

## Critical Analysis of Obstetrics Patients Admitted In HDU and ICU in A Tertiary Care Hospital-A Retrospective Study

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### Abstract

**Introduction:** Admission of obstetric patients occur approximately at 0.1-0.9% of the deliveries. Overall maternal death rate in the ICU varies from 3.4-21%. Inadequate knowledge about the illness and infrequent admission of the obstetric patients results in high mortality and morbidity. WHO states that, "there is a story behind every maternal death or life-threatening complication". So a better knowledge of the spectrum, characteristics, and outcomes of the disease involving this group of patients is the first step towards achieving prevention and hence, reduction of both maternal morbidity and mortality.

**Materials and Methods:** Critical care is an umbrella term which includes the care given to critically ill patient requiring high dependency care or intensive care. Competent staff and setup for management of obstetric emergencies and critically ill patients. Retrospective analysis of a total of 173 patients admitted in HDU and ICU in Sri Ramachandra Medical College from 1<sup>st</sup> June 2017 to 30<sup>th</sup> November 2017 falling into levels I, II and III according to critical care guidelines formulated by Royal college of Obstetrics and Gynecology, Ireland.

**Results:** Of the 4418 obstetric patients admitted in SRIHER, 173(3.9%) patients required admission in HDU and ICU. Of which only 23/173(13.2%) required ICU care. Indications requiring LEVEL III critical care included hypertensive disorders (35%) followed by hemorrhage (20%). Sepsis and cardiac disorders contributed a small number. 82% of patients admitted in HDU required level I of critical care followed by Level II. A total of 5 patients required massive blood transfusion.

**Conclusion:** There was a direct correlation between the duration of surgery and amount of blood loss. However, no statistically significant correlation was observed between the duration of stay in HDU and duration of surgery or amount of blood loss. A well defined guidelines needs to be formulated for management of critically ill obstetric patients.

**Key Words:** ICU, HDU, critical care.

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### I. Introduction

Management of the critically ill obstetric woman at an ICU is a unique challenge to ICU Physicians and obstetricians. Admission of obstetric patients to ICU occur approximately at 0.1-0.9% of the deliveries. Overall maternal death rate in the ICU varies from 3.4-21%. Inadequate knowledge about the illness and infrequent admission of the obstetric patients results in high mortality and morbidity.<sup>1</sup> WHO states that, "there is a story behind every maternal death or life-threatening complication". So a better knowledge of the spectrum, characteristics, and outcomes of the disease involving this group of patients is the first step towards achieving prevention and hence, reduction of both maternal morbidity and mortality.<sup>2,3</sup> The challenge faced in the treatment of this patient population are even greater due to the fact that sometimes two lives are endangered simultaneously. From Indian perspective, there are relatively few reports and this study attempts at evaluating the occurrence, indications, course, interventions, and outcome of obstetric patients admitted to ICU of a tertiary referral hospital.<sup>4</sup>

Though pregnancy and labor are considered a physiological process the potential for catastrophic complications is constant and may develop in a matter of minutes. There are approximately 118 life threatening events of 'near miss mortality' or 'severe acute maternal morbidity' (SAMM) for each maternal death. Global prevalence of SAMM (defined as severe life threatening obstetric complication necessitating urgent medical intervention in order to prevent likely death of the mother) varies from 0.015 to 8.23%. It is these 'near misses'

or 'SAMM' which require High dependency unit (HDU) interference.<sup>5,6,7</sup> The UK Department of Health defined HDU care as a level of care which lies in between a general ward and an intensive care unit (ICU). It typically involves the patients with single organ failure and patients who are at a high risk of developing life threatening complications.<sup>8</sup>

## II. Materials And Methods

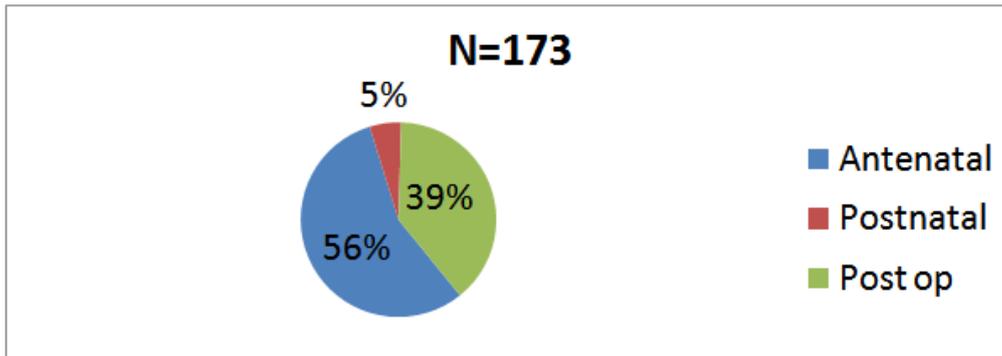
This study was conducted in Sri Ramachandra Institute of Higher Education and Research (SRIHER) from 1<sup>st</sup> June 2017 to 30<sup>th</sup> November 2017. It was a retrospective analysis of a total of 173 patients admitted in HDU and ICU falling into levels I, II and III according to critical care guidelines formulated by Royal college of Obstetrics and Gynecology, Ireland. Objective was to analyse Demographic details, treatment details, duration of stay, duration and type of procedure, amount of blood loss in patients admitted over the same period falling into the above mentioned category. Includes antenatal and immediate post natal patients.

### Examples of Maternity Care Required at ICS Levels of Support for Critical Care (Saravanakumar et al., 2008)

Level of Care	Maternity Example
<b>Level 0:</b> Normal ward care	Care of low risk pregnant woman
<b>Level 1:</b> Additional monitoring or intervention, or step down from higher level of care	<ul style="list-style-type: none"> <li>• Risk of haemorrhage</li> <li>• Oxytocin infusion</li> <li>• Mild pre-eclampsia on oral anti-hypertensive/fluid restriction etc.</li> <li>• A woman with a medical condition such as congenital heart disease, or insulin dependent diabetes.</li> </ul>
<b>Level 2:</b> Single organ support	<p><b>Basic Respiratory Support (BRS)</b></p> <ul style="list-style-type: none"> <li>• 50% or more oxygen via face-mask to maintain oxygen saturation</li> <li>• Continuous Positive Airway Pressure (CPAP), Bi-Level Positive Airway Pressure (BIPAP)</li> </ul> <p><b>Basic Cardiovascular Support (BCVS)</b></p> <ul style="list-style-type: none"> <li>• Intravenous anti-hypertensive, to control blood pressure in pre-eclampsia</li> <li>• Arterial line used for pressure monitoring or sampling</li> <li>• CVP line used for fluid management and CVP monitoring to guide therapy</li> </ul> <p><b>Advanced Cardiovascular Support (ACVS)</b></p> <ul style="list-style-type: none"> <li>• Simultaneous use of at least two intravenous, anti-arrhythmic/anti-hypertensive/vasoactive drugs, one of which must be a vasoactive drug</li> <li>• Need to measure and treat cardiac output</li> </ul> <p><b>Neurological Support</b></p> <ul style="list-style-type: none"> <li>• Magnesium infusion to control seizures (not prophylaxis)</li> <li>• Hepatic support</li> <li>• Management of acute fulminant hepatic failure, e.g. from HELLP syndrome or acute fatty liver, such that transplantation is being considered</li> </ul>
<b>Level 3:</b> Advanced respiratory support alone, or support of two or more organ systems above	<p><b>Advanced Respiratory Support</b></p> <ul style="list-style-type: none"> <li>• Invasive mechanical ventilation</li> </ul> <p><b>Support of two or more organ systems</b></p> <ul style="list-style-type: none"> <li>• Renal support and BRS</li> <li>• BRS/BCVS and an additional organ supported</li> <li>• Intracranial pressure monitoring</li> </ul>

**Statistical Analysis:** The data was scrutinized by experienced intensivists and statistical analysis was done by using fractional percentage and Chi-square test. The number of patients requiring high dependency unit (HDU) or ICU admissions was based on the requirement on single organ system support with acute or acute on chronic single organ failure and step up or step down support between different levels of care.

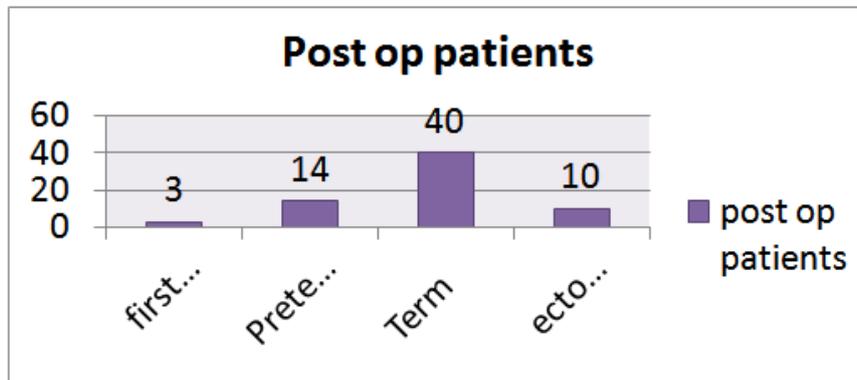
**III. Results**  
**Total Distribution**



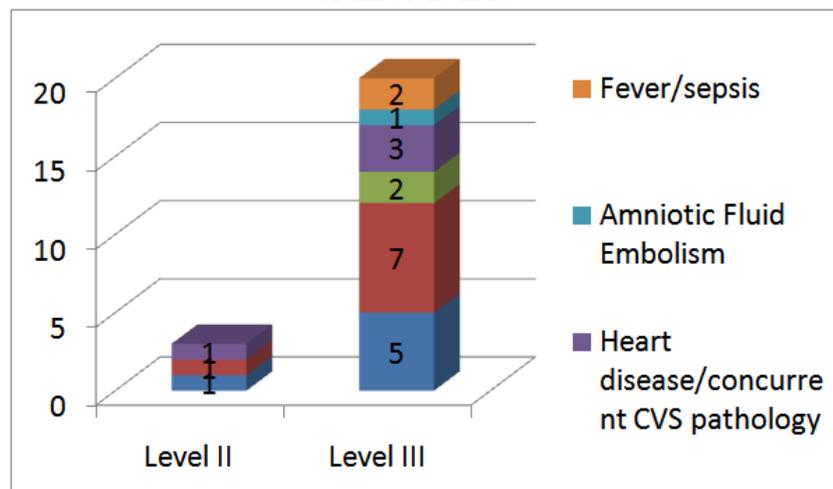
**POST OPERATIVE DAYS ADMISSIONS IN HDU**

Post operative day admissions	LSCS	laparotomy	Obstetric Hysterectomy	Uterine artery Embolism	Hysterotomy
First POD	47	10			
Second POD	1				1
Third POD	3		1		1
Others	2			1	

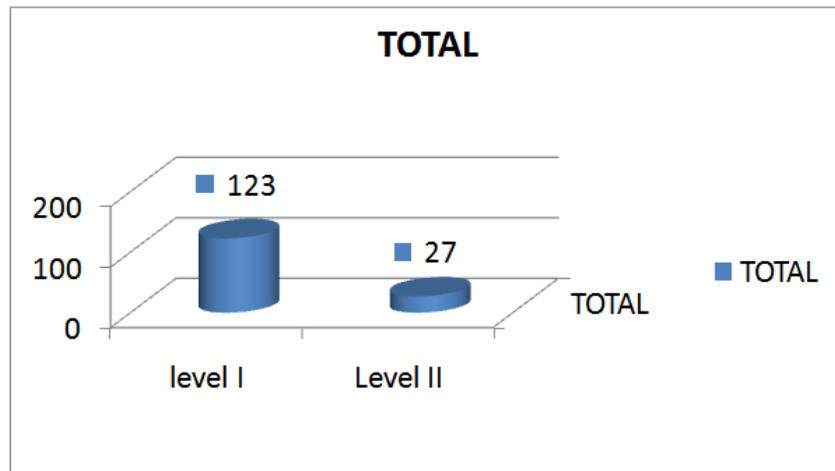
**POST OP PATIENTS**



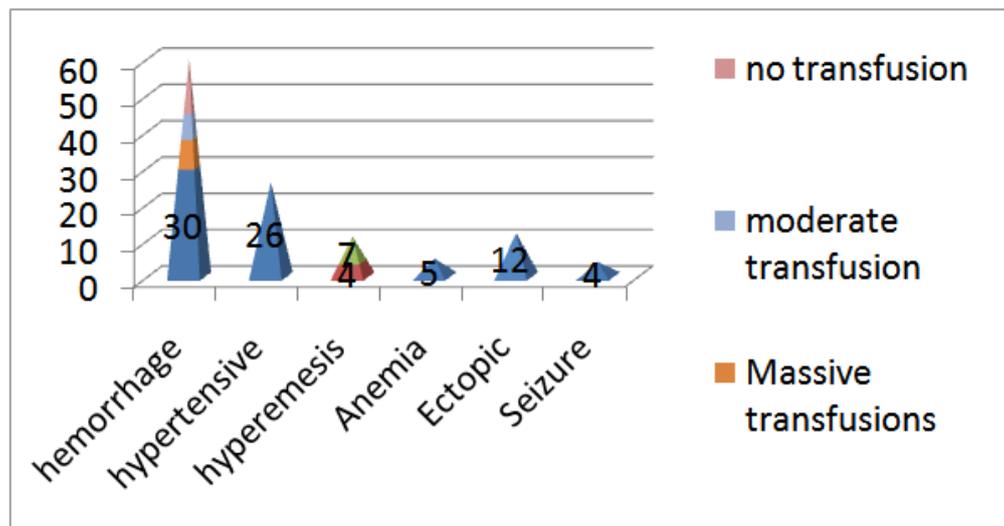
**Admissions in ICU**



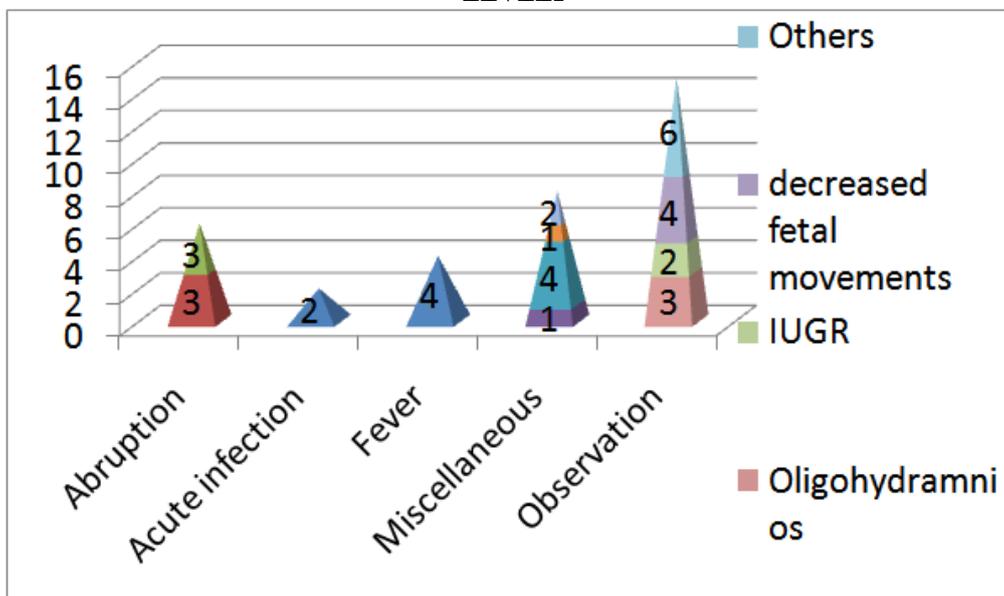
DISTRIBUTION IN HDU



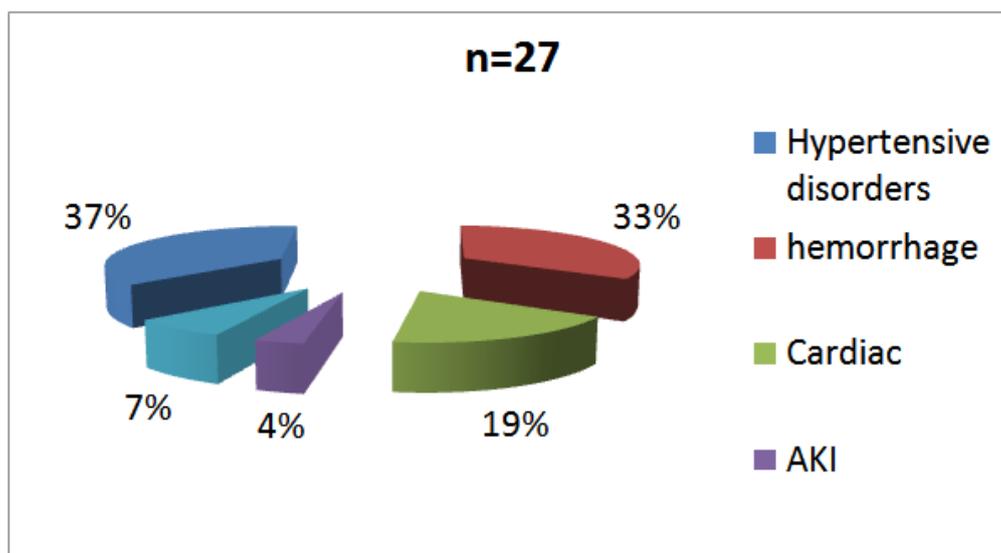
LEVEL I



LEVEL I



LEVEL IIIN HDU



Number of women requiring ICU care was 23(13.2%).All Level III patients required ICU care. This included hypertensive disorders (35%)followed by hemorrhage (20%) while sepsis and cardiac disorders formed a small number. Of the 30 level II patients, 3 were in ICU initially and 27 were monitored in HDU as the case necessitated. Level II patients in the ICU, were the patients who were on multiple infusions of antihypertensives but not on mechanical ventilation or those who required single organ support in the form of haemodialysis. 82% of patients admitted in HDU required level I of critical care followed by Level II.A total of 5 patients required massive blood transfusion.

Of the 30 women who required Level II of Critical care, 27 required monitoring in the HDU and this spectrum included the patients who required Magnesium Sulphate infusion or IV Antihypertensives for severe pre-eclampsia, need for Basic Respiratory Support for maintaining saturation.

86.9% (n=20) of the patients admitted in ICU required invasive mechanical ventilation in the form of ventilatory support. Two patients required Haemodialysis secondary to Acute Kidney Injury. There was one maternal death. Cause of death being Disseminated Intravascular Coagulation and shock secondary to abruption, hemorrhage and multi-organ failure.

For n=67,mean duration of stay in HDU was found to be 40.38 hrs(SD=29.54), while mean duration of surgery was found to be 70.07min(SD=28.33 ) and mean blood loss was841.79 ml(SD=245.19). Duration of surgery and amount of blood loss for total post op patients(n=67) was correlated and p=0.00. Duration of surgery and stay in HDU correlated(p=0.73). Duration of stay in HDUwith amount of blood loss during surgery (p=0.36)

#### IV. Discussion

Despite a series of physiological alterations in pregnancy, most women complete pregnancy uneventfully, but a few of them develop complications that may require ICU admissions. During the 6.5-year study period, obstetric admissions to the ICU represented 0.39% of all deliveries and 0.41% of all those admitted to the ICU.<sup>9</sup> This is comparable with other studies (0.1-0.9%). These variations might be due to differences in defining major morbidity criteria for ICU admission and availability of an alternative facility for intermediate care. The relatively high admission rate in our study might be due to the lack of a HDU, where patients not suitable for ward observation were transferred to the ICU. Only 24.6% of admissions were antepartum which is in agreement with earlier observations (22.1-62.4%).<sup>10</sup> Majority of the admissions are due to obstetric as compared to nonobstetric indications. This is similar to the study reported by Vasquez *et al.* in 2007. It was observed that the associated medical disorders contributed to 75% of the antepartum admissions while obstetric disorders comprised 67.3% in the postpartum period. These observations are comparable to an earlier study by Karnad *et al.* in 2004.<sup>11</sup>

According to Lueng *et al* who did a 10 year retrospective review, major obstetric hemorrhage 18 (27.7%) and pregnancy-related hypertension with its complications 17 (26.2%) were the two main primary diagnoses at the time of admission. Both are associated with increased risk of maternal morbidity and mortality.<sup>12</sup> The mortality rate was found to be higher in the hemorrhage group (44.4%) as compared to the hypertension group (35.2%). Early detection and timely appropriate intervention might avoid or minimize the

effects of such complications. Among patients with obstetric hemorrhage, majority had postpartum as compared to antepartum hemorrhage. Most of the cases had severe PPH which necessitated surgical interventions like emergency peripartum obstetric hysterectomy in 1 (1.5%) case, and uterine artery embolization in 1 (1.5%). A number of ICU scoring systems were used to determine the degree of severity and risk of mortality.<sup>13</sup> These include the simplified acute physiology score (SAPS), the mortality prediction model, the standardized hospital mortality ratio, and the acute physiology and chronic health evaluation (APACHE II). The most frequently used scores were simplified acute physiological score (SAPS II) and APACHE score. Both were not able to accurately predict the mortality in obstetric population. This was explained by the fact that obstetric patients are relatively young and the physiological alteration in pregnancy causes higher scores in the absence of any pathology. Therefore, it was not used in our study.<sup>14,15</sup>

## V. Conclusion

There was a direct correlation between the duration of surgery and amount of blood loss associated with it. No statistically significant correlation was observed between the duration of surgery and stay in HDU or between amount of blood loss and duration of stay in HDU. A well defined guidelines has to be formulated for management of critically ill obstetric patients.

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