

A Study on Obstetric Admissions to HDU/ICU in a Tertiary Care Centre

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Abstract

Background: Pregnant women are at risk to develop complications due to illness related to pregnancy or due to aggravation of pre-existing disease. Those patients with critical illness require close monitoring and intensive care. To determine the current spectrum of diseases requiring admissions in High dependency unit (HDU)/intensive care unit (ICU) at a tertiary care hospital. **Methods:** A retrospective case series study and analysis of data from obstetric patients admitted for critical care management. **Results:** A total of 102 (1.6%) of patients among admitted to the hospital required ICU admissions. Among them 14% of patients were admitted to ICU for ventilator support. Pre-eclampsia and obstetrical hemorrhage were the common diagnosis and 9.8% of maternal deaths were seen in this group. **Conclusion:** Critically ill obstetric patients require a team approach of the obstetrician, anesthesiologist and intensive care specialist for the optimal care of these patients.

Keywords: Critical care in obstetrics; High dependency unit; Intensive care unit; Maternal mortality.

Introduction

Health of a woman reflects health of a family and hence the nation. Maternal mortality is an important indicator of

maternal health [1]. Pregnancy is a normal physiologic process with the potential for pathologic states. Critical illness in pregnant women may result from deteriorating preexisting conditions, diseases that are co-incidental to pregnancy, or pregnancy-specific conditions [2].

Approximately 800 maternal deaths occur daily worldwide¹. Maternal mortality rates remain relatively high in India although there is a declining trend in recent years. The National Family Health Survey 4 from India (2015–2016) reported that institutional births increased from 38.7% to 78.9%, and child births by caesarean sections increased to 17.2% from 8.5%. The maternal mortality rates (per 100,000 live births) have also shown a decline from 254 in 2004–2006 to 167 in 2011–2013 but still lagging behind of 140 by 2015 as per millennium development goals (MDG) [1-5].

Maternal mortality is just tip of iceberg with a vast base of near miss cases of severe acute maternal morbidity which require urgent medical intervention to prevent likely death of mother. The global prevalence varies from 0.01-8.23%, with case fatality rate 0.02-37%. About 1-3% of obstetric patients require critical care for respiratory support antenatally and for hemodynamic instability in postpartum period [1-4].

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Obstetric patients are young with incidence of high-risk pregnancy of approximately 15% in India, but any pregnant woman can develop life threatening complications. There are two categories of obstetric complications like postpartum haemorrhage, pre-eclampsia, abruption, rupture uterus etc. requires skilled obstetricians with intensive obstetric care and other category with preexisting co-morbid medical conditions requiring multidisciplinary approach [1-2].

In India most of the public health facilities do not have separate special care unit for these patients. Timely care to these critically ill pregnant women with team of trained professionals is essential. Dedicated high dependency unit (HDU) is a requisite in all obstetric units.

Obstetric High dependency unit are units for pregnant women (PW) who need more intensive observation, treatment and nursing care than routine ward but slightly less than that given in intensive care. It is a step down, step up, progressive and intermediate care units with close monitoring [1,2].

Obstetric Intensive care unit is an ICU dedicated to manage only obstetric patients having critical obstetrical, medical or surgical complications. Conditions requiring admissions to ICU include multiorgan involvement/failure necessitating care of intensivists and superspecialists like nephrologist, cardiologist, pulmonologist etc.

Hybrid model (Obstetric ICU and Obstetric HDU) have few ICU beds and few HDU beds with a dedicated team for managing critically ill patients.

Obstetric patients may require admission either in the obstetric HDU or ICU if they have

Hemodynamic instability

Respiratory dysfunction

Neurological complications

Acute lung injury

Haematological conditions

High dependency care unit admissions are for single organ dysfunction, requiring minimal oxygen support, blood transfusion or noninvasive monitoring. Obstetric ICU admissions are for invasive monitoring, ventilator support, ionotropic support, two or more organ support, renal replacement therapy etc [1-6].

Antenatal period, intra-partum period and puerperium can be complicated by aggravation of a pre-existing illness, complications of the delivery or the pregnancy itself leading to severe maternal morbidity necessitating intensive care unit (ICU) admission [7-10].

This study was undertaken with objective to ascertain the prevalence, causes and outcome of critically ill obstetric patients admitted to the HDU/ intensive care unit (ICU).

