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Research Article

Study of Obstetric Cases Admitted in ICU

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Abstract: The purpose of present study is to identify the risk factors responsible for complication leading to ICU admission and maternal outcome in terms of morbidity and mortality in a intensive care unit at Govt. Medical College Nagpur, Maharashtra. We carried out retrospective observational study. All patients admitted to ICU during pregnancy and up to 42 days of postpartum between 1st July 2012 to 30 June 2013 were studied. Demographic data, medical and surgical histories, all the events in obstetric patients were recorded. Data was analysed by using appropriate software. 170 obstetric patients were admitted to ICU representing 1.5% of deliveries. Mean age was 24.65±4.05. Mean gravidity were 1.73±0.95. The most common obstetric cause for admission was haemorrhage (n=52, 30.58%) followed by hypertensive disorder of pregnancy (n=48, 28.23%). The commonest Non-Obstetric cause was tropical infective cases (n=19 11.17%). The commonest intervention was mechanical ventilation (n=114, 67%) and vasoactive infusion (n=55, 32.5%). Maternal mortality was 52.9% (n=90). Amongst them 93.33% (n=84) were referred cases ours being tertiary care centre. 63.52% (n=108) were from rural area.55.29% (n=94) patients received antenatal care, of these only 16 (17.02%) were booked at our hospital. obstetric haemorrhage, hypertensive disorders of pregnancy, and tropical diseases like viral encephalitis, Dengue fever, malarial fever, viral hepatitis and swine flu. Amongst 90 cases of Non-Survivors, 62.22% (n=56) belongs to obstetric group and 35.55% (n=32) were of non-obstetric group. Amongst Non-survivors 57.7% (n=52) died within 48 hour of admission.

Keywords: Critical obstetric patients, Intensive care unit (ICU), maternal death.

INTRODUCTION

Obstetric patients are young and healthy [1]. However, the potential for catastrophic complications are real, and despite therapeutic advances of last few decades, maternal mortality and morbidity continues to occur. This may be related to pregnancy itself, aggravations of pre-existing illness, or complications of operative delivery. Critically ill obstetric patients are a challenge to intensive care units (ICU) physicians.

In developed countries obstetric patients account only for small proportion (0.1-0.9%) [2, 3] of ICU admissions, where as this figure rises to 8.5% in developing countries. Maternal mortality ratio is also higher in most of such developing countries. In developed countries, morbidity rates range from 0.05 to 1.7%. In countries with low resources, it ranges from 0.6 to 8.5%.

Various scoring systems like acute physiology and chronic health evaluation (APACHE), mortality probability model (MPM), Glasgow coma scale (GCS) have been used to predict the outcome of obstetric patients in developed world [4]. But in ICU from Indian subcontinent, seldom ever participated in these studies as dedicated ICU is not available in developing countries [5, 6].

Only few studies have been published concerning ICU admissions of obstetric patients in developing world, hence the present study was conducted to evaluate the obstetric admissions to ICU in the settings of tertiary referral hospital with certain limitations in resources, in an attempt to identify the risk factors influencing maternal outcome, reasons of admissions and maternal outcome in terms of maternal mortality and morbidity

Aim and Objective

To identify the risk factors responsible for complication leading to ICU admission and to identify maternal outcome in terms of morbidity and mortality

MATERIALS AND METHODS

The present study was undertaken in department of Obstetrics and Gynaecology Government Medical College, Nagpur from 1st July 2012 to 30 June 2013. It was retrospective observational study.

Permission from ethics committee had been taken. Study population consist of 170 obstetric cases admitted in ICU. The total numbers of deliveries during this period were 10923.

Sample size was calculated with reference by study Baloch R *et al*. [6] study and on the assuming that proportion of subjects having hypertensive disorder of pregnancy are 36.2%.(relative precision=20%, confidence level=95%)

Inclusion criteria: All obstetric patients admitted in ICU

The data retrieved for analysis contained age, parity, gestational age, booking status, area of residence, mode of delivery, indication for ICU admission, intervention in ICU, length of ICU stay and Outcome. The causes for admission To ICU were classified as obstetric and Non-Obstetric. These patients were followed till discharged from hospital or till death which ever occur first.

