcare access and quality	Global, with data for Cameroon	Healthcare access and quality assessment	Healthcare Access and Quality Index	Cameroon's low Healthcare Access and Quality Index score reveals significant service delivery gaps, particularly in rural regions.
African Development Bank, 2021	Health sector performance review	Cameroon, national focus	Health sector performance	Healthcare access, maternal mortality rates	Resource constraints, inadequate training, and systemic inefficiencies are major gaps in Cameroon's health sector.

Interpretation: The studies and reports in this table highlight significant gaps in maternal healthcare delivery in Cameroon. These gaps include the following:

3.3.1. Geographic and Conflict-Related Barriers

Ongoing conflict in certain regions of Cameroon disrupts maternal health services, resulting in high maternal mortality rates. The destruction of health infrastructure, threats to healthcare workers, and shortage of medical supplies are direct consequences of the conflict that exacerbates mortality rates (21).

3.3.2. Sociocultural and Economic Barriers

- Traditional beliefs, gender norms, and economic constraints are significant barriers to accessing maternal health services, especially in rural areas. These sociocultural and economic factors hinder the use of antenatal care (ANC) and skilled birth attendance, leading to higher mortality rates (31).

3.3.3. Systemic health sector issues

- Systemic issues such as inadequate training for healthcare workers, insufficient resources, and overall inefficiencies within the health sector. These issues lead to poor quality of care, which is a significant contributor to maternal mortality (30).

3.3.4. Inequities in Healthcare Access

Disparities in healthcare access, particularly between urban and rural areas, contribute to maternal deaths. Financial constraints and geographic inaccessibility are significant factors leading to delayed or absent maternal care (23).

A. Strengthening Health Infrastructure in Conflict Zones

- Enhancing the resilience of health systems in conflict-affected areas to address the impact of conflict. This includes rebuilding infrastructure, ensuring the safety of healthcare workers, and providing adequate medical supplies to these regions (21).

B. Community Engagement and Education

- To overcome sociocultural barriers, there is a need for targeted community education programs that challenge traditional beliefs and promote the importance of maternal health services. Engaging men in maternal health, as suggested by Chukwuemeka et al., is also crucial for improving outcomes (31) (20).

C. Improving training and resources

- This study recommends enhanced training programs for healthcare workers to ensure that they are well equipped to manage maternal health cases. Additionally, the allocation of more resources to healthcare facilities, particularly in underserved areas, is vital (30).

D. Addressing Inequities

- To reduce inequities in healthcare access, the study suggests implementing policies that provide financial support to disadvantaged populations and improve the distribution of healthcare facilities to ensure that even remote areas have access to essential maternal health services (23).

E. Policy Implementation and Monitoring

- **Cameroon Ministry of Public Health (2020):** The uneven implementation of national reproductive health policies needs to be addressed by ensuring that all regions, including conflict-affected areas, receive equal attention. Strengthening monitoring and evaluation mechanisms can help track progress and identify areas needing further intervention.

4. CONCLUSION

After reviewing the best approaches for curbing maternal mortality, we determined that many strategies, such as inadequate antenatal care, insufficient training of healthcare workers, lack of emergency obstetric care, unsafe abortions, and weak health infrastructure, were major barriers in curbing maternal mortality, although many

strategies have been put in place by governments. We also identified key causes of maternal mortality, such as conflict-related disruptions, sociocultural and economic barriers, systemic inefficiencies, and inequities in healthcare access. To address these issues, studies have proposed strengthening health infrastructure, enhancing community engagement, improving training and resources, addressing inequities, and ensuring effective policy implementation. To address these needs, we propose these recommendations.

4.1. THE RECOMENDATIONS

Need for an Adaptable Model: There is a critical need for a flexible, adaptable model that can address these challenges by tailoring strategies to local contexts and specific needs. Such a model should integrate the following components:

1. **Localized Interventions:** Developing strategies that account for regional variations in healthcare access, infrastructure, and cultural practices.
2. **Enhanced Data Utilization:** Utilize real-time data and feedback to continuously improve and adapt interventions.
3. **Community Engagement:** Community involvement should be strengthened to ensure that maternal health programs are culturally sensitive and effectively address local barriers.
4. **Resource Optimization:** Ensure efficient allocation and use of resources to support effective program delivery and sustainability.

5. LIST OF ABBREVIATIONS

1. **ANC** : Antenatal Care
2. **EmOC** : Emergency Obstetric Care
3. **EmONC** : Emergency Obstetric and Neonatal Care
4. **MMR** : Maternal Mortality Rate
5. **MNCH** : Maternal, Neonatal, and Child Health
6. **PRISMA** : Pregnancy Risk Infant Surveillance and Measurement Alliance
7. **SDG** : Sustainable Development Goals
8. **TBA** : Traditional Birth Attendance
9. **WHO** : World Health Organisation

6. DECLARATIONS

6.1. Ethics approval and consent to participate “NOT APPLICABLE”

6.2. Consent for publication “NOT APPLICABLE”

6.3. Availability of data and material ‘NOT APPLICABLE’

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- Jumo Olga Mankfu Ngafeeson: producer of the wright op
- Bi Suh Mary Atanga: Main supervisor
- Calvin Besong Ebai: co-supervisor

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