



ICU Admission and Outcome in Obstetrics

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Abstract

Background: Obstetric patients represent a unique population in the intensive care unit (ICU) due to the physiological changes of pregnancy and the need to care for both the mother and fetus. ICU admission during pregnancy and the puerperium is often associated with life-threatening complications and adverse maternal and perinatal outcomes

Introduction: Obstetric patients represent a distinct group in critical care due to the dual concern of maternal and fetal well-being. ICU admission in pregnancy and the puerperium often indicates severe maternal morbidity and mortality and is associated with high maternal risk. This study aims to analyze the incidence, indications, clinical characteristics, interventions, and outcomes of obstetric ICU admissions in a tertiary care center.

Methods: This was a descriptive observational study conducted at Mahadevappa Rampure Medical College, Kalaburagi. All obstetric patients—antenatal, intrapartum or within six weeks postpartum—admitted to the ICU over the study period were included. Data collected included age, parity, gestational age, timing of ICU admission, primary diagnosis, types of ICU interventions, and outcomes.

Results: A total of 60 obstetric patients required ICU admission. The majority (55%) were below 25 years of age, and 56% were multigravidae. The highest proportion of ICU admissions occurred between 34–37 weeks and <34 weeks, comprising 26.6% of patients, indicating a high burden of preterm complications. 18.3% were admitted at <28 weeks. Term pregnancies (>37 weeks) accounted for 15%, and postpartum admissions made up 13.3%. The most common indication for ICU admission was pre-eclampsia

(28.3%), followed by abruptio placentae (15%), cardiac disorders (13.3%), anemia (13.3%), and eclampsia (11.6%). Other causes included PPH, HELLP syndrome, sepsis, DIC, acute fatty liver and transfusion reactions. The most frequently required interventions were blood transfusion (60%), oxygen therapy (50%), mechanical ventilation (23.3%), and inotropic support (20%). Most patients (62%) had an ICU stay of 1–3 days, while 24% stayed 4–7 days, and 14% stayed longer than 7 days.

Outcomes were favorable in most cases: 88.3% recovered, 3.3% were referred, and 8.3% died.

Discussion: This study highlights that hypertensive disorders and obstetric hemorrhage are the leading causes of ICU admissions. The need for mechanical ventilation, blood transfusions, and inotropic support underscores the severity of these cases. Despite intensive care, maternal mortality occurred in a small proportion. Delayed referral, lack of antenatal care, and resource constraints were important contributing factors. These findings reflect broader national and international patterns and emphasize the need for improved obstetric emergency care systems.

Conclusion: ICU admission in obstetric patients is a marker of severe morbidity. Hypertensive disorders, hemorrhage, and sepsis remain the primary causes. Early identification, timely referral, a multidisciplinary approach, and well-equipped ICUs are key to improving maternal and neonatal outcomes. Strengthening antenatal care, risk stratification, and critical care training in obstetrics is essential to reduce preventable morbidity and mortality.

Keywords: Anesthesiologists, ICU, High-Risk Pregnancies, Obstetricians

Introduction

The journey through pregnancy and childbirth, while physiological, can be fraught with unexpected complications that may necessitate intensive care. In obstetrics, ICU admission is often required for managing life-threatening conditions such as hypertensive disorders of pregnancy, obstetric hemorrhage, sepsis, and multiorgan dysfunction. Although obstetric patients constitute a small proportion of ICU admissions, they demand specialized care due to the dual responsibility for both mother and fetus, and the physiological changes that affect clinical management. The need for ICU care reflects the severity of maternal conditions and the challenges in peripartum monitoring and intervention. The rate of ICU admissions in obstetrics varies widely across different settings, largely influenced by the availability of antenatal care, timely referrals, and the burden of high-risk pregnancies. Evaluating the causes, clinical presentations, and outcomes of ICU admissions in obstetrics helps in identifying gaps in obstetric care and aids in formulating strategies for early intervention and prevention.

ICU admission in obstetrics is considered a marker of severe maternal morbidity. The incidence of ICU admissions among obstetric patients varies widely between developed and developing countries, ranging from 0.1% to 4%, depending on the healthcare system, patient population, referral patterns, and availability of resources. In resource-limited settings, delayed referrals, lack of access to specialist care, and poor health-seeking behavior can contribute to a higher burden of severe complications.

The dual responsibility for maternal and fetal wellbeing places a high demand on healthcare professionals, requiring a multidisciplinary approach involving

obstetricians, intensivists, anesthesiologists, neonatologists, and nursing staff. Prompt identification of high-risk cases, early referral, timely intervention, and efficient ICU management are crucial in reducing maternal and perinatal morbidity and mortality. Understanding the epidemiology, clinical profile, interventions, and outcomes of obstetric ICU admissions is essential for improving maternal healthcare delivery. It also provides insight into the gaps in the current system, thereby helping to develop targeted strategies for prevention, early intervention, and capacity building. This study aims to analyze the demographic profile, clinical characteristics, indications for ICU admission, interventions required, and maternal and neonatal outcomes among obstetric patients admitted to the ICU

in a tertiary care teaching hospital. By identifying the common causes and outcomes associated with ICU admissions, this research intends to inform policies for better management of critically ill obstetric patients and strengthen maternal critical care infrastructure.

Methodology

This was a descriptive observational study conducted from April 2024 to April 2025 at Mahadevappa Rampure Medical College Kalaburagi. All obstetric patients (antenatal, intrapartum, and postpartum up to 6 weeks) who required ICU admission were included. Data were collected on demographic variables, obstetric details, indications for ICU admission, interventions, maternal outcomes.

Results

Table 1: Distribution of patients according to Age

Age in years	No. of patients	Percentage (%)
<25 years	33	55%
25-30 years	20	33.3%
31-35 years	03	5%
>35 years	04	6.6%

The majority of ICU-admitted patients were less than 25 years of age (55%), followed by the age group of 25–30 years (33%), indicating that women in the prime

reproductive age are more likely to experience severe obstetric complications necessitating ICU care.

Table 2: Distribution of patients according to Parity

Parity	No.of patients	Percentage(%)
Primigravida	26	43.3%
Multigravida	34	56.6%

Most ICU admissions occurred among multigravida women (56%), while primigravida patients constituted 43%, suggesting that complications may be more common or more severe in women with previous pregnancies.

Table 3: Distribution of patients according to gestational age

Gestational age(weeks)	No.of patients	Percentage (%)
Postpartum	8	13.3%

>37 weeks	9	15%
34-37 weeks	16	26.6%
<34 weeks	16	26.6%
<28 weeks	11	18.3%

The highest proportion of patients were admitted at 34–37 weeks and <34 weeks, each accounting for 26.6% (16 patients). This suggests a significant number of ICU admissions occur during the late preterm and early preterm periods, likely due to complications like preeclampsia, abruptio placentae, or preterm labor.

A notable 18.3% (11 patients) were admitted at less than 28 weeks of gestation, indicating severe early pregnancy

complications requiring intensive care. Term pregnancies (>37 weeks) accounted for 15% (9 patients), while 13.3% (8 patients) were admitted during the postpartum period, reflecting the occurrence of life-threatening complications such as postpartum hemorrhage, eclampsia, or sepsis after delivery.

Table 4: Distribution of patients according to need for ICU admission

Diagnosis	No.of patients	Percentage (%)
Cardiac disorder	08	13.3%
PPH	05	8.3%
Anemia	08	13.3%
Pre-eclampsia	17	28.3%
Abruptio placenta	09	15%
Acute fatty liver of pregnancy	03	5%
Eclampsia	07	11.6%
Shock	03	5%
Sepsis	02	3.3%
Renal failure	02	3.3%
Ectopic	03	5%
HELLP Syndrome	04	6.6%
DIC	04	6.6%
Transfusion reaction	03	5%
Pneumonia	02	3.3%
Pleural effusion	02	3.3%
Others	06	10%

Pre-eclampsia was the leading cause, accounting for 28.3% (17 patients) of admissions. This was followed by abruptio placenta in 15% (9 patients) and cardiac disorders and anemia, each contributing 13.3% (8

patients). Eclampsia accounted for 11.6% (7 patients), reflecting the burden of hypertensive disorders in pregnancy as a major contributor to critical care needs.

Other notable diagnoses included postpartum hemorrhage (PPH) in 8.3% (5 patients), HELLP syndrome and DIC, each at 6.6%, and acute fatty liver of pregnancy, shock, ectopic pregnancy, and transfusion reactions, each at 5%. Less frequent causes included sepsis, renal failure, pneumonia, and pleural effusion

(each 3.3%). Other conditions not categorized specifically comprised 10% (6 patients). This distribution highlights that hypertensive disorders and obstetric hemorrhage remain the predominant contributors to ICU admissions in obstetrics.