Statistical analysis

Categorical data as reported as percentage, continuous data as mean ± SD. The data was analyzed using Epi info 3.4.3 software. Comparisons between categorical variables were performed with chi square test. P<0.05 was taken as significant.

RESULTS

The total admissions in ICU were 170 women i.e 1.5% of total deliveries.

Table 1: Demographic parameters

Demographic parameters	Observations
Mean age in years	24.65±4.05
Mean gravidity	1.73±0.95
Rural Urban	63.52% 36.47%
Booked Unbooked	55.29% 44.70%
Literate Illiterate	74.70% 25.30%
Duration of pregnancy 1. 1st trimester 2. 2nd trimester 3. 3rd trimester 4. Postpartum	 2.9% 10% 65.29% 21.76%

Table 1 shows the mean age of patient was 24.65±4.05. The mean gravidity was 1.73±0.95. 63.52% patients in our study were from rural area and 36.47% were from urban area. 127 (74.7%) patients were literate while 43 (25.3%) were illiterate. In our study we found that 94 (55.29%) were booked while 76 (44.70%) were unbooked cases. Among 94 booked cases only 16 (17.02%) cases were booked at our hospital while 78 (82.97%) cases were booked at primary health centre, rural health centre and district hospital and private hospital. In our study antepartum admissions (n=133, 78.23%) were significantly more as compared to postpartum admissions (n=37, 21.76%) (p<0.05)

Table 2: According to interventions done before shifting to ICU

Interventions	No. of cases	Percentage
Vaginal delivery	63	37.05
Caesarean delivery	83	48.82
Undelivered	17	10
Laparotomy	07	4.1
Hysterectomy done	11	6.4
B-lynch sutures	05	2.9
Stepwise devascularisation	09	5.2

Table 2 depicts among 170 cases, 63(37.05%) cases delivered by vaginal route, 83(48.82%) cases needed caesarean section, 17(10%) patients remained undelivered. Laparotomy was done in 7 (2.9) cases out of which 2 cases had ruptured ectopic pregnancy, one had ruptured rudimentary horn, 4 had ruptured uterus.

Obstetric hysterectomy was done in 11 (6.4%) cases out of which 2 cases were of rupture uterus, 5 cases had PPH, 4 cases had accidental hemorrhage with PPH. B-lynch suture to control PPH during caesarean section was needed in 5 (2.9%) cases. 5.2% cases required stepwise devascularisation.

Table 3: Distribution of cases according to obstetric and Non-obstetric reasons for ICU admissions

Obstetric causes	112(65.88%)	**Non-Obstetric causes**	58(34.11%)
Hypertensive disorders in pregnancy	48(28.23%)	Heart diseases for intensive monitoring	11
Preeclampsia	09	Pulmonary oedema	16
Eclampsia	21	Pulmonary embolism	03
HELLP syndrome	18	**Infective causes**	19(11.1%)
Obstetric haemorrhage	52(30.58%)	Viral hepatitis	03
Antepartum haemorrhage	11	Dengue fever	04
Postpartum haemorrhage	24	Malarial fever	08
DIC	10	Viral encephalitis	02
Ectopic pregnancy	03	Swine flu	01
Rupture Uterus	04	Acute gastroenteritis	01
Obstetric sepsis	10(5.88%)	**Surgical complications**	06(3.5%)
Peripartum cardiomyopathy	02(1.1%)	**Anaesthetic complications**	02(1.1%)
		Insulin dependent diabetes mellitus	01

Table 3 depicts that Obstetric complications (n=112, 65.88%) were significant cause of severe morbidity as compared to Non-obstetric (n=58, 34.11%). Of which obstetric haemorrhage (n=52, 30.58%) and hypertensive disorder in pregnancy (n=48, 28.23%) were found to be significant risk factor for ICU admissions ($p<0.05$). Some of the associated medical conditions were heart disease (n=11, 6.4%), pulmonary oedema (n=16, 9.4%),malarial fever (n=8, 4.7%), dengue fever (n=4, 2.3%) and viral encephalitis (n=2, 1.1%).

Table 4: According to interventions carried in ICU

Interventions	**Obstetric group**	**Non-Obstetric group**	**p-value**
Intubation and mechanical ventilation	77(68.75%)	37(63.79%)	0.51
Vasoactive infusions	47(40.79%)	08(13.79%)	0.0001
Dialysis	06(5.3%)	02(3.4%)	0.57
FFP transfusion	60(53.57%)	07(12.06%)	<0.001
Platelets transfusions	62(55.35%)	08(13.79%)	<0.001
Blood transfusions	89(79.46%)	19(32.75%)	<0.0001
Anticoagulant drugs	18(16.07%)	08(13.79%)	0.69
$MgSO_4$ therapy	40(35.71%)	00(0%)	<0.001
NTG drip	08(7.1%)	00(0%)	0.03
Antiarrhythmic drugs	00(0%)	07(12.06%)	0.0001

Table 4 shows that Intubation and mechanical ventilation was carried out in 77(68.75%) vs. 37(63.79%) cases in obstetric and Non-obstetric group respectively (p=0.51). Vasoactive drugs like Nor-adrenaline, Adrenaline and Dopamine was given in 47(40.79%) cases of obstetric and 08 (13.79%) cases of Non-obstetric groups. (p=0.0001) Dialysis was given in 06 (5.3%) cases of obstetric group and 02 (3.4%) of Non obstetric group (p=0.57). Blood transfusion was given in 89(79.46%) cases of obstetric group and 19 (32.75%) cases in Non-Obstetric group ($p<0.001$). Platelets transfusion and FFP transfusions were given in 62 (55.35%), 60 (53.57%) vs. 08 (13.79%), 07 (12.06%) cases in obstetric and Non-obstetric group respectively ($p<0.001$). Anticoagulant drugs were required in 18 (16.07%) cases of obstetric and 08 (13.79%) cases of Non-obstetric group (p=0.69). $MgSO_4$ therapy was given in 40 cases (35.71%) and NTG drip in 08 cases (7.1%), ($p<0.001$, p=0.03). Antiarrhythmic drugs were required in 7 patients of organic heart disease, no patients in obstetric group required them (p=0.0001)

Table 5: Distribution of cases according to stay in hours in ICU

Duration of stay in ICU	Non-survivors	Survivors
≤24 hours	37	09
25 to 48 hours	15	38
49 to 72 hours	11	19
> 72 hours	27	14
Total	90	80

Chi square for linear trend: 0.89, p=0.34 (Not significant)

Table 5 shows that amongst the Non-survivors 37 (41.11%) cases succumbed within 24 hours, 15(16.66%) cases died within 25-48 hours, 11(12.22%) cases died within 49-72 hours and 27(30%) cases died after 72 hours in ICU. So, it is evident that maximum number of mortalities i.e 52 (57.77%) died within 48 hours and all were referred to our hospital in critical condition.

Table 6: Distribution of cases according to cause of death in 90 patients

Primary cause of death	Number of deaths with (%)	Primary diagnosis	Number of deaths
MODS	24(26.6)	DIC	07
		Infective hepatitis	03
		HELLP syndrome	06
		eclampsia	01
		Dengue fever	01
		Malarial fever	01
		Postpartum haemorrhage	01
		Chorioamnionitis	01
		Surgical complications	03
ICH	13(14.4)	Preeclampsia	03
		Eclampsia	08
		HELLP syndrome	01
		Sickle cell disease	01
Peripheral circulatory failure	12(13.3)	Acute gastroenteritis	01
		Postpartum haemorrhage	09
		HELLP syndrome	01
		Antepartum haemorrhage	01
Respiratory failure	41(45.5)	Preeclampsia	03
		Eclampsia	07
		Puerperal sepsis	03
		Pulmonary embolism	03
		Pulmonary Oedema	04
		Malarial fever	07
		Dengue fever	03
		APH	01
		PPH	01
		HELLP syndrome	01
		Viral encephalitis	02
		Swine flu	01
		IDDM	01
		Peripartum cardiomyopathy	01
		Surgical complications	03

Table 6 depicts that there were 90 mortalities in our study. Amongst them 84 cases were referrals ours being Tertiary care centre. As a primary cause of death, Multiorgan dysfunctions was seen in 24 cases, Intracranial haemorrhage in 13 cases, peripheral circulatory failure in 12 cases, and respiratory failure in 41 cases. Primary diagnosis on admission was hypertensive disorders in pregnancy in 33 cases (36.66%), infective causes (viral hepatitis, malarial fever, Dengue fever, viral encephalitis, swine flu, gastroenteritis) in 18 cases (20.0%), obstetric haemorrhage in 20 cases (22.22%), sickle cell anaemia in 4 cases, heart disease in 3 cases and surgical complications in 6 cases.

DISCUSSION

Management of critically ill obstetric patients in intensive care unit is a challenge. Maternal mortality and morbidity are important quality assurance indicators. Pregnancy, delivery and puerperium can be

complicated by severe maternal morbidity necessitating Intensive Care Unit (ICU) admission. Management of the critically ill obstetric patients is very complex and requires cooperation of obstetrician and intensivists/ anaesthetists.

In the present study, we have tried to identify the risk factors responsible for ICU admission and outcome in terms of maternal morbidity and mortality. In present study 1.5% of total deliveries required ICU admission in 1 year of period.

Mean age of patients in our study was 24.65±4.05 which is comparable to study conducted by Kilpatrick S J *et al*. [7], Gupta S *et al*. [8] Ghike S *et al*. [9], which are 26±6, 25.21±4.07 and 26.05 respectively.

In this study primigravida were around 51.11%, where as multigravidae were 48.8%. Ours findings are comparable with those of Mowafy *et al*. [10], who have reported primigravida around 39.6% and multigravidae around 60.4%. Sheikh S *et al*. [11], in their study found 31.3% of primigravida, 78.7% of multigravidae.

In the study conducted by Gupta S *et al*. [8], found 45.83% were literate and 54.16% were illiterates. Bajwa S K *et al*. [12] found 45.90% cases were literate and 54.09% cases were illiterate. In present study we found 70.70% cases were literate (can read or write) and 25.30% cases were illiterate. Despite higher percentage of literacy status, ICU admissions are more may be due to low socioeconomic status or poor antenatal care or delay of referral services.

This finding is comparable with Bajwa S K *et al*. [12] and Bibi S *et al*. [13] in whose studies patients from rural area were 84% and 73% and urban area 16% and 27% respectively. In present study, maximum numbers of cases i.e. 63.52% were from rural area where as 36.47% cases were from urban area.

In present study we found 54.70% cases were booked and 45.30% cases were unbooked which is comparable to study conducted by Ghike S *et al*. [9] and Sheikh S *et al*. [11].

In present study 78.23% cases were antepartum admissions and 21.77% cases as postpartum admissions which were comparable to studies conducted by Sheikh S *et al*. [11] and Baloch R *et al*. [6]. In studies conducted by Sheikh S *et al*. [11] and Baloch R *et al*. [6] had more antepartum admission 78% and 72.4% respectively.

In our study 37.49% patients delivered vaginally 37.05% cases required caesarean section which is comparable to findings of sheikh S *et al*. [11] (vaginal-37.4%, caesarean-49.4%) and Baloch R *et al*. [6] (vaginal-37.49%). Laparotomy was conducted in 6% and 7% cases respectively in studies conducted by Sheikh S *et al*. [11] and Bibi S *et al*. [13] we did laparotomy in 4.1% cases. In present study 6.4% cases required obstetric hysterectomy which is comparable to study conducted by Bibi S *et al*. [13] which is 7%.

In a study conducted by Mowafy *et al*. [10] it was found that 76.92% cases were with obstetric causes and 34.12% cases were of Non-Obstetric causes. Leung N YW *et al*. [1] found 70% cases were admitted for Obstetric reason and rest (30%) for Non-obstetric reasons. In present study obstetric cases were 65.88% and Non-obstetric cases were 34.12%.

In present study Hypertensive disorders of pregnancy was found in 27.05% cases and obstetric Haemorrhage in 31.76% cases which is comparable to studies carried by Bhat PBR *et al*. [14], Baloch R *et al*. [6], Devbhaktuni P *et al*. [15] and Bajwa S K *et al*. [12].

In present study we had 6.47% cases of APH, 14.11% cases of PPH and 5.88%cases of DIC in obstetric haemorrhage while incidence of APH, PPH, and DIC in study conducted by Baloch R *et al*. [6] was 7.89%, 17.7% and 11.18% respectively which is comparable to my study.

In present study dengue fever was seen 2.35% cases which is comparable to studies conducted by Sharma S *et al*. [16] (6.8%) and Devbhaktuni P *et al*. [15] (3.84%). Malarial fever was found in 4.7% cases in present study where as 3.28% cases and 3.4% cases in Baloch R *et al*. [6] and Sharma S *et al*. [16] respectively. Ghike S *et al*. [9] found malaria and Dengue together in 23.40% cases of ICU admissions. There was one case of H1N1 in present study and study carried out by Devbhaktuni P *et al*. [15]. Incidence of viral hepatitis in present study is 1.7% which is comparable to studies carried out by Devbhaktuni P *et al*. [15] and Ghike S *et al*. [9] i.e 3.84% and 2.1% respectively.

In present study 65.88% of cases required intubation and mechanical ventilations which is comparable to studies carried out by Gupta S *et al*. [8] and sheikh S *et al*. [11] where intubation is required in 70.83% cases and 71% cases respectively.

Studies conducted by Leung N YW *et al*. [1] and Baloch R *et al*. [6] found 2% and 5.92% cases of renal failure requiring dialysis. In present study dialysis was done in 4.7%.

FFP transfusions were given in 43.6% cases and 66% cases in studies conducted by Zwart J J *et al*. [17] and Togal T *et al*. [18] respectively which is comparable to present study where FFP transfusions were given in 39.41% cases.

Vasoactive drugs like Nor adrenaline and Dopamine was given in 33% cases and 38.46% cases in a study conducted by Bibi S *et al*. [13] and Devbhaktuni P *et al*. [15] which is comparable to present study where vasoactive drugs was given in 32.35% cases.

In the present study Anticoagulants like heparin was given in 15.29% cases (mostly in patients with heart disease and hypertensive disorders in pregnancy) which is comparable to 12.41% cases requiring anticoagulants in study conducted by Mowafy *et al*. [10].

Antiarrhythemic drugs was required in 4.1% cases in present study in patients with heart diseases which is comparable to study carried by Mowafy *et al*. [10] where 7.1% cases required Antiarrhythemic drugs.

The main cause of death in our study was respiratory failure found in 45.5% cases followed by MODS seen in 26.6% cases. MODS contributed to 44% mortality and ICH to 39% in the study by Vasquez D N *et al*. [19]. In the study by Sheikh S *et al*. [11], MODS attributed to 76.4% and ICH was responsible for 13.2% mortality.

CONCLUSIONS AND RECOMMENDATIONS

- This study underlines the unique characteristics of critically ill obstetric patients
- Obstetric haemorrhage, hypertensive disorders of pregnancy and tropical diseases like malarial fever, Dengue fever, swine flu, viral hepatitis etc were most common reasons for ICU admissions.
- There is change in trend in cause of maternal mortality as compared to other studies as tropical diseases emerge as leading cause of mortality amongst Non-Obstetric group.
- The admission rate to intensive care unit and problems faced by critically ill parturient may be reduced by improving antenatal care by means of upgrading peripheral health centres, making them well equipped, providing them with trained staff and updating their knowledge by conducting CMEs through telemedicine, so as to facilitate early identification of high risk pregnancies and their timely referral to higher centres. This will help in reducing the morbidity and mortality associated with hypertensive diseases in pregnancy and obstetric haemorrhage.
- It is of critical importance to create a link between obstetric department and ICU centres to achieve early identification of attributing factors leading to mortality in order to achieve best prognosis.
- Physician in the intensive care should be familiar with the complications of pregnancy and should work closely with obstetrician in order to improve maternal outcome in these patients.
- Early admission and management of critically ill obstetric patients in ICU will decrease maternal morbidity and mortality.
- Finally a special obstetric ICU is needed to deal with critically ill obstetric patients only. We think this will improve maternal health care and this too in conjunction with proper and efficient antenatal care, in order to prevent maternal morbidity and mortality. At least in specialised centres concerned with management of obstetric patients.

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