PROSPECTIVE STUDY OF THE OBSTETRICAL PATIENTS IN INTENSIVE CARE UNITS AND MATERNAL OUTCOME IN TERMS OF MATERNAL MORTALITY

Neena Gupta[1], Sachidanand Gupta[2], Anil Verma[3], Seema Dwivedi[4], Nisha Singh[5]

[1]Professor, Department of Obstetrics and Gynaecology, GSVM Medical College, Kanpur, Uttar Pradesh.
[2]Associate Professor, Department of Anaesthesiology and Critical Care, Rama Medical College, Kanpur, Uttar Pradesh.
[3]Associate Professor and Head, Department of Anaesthesiology and Critical Care, GSVM Medical College, Kanpur, Uttar Pradesh.
[4]Assistant Professor, Department of Obstetrics and Gynaecology, GSVM Medical College, Kanpur, Uttar Pradesh.
[5]Third Year Resident, Department of Obstetrics and Gynaecology, GSVM Medical College, Kanpur, Uttar Pradesh.

ABSTRACT

BACKGROUND
The aim of this study is to study ICU admission in obstetrical patients and outcome in terms of maternal mortality and morbidity.

MATERIALS AND METHODS
Prospective observational study conducted over 20-month period from 01/01/15 - 31/08/16.

RESULTS
In our study 8% patients required ICU, but 5.8% of the total obstetric patients were admitted in ICU. Both haemorrhage (32%) and hypertensive disorders (31%) were leading causes among low general condition patients. Majority of the critically ill patients (Group B and C) had longer duration of stay, i.e. > 10 days. Mortalities in Group B and C were 39% and 22%, respectively.

CONCLUSION
To avoid first and second delay apart from winning over socio-demographic factors, better implementation of Government Programmes like ASHA Bahu under NRHM is essential for saving critically ill obstetrical patients. To avoid third delay, i.e. delay in receiving appropriate care: High Dependency Units (HDU) should be established to avoid unnecessary consumption of ICU resources. On the other hand, ICUs facilities should also be upgraded to suffice the requirements for treating critically ill patients. Indeed, filling these small pitfalls can go a long way in saving our critically ill patients.

KEYWORDS
Maternal Mortality, ICU, HDU.

BACKGROUND
Maternal mortality refers to deaths due to complications from pregnancy or childbirth. According to World Health Statistics (WHS) 2016[1]: From 1990 to 2015, the global maternal mortality ratio declined by 44 percent from 385 deaths to 216 deaths per 100,000 live births. This translates into an average annual rate of reduction of 2.3 percent. This is less than half the 5.5 percent annual rate needed to achieve the three-quarters reduction in maternal mortality targeted for 2015 in Millennium Development Goal 5. A Maternal Near Miss (MNM) is an event in which a pregnant woman comes close to maternal death, but does not die - a "near-miss." Traditionally, the analysis of maternal deaths has been the criteria of choice for evaluating women's health and the quality of obstetric care. Due to the success of modern medicine such deaths have become very rare in developed countries, which has led to an increased interest in analysing so-called "near-miss" events.

Obstetrical patients admitted to ICU forms a critical part in assessing maternal morbidity and mortality inclusion of critically ill patients (near-miss) in maternal death enquiry can better inform the quality of obstetric care at different levels of health care delivery at more frequent intervals.

MATERIALS AND METHODS
Prospective observational study was conducted in GSVM Medical College and other associated hospitals, Kanpur, from 01/01/15 - 31/08/16. All pregnant patients who needed intensive care were included in the study.

Inclusion Criteria
1. All obstetrical patients who needed the intensive care were included in the study.
2. Outcome will be evaluated in terms of the patients who were saved, survived and discharged in satisfactory condition.
3. On the other hand, outcome will be also be evaluated in terms of morbidity and mortality in these patients.

Exclusion Criteria
Non-Obstetric Morbidity
Morbidity from accidental or incidental causes no way related to pregnancy, e.g. morbidity from automobile accident, suicide and poisoning.

Patients were identified using Mantel et al criteria.[2] Patients of low general condition were divided into three groups.

Group A
Included low general condition patients managