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A critical review of eclampsia in Nigeria: From healthcare barriers to strategies for improved maternal outcomes

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Abstract

Nigeria faces a critical challenge in managing eclampsia, a major contributor to maternal morbidity and mortality. This review systematically examines the factors influencing eclampsia outcomes by evaluating peer-reviewed literature, case studies, and national health reports from 2000 to 2024. Key barriers to effective eclampsia management identified include inadequate antenatal care services, limited access to emergency obstetric facilities, and a lack of trained healthcare personnel. The findings emphasize the importance of early detection and timely intervention in improving maternal health outcomes. Despite the existence of national policies like the National Safe Motherhood Program, gaps in policy implementation and healthcare infrastructure persist, particularly in rural areas where healthcare resources are scarce. Additionally, the review highlights the need for enhanced training for healthcare providers and the integration of community health workers in recognizing early signs of preeclampsia. To address these challenges, the review calls for systemic reforms, increased investment in healthcare infrastructure, and the establishment of efficient referral systems. Collaborative efforts among government agencies, healthcare institutions, and international organizations are crucial to enhancing maternal health outcomes and reducing eclampsia-related mortality in Nigeria. Future research should focus on sustainable interventions that improve access to quality maternal healthcare services.

Keywords: Eclampsia, maternal mortality, healthcare barrier, improving maternal outcomes, Nigeria

Introduction

Eclampsia is a severe and life-threatening obstetric emergency, characterized by the onset of convulsions or seizures in a pregnant woman with preeclampsia^[1, 2]. It represents the most extreme spectrum of hypertensive disorders in pregnancy and is associated with high maternal and perinatal morbidity and mortality^[2]. Preeclampsia, a precursor to eclampsia, is defined as hypertension and proteinuria after 20 weeks of gestation, with eclampsia manifesting as generalized seizures in the absence of other neurological conditions^[2, 3]. The clinical progression from preeclampsia to eclampsia is unpredictable and can occur suddenly, making early recognition and timely intervention critical for improving maternal and neonatal outcomes^[3, 4]. Despite medical advancements, eclampsia remains a significant cause of preventable maternal death globally, especially in low-resource settings like Nigeria^[1, 5].

Globally, eclampsia is a major contributor to maternal mortality, with an estimated 50,000 deaths annually^[6]. While maternal mortality rates have declined in many parts of the world, sub-Saharan Africa remains disproportionately affected, accounting for over two-thirds of the global burden^[7]. Eclampsia is notably prevalent in sub-Saharan Africa due to the combination of high rates of preeclampsia, limited access to prenatal care, delayed recognition of symptoms, and inadequate healthcare infrastructure^[2]. In Nigeria, the most populous country in Africa, the maternal mortality rate is among the highest in the world, with eclampsia being one of the leading direct causes^[8, 9].

Nigeria's maternal health context is particularly devastating due to a confluence of factors, including poor access to quality healthcare, inadequate healthcare worker training, and a weak referral system^[10].

Many women in rural areas experience delays in seeking care, reaching healthcare facilities, and receiving timely interventions, all of which contribute to the high incidence of eclampsia-related complications [10]. Additionally, socio-cultural factors such as early marriage, poverty, and limited education exacerbate the risk of developing eclampsia. [11, 12]. The healthcare system, already strained by underfunding and personnel shortages, struggles to provide adequate prenatal care and manage obstetric emergencies, further exacerbating the issue [11]. As a result, eclampsia continues to claim the lives of thousands of Nigerian women, making it a key target for maternal health interventions.

This review aims to critically analyze the epidemiology, management, and policy gaps surrounding eclampsia in Nigeria. By examining the healthcare barriers that hinder the effective management of eclampsia, this paper seeks to highlight areas in urgent need of improvement, including healthcare infrastructure, workforce training, and policy implementation. Additionally, the review will explore global best practices for the prevention and management of eclampsia, with a focus on adapting successful strategies to the Nigerian context. Ultimately, this review aims to provide actionable recommendations to reduce the incidence of eclampsia and improve maternal outcomes in Nigeria.