Table 5: Distribution of patients according to ICU care required

ICU care required	No.of patients	Percentage (%)
Room air	16	26.6%
oxygen supply	30	50%
Mechanical Ventilator	14	23.3%
Inotropic support	12	20%
Dialysis	02	3.33%
Blood and blood products	36	60%

The most frequently required intervention was blood and blood product transfusion, utilized in 60% (36 patients), reflecting the high burden of obstetric hemorrhage and anemia. Oxygen supplementation was needed by 50% (30 patients), indicating moderate respiratory compromise in many cases. Room air sufficed for 26.6% (16 patients), suggesting a milder course or early recovery in a subset of patients. Mechanical ventilation

was required in 23.3% (14 patients), and inotropic support in 20% (12 patients)—both indicating significant hemodynamic or respiratory instability in a notable proportion of cases. Dialysis was necessary for 3.33% (2 patients), pointing to renal failure as a complication in a few critically ill mothers.

Table 6: Distribution of patients according to Duration of stay in ICU

No. of days in ICU	No.of patients	Percentage (%)
2-5 days	28	46.6%
6-8days	25	41.6%
>8days	07	11.6%

Among the 50 obstetric patients admitted to the ICU, the majority (62%) had a short stay of 1–3 days, indicating timely stabilization and transfer. 24% of patients required a moderate stay of 4–7 days, while a smaller

proportion, 10%, stayed for 8–10 days. Only 4% had a prolonged ICU stay exceeding 10 days, reflecting more severe or complicated clinical conditions.

Table 7: Distribution of patients according to their outcome

Outcome	No.of patients	Percentage (%)
Recovered	53	88.3%
Shifted	03	3.33%
Death	04	6.66%

A large majority of patients, 53 out of 60 (88.3%), recovered and were successfully discharged following ICU care, indicating effective management and supportive interventions. A small number of patients, 3 (3.33%), were shifted to higher centers or specialized units for advanced management like dialysis care unit and cardiac care unit due to the complexity or progression of their condition. Unfortunately, 4 patients (6.66%) succumbed to their illness despite intensive care, reflecting the critical nature and severity of conditions requiring ICU admission.

Discussion

The present study underscores the critical nature of ICU admissions in obstetric patients, who, despite representing a small fraction of the overall patient population, often present with severe, life-threatening complications. The findings reinforce global literature identifying hypertensive disorders of pregnancy (especially eclampsia and severe preeclampsia), postpartum hemorrhage (PPH), and sepsis as the most common reasons for ICU transfer.

The varied incidence of ICU admissions across different centers—ranging from 0.1% to 4%—reflects the heterogeneity in health systems, patient profiles, and referral pathways. In resource-constrained settings like many tertiary centers in India, delayed antenatal registration, poor access to emergency obstetric care, and late referrals significantly influence the rate and severity of ICU admissions.

These highlight the severity of underlying pathology and the importance of well-equipped ICUs in handling such emergencies. The maternal and perinatal mortality rates observed, although reflective of critical illness, also indicate the need for early identification and timely referral of high-risk pregnancies. A key insight is the importance of multidisciplinary collaboration—involving obstetricians, anesthetists, intensivists, neonatologists, and trained nursing staff—for optimal maternal and fetal outcomes. ICU care in obstetrics is complex due to the dual responsibility for both mother and fetus, compounded by altered maternal physiology that influences drug pharmacokinetics, respiratory parameters, and cardiovascular dynamics.

While improvements in obstetric and ICU care have helped reduce mortality, this study identifies persistent challenges such as late referrals, lack of antenatal care, and resource limitations.

These findings align with global calls for strengthened maternal critical care services, especially in lower- and middle-income countries.

Conclusion

ICU admissions among obstetric patients, though uncommon, are markers of severe maternal morbidity and carry substantial risks for both mother and fetus. Hypertensive disorders, obstetric hemorrhage, and sepsis remain the leading causes of critical care need. The outcomes in such cases are heavily dependent on the timing of intervention, quality of critical care infrastructure, and availability of trained personnel.

This study emphasizes the need for:

- Improved antenatal care and risk stratification to identify high-risk cases early,
- Timely referral systems with robust peripheral and tertiary linkages,
- Enhanced ICU preparedness, including protocols tailored to obstetric physiology,
- Regular training and audit to ensure adherence to best practices.

Strengthening these aspects can significantly reduce maternal and perinatal morbidity and mortality, and serve as a blueprint for improving obstetric critical care outcomes in similar healthcare settings.

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