**Scholars Journal of Applied Medical Sciences (SJAMS)**
***Abbreviated Key Title: Sch. J. App. Med. Sci.***
**ISSN 2320-6691 (Online)**
**ISSN 2347-954X (Print)**

A Unit of Scholars Academic and Scientific Society, India
www.saspublishers.com

Anesthesiology

# Profile of Patients Admitted in ICU with Obstetric Emergencies: An Observational Study

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**Original Research Article**

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**Article History**
*Received: 01.11.2018*
*Accepted: 05.11.2018*
*Published: 30.11.2018*

**DOI:**
10.36347/sjams.2018.v06i11.043

**Abstract:** Care of the critically ill obstetric patients is a unique challenge particularly because of its unpredictability. Pregnancy though physiological and can be associated with major maternal morbidity with potential catastrophic consequences requiring utilization of facilities of Intensive Care Unit (ICU). To study the profile of patients admitted in LD Tertiary Care ICU Hospital Dept of Obstetrics & Gynecology, Govt; Medical College, Srinagar. A hospital based observational study was conducted from June 2014 to June 2016. All obstetric admissions to the ICU up to 42 days postpartum were included. Detailed history taken and outcome noted. Results were subjected to statistical evaluation using SSP software. A total of 460 obstetric patients required ICU admission during the study period. This accounts for 2.83% of total hospital deliveries and 7.57% of all ICU admissions. Majority of patients (63%) were admitted during postpartum period. The leading obstetric indication for ICU admission was obstetric hemorrhages (23.9%). Ectopic pregnancy was common (12 patients) among the obstetric hemorrhages. In the present study maternal mortality was 4.56%, while 89.13% were improved after treatment. The main cause of maternal death was obstetric haemorrhage (42.85%). ICU interventions during the stay of the patients in terms of mechanical ventilation were used in 34.56% of cases. Other interventions included blood & blood product transfusion in 108 (23.47%), inotropes in 68 (14.78%), anti-hypertensive in 45 (9.78%), anticonvulsant in 55 (11.95%) & dialysis in 12 (2.6%) cases. The need of ICU admission has not changed over the past years. Pattern is same all over the world with hypertensive disorders and obstetric haemorrhage being the most common obstetric reasons for admission. Risk factors for admission included lesser gestational age, caesarean section, blood loss and co-morbid conditions. To reduce the mortality early referral to ICU so as to provide optimum care of circulation, blood pressure and ventilation was necessary so that the prevalence of multi organ failure can be minimized. To achieve all of these a team effort of all disciplines is required.

**Keywords**: Maternal mortality, PPH, Eclampsia, Intensive care unit, obstetric Hemorrhage, Critical obstetric patients, ICU outcome.

## INTRODUCTION

Despite the drastic decrease in maternal morbidity over the last few decades because of improvements in obstetric care, maternal mortality remains to be a challenge in the developing countries. Although patients receiving obstetric care are young and healthy in general, there is an indisputable potential for catastrophic complications related to the pregnancy and the delivery [1-3] maternal mortality is a basic health care indicator that reflects the health care adequacy of a country.

The maternal mortality in India is still 178 per 100000 live births despite different safe motherhood programmes. WHO depicts "there is a story behind every maternal death or life threatening complications [4]". Major cause of maternal mortality are haemorrhage, sepsis, hypertensive disorder of pregnancy, unsafe abortion, and obstructed labour. So better knowledge of the characteristic, treatment and outcome of these high risk patients will be a step ahead for reduction of maternal mortality and morbidity. Pregnancy and delivery of these high risk cases can involve complications that necessitate admission to critical care units. Critically ill obstetric patients are always a challenge to Intensive Care Unit (ICU) physicians and account for as much as 7% of the ICU admissions in developing countries, while they account

for a smaller proportion in developed countries [5-9]. This study was conducted to evaluate the incidence, indications, and outcomes of obstetric patients requiring admission to an intensive care unit (ICU) in a tertiary care hospital.

## MATERIALS & METHODS

A hospital based observational study was conducted in LD Tertiary Care ICU Hospital Dept of Obstetrics & Gynecology, Govt; Medical College, Srinagar from June 2014 to June 2016. LD is a tertiary care hospital with ICU facilities managed by anesthesiologists, with broad case mix and caters not only to its own patients but also to referrals from centre to periphery of state. The unit has facilities for ventilator support, non-invasive cardio-vascular monitoring and is close to operating room. The admission criteria into our ICU to any patient include the need for respiratory support or intensive therapy. The decision for admission is often taken by consultant in the ICU with consultant obstetrician.

All obstetric patients admitted to ICU either from the emergency room, the operating rooms, or from the service ward were enrolled in the study. The patients included all females admitted to the ICU during pregnancy or within 42 days of delivery. Data retrieved included age, parity, co-morbidity, obstetric history, mode of delivery, vital signs. Other data retrieved for each patient pertaining to ICU interventions were mechanical ventilation, use of control or artificial lines, blood products/transfusions, haemodialysis, radiological examination, anti-hypertensive treatment, inotropic support, and use of magnesium sulphate, length of ICU stay and outcome of such patients. The quantitative variables are presented by their frequency along with percentages. The quantitative variable (scale measurements) is presented by their mean± SD values.

## RESULTS

**Table-1: Demographic Characteristics**

| Age | NO. of cases | % |
|---|---|---|
| 25-30 | 177 | 38.47 |
| 30-35 | 168 | 36.52 |
| 35-38 | 115 | 25 |
| Parity | | |
| Primi | 198 | 43 |
| Multi | 210 | 45.65 |
| Grand Multi | 52 | 11.3 |
| Gestational age at the time of admission | | |
| Anepartum | 170 | 36.95 |
| Postpartum | 290 | 63 |

A total of 460 patients were admitted which was 2.83% of total ICU admissions and 7.57% of total deliveries. Among all emergency obstetric admissions (6074) only 2.83% needed ICU intervention. Most of the patients were 25-30year age group (38.47%) and multigravida (45%) was more as compared to primigravidas (43%). Only 236.95% patients were inantepartum period while majority of patients (63%) were admitted during postpartum period (Table 1). The main obstetric indications for ICU admission were obstetric haemorrhages (23.9%) followed by pregnancy-induced hypertension (10.43%) and post MTP complications (5.86%). PPH was the leading cause (88 patients) whereas only 12 patients had Ectopic pregnancy among the obstetric haemorrhages (Table 2).

**Table-2: Causes of ICU admission**

| Diagnosis | Number (n=460) | % |
|---|---|---|
| Obstetric Haemorrhages | 110 | 23.91 |
| Ectopic Pregnancy | 17 | 3.69 |
| PPH | 88 | 19.13 |
| Ruptured uterus | 48 | 4.34 |
| Hypertensive disorder of pregnancy | 20 | 10.43 |
| Heart Disease | 22 | 4.78 |
| Puerperal sepsis | 20 | 4.34 |
| Severe Anaemia | 19 | 4.13 |
| Post MTP complication | 27 | 5.86 |
| Hyperemesis gravidarum | 16 | 3.47 |
| Jaundice in pregnancy | 19 | 4.13 |
| HEELP | 13 | 2.82 |
| Eclampsia | 22 | 4.78 |

| | | |
|---|---|---|
| Preeclampsia | 19 | 4.13 |

Other indications were puerperal sepsis (4.34%), severe anaemia (4.13%), hyperemesis gravidarum (3.47%), and jaundice (4.13%). In the present study maternal mortality among the women admitted to ICU was 4.56%. The leading cause of maternal death was obstetric haemorrhage (42.85%) followed by sepsis (23.8%) (Table 3).

**Table-3: Maternal mortality and its cause in ICU**

| Cause | No. of cases (n=21) | % |
|---|---|---|
| Obstetric Haemorrhage | 9 | 42.85 |
| Sepsis | 5 | 23.8 |
| Medical disorder | 4 | 19.0 |
| PIH | 3 | 14.28 |

**Table-4: ICU intervention**

| Procedure | No. of cases (n=460) | % |
|---|---|---|
| Mechanical Ventilation | 159 | 34.56 |
| Blood or blood product transfusion | 108 | 23.47 |
| Ionotrops | 68 | 14.78 |
| Antihypertensive | 45 | 9.78 |
| Anticonvulsant | 55 | 11.95 |
| Dialysis | 12 | 2.60 |
| Surgical intervention | 13 | 2.82 |

Associated medical disorder and pregnancy induced hypertension each constitute 19% and 14.28% respectively for mortality. An ICU intervention during the stay of the patients in terms of mechanical ventilation was used in 34.56% of cases. Other ICU interventions included blood & blood product transfusion in (23.47%), inotropes in (14.78%), anti-hypertensive in (9.78%), anticonvulsant in (11.95%) & dialysis in (2.6%) cases. As a surgical procedure suction & evacuation was done only in (2.82) cases (Table-4). We had 4.56% mortality in ICU while 410 patients (89.13%) were improved after treatment. A number of patients (6.30%) had left the hospital against medical advice.

**Table-5: Maternal outcome**

| Outcome. | No. of Cases (n=460) | % |
|---|---|---|
| Improved | 410 | 89.13 |
| LAMA(Left against medical advice) | 29 | 6.30 |
| Death | 21 | 4.56 |

## DISCUSSION

Goals in the management of critically ill obstetric patients involve intensive monitoring and physiologic support for patients with life threatening but potentially reversible conditions [10, 11] ICU admission is management based criterion and therefore by definition leads to inclusion bias [11]. This is especially the case for tertiary care centres, where the threshold for ICU admission is high due to presence of obstetric high care units [11]. The majority of maternal deaths occur in the developing countries (99%) [5]. A relatively small number of obstetric patients develop complications that may require ICU admissions. Management of those critically ill patients requires multidisciplinary approach.

Critically ill obstetric patients who need ICU admission constitute 2.83% of all the deliveries in our hospital; compared to 0.87% in the study by Saha R *et al*. [12] and 0.8% by Verma *et al*.[13]. This is comparable with other studies. American academic of family physicians had mentioned 0.4% admissions of the total deliveries [6] Marbie and Sibai reported that 1% of women delivered at the University of Tennessee were admitted to Obstetrical ICU [7]. Only 0.4% of obstetrical patients needed ICU treatment in a study by Harris & Foley at the University of California, San Fransico[8]. Niyaz *et al*. reported obstetric patient's accounts for 0.41% of all ICU admission [9]. These variations might be due to differences in defining major morbidity criteria for ICU admission & availability of high dependency unit (HDU), an intermediate care unit. In our study a relatively high obstetric ICU admission might be due to lack of HDU. The rate is comparable with other studies also (0.1-0.9%)[14]. The slightly higher rate of ICU admission in our institution was explained by it being a tertiary referral centre. In developed countries, obstetric patients only account for

a small proportion (<2%) of ICU admissions, whereas the figure is up to 7% in India and the maternal mortality ratio also significantly higher in developing countries [15]. Obstetric patients constitute 7.57% of total ICU admissions in the present study, which was higher when compared to the study conducted in Nepal by Saha R *et al*. where obstetric patients constitute 4.32% of total ICU admissions [16]. Most of the women admitted to the ICU were young (mean age= 26.5±4.4 years), postpartum (n=290, 63%). These results were similar to study by Verma *et al.* Saha *et al*. Chawla *et al*. Gupta *et al*. and Ramachandra Bhat *et al*.[17, 18, 19-21].

Postpartum admissions of obstetric patients to ICU were significantly higher. This could be attributed to the hemodynamic changes in the postpartum period which show a 65% increase in cardiac output, acute blood loss during delivery and decrease in plasma oncoticpressure[22]. Secondly, there is a general reluctance to move a pregnant woman away from the proficiency of obstetrician's care unless it is absolutely necessary. Of all the admissions, 9.8% were completely unbooked and not investigated during the whole antenatal period, 69% were registered/ booked at other hospitals, referred to our hospital because of complications and 19% were booked in our hospital. These results were comparable to study conducted by Ashraf *et al.* where 60% cases are referred cases [23]. The majority of referred cases were from peripheral health centres and nursing homes which are poorly equipped to manage obstetric emergencies, in terms of blood components and ventilator support. Timely referral to a tertiary medical facility is an important predictor of the morbidity and mortality of patients admitted to ICU for further management and stabilization.

Major obstetric haemorrhage which includes PPH, APH, ectopic pregnancy & ruptured uterus were the most important cause of ICU admission (110, 23.9%). Hypertensive disorder in pregnancy was the second most cause of ICU admission (48, 10.43%). This is comparable with studies conducted by Munench *et al*. and Zwart *et al*. which shows haemorrhage & sepsis was the leading cause of ICU admission [20, 21]. In contrary to this Aldawood showed in his study that pregnancy-induced hypertension (PIH) was the most common obstetric indication for ICU admission followed by obstetric hemorrhage [24]. This may be due to better management of PIH in the labor wards in our study The maternal mortality was highest with haemorrhage group (42.85%) as compared to hypertension that was (19.0%). One hundred and fifty nine critically ill obstetric patients (34.56%) required mechanical ventilation during their stay in the ICU whereas only 27% of ICU obstetric admission required mechanical ventilation in Osinaike *et al*. study[22] Daniela *et al*. reported as high as 41% of patients requiring mechanical ventilation[19]. The most common indications for MV were acute respiratory failure and hemodynamic instability and moreover 4.34% of the patients in our study had sepsis, and the patients with sepsis were usually more ill and all of them required MV. The maternal mortality among the women admitted to ICU was 4.56%. In a study by Niyaz *et al*. the proportional death rate among obstetric patients in ICU was 33.8%.6 Ghike S, Asegaonkar P reported 31.91% of maternal mortality rate in obstetric ICU patients [23]. In our study relatively low maternal mortality may be due to increased number of cases who have left hospital against medical advice (LAMA) (6.30%) and their status could not be followed up. This increase number of LAMA cases is due to high cost of ICU care along with poor socio economic status of the patient.

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