Materials & Methods

A retrospective study was carried out from 01/08/2018 to 31/01/2019 in our tertiary care hospital & teaching institute. The hospital has an 4+8 bedded hybrid model of HDU/ICU for Obstetric patients. The hospital is a referral center for cases from various peripheral hospitals.

The ICU in our hospital is managed by the anesthesiologists, but the obstetric team decides about admissions. All critically ill obstetrics patients who require hemodynamic monitoring and vasopressor support, invasive or non - invasive ventilator care and also patients with severe organ dysfunction are admitted to the ICU. Medical and surgical consults are taken as and when required.

Table 1: Showing the Criteria for admissions in obstetric high dependency unit/intensive unit

Obstetric high dependency unit	Obstetric intensive care unit
Systolic BP < 90 or > 160 mm Hg	Systolic BP < 80 or 30 mm Hg below patient's baseline
Diastolic BP < 50 or > 110 mmHg	Heart rate < 50 or > 140 beats /min.
Heart rate < 60 or > 110/min	Respiratory rate < 8 or > 35 per min.
Respiratory rate > 25 per min.	Urine output < 400 ml in 24 hrs unresponsive to routine measures
Urine < 0.5 ml/kg/hour (30 ml/hr)	Unconscious patient with Glasgow coma scale < 8 in nontraumatic coma
Any organ dysfunction	SaO ₂ < 90% on supplemental oxygen
	Disseminated intravascular coagulation
	Need for ionotropic, respiratory support
	Serum sodium < 110 or > 160 mmol/L
	Serum potassium < 2.0 or > 7.0 mmol/L,
	pH < 7.1 or > 7.7
	Multiorgan failure, ARDS

BP-Blood pressure, SaO₂-oxygen saturation, ARDS-Acute respiratory distress syndrome

Results

A total of 102 obstetric patients were admitted to HDU/ICU during this period. On admission etiologic factors leading to the need for critical care were analyzed. A detailed study was made of their management and outcome. The collected data has been shown in the Table 2-7.

Table 2: Patient Characteristics.

Characteristics	Number	Percentage (%)
<i>Age</i>		
< 20 yrs	25	24
21-25 yrs	39	38
26-30 yrs	28	27
31-35 yrs	07	6.8
>35 yrs	01	0.9
<i>Parity</i>		
Primigravida	26	25
Multigravida	76	74
<i>Hospital admission</i>		
Direct	21	20
Referral Case	81	79
Booked	90	88
Unbooked	12	11

During the study period a total of 8510 admissions for obstetric reasons and a total of 6216 deliveries. Admissions included pregnant women with antenatal complications, deliveries, abortion and its complications, ectopic pregnancy, obstetric haemorrhage and puerperal complications. 1.1% of total obstetric admitted patients required ICU admissions and 1.6% of deliveries required critical care.

Age of the patient ranged from 16-37 years, most of the pregnant mothers are between 20-30 years; 25% of them are primigravidas, 79% are referred cases from peripheral hospitals and 11% of them were unbooked.

Table 3: Timing of admission

Time	N = 102
I st trimester	02
II nd trimester	10
III rd trimester	57
Post-partum	22
Post- abortal	01
Ectopic Pregnancy	10

Most of the admissions (79) were in 3rd trimester and post-partum period, around 10 in 2nd trimester, another 10 constitutes ruptured ectopic cases.

Table 4: Primary patient diagnosis

Etiology	N = 102
<i>Pre-eclampsia & its complications</i>	
Severe Pre-eclampsia	08
Eclampsia	21
HELLP syndrome	06
Abruption	05
Inversion of uterus	01
Post - partum hemorrhage	11
Rupture uterus	01
Puerperal sepsis	06
Heart disease	04
Diabetes	01
Respiratory (pneumonitis)	02
Ectopic pregnancy	10
Fever	02
Blood reaction	01
Intractable vomiting	01
Anemia	10

Primary diagnosis was pre-eclampsia and complications in 35 of cases, next to this was haemorrhage and anemia in 25 (15+10) cases. Ruptured ectopic pregnancies were next common condition requiring admission to HDU, Other conditions were puerperal sepsis, cardiac diseases, inversion of uterus, rupture of uterus, bronchial asthma, pneumonitis, dengue fever, hyperemesis and severe blood reaction in one of the case.

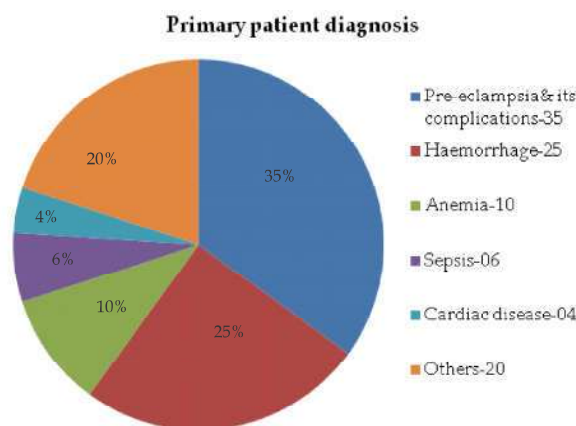


Table 5: Interventions done in obstetric HDU / ICU

Interventions	Frequency
Mechanical ventilation	15
Blood and blood products	48
Inotropes	12
Antihypertensives	10
Anticonvulsants	30
Peripartum hysterectomy	03
Balloon tamponade	05
Uterine artery ligation	04

Out of these, 15 patients required ventilation, blood and blood products were used in 48 cases, inotropes in 12 cases, anticonvulsants in 30 cases, antihypertensives in 10 cases. Balloon tamponade was done in 5 cases and uterine artery ligation in 4 cases. Peripartum hysterectomy was done in 3 cases for adherent placenta, atonic PPH with failed conservative treatment and for traumatic PPH.

Table 6: Indications for mechanical ventilation in obstetric HDU / ICU

Indication	Number
Acute respiratory failure	00
Hemodynamic failure	09
Impaired consciousness	02
Postoperative ventilation	03
Blood transfusion complication	01

Table 7: Causes of maternal death in obstetric HDU / ICU

Primary cause	Number of deaths
Hypovolemic shock	02
Multiorgan dysfunction syndrome	01
Sepsis	02
DIC	01
Pulmonary edema	01
Total	07

There were 7 maternal deaths during this period, the causes were sepsis (2-postabortal, puerperal) hemorrhagic shock (2), multiorgan dysfunction (1), DIC (1) and, pulmonary edema (1). Another three deaths occurred in the dept. of medicine after shifting for dengue shock syndrome, acute renal failure and unexplained thrombocytopenia.

Discussion

Critical illness may complicate any pregnancy. Early warning scores can predict clinical deterioration [2]. Timely delivery improves not only maternal outcome but also foetal outcome. No efforts should be spared in the management of critically ill obstetric patients because their outcomes are often dramatically better than expected from the initial severity of illness.

In our study 1.1% of total obstetric patients required ICU admissions. Richa et al. in their study found 0.24% of deliveries [11]. In study of Chawla et al. 0.26% of total obstetric patients required ICU admissions, [12] Muench et al., study critical care required for 1.3% of 2565 women admitted for delivery [13].

Hypertensive disorders and their complications are most common reasons for maternal morbidity (35), followed by obstetric haemorrhage and anemia (25). In study of Richa et al. pre eclampsia (62%) and obstetric haemorrhage (18.3%) were common causes of ICU admissions [11]. Hypertensive disorders of pregnancy (50%) and sepsis (17%) were the two main obstetrical conditions for maternal illness in study of Bibi [14].

Our study showed use of blood and blood components in 48 of cases, and mechanical ventilation in 15 cases. Chawla et al.'s study showed 46% of patients with respiratory insufficiency and 31% required ventilator support along with hemodynamic instability [12]. Bibi in their study showed 40% of patients with hemodynamic instability [14].

Our study showed 7 maternal deaths which is very low compared to other studies. Two of our ICU patients left against medical advice (LAMA), and three patients shifted out for dialysis, unexplained thrombocytopenia, and dengue shock syndrome were also died. 79% of our patients admitted to ICU presented in third trimester and in postpartum period indicating the most critical period during pregnancy.

Conclusion

A good obstetric care, early assessment and intervention of critically ill patients with provision of ICU care through a team approach involving obstetricians and anesthesiologists is essential.

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