The epidemiology of eclampsia in Nigeria

Eclampsia remains a significant public health challenge in Nigeria, contributing substantially to the country's high maternal mortality rate [1, 2, 8]. Hypertensive disorders of pregnancy, including preeclampsia and eclampsia, are among the leading causes of maternal deaths globally, with eclampsia being particularly devastating in Nigeria [1, 13, 14]. Estimates suggest that eclampsia is responsible for 20-40% of maternal deaths in the country [15, 16]. A 2015 study conducted across multiple Nigerian health facilities found that the prevalence of eclampsia was approximately 2.3%, underscoring its widespread impact [17]. In a facility-based audit of maternal near-miss cases, maternal, and neonatal mortality conducted at a tertiary hospital in Ondo, South-West Nigeria, preeclampsia was identified as contributing to 42.9% of maternal mortality cases, while eclampsia accounted for 29.6% of maternal near-miss events [18].

This burden is compounded by delayed care, inadequate emergency response, and weak healthcare infrastructure [1]. The incidence of eclampsia in Nigeria exhibits notable regional disparities. Northern Nigeria, particularly the northeastern and northwestern regions, reports higher rates of eclampsia and maternal mortality than the southern regions [19]. Several factors contribute to these disparities, including limited access to prenatal care, poor healthcare infrastructure, and sociocultural practices such as early marriage [19]. In contrast, the southern regions, particularly in urban areas, tend to have better healthcare access and lower maternal mortality rates. However, even in these areas, eclampsia continues to pose a significant threat to maternal health [12, 20].

Several risk factors increase the likelihood of eclampsia among Nigerian women. Socioeconomic status plays a key role, as women from lower-income households often lack access to quality prenatal care and timely medical interventions [1, 8]. Educational disparities are another significant factor, with women who have limited formal education being more likely to experience complications during pregnancy, including eclampsia. Access to healthcare

is also limited for many Nigerian women, particularly in rural areas. Poor health-seeking behavior, lack of transportation, and long distances to health facilities further hinder access to timely care, increasing the risk of developing severe complications such as eclampsia.

When comparing Nigeria to other countries in sub-Saharan Africa and globally, the burden of eclampsia is disproportionately high. In countries such as South Africa and Ghana, the prevalence of eclampsia is lower, primarily due to better healthcare systems and more comprehensive antenatal care services [20, 21]. Globally, high-income countries have seen dramatic declines in eclampsia-related mortality due to advances in obstetric care and preventive measures like early detection and management of preeclampsia. However, in Nigeria, healthcare barriers such as insufficient healthcare personnel and delayed referrals continue to exacerbate the issue, making eclampsia a persistent and deadly complication in pregnancy.

The psychological and social impact of eclampsia on families is profound. Maternal deaths leave families devastated, with children often growing up without a mother, leading to long-term social and economic challenges. The emotional trauma for the surviving family members, especially husbands and children, can be overwhelming. Moreover, in communities where maternal deaths are common, women may develop fear or anxiety surrounding childbirth, further reducing engagement with healthcare services, perpetuating a cycle of preventable deaths [22, 23].

Pathophysiology and risk factors of eclampsia

Eclampsia is the culmination of severe preeclampsia, marked by the onset of seizures in a pregnant woman with no previous history of neurological disorders. The underlying pathophysiology involves widespread endothelial dysfunction, which leads to vasospasm, increased vascular permeability, and systemic inflammation [24]. This results in end-organ damage, particularly affecting the brain, liver, and kidneys, and causing the neurological complications seen in eclampsia. Placental ischemia plays a central role in the pathogenesis, releasing antiangiogenic factors into maternal circulation, exacerbating endothelial damage, and contributing to hypertension.

Hypertension during pregnancy is a major predisposing factor for eclampsia, and in Nigeria, several contextual factors contribute to its prevalence. A lack of routine prenatal care limits the early detection of hypertension, and many women present with severe disease at a later stage of pregnancy. In the Nigerian context, high rates of teenage pregnancies, early marriages, and low educational attainment are associated with an increased risk of hypertensive disorders of pregnancy [1, 8]—furthermore, poor access to healthcare services, particularly in rural areas, limits opportunities for early intervention. Nutritional deficiencies, particularly in calcium and protein intake, may contribute to the development of preeclampsia and eclampsia in Nigerian women [25, 26]. Genetic predisposition also plays a role, with studies suggesting a familial link to hypertensive disorders of pregnancy [27]. Environmental factors, such as exposure to malaria and high-stress living conditions, can further increase the risk of eclampsia in Nigerian women [28].

Socioeconomic and cultural factors contribute significantly to delayed treatment; poverty, limited health literacy, and

traditional beliefs often lead to delays in seeking care, with some women relying on traditional birth attendants rather than formal healthcare services^[8]. This delay exacerbates complications, leading to higher rates of eclampsia and maternal mortality.

Clinical Presentation of Eclampsia and Challenges in Diagnosis

Eclampsia typically presents in Nigerian women as generalized tonic-clonic seizures in the context of preeclampsia, often accompanied by hypertension, proteinuria, headaches, visual disturbances, and epigastric pain^[1]. The seizures can occur during pregnancy, labor, or postpartum, and they are often sudden and unanticipated. In many cases, women do not exhibit premonitory symptoms, leading to delays in intervention. Additionally, in the Nigerian context, some women present late to health facilities, sometimes after seizures have already begun^[8]. This late presentation exacerbates the risk of complications, including maternal and perinatal death.

One of the key challenges in diagnosing eclampsia in Nigeria is the difficulty in early detection during antenatal care^[29]. Many Nigerian women do not attend regular antenatal appointments due to financial barriers, long distances to healthcare facilities, or a lack of awareness about the importance of routine care. This results in missed opportunities for screening and early detection of preeclampsia, the precursor to eclampsia. Inadequate training of healthcare workers in recognizing early warning signs, such as elevated blood pressure or abnormal proteinuria, further complicates early diagnosis. These challenges are compounded in rural areas, where access to healthcare is limited, and antenatal visits are sporadic.

Community healthcare workers play a critical role in identifying at-risk pregnancies, especially in rural and underserved communities. Given the scarcity of healthcare professionals in these regions, trained community health workers (CHWs) can assist in monitoring blood pressure and educating pregnant women about the signs of preeclampsia^[30]. However, CHWs often lack the necessary equipment and diagnostic tools to provide comprehensive care. In many cases, their role is limited to basic health education, and they may not be equipped to screen for risk factors like proteinuria, leading to underdiagnosis.

Limitations in diagnostic tools and antenatal monitoring further complicate the early identification of eclampsia in Nigerian healthcare facilities^[19, 31]. Many facilities, particularly in rural areas, lack the necessary equipment to perform routine blood pressure checks, urinalysis, and blood tests to detect proteinuria and elevated liver enzymes—key indicators of preeclampsia^[31]. Additionally, healthcare personnel shortages and overcrowded facilities often result in inadequate time for thorough patient evaluation. The absence of standardized protocols for screening and managing preeclampsia in many settings also leads to inconsistent care, delaying diagnosis and treatment.

Current management strategies for eclampsia in Nigeria

Eclampsia management in Nigeria follows both global and national treatment protocols, which focus on preventing seizures, controlling blood pressure, and delivering the baby to improve maternal and neonatal outcomes. The cornerstone of treatment involves administering magnesium sulfate, an anticonvulsant proven to significantly reduce the

risk of recurrent seizures and maternal death^[1, 32]. In Nigeria, magnesium sulfate is recommended as the first-line treatment for eclampsia by the Federal Ministry of Health and is widely used in tertiary healthcare facilities^[33]. However, access to this life-saving drug remains inconsistent, especially in rural areas, where healthcare facilities are often poorly resourced^[34]. Alongside seizure control, effective management of hypertension is essential. Antihypertensive medications such as hydralazine, labetalol, and nifedipine are used to stabilize blood pressure in women with severe preeclampsia and eclampsia. The goal is to prevent further complications like stroke, renal failure, or pulmonary edema. However, in many Nigerian settings, there is often a delay in administering these medications due to shortages or healthcare workers inexperience in managing hypertensive crises during pregnancy^[31, 35]. Delivery management is crucial, as definitive treatment for eclampsia requires expediting delivery to remove the source of the pathology placenta. Early delivery is often induced in eclamptic women, depending on gestational age and maternal stability, and cesarean sections are performed when necessary.

Skilled birth attendants (SBAs), including doctors, nurses, and midwives, play a critical role in managing eclampsia during labor. In well-equipped centers, SBAs are trained to administer magnesium sulfate, manage hypertensive emergencies, and perform timely deliveries. In urban centers, where healthcare facilities are better staffed and resourced, SBAs are more capable of following standard treatment protocols. However, in rural areas, where many women give birth at home or in under-resourced clinics, the role of skilled attendants is diminished due to a lack of personnel, inadequate training, and limited access to essential medications^[31]. This disparity in healthcare services is a significant challenge in Nigeria's maternal health system.

The variability in treatment practices between urban and rural areas is stark. In urban centers such as Lagos, Abuja, and Benin City, tertiary hospitals and teaching hospitals are well-resourced, with specialized obstetric units capable of managing eclampsia. These facilities follow standardized protocols, have access to medications, and can provide intensive care when needed. In contrast, rural healthcare centers often lack basic supplies, including magnesium sulfate, reliable blood pressure monitors, and trained personnel. Delays in reaching these facilities, coupled with inadequate emergency obstetric care, lead to worse outcomes for women in rural Nigeria^[1, 8].

Successful interventions in some Nigerian healthcare centers highlight the potential for improving eclampsia management nationwide. For example, in Northern Nigeria, a focused intervention at Aminu Kano Teaching Hospital involved training healthcare workers in the early recognition of preeclampsia and eclampsia and the use of magnesium sulfate. This program significantly reduced maternal mortality from eclampsia^[36]. Similar success stories have emerged from tertiary centers in Lagos and Ibadan, where comprehensive maternal health programs prioritize early screening for hypertensive disorders and prompt treatment of eclampsia, resulting in better maternal outcomes^[37].

Policy and systemic gaps in eclampsia management

Nigeria has developed several healthcare policies aimed at improving maternal health, including guidelines for

managing hypertensive disorders like eclampsia [38, 39]. The National Health Policy (2016) and the Maternal, Newborn, and Child Health (MNCH) Strategy emphasize maternal health services, including antenatal care and emergency obstetric care [40]. These policies align with global initiatives like the Sustainable Development Goals (SDGs), particularly the target to reduce maternal mortality to fewer than 70 per 100,000 live births by 2030 (Federal Ministry of Health, 2016) [7]. Despite these efforts, eclampsia remains a significant contributor to maternal mortality in Nigeria, indicating major gaps in policy implementation and systemic support.

The National Safe Motherhood Program, launched in the early 1990s, was intended to reduce maternal deaths by improving antenatal care, training healthcare workers, and increasing access to emergency obstetric services [41]. This program, although well-intentioned, has had a limited impact on eclampsia-related deaths due to inconsistent implementation across Nigeria's diverse regions. In urban areas, tertiary healthcare facilities benefit from better resources and staffing, allowing them to follow the Safe Motherhood guidelines more effectively. However, in rural areas, the lack of skilled healthcare workers, insufficient infrastructure, and weak supply chains limit the program's reach [31]. The absence of widespread training in eclampsia management, such as the use of magnesium sulfate and antihypertensive therapies, exacerbates maternal mortality rates in underserved areas [42].

One of the key gaps in Nigeria's healthcare system is the lack of targeted programs focused specifically on eclampsia. Existing maternal health policies focus broadly on improving antenatal care and emergency obstetric services, but no specific national programs are addressing the prevention, early detection, and management of eclampsia. Screening for preeclampsia, the precursor to eclampsia, is not standardized across healthcare facilities, particularly in rural areas. Furthermore, many community health workers and traditional birth attendants, who are often the first point of contact for pregnant women in Nigeria, are not equipped to recognize and manage preeclampsia, leading to missed opportunities for early intervention [36]. These policy and systemic gaps significantly undermine efforts to reduce eclampsia-related maternal deaths.

Comparatively, some low- and middle-income countries have successfully reduced eclampsia-related mortality through more targeted policies. For instance, Sri Lanka's maternal healthcare system is renowned for its effective management of hypertensive disorders in pregnancy [43]. The country implemented a community-based maternal care system where midwives routinely visit pregnant women at home, ensuring early detection of preeclampsia and timely referral to healthcare facilities [44]. This model, coupled with free access to magnesium sulfate and antenatal care, has helped significantly reduce maternal mortality from eclampsia. Similarly, in Uganda, the government has focused on training rural healthcare workers and expanding the availability of magnesium sulphate, leading to improved outcomes in managing hypertensive disorders during pregnancy [45]. These examples highlight the importance of targeted interventions, community-based care, and consistent access to life-saving treatments.

In Nigeria, replicating the success of these countries requires a more robust focus on policy implementation, with a specific emphasis on training healthcare workers,

increasing access to essential medications like magnesium sulphate, and expanding community-based antenatal services. Addressing the systemic gaps that limit early detection and intervention for eclampsia is critical for reducing maternal mortality. A concerted effort is needed from both federal and state governments to allocate adequate resources, improve healthcare infrastructure, and prioritize the training of healthcare professionals to manage hypertensive disorders in pregnancy effectively.

Public health Interventions and education in eclampsia Management

Community awareness and health education programs are vital in reducing eclampsia-related maternal deaths in Nigeria. Many women, particularly in rural areas, lack awareness of the symptoms and dangers of preeclampsia and eclampsia [31, 36]. Public health interventions that raise awareness about the importance of antenatal care, early detection of hypertensive disorders, and timely medical intervention can significantly improve maternal outcomes. These programs should focus on educating both women and their families, as cultural and familial influences often dictate when and where women seek care during pregnancy. Antenatal care campaigns, particularly those that leverage mobile health (mHealth) technologies, are crucial in promoting early detection [31]. mHealth platforms can provide pregnant women with reminders for antenatal visits, educational messages about warning signs, and direct communication with healthcare providers. In areas where healthcare infrastructure is lacking, mobile technologies bridge gaps in access, improving the chances of detecting preeclampsia before it progresses to eclampsia. Additionally, integrating community outreach efforts into antenatal campaigns can extend their reach, especially in hard-to-reach areas. Improving awareness among healthcare workers is equally important. Regular training on the early identification of preeclampsia, proper use of magnesium sulfate, and management protocols can enhance healthcare worker preparedness, particularly in under-resourced areas [1, 38]. For pregnant women, targeted education campaigns through media, local clinics, and community groups can equip them with the knowledge to recognize early symptoms and seek timely care.

Traditional birth attendants (TBAs), who are often the first point of contact for pregnant women in rural Nigeria, can play a key role in identifying early signs of preeclampsia [46]. Training TBAs to recognize symptoms like high blood pressure and swelling and to refer women promptly to healthcare facilities can help bridge the gap between informal and formal healthcare systems, ultimately reducing delays in intervention and improving maternal outcomes.

Recommendations for improving eclampsia outcomes in Nigeria

Eclampsia remains a major contributor to maternal mortality in Nigeria, but several evidence-based strategies can significantly improve outcomes. Key among these is enhancing antenatal care (ANC) services and early screening protocols for preeclampsia. Regular ANC visits provide an opportunity to monitor blood pressure, test for proteinuria, and assess other risk factors for hypertensive disorders. Introducing standardized screening protocols that emphasize early detection of preeclampsia can lead to timely intervention and prevent the progression of

eclampsia. This should include expanding access to routine ANC services in rural and underserved areas, as delays in antenatal care are strongly linked to higher rates of maternal mortality^[1].

Strengthening healthcare systems to handle obstetric emergencies is crucial for managing eclampsia effectively. Nigeria's health system must prioritize the development of emergency obstetric care units with specialized personnel and life-saving equipment. Implementing policies that mandate the availability of emergency drugs, such as magnesium sulfate and antihypertensive medications, in all healthcare facilities is essential for reducing eclampsia-related deaths. Furthermore, improving the emergency response capabilities of healthcare workers through regular simulations and training in obstetric emergencies can ensure rapid, appropriate responses when cases of eclampsia arise^[2].

Investment in healthcare infrastructure, particularly in rural areas, is critical. Many rural health centers in Nigeria lack the basic resources to manage obstetric emergencies, leading to preventable maternal deaths. Ensuring that these facilities are equipped with reliable power, clean water, and functioning medical equipment will improve their capacity to provide essential care. Additionally, expanding access to skilled healthcare workers in rural regions is a priority^[31, 38]. Establishing incentives to retain doctors, nurses, and midwives in underserved areas can help bridge the gap in maternal healthcare delivery between urban and rural regions^[47].

Training and capacity building for healthcare professionals is essential for improving eclampsia outcomes^[1]. Continuous education programs should be implemented to keep healthcare workers updated on the latest clinical guidelines for the prevention and management of preeclampsia and eclampsia. This is particularly important for community health workers and midwives, who are often the first point of contact for pregnant women. Training programs should emphasize the use of magnesium sulphate, proper blood pressure management, and timely decision-making for delivery to reduce maternal complications.

An efficient referral and transport system is also vital for managing high-risk pregnancies^[48]. In Nigeria, many women, especially in rural areas, face delays in reaching health facilities due to poor transportation infrastructure. Developing a well-coordinated referral system, where high-risk pregnancies are identified early and referred to specialized centres, can prevent maternal deaths. Emergency transport services, including ambulance networks that are integrated with health centres, are necessary to ensure that women experiencing complications like eclampsia can access care swiftly.

Ensuring access to affordable medications and emergency care remains a significant challenge in Nigeria^[49]. The government and international health organizations should work together to ensure that essential medications, particularly magnesium sulphate and antihypertensive drugs, are available and affordable at all levels of healthcare. Strengthening supply chains to prevent stockouts, especially in rural facilities, can improve timely access to life-saving treatments. Furthermore, subsidizing the cost of emergency obstetric care for low-income women could significantly reduce financial barriers and prevent delays in seeking care.

Conclusion

Eclampsia remains a major contributor to maternal mortality in Nigeria, underscoring the urgent need for improved maternal healthcare services. Key findings reveal significant gaps in antenatal care, early detection, healthcare infrastructure, and the availability of life-saving medications like magnesium sulfate. In rural areas, limited access to emergency obstetric care and trained healthcare personnel exacerbates the problem, while inadequate training and inconsistent use of screening protocols further delay timely intervention.

Addressing these issues requires systemic reforms, including strengthening healthcare systems to handle obstetric emergencies, enhancing training for healthcare workers, and investing in rural healthcare infrastructure. Policy implementation must also focus on developing efficient referral and transport systems, ensuring access to affordable medications, and integrating community-based care.

The need for action is clear: reducing eclampsia-related deaths in Nigeria demands a collective effort from government agencies, healthcare institutions, and international organizations. By prioritizing maternal health and addressing these systemic gaps, Nigeria can make significant strides toward improving maternal outcomes, reducing preventable deaths, and ensuring a healthier future for women across the country. It is time to commit resources and attention to safeguarding maternal health, ultimately saving lives and promoting the well-being of families and communities.

Conflict of Interest

Not available

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