

AN OBSERVATIONAL STUDY OF OUTCOME AMONG OBSTETRIC PATIENTS ADMITTED TO THE INTENSIVE CARE UNIT IN DINDIGUL MEDICAL COLLEGE AND HOSPITAL

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ABSTRACT

Background: Critically ill obstetric patients require intensive care for life-threatening pregnancy or postpartum complications. In countries such as India, ICU admissions are more frequent, often due to preventable causes such as haemorrhage and hypertension. This study assessed the demographics, clinical indications, interventions, and outcomes of these patients in a secondary care setting. **Materials and Methods:** This descriptive observational study was conducted at Government Medical College and Hospital, Tamil Nadu, over one year (October 2023–October 2024). Data were prospectively collected, including demographics, clinical details, ICU indications, interventions, and outcomes. Treatment measures such as ventilation, transfusion, and inotropes were recorded. **Results:** Most patients were aged 25–30 years (46.29%), primiparous (49.71%), and lived in rural areas (70%). Antenatal care was booked in 79.57% of the cases. The most common diagnoses were postpartum haemorrhage (32%), severe preeclampsia (20.71%), and placenta accreta/percreta (14%). Ventilatory support was required in 42.14%, blood transfusion in 64.14%, and inotropes in 19.29% of patients. Major surgeries included caesarean delivery (37.43%) and hysterectomy (16.29% of patients). ICU stay was <3 days in 41.57%, 3–7 days in 43%, and >7 days in 15.43%. The overall survival rate was 99.43%, with 4 maternal deaths (0.57%). **Conclusion:** Most obstetric ICU admissions were young primiparous rural women, primarily due to postpartum haemorrhage and hypertensive disorders. Many required intensive interventions; however, the survival rate was high. Early referral, quality antenatal care, and a multidisciplinary approach are vital.

INTRODUCTION

Pregnancy is a unique physiological state that poses specific risks and challenges. Obstetric care focuses on managing normal pregnancy and childbirth; however, emergencies can be complex owing to altered maternal physiology, the presence of the foetus, and the need to manage two lives simultaneously. Pregnancy affects multiple systems respiratory, endocrine, urinary, and cardiovascular, which can lead to complications impacting both mother and fetus.^[1] While most women remain healthy throughout pregnancy, a small number may develop severe conditions requiring critical care.^[2] Increasing maternal age, obesity, and associated

comorbidities have contributed to a rise in such cases.^[3]

Common indications for Intensive Care Unit (ICU) admission in obstetric patients include hypertensive disorders, cardiac and neurological conditions, autoimmune diseases, and infections. Critically ill women during pregnancy, childbirth, or the postpartum period should have timely access to high-quality critical care, regardless of their location.^[4] The management of critically ill obstetric patients poses unique challenges for both obstetricians and ICU physicians. Approximately 0.1%–0.9% of obstetric patients require ICU admission postpartum, with maternal mortality rates ranging from 3.4% to 21% in such settings. Limited experience with these rare admissions and insufficient understanding of the

underlying conditions contribute to high morbidity and mortality.^[5] Improving knowledge about the spectrum, characteristics, and outcomes of these conditions may support preventive strategies and reduce maternal complications and deaths.^[6] According to the American College of Obstetrics and Gynaecology, ICU admission is a marker of severe maternal morbidity.^[7] In high-income countries, obstetric patients comprise less than 1% of ICU admissions.^[8,9] In contrast, the rate is significantly higher in low- and middle-income countries, with ICU admissions reaching up to 7% in India, along with a comparatively higher maternal mortality ratio.^[10] ICU admissions among obstetric patients serve as indirect indicators of maternal morbidity and mortality. Obstetric critical care involves specialised multidisciplinary management aimed at addressing the complex needs of both the mother and foetus. Due to the low frequency of ICU admissions during pregnancy,^[11] evidence on optimal management strategies for critically ill obstetric patients remains limited. Therefore, this study aimed to assess the demographic characteristics, indications, interventions, and outcomes of critically ill obstetric patients admitted to the obstetric ICU.

