

Patterns, Indications and Clinical Outcomes of Obstetric Intensive Care Unit Admissions: A Comprehensive Review

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Abstract

Background: Obstetric admission to the intensive care unit (ICU) is a major indicator of severe maternal morbidity and reflects the capacity of healthcare systems to manage life-threatening pregnancy-related complications. Despite advances in maternal healthcare, obstetric ICU admissions remain associated with high maternal and neonatal morbidity and mortality, particularly in low- and middle-income countries (LMICs). **Objective:** This review synthesizes current evidence on the patterns, indications, maternal and neonatal outcomes, and healthcare system factors associated with obstetric ICU admissions, with emphasis on resource-limited settings and Nigeria. **Methods:** A comprehensive review of the literature published between 2010 and 2025 was conducted using PubMed, Scopus, Web of Science, Google Scholar, and African Journals Online (AJOL). Eligible peer-reviewed studies reporting obstetric ICU admissions, their indications, and maternal or neonatal outcomes were reviewed. Findings were synthesized thematically. **Results:** Hypertensive disorders of pregnancy, obstetric haemorrhage, and maternal sepsis were consistently identified as the leading indications for obstetric ICU admission. Admission rates and maternal mortality were markedly higher in LMICs than in high-income countries, reflecting disparities in antenatal care, emergency obstetric services, referral systems, critical care infrastructure, and access to essential resources. Maternal critical illness was also associated with adverse neonatal outcomes, including preterm birth, low birth weight, increased neonatal intensive care unit admission, and higher perinatal mortality. Delayed referral, limited ICU capacity, shortages of skilled personnel, and financial barriers were major contributors to poor outcomes. **Conclusion:** Obstetric ICU admissions remain an important marker of maternal healthcare quality. Strengthening emergency obstetric care, referral systems, critical care services, and healthcare financing is essential to improve maternal and neonatal outcomes, particularly in resource-constrained settings.

Keywords: Obstetric Intensive Care, Maternal Mortality, Postpartum Haemorrhage, Neonatal Outcomes, Nigeria

1. Introduction

Maternal health is widely recognized as a key indicator of the quality, accessibility, and effectiveness of healthcare systems [1, 2]. Although remarkable progress has been achieved in reducing maternal mortality over the past two decades,

pregnancy and childbirth continue to be associated with substantial morbidity and mortality, particularly in low- and middle-income countries (LMICs), where approximately 95% of global maternal deaths occur [1, 2]. Most maternal deaths are preventable and result from complications that can be

effectively managed through timely diagnosis, skilled obstetric care, and access to advanced critical care services. The leading direct causes of maternal mortality include obstetric haemorrhage, hypertensive disorders of pregnancy, sepsis, thromboembolic disease, and complications of unsafe abortion, while indirect conditions such as cardiovascular disease, respiratory disorders, diabetes mellitus, and infectious diseases increasingly contribute to severe maternal morbidity and mortality [1–5].

The increasing recognition of severe maternal morbidity has shifted attention beyond maternal mortality alone to the quality of care provided for women who survive life-threatening obstetric complications [1-5]. Admission to an intensive care unit (ICU) represents one of the most important indicators of severe maternal morbidity or maternal near miss, reflecting the need for advanced monitoring, organ support, and multidisciplinary management [6-9]. Obstetric ICUs play a pivotal role in managing critically ill pregnant and postpartum women with conditions such as severe preeclampsia and eclampsia, massive obstetric haemorrhage, maternal sepsis, respiratory failure, acute kidney injury, cardiac disorders, and other life-threatening complications [7-9]. Consequently, patterns of obstetric ICU admissions provide valuable insights into the epidemiology of severe maternal illness, the effectiveness of emergency obstetric services, and the capacity of healthcare systems to respond to maternal emergencies [8,9]. The epidemiology of obstetric ICU admissions varies considerably across regions, reflecting differences in healthcare infrastructure, availability of critical care services, socioeconomic conditions, and clinical practice [6-9]. In high-income countries, obstetric ICU admissions account for a relatively small proportion of all deliveries because of comprehensive antenatal care, effective maternal early warning systems, timely referral pathways, and well-developed critical care services [6, 7]. In contrast, women in many LMICs continue to experience disproportionately higher rates of severe maternal complications requiring intensive care [3-5]. Delayed recognition of obstetric emergencies, inadequate antenatal care, shortages of skilled healthcare personnel, limited ICU capacity, and weak referral systems contribute significantly to poor maternal outcomes in these settings [1-9].

Nigeria continues to bear one of the highest burdens of maternal mortality worldwide and contributes substantially to the global burden of preventable maternal deaths [5, 10]. Despite improvements in maternal healthcare delivery, severe obstetric complications remain common, particularly in tertiary referral hospitals where critically ill patients are concentrated [5, 10]. Hypertensive disorders of pregnancy, obstetric haemorrhage, maternal sepsis, severe anaemia, and indirect medical disorders consistently account for most obstetric ICU admissions reported in Nigerian studies [5, 10-12]. Outcomes are frequently

worsened by delayed referral, inadequate blood transfusion services, shortages of intensive care beds, limited access to life-support technologies, and insufficient numbers of trained critical care personnel.

Maternal critical illness has profound consequences that extend beyond maternal survival. Women admitted to ICUs are more likely to experience adverse pregnancy outcomes, including preterm delivery, fetal growth restriction, emergency operative delivery, low birth weight, neonatal intensive care unit (NICU) admission, and perinatal mortality [6-12]. These observations highlight the close relationship between maternal and neonatal outcomes and emphasize the importance of integrated obstetric and neonatal critical care services. Contemporary obstetric critical care therefore advocates multidisciplinary management involving obstetricians, intensivists, anaesthetists, neonatologists, specialized nurses, and other healthcare professionals working collaboratively to optimize maternal and foetal outcomes [11-14].

Although numerous studies have investigated obstetric ICU admissions in different countries and healthcare settings, the available evidence remains fragmented and heterogeneous [11-14]. Differences in ICU admission criteria, study populations, healthcare resources, outcome measures, and reporting practices have made comparisons across studies difficult. Furthermore, evidence from many LMICs, particularly those in sub-Saharan Africa, remains limited despite the disproportionate burden of severe maternal morbidity in these regions [6-12]. An integrated review of the available literature is therefore essential to provide a comprehensive understanding of the current evidence, identify consistent patterns and determinants of adverse maternal and neonatal outcomes, and highlight deficiencies in healthcare delivery that require policy and clinical attention.

Against this background, the present review synthesizes published evidence on the patterns, indications, clinical outcomes, and healthcare system factors associated with obstetric ICU admissions across diverse healthcare settings. Specifically, the review examines the epidemiology and major indications for obstetric ICU admission, evaluates maternal and neonatal outcomes associated with critical maternal illness, explores healthcare system challenges influencing these outcomes, and identifies important gaps in the existing literature. By integrating current evidence, this review seeks to provide clinicians, researchers, healthcare administrators, and policymakers with a comprehensive understanding of obstetric critical care while highlighting priority areas for improving maternal critical care services, strengthening referral systems, guiding future research, and ultimately reducing preventable maternal and neonatal morbidity and mortality, particularly in resource-constrained settings.

2. Methods

2.1 Literature Search Strategy

A comprehensive review of the published literature was conducted to identify studies reporting patterns, indications, and clinical outcomes of obstetric intensive care unit (ICU) admissions. Electronic databases including PubMed, Scopus, Web of Science, Google Scholar, and African Journals Online (AJOL) were searched for relevant articles published between January 2010 and March 2025. To ensure broad coverage of the available evidence, the reference lists of eligible articles and relevant review papers were also examined for additional studies.

The search strategy combined Medical Subject Headings (MeSH) and free-text terms related to obstetric critical care. *The principal search terms included obstetric intensive care unit, obstetric ICU admission, maternal critical care, pregnancy complications, maternal morbidity, maternal mortality, postpartum haemorrhage, preeclampsia, eclampsia, maternal sepsis, critical illness in pregnancy, and intensive care in obstetrics.* These terms were combined using Boolean operators ("AND" and "OR") as appropriate to optimize retrieval of relevant publications.

2.2 Study Selection

Studies were considered eligible if they evaluated pregnant or postpartum women requiring admission to an intensive care unit and reported information on the indications for admission, patterns of ICU utilization, maternal outcomes, neonatal outcomes, or healthcare system factors influencing obstetric critical care. Original research articles, multicentre studies, cohort studies, case-control studies, cross-sectional studies, and relevant systematic reviews published in English were included. Editorials, conference abstracts without full-text publications, letters to the editor, duplicate reports, and studies focusing exclusively on non-obstetric gynaecological critical care were excluded. Where multiple publications reported findings from the same study population, the most comprehensive or recent publication was considered.

2.3 Data Extraction and Evidence Synthesis

Relevant information was extracted from the selected studies, including the country of study, study design, sample characteristics, indications for ICU admission, maternal and neonatal outcomes, and key findings. Particular attention was given to identifying recurring patterns, regional variations, and healthcare system factors associated with obstetric critical care. Because of considerable heterogeneity in study designs, patient populations, healthcare settings, and reported outcome measures, a quantitative meta-analysis was not undertaken. Instead, findings were synthesized narratively and organized into major thematic areas, including the prevalence and patterns

of obstetric ICU admissions, common indications for admission, maternal outcomes, neonatal outcomes, and healthcare system challenges. Comparisons were also made between evidence from high-income countries and low- and middle-income countries to highlight differences in disease burden, critical care capacity, and clinical outcomes.

2.4 Quality Considerations

Although this review was not designed as a formal systematic review or meta-analysis, preference was given to peer-reviewed studies published in reputable journals and reports from recognized international health organizations. Recent publications, systematic reviews, multicentre studies, and evidence from authoritative organizations such as the World Health Organization (WHO) were prioritized to ensure that the review reflects current knowledge and clinical practice.

3. Current Evidence on Obstetric Intensive Care Unit Admissions

3.1 Global Patterns of Obstetric ICU Admissions

Obstetric admission to the intensive care unit (ICU) is an important indicator of severe maternal morbidity and reflects both the burden of pregnancy-related complications and the capacity of healthcare systems to provide advanced maternal care [15-17]. Although obstetric patients constitute a relatively small proportion of all ICU admissions, they require highly specialized multidisciplinary management because of the unique physiological changes associated with pregnancy and the rapid progression of obstetric emergencies [15-17].

The frequency of obstetric ICU admissions varies considerably across countries and healthcare systems. In high-income countries (HICs), ICU admissions generally account for less than 1% of all deliveries, reflecting comprehensive antenatal care programmes, effective maternal early warning systems, prompt referral pathways, and well-established critical care services [17-20]. Conversely, considerably higher admission rates have been reported in many LMICs, particularly in sub-Saharan Africa and South Asia, where deficiencies in emergency obstetric care, delayed presentation, and limited critical care capacity contribute to an increased burden of severe maternal illness [6-12, 21].

Within sub-Saharan Africa, reported obstetric ICU admission rates vary widely because of differences in referral patterns, ICU admission criteria, healthcare infrastructure, and availability of specialist obstetric services [21]. Tertiary referral hospitals generally report higher admission rates because they receive women with severe obstetric complications from lower-level healthcare facilities [5, 10, 21]. These observations emphasize that ICU admission rates should be interpreted within the context of local healthcare systems and referral networks rather than as isolated indicators of disease burden.

Beyond geographical variation, changes in obstetric practice have also influenced ICU admission patterns. Improvements in maternal survival have resulted in increasing numbers of women with complex pre-existing medical conditions successfully completing pregnancy but requiring intensive care during the antenatal, intrapartum, or postpartum periods. Consequently, indirect obstetric conditions such as cardiovascular disease, respiratory disorders, renal disease, endocrine disorders, and severe infections now account for an increasing proportion of obstetric ICU admissions in many countries [17-21].

Overall, available evidence suggests that the burden of obstetric critical illness remains disproportionately concentrated in resource-limited settings, where preventable maternal complications continue to account for a substantial proportion of ICU admissions. These findings underscore the need for strengthening maternal healthcare systems, improving timely access to emergency obstetric care, and expanding critical care services to reduce severe maternal morbidity and mortality.

3.2 Common Indications for Obstetric ICU Admission

Hypertensive disorders of pregnancy remain the most frequently reported indication for obstetric ICU admission worldwide [17-21]. Severe preeclampsia, eclampsia, and HELLP syndrome frequently require intensive care because of complications such as uncontrolled hypertension, seizures, pulmonary oedema, acute kidney injury, hepatic dysfunction, disseminated intravascular coagulation, and multiple organ failure [17, 19, 21]. The persistently high burden of hypertensive disorders in LMICs reflects delayed diagnosis, inadequate antenatal surveillance, and limited access to specialist obstetric care.

Obstetric haemorrhage is another leading indication for ICU admission and remains one of the principal causes of preventable maternal death globally. Massive postpartum haemorrhage, placental abruption, placenta previa, uterine rupture, retained placenta, and complications following operative delivery frequently necessitate aggressive haemodynamic resuscitation, blood transfusion, emergency surgery, and intensive monitoring [22, 23]. In many resource-limited settings, delayed recognition of haemorrhage and inadequate access to blood products continue to worsen maternal outcomes.

Maternal sepsis also contributes substantially to obstetric critical illness. Puerperal sepsis, septic abortion, postoperative wound infections, urinary tract infections, and severe pneumonia are common causes of ICU admission. Progression to septic shock and multiple organ dysfunction often occurs when diagnosis or antimicrobial therapy is delayed, particularly in healthcare facilities with inadequate infection prevention and control measures [24-26].

In recent years, indirect obstetric conditions have become increasingly important contributors to ICU admissions. Cardiovascular disorders, including peripartum cardiomyopathy, congenital heart disease, rheumatic valvular disease, and pulmonary embolism, frequently complicate pregnancy because of physiological increases in cardiac workload. Similarly, respiratory disorders, acute kidney injury, endocrine emergencies, neurological disorders, sickle cell disease, and severe anaemia may require advanced organ support during pregnancy and the postpartum period [17-21]. The relative contribution of these conditions varies according to geographical location, healthcare resources, referral practices, and population characteristics. Nevertheless, hypertensive disorders, obstetric haemorrhage, and maternal sepsis consistently remain the dominant indications for obstetric ICU admission across diverse healthcare settings, highlighting the continued importance of strengthening preventive maternal healthcare and emergency obstetric services.

3.3 Maternal Outcomes of Obstetric ICU Admission

Maternal outcomes following obstetric ICU admission vary considerably across healthcare settings and are influenced by the severity of illness, timing of intervention, availability of critical care resources, and the efficiency of referral systems. In high-income countries (HICs), advances in antenatal surveillance, emergency obstetric care, and critical care medicine have resulted in relatively low maternal mortality among ICU-admitted obstetric patients [1-5]. Conversely, women in low- and middle-income countries (LMICs) continue to experience substantially poorer outcomes because they frequently present with advanced disease following delays in diagnosis, referral, or initiation of definitive treatment [5, 10]. The principal causes of maternal mortality among critically ill obstetric patients include hypertensive disorders of pregnancy, severe obstetric haemorrhage, maternal sepsis, and multiple organ dysfunction syndrome [17-21]. These conditions often necessitate advanced life-support interventions, including mechanical ventilation, vasopressor therapy, renal replacement therapy, massive blood transfusion, and emergency surgical procedures. Early recognition and prompt multidisciplinary management remain critical determinants of survival [27, 28]. Survivors of obstetric critical illness frequently experience significant short- and long-term complications. Persistent renal impairment, neurological deficits following eclamptic seizures or cerebrovascular events, chronic cardiovascular disease, reproductive complications, and psychological disorders such as anxiety, depression, and post-traumatic stress disorder have all been reported among women discharged from intensive care [27, 28]. These findings underscore the need for structured post-ICU follow-up programmes incorporating physical

rehabilitation, mental health support, and reproductive counselling.

Several factors consistently influence maternal outcomes following ICU admission. Early recognition of obstetric emergencies, rapid referral to appropriately equipped healthcare facilities, timely availability of blood products, access to advanced organ support, and multidisciplinary collaboration among obstetricians, intensivists, anaesthetists, nephrologists, and specialist nurses are associated with improved survival [18, 19, 27, 28]. Conversely, delayed presentation, inadequate healthcare infrastructure, shortages of skilled personnel, and financial barriers remain major contributors to preventable maternal mortality, particularly in resource-constrained settings [5, 10].

3.4 Neonatal Outcomes Associated with Maternal Critical Illness

Maternal critical illness has important consequences for foetal and neonatal health [13, 15]. The physiological disturbances associated with severe maternal disease, together with the need for emergency obstetric interventions, frequently compromise foetal wellbeing and increase the risk of adverse neonatal outcomes [29]. Consequently, pregnancies complicated by maternal ICU admission are consistently associated with poorer neonatal outcomes than uncomplicated pregnancies [13, 28-30]. Preterm birth is one of the most frequently reported neonatal outcomes among women requiring intensive care. Severe maternal complications such as preeclampsia, obstetric haemorrhage, and sepsis often necessitate medically indicated early delivery to preserve maternal or foetal life [13, 17-21]. Prematurity consequently contributes to increased risks of respiratory distress syndrome, feeding difficulties, neonatal infections, intraventricular haemorrhage, and prolonged hospitalization [29]. Low birth weight and foetal growth restriction are also common among infants born to critically ill mothers, particularly in pregnancies complicated by placental insufficiency, hypertensive disorders, or chronic maternal illness [25-29]. These infants frequently require admission to neonatal intensive care units (NICUs) for specialized monitoring and supportive care. Other adverse neonatal outcomes include birth asphyxia, neonatal sepsis, low Apgar scores, and increased perinatal mortality [5, 11, 13].

Neonatal outcomes are influenced by several interrelated factors, including gestational age at delivery, severity of maternal illness, timing of obstetric intervention, availability of neonatal intensive care services, and the level of collaboration between obstetric and neonatal teams [13, 29]. Healthcare facilities with well-developed multidisciplinary maternal-foetal critical care services generally report improved neonatal survival and reduced long-term morbidity, highlighting the

importance of coordinated obstetric and neonatal management [28-30].

3.5 Healthcare System Challenges in Obstetric Critical Care

The quality of obstetric critical care is strongly influenced by the capacity of healthcare systems to recognize, stabilize, and manage women with life-threatening pregnancy-related complications. Across many LMICs, deficiencies in healthcare infrastructure, workforce capacity, referral systems, and healthcare financing continue to limit access to timely and effective critical care, thereby contributing to preventable maternal and neonatal deaths [5, 10, 13, 21].

Delayed referral remains one of the most consistently reported barriers to optimal maternal outcomes. Many women initially present to primary or secondary healthcare facilities that lack specialist obstetric services or intensive care capabilities. Delays in recognizing severe maternal illness, arranging transportation, and transferring patients to tertiary referral centres frequently result in women arriving with advanced organ dysfunction, reducing the likelihood of successful treatment [20, 21].

Limited critical care capacity further compounds these challenges. Many hospitals in resource-constrained settings have insufficient ICU beds, mechanical ventilators, multiparameter monitors, dialysis facilities, and blood gas analysis equipment to meet the growing demand for obstetric critical care. Consequently, critically ill obstetric patients may experience delays in receiving advanced organ support or may be managed outside dedicated ICUs, compromising the quality of care [21]. Human resource shortages also remain a significant challenge. Many healthcare facilities lack adequate numbers of obstetricians, intensivists, anaesthetists, neonatologists, critical care nurses, and other specialized personnel required for multidisciplinary management [18-21]. These workforce limitations contribute to delayed clinical decision-making, inadequate patient monitoring, and increased workload for available staff, particularly during obstetric emergencies [13]. In addition, inadequate blood transfusion services, inconsistent availability of essential medicines, poor transportation networks, and high out-of-pocket healthcare expenditure continue to impede access to life-saving interventions. In many LMICs, financial constraints delay investigations, emergency surgery, blood transfusion, and ICU admission, further increasing maternal and neonatal morbidity and mortality [5, 10, 21]. Addressing these systemic challenges requires sustained investment in healthcare infrastructure, expansion of obstetric critical care capacity, strengthening of referral networks, workforce development, and implementation of universal health financing strategies. Such interventions are fundamental to improving maternal survival and achieving

global targets for reducing preventable maternal and neonatal deaths.

4. Discussion

This comprehensive review synthesizes current evidence on the patterns, indications, clinical outcomes, and healthcare system factors associated with obstetric intensive care unit (ICU) admissions. The findings demonstrate that obstetric ICU admission remains an important indicator of severe maternal morbidity and reflects both the burden of life-threatening pregnancy-related complications and the capacity of healthcare systems to provide timely, high-quality emergency obstetric and critical care. Although advances in maternal healthcare have improved survival in many high-income countries (HICs), substantial disparities persist between developed and resource-limited settings, where preventable maternal and neonatal deaths remain unacceptably high.

The predominance of hypertensive disorders of pregnancy, obstetric haemorrhage, and maternal sepsis as the leading indications for ICU admission is consistent with the major direct causes of maternal mortality identified by the World Health Organization and other international reports [1–7, 17–21]. Despite significant advances in obstetric practice, these conditions continue to account for most episodes of severe maternal morbidity because they often progress rapidly and require specialized multidisciplinary management. Their continued prominence highlights the importance of strengthening antenatal surveillance, ensuring timely recognition of obstetric emergencies, and implementing evidence-based management protocols to prevent clinical deterioration [26–29].

The review further demonstrates marked geographical differences in obstetric ICU admission patterns and outcomes. Women in HICs generally experience better outcomes because of comprehensive antenatal care programmes, effective maternal early warning systems, efficient referral pathways, and greater availability of specialized critical care services [28–32]. In contrast, women in low- and middle-income countries (LMICs) frequently present with advanced disease after significant delays in seeking or receiving appropriate care. These disparities underscore the continuing influence of socioeconomic inequalities, healthcare infrastructure, and health system organization on maternal survival [28–32].

The relationship between maternal critical illness and adverse neonatal outcomes observed across the reviewed literature reinforces the concept that maternal and foetal health are inseparable [26–32]. Severe maternal complications frequently necessitate preterm delivery or emergency operative intervention, increasing the risks of prematurity, low birth weight, neonatal intensive care unit admission, and perinatal mortality. These findings emphasize the need for integrated

maternal-fetal critical care models that promote close collaboration between obstetricians, intensivists, anaesthetists, neonatologists, and specialized nursing personnel to optimize outcomes for both mother and child.

Another important finding of this review is the significant contribution of healthcare system deficiencies to adverse maternal outcomes [33, 34]. Delayed referral, inadequate emergency transport systems, shortages of ICU beds, limited availability of blood products, insufficient life-support equipment, and workforce shortages remain major barriers to effective obstetric critical care in many resource-constrained settings. These challenges correspond closely with the Three Delays Model, which continues to provide a useful framework for understanding preventable maternal deaths in LMICs [33–35]. Addressing these systemic barriers will require coordinated investments in health infrastructure, workforce development, emergency referral networks, and equitable healthcare financing.

Recent advances in obstetric critical care have demonstrated the value of maternal early warning systems, standardized treatment protocols, simulation-based emergency training, and obstetric high-dependency units in improving clinical outcomes [33–35]. Early recognition of physiological deterioration, combined with rapid multidisciplinary intervention, has been associated with reductions in severe maternal morbidity and mortality in several healthcare systems [15–17]. Wider implementation of these strategies, particularly in resource-limited settings, offers considerable potential for improving maternal outcomes while reducing the demand for intensive care services.

Overall, the evidence indicates that improving obstetric critical care requires more than expanding ICU capacity alone. Sustainable improvements will depend on strengthening the entire continuum of maternal healthcare, including high-quality antenatal care, effective emergency obstetric services, timely referral, multidisciplinary critical care, and comprehensive post-discharge follow-up. Such an integrated approach is essential for achieving the Sustainable Development Goal of reducing preventable maternal mortality and improving maternal and neonatal health worldwide [10, 13].

5. Strengths And Limitations

This review provides a comprehensive synthesis of contemporary evidence on obstetric intensive care unit admissions across diverse healthcare settings. By integrating findings from studies conducted in both high-income and low- and middle-income countries, the review highlights global patterns of disease, identifies common indications for ICU admission, and examines the healthcare system factors that influence maternal and neonatal outcomes. The inclusion of recent international guidelines and contemporary literature

further enhances the relevance of the review to current clinical practice.

Nevertheless, several limitations should be acknowledged. First, only studies published in English were considered, which may have excluded relevant evidence published in other languages. Second, considerable heterogeneity existed among the included studies with respect to study design, patient populations, ICU admission criteria, outcome measures, and healthcare settings, limiting direct comparison of findings. Third, because this review was designed as a comprehensive narrative review rather than a systematic review or meta-analysis, quantitative pooling of data was not performed. Finally, variations in critical care infrastructure and reporting standards across countries may influence the generalizability of some findings, particularly when comparing resource-rich and resource-constrained settings.

6. Future Research Directions

Despite the growing body of literature on obstetric intensive care, several important knowledge gaps remain. Most available studies are retrospective, single-centre investigations conducted in tertiary referral hospitals, limiting the generalizability of findings to broader populations and lower levels of healthcare. There is a need for large, multicentre prospective studies that evaluate obstetric critical care across diverse healthcare settings using standardized definitions and outcome measures. Future research should focus on developing and validating standardized criteria for obstetric ICU admission to improve comparability between studies and facilitate international benchmarking.

Greater attention should also be directed towards evaluating maternal early warning systems, obstetric high-dependency units, and multidisciplinary models of care, particularly in resource-constrained settings where critical care resources are limited. The long-term consequences of maternal critical illness remain poorly understood. Prospective studies examining physical recovery, reproductive health, mental health outcomes, health-related quality of life, and socioeconomic impacts following ICU discharge are needed to guide comprehensive post-critical care services. Similarly, further research should explore the long-term developmental outcomes of infants born to critically ill mothers.

Health systems research should evaluate the effectiveness and cost-effectiveness of interventions designed to strengthen referral networks, emergency transport systems, blood transfusion services, and critical care infrastructure. Emerging technologies, including telemedicine, artificial intelligence, and predictive risk models, also warrant investigation for their potential to improve early recognition of maternal deterioration and optimize clinical decision-making. Addressing these research priorities will strengthen the evidence base for

obstetric critical care, support evidence-informed policy development, and contribute to improving maternal and neonatal outcomes globally.

Conclusion

Obstetric intensive care unit admission remains a critical marker of severe maternal morbidity and an important indicator of healthcare system performance. Current evidence demonstrates that hypertensive disorders of pregnancy, obstetric haemorrhage, and maternal sepsis continue to be the predominant causes of maternal critical illness worldwide, with disproportionately poorer outcomes observed in low- and middle-income countries. These disparities are largely driven by delayed recognition of obstetric emergencies, inadequate referral systems, limited critical care capacity, shortages of skilled healthcare personnel, and inequitable access to essential maternal health services. The review further highlights the close relationship between maternal critical illness and adverse neonatal outcomes, emphasizing the need for integrated multidisciplinary approaches that address the health of both mother and child. Although substantial progress has been made in obstetric critical care, preventable maternal and neonatal morbidity and mortality remain significant public health challenges, particularly in resource-constrained settings. Strengthening the continuum of maternal healthcare—from antenatal risk identification and emergency obstetric management to critical care, rehabilitation, and post-discharge follow-up—is essential for improving maternal and neonatal survival. Continued investment in healthcare infrastructure, workforce development, clinical governance, and research will be fundamental to achieving sustainable improvements in maternal health and meeting global targets for reducing preventable maternal mortality.

Funding

This review did not receive any grants from funding agencies in the public, commercial or not-for-profit sectors.

Availability of data and materials

Not Applicable

Competing interests

All authors of this paper declare that there is no conflict of interest related to the content of this manuscript.

Received June 19th, 2026, Revised July 7th, 2026; Accepted: July 10th, 2026, **Published online:25/08/2026**

References

1. Misu F, Gasbarro D, Alam K. Inequality in Utilization of Maternal Healthcare Services in Low- and Middle-Income Countries: A Scoping Review of the Literature. *Matern Child*

- Health J. 2025 Jun;29(6):741-766. doi: 10.1007/s10995-025-04111-9.
2. Morar A, Dascal MD, Blaga OM, Baba CO. Effectiveness and evidence-based practices in maternal care bundles for labour and birth: a systematic review protocol. *BMJ Open*. 2025 Oct 6;15(10):e107369. doi: 10.1136/bmjopen-2025-107369.
3. Filippi V, Chou D, Ronsmans C, et al. Levels and Causes of Maternal Mortality and Morbidity. In: Black RE, Laxminarayan R, Temmerman M, et al., editors. *Reproductive, Maternal, Newborn, and Child Health: Disease Control Priorities, Third Edition (Volume 2)*. Washington (DC): The International Bank for Reconstruction and Development / The World Bank; 2016 Apr 5. Chapter 3. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK361917/> doi: 10.1596/978-1-4648-0348-2_ch3
4. Debie A, Wassie MM, Roberts CT, Mittinty MN, Wilson A, Stephens JH. Trends and contributors of complete continuum of maternal healthcare service utilization in Ethiopia: a multivariate decomposition analyses. *Reprod Health*. 2025 Jan 27;22(1):9. doi: 10.1186/s12978-025-01945-y.
5. Dogbanya G. The Tortuous Road to Ending Preventable Maternal Deaths in Nigeria. *Ann Glob Health*. 2026 Apr 16;92(1):33. doi: 10.5334/aogh.5197.
6. Lotufo FA, Parpinelli MA, Haddad SM, Surita FG, Cecatti JG. Applying the new concept of maternal near-miss in an intensive care unit. *Clinics (Sao Paulo)*. 2012;67(3):225-30. doi: 10.6061/clinics/2012(03)04.
7. Soares FM, Guida JP, Pacagnella RC, Souza JP, Parpinelli MÂ, Haddad SM, Cecatti JG. Use of Intensive Care Unit in Women with Severe Maternal Morbidity and Maternal Death: Results from a National Multicenter Study. *Rev Bras Ginecol Obstet*. 2020 Mar;42(3):124-132. doi: 10.1055/s-0040-1708095.
8. Krishna Kumar M, Joshi A, Saraswat M, Jose T, Kapoor R, Saha M, Goyal BK. Near-Miss Incidents in Obstetric Patients Admitted to an Intensive Care Unit of a Tertiary Care Center in Eastern India: A Retrospective Cohort Study. *J Obstet Gynaecol India*. 2022 Aug;72(Suppl 1):89-95. doi: 10.1007/s13224-021-01559-x.
9. Gombar S, Ahuja V, Jafra A. A retrospective analysis of obstetric patient's outcome in intensive care unit of a tertiary care center. *J Anaesthesiol Clin Pharmacol*. 2014 Oct;30(4):502-7. doi: 10.4103/0970-9185.142843.
10. Anumudu SI, Uhegwu CC, Anumudu CK. A scoping review of maternal mortality, its health determinants, and factors that influence care utilization in women of child-bearing years in Nigeria. *Global Health Journal*. 2025;9(3):185-199, ISSN 2414-6447 doi.org/10.1016/j.glohj.2025.10.004.
11. Abie A, Getie Mehari M, Eseyneh Dagnew T, Mebrat Delie A, Melese M, Workie Limenh L, Kassie Worku N, Talie Fenta E, Esubalew D, Hailu M. Obstetric admission and maternal mortality in the intensive care unit in Africa: A systematic review and meta-analysis. *PLoS One*. 2025 Apr 16;20(4):e0320254. doi: 10.1371/journal.pone.0320254.
12. Akpan, Ubong
Bassey, Asibong, Udemé, Omoronyia, Ezukwa, Arogundade, Ka zeem, Agan, Thomas, Ekott, Mabel, Severe Life-Threatening Pregnancy Complications, "Near Miss" and Maternal Mortality in a Tertiary Hospital in Southern Nigeria: A Retrospective Study, *Obstetrics and Gynecology International*, 2020, 3697637, 7 pages, 2020. <https://doi.org/10.1155/2020/3697637>
13. Braga A, De Melo HK, Paiva G, Rodrigues GM, Callado GY, Araujo Júnior E, Amim-Junior J, de Rezende-Filho J, Granese R. Advances and Challenges in Obstetric Intensive Care Medicine. *J Clin Med*. 2026 Feb 13;15(4):1487. doi: 10.3390/jcm15041487.
14. Koukoubanis K, Prodromidou A, Stamatakis E, Valsamidis D, Thomakos N. Role of Critical Care Units in the management of obstetric patients (Review). *Biomed Rep*. 2021 Jul;15(1):58. doi: 10.3892/br.2021.1434.
15. Yuan, W., Zheng, Y., Zhang, X. et al. Pregnancy and postpartum-related admissions to the intensive care unit at a tertiary centre in Northwest China: a 14-year retrospective study. *BMC Pregnancy Childbirth* 25, 1212 (2025). <https://doi.org/10.1186/s12884-025-08235-2>
16. Abie A, Getie Mehari M, Eseyneh Dagnew T, Mebrat Delie A, Melese M, Workie Limenh L, Kassie Worku N, Talie Fenta E, Esubalew D, Hailu M. Obstetric admission and maternal mortality in the intensive care unit in Africa: A systematic review and meta-analysis. *PLoS One*. 2025 Apr 16;20(4):e0320254. doi: 10.1371/journal.pone.0320254.
17. Vargová, M., Krištúfková, A., Adamec, A. et al. Maternal Intensive Care Unit Admission: A 10-Year Population-Based Study in Slovakia. *Bratisl. Med. J*. 126, 3487–3496 (2025). <https://doi.org/10.1007/s44411-025-00389-x>
18. Masterson, J.A., Adamestam, I., Beatty, M. et al. Measuring the impact of maternal critical care admission on short- and longer-term maternal and birth outcomes. *Intensive Care Med* 50, 890–900 (2024). <https://doi.org/10.1007/s00134-024-07417-4>
19. Aoyama, K., Pinto, R., Ray, J.G. et al. Variability in intensive care unit admission among pregnant and postpartum women in Canada: a nationwide population-based observational study. *Crit Care* 23, 381 (2019). <https://doi.org/10.1186/s13054-019-2660-x>
20. Naruse, S., Nakajima, M., Aoki, Y. et al. Clinical features and outcomes of peripartum obstetric patients admitted to the intensive care unit: A nationwide inpatient database in Japan. *Crit Care* 29, 358 (2025). <https://doi.org/10.1186/s13054-025-05597-z>
21. Oladiran FA, Owolabi A, Adeyemo M, Obafemi T, Gbala M Pregnant and Postpartum Admissions to the Intensive Care Unit: A Ten-Year Review from Southwest Nigeria. *Tropical Journal of Obstetrics and Gynaecology (TJOG)* , 2025;43(4)
22. Drew T, Carvalho JCA. Major obstetric haemorrhage. *BJA Educ*. 2022 Jun;22(6):238-244. doi: 10.1016/j.bjae.2022.01.002.
23. Mohamed TAEH, Chandharan E. Recognition and Management of Postpartum Hemorrhage. *Matern Fetal Med*. 2025 Jan;7(1):29-37. doi: 10.1097/FM9.0000000000000256.
24. Cordioli RL, Cordioli E, Negrini R, Silva E. Sepsis and pregnancy: do we know how to treat this situation? *Rev Bras Ter Intensiva*. 2013 Oct-Dec;25(4):334-44. doi: 10.5935/0103-507X.20130056.
25. Firoz T, Woodd SL. Maternal sepsis: Opportunity for improvement. *Obstet Med*. 2017 Dec;10(4):174-176. doi: 10.1177/1753495X17704362.
26. Gibbs R, Bauer M, Olvera L, Sakowski C, Cape V, Main E. Improving Diagnosis and Treatment of Maternal Sepsis: A Quality Improvement Toolkit. Stanford, CA, 2019 California Maternal Quality Care Collaborative.
27. Nelson-Piercy, C., Luyckx, V.A. & Krawczyk, P. Maternal critical care. *Intensive Care Med* 50, 928–930 (2024). <https://doi.org/10.1007/s00134-024-07443-2>
28. Susanu C, Vasilache I-A, Harabor A, Vicoveanu P, Călin A-M. Factors Associated with Maternal Morbidity in Patients with Eclampsia in Three Obstetric Intensive Care Units: A Retrospective Study. *Journal of Clinical Medicine*. 2024; 13(21):6384. <https://doi.org/10.3390/jcm13216384>
29. Sokou R, Lianou A, Lampridou M, Panagiotounakou P, Kafalidis G, Paliatsiou S, Volaki P, Tsantes AG, Boutsikou T, Iliodromiti Z, Iacovidou N. Neonates at Risk: Understanding the Impact of High-Risk Pregnancies on Neonatal Health. *Medicina (Kaunas)*. 2025 Jun 11;61(6):1077. doi: 10.3390/medicina61061077.
30. Aldabbour, B., Elamassie, S., Mahdi, S. et al. Exploring maternal and neonatal health in a conflict-affected setting: cross-sectional

- findings from Gaza. *Confl Health* **19**, 45 (2025). <https://doi.org/10.1186/s13031-025-00687-9>
31. Doraiswamy S, Cheema S, Maisonneuve P, Jithesh A, Mamtani R. Maternal mortality in the Middle East and North Africa region - how could countries move towards obstetric transition stage 5? *BMC Pregnancy Childbirth*. 2022 Jul 8;22(1):552. doi: 10.1186/s12884-022-04886-7.
 32. Shatilwe JT, Hlongwana K, Mashamba-Thompson TP. Pregnant adolescents and nurses perspectives on accessibility and utilization of maternal and child health information in Ohangwena Region, Namibia. *BMC Pregnancy Childbirth*. 2022 Apr 5;22(1):284. doi: 10.1186/s12884-022-04619-w.
 33. Mselle, L.T., Kohi, T.W. Healthcare access and quality of birth care: narratives of women living with obstetric fistula in rural Tanzania. *Reprod Health* **13**, 87 (2016). <https://doi.org/10.1186/s12978-016-0189-x>
 34. Kumar V, Khajanchi M, Raykar NP, Gerdin M, Roy N. Waiting at the hospital door: a prospective, multicentre assessment of third delay in four tertiary hospitals in India. *Lancet*. 2015 Apr 27;385 Suppl 2:S24. doi: 10.1016/S0140-6736(15)60819-4.
 35. Sharma B, Smith R, E Pennell C. Global Trends in Maternal Mortality and Efforts to Improve Maternal Outcomes Through Sociomedical Interventions. *Reprod Sci*. 2026 May;33(5):950-960. doi: 10.1007/s43032-026-02086-8.

Cite as: Folami EO, Olaosun FF, Folami RO, Afolabi AS, Asafa OQ, Ajayi AA, Falade J, Akpata OE, Afolabi BA, Akinwale OD Patterns, Indications, and Clinical Outcomes of Obstetric Intensive Care Unit Admissions: A Comprehensive Review. *Acta Bioscientia* **2026**;2(5);483-491. <https://doi.org/10.71181/actabioscientia12630>