MATERIALS AND METHODS

Study design and setting

This descriptive observational study was conducted on 700 obstetric patients admitted to the ICU at the Government Medical College and Hospital, Dindigul, Tamil Nadu, from October 2023 to October 2024. The study was approved by the Institutional Ethics Committee, and written informed consent was obtained from each participant prior to their enrolment.

Inclusion Criteria

The study included obstetric patients who were selected based on clinical findings, investigations, interventions, or a single criterion such as cardiopulmonary collapse.

Exclusion Criteria

Patients who did not provide consent or were admitted to the ICU for non-obstetric conditions, such as accidental poisoning, trauma, or unrelated medical emergencies, were excluded from the study.

Methods

Data were collected prospectively using a structured records form. Patient records were reviewed in detail, and information was obtained regarding age, parity, antenatal booking status, socioeconomic background, and residence. Clinical data relevant to the patients were gathered on a specially designed proforma regarding diagnosis on admission, associated medical and surgical conditions, reason for ICU admission, surgery/procedure performed, antenatal or postnatal admission, and details of treatment such as ventilator support, blood product transfusion, and inotropic support. Each patient's outcome was recorded as either survival or death. All data were carefully verified using hospital records to ensure their accuracy and completeness.

Statistical Methods

All collected data were entered into Microsoft Excel and analysed using IBM SPSS Statistics software version 24. Categorical variables are presented as frequencies and percentages.

RESULTS

A total of 217 patients (31%) were aged below 25 years, 324 (46.29%) were between 25 and 30 years, 147 (21%) were between 30 and 35 years, and 12 (1.71%) were above 35 years. Regarding parity, 348 (49.71%) were primipara, 277 (39.57%) had two deliveries, 62 (8.86%) had three, and 13 (1.86%) had four or more. Rural residents accounted for 490 (70%) and urban residents for 210 (30%). Antenatal care was booked in 557 (79.57%) and unbooked in 143 (20.43 %) cases. Socioeconomic status was lower in 104 cases (14.86%), upper lower in 425 (60.71%), lower middle in 97 (13.86%), and upper middle in 74 (10.57%) cases. [Table 1]

Table 1: Demographic and sociocultural profile

Category	Subcategory	N (%)
Age (years)	<25	217 (31%)
	25–30	324 (46.29%)
	30–35	147 (21%)
	>35	12 (1.71%)
Parity	1 (Primi para)	348 (49.71%)
	2	277 (39.57%)
	3	62 (8.86%)
	4 or more	13 (1.86%)
Residency	Rural	490 (70%)
	Urban	210 (30%)
Antenatal care	Booked	557 (79.57%)
	Unbooked	143 (20.43%)
Socioeconomic status	Lower (<5)	104 (14.86%)
	Upper Lower (5–10)	425 (60.71%)
	Lower Middle (11–15)	97 (13.86%)
	Upper Middle (16–25)	74 (10.57%)

Postpartum haemorrhage was observed in 224 cases (32%), severe preeclampsia in 145 (20.71%),

eclampsia in 70 (10%), placenta accreta/percreta in 98 (14%), severe anaemia in 56 (8%), abruption in 28

(4%), ruptured ectopic pregnancy in 25 (3.57%), ruptured uterus in 18 (2.57%), pulmonary oedema in 30 (4.29%), and HELLP syndrome in 6 cases (0.86%). The comorbidities included gestational hypertension in 236 cases (33.71%), gestational

diabetes in 81 (11.57%), heart disease in 30 (4.29%), and anaemia in 56 (8%), and there were no comorbidities in 297 cases (42.43%). Antenatal admissions accounted for 427 (61%) and postnatal admissions for 273 (39%). [Table 2]

Table 2: Clinical presentation and comorbidities

Category	Subcategory	N (%)
Diagnosis on admission	Postpartum hemorrhage	224 (32%)
	Severe preeclampsia	145 (20.71%)
	Eclampsia	70 (10%)
	Placenta Accreta/percreta	98 (14%)
	Severe anemia	56 (8%)
	Abruption	28 (4%)
	Ruptured Ectopic pregnancy	25 (3.57%)
	Ruptured uterus	18 (2.57%)
	Pulmonary edema	30 (4.29%)
	HELLP syndrome	6 (0.86%)
Comorbidities	Gestational hypertension	236 (33.71%)
	Gestational diabetes	81 (11.57%)
	Heart disease	30 (4.29%)
	Anemia	56 (8%)
	Nil	297 (42.43%)
Admission type	Antenatal	427 (61%)
	Postnatal	273 (39%)

Caesarean delivery was performed in 262 cases (37.43%), hysterectomy in 114 (16.29%), uterine artery ligation in 36 (5.14%), internal iliac artery ligation in 19 (2.71%), salpingectomy in 25 (3.57%), B-Lynch suture in 45 (6.43%), cervical tear repair in 49 (7%), manual removal of placenta in 23 (3.29%), pelvic haematoma drainage in 36 (5.14%), and repair of ruptured uterus in 18 (2.57 %) cases. No surgical

procedure was performed in 73 cases (10.43%). Ventilatory support was required in 295 (42.14%) patients and not required in 405 (57.86%) patients. Blood transfusion was administered in 449 (64.14 %) cases and not administered in 251 (35.86%) cases. Inotropic support was required in 135 cases (19.29%) and not required in 565 (80.71%). [Table 3]

Table 3: Interventions and surgical procedures

Category	Subcategory	N (%)
Surgery performed	Cesarean delivery	262 (37.43%)
	Hysterectomy	114 (16.29%)
	Uterine artery ligation	36 (5.14%)
	Internal Iliac artery ligation	19 (2.71%)
	Salpingectomy	25 (3.57%)
	B-Lynch suture	45 (6.43%)
	Cervical tear repair	49 (7.00%)
	Manual removal of placenta	23 (3.29%)
	Pelvic hematoma drainage	36 (5.14%)
	Repair of ruptured uterus	18 (2.57%)
	Nil	73 (10.43%)
Ventilatory support	Yes	295 (42.14%)
	No	405 (57.86%)
Blood transfusion	Yes	449 (64.14%)
	No	251 (35.86%)
Inotropic support	Yes	135 (19.29%)
	No	565 (80.71%)

ICU stay was <3 days in 291 (41.57%), 3–7 days in 301 (43%), and >7 days in 108 (15.43%) patients. A

total of 696 patients (99.43%) survived, whereas 4 patients (0.57%) died. [Table 4]

Table 4: ICU stay duration and patients outcome

Category	Subcategory	N (%)
Duration of ICU stay (Days)	<3	291 (41.57%)
	3–7	301 (43%)
	>7	108 (15.43%)
Outcome	Survived	696 (99.43%)
	Death	4 (0.57%)

DISCUSSION

In our study, most ICU-admitted obstetric patients were aged 25–30 years, primarily primiparas or women with two previous deliveries, predominantly from rural areas, and booked antenatal cases, with the majority in the upper-lower socioeconomic class (Table 1). Das et al. similarly reported most patients aged 26–30 years (40.6%), followed by 21–25 years (31.3%).^[12] Mehendale et al. found 34.6% were aged 21–25 and 28% aged 26–30, with 38.6% primigravida and 44% primipara, aligning with our results.¹³ Rajendra et al. observed a lower mean age of 24.65 years, an average gravidity of 1.73, 63.52% rural residents, and only 17.02% booked cases, with most referred.^[14] Sailaja et al. reported a mean age of 29.52 ± 5.9 years, and 69.2% of patients were primipara, comparable to our findings. However, 41.8% were referred cases, and 22% did not undergo antenatal checkups.^[15] Okafor et al. reported a slightly higher mean age of 31.4 years, with the majority (55.5%) being primipara.¹⁶ Our findings on age, parity, rural background, and booking status are consistent with those of other studies, reinforcing common demographic patterns among ICU-admitted obstetric patients.

Postpartum haemorrhage was the most common reason for ICU admission, followed by severe preeclampsia, placenta accreta/percreta, and eclampsia. Comorbidities were present in over half of the patients, mainly gestational hypertension and diabetes. Most admissions occurred during the antenatal period (Table 2). Miglani et al. found obstetric haemorrhage to be the leading cause (37.1%) and hypertensive disorders in 25.8% of cases, both of which align with our findings. They did not detail individual comorbidities but emphasised systemic delays and illness severity.^[17] Parihar et al. reported hypertensive disorders of pregnancy as the main cause (36.09%), followed by obstetric haemorrhage (33.10%). Pre-existing medical illnesses were found in 27.12% of patients, with haematological disorders being the most frequent (10.62%).^[18]

Rajendra et al. also noted haemorrhage (30.58%) and hypertensive disorders (28.23%) as the leading obstetric causes. Additionally, tropical infections (11.17%) were common non-obstetric causes, including swine flu, hepatitis, dengue, and encephalitis.^[14] Das et al. reported haemorrhage with hypovolemic shock in 34.4% of cases, refractory seizures (likely eclampsia) in 21.9%, followed by postpartum sepsis (6.3%) and rare conditions such as leptospirosis with hepatitis E (3.1%).^[12] Sailaja et al. also reported hypertensive disorders (24.2%) and obstetric haemorrhage (23.1%) as the most common causes. Additionally, 57.14% had associated medical conditions, with renal failure (22%) and PRES (13%) being notable complications.^[15]

The most common surgical intervention was caesarean delivery, followed by hysterectomy and

other uterine procedures. A small proportion of patients did not require surgery. Supportive care included ventilatory support, blood transfusions, and inotropic therapy (Table 3). Das et al. reported that 53.1% of patients received blood transfusions. Mechanical ventilation was associated with higher mortality, although specific rates were not provided, and a significant association between transfusion and mortality was noted ($p = 0.008$).^[12] Parihar et al. observed that 70.23% of patients underwent caesarean delivery, 17.7% required mechanical ventilation, 1.72% needed dialysis, 72.41% received blood components, and all cases involved advanced monitoring.^[18] Rajendra et al. reported higher rates of mechanical ventilation (67%) and vasoactive drug use (32.5%).^[14] Sailaja et al. noted mechanical ventilation in 54.9% (mean duration 2.72 days), transfusions in 46.1%, dialysis in 10.1%, and emergency caesarean sections in 34.1% of patients.^[15] Caesarean delivery and supportive care were commonly needed, with similar intervention patterns reported across studies.

Most patients stayed in the ICU for less than a week, with a smaller group requiring an extended stay. The overall survival rate was high, with minimal mortality (Table 4). In contrast, Miglani et al. reported a mean ICU stay of 3.18 ± 2.4 days and a maternal mortality rate of 30.6% (38 deaths), with poor outcomes linked to delays and higher APACHE II scores (mean 14.77 ± 6.85).^[17] Parihar et al. reported a mean ICU stay of 3.4 days, with 70.11% staying for 1–3 days. Maternal mortality was 11.95%, with hypertensive disorders accounting for 61.85% of deaths.¹⁸ Okafor et al. reported a shorter average ICU stay of 2.5 days and a higher mortality rate of 33.3% (6 deaths), with most deaths due to eclampsia and haemorrhage.^[16] ICU stay was generally short with low mortality in our study, contrasting with higher mortality rates reported in other studies despite similar durations of stay.

Limitations

This single-centre study at a secondary care hospital may limit generalisability, lacked long-term follow-up, and depended on hospital records, which may have missed some clinical details.

CONCLUSION

Most obstetric ICU admissions were young primiparous women from rural areas, mainly due to postpartum haemorrhage and hypertensive disorders. Many required ventilatory support, transfusions, and major surgeries, such as caesarean sections and hysterectomies. Despite the severity, the maternal survival rate was high. Early referral, quality antenatal care, and a multidisciplinary approach are essential. Strengthening infrastructure and establishing obstetric intermediate care units can improve outcomes in low-resource settings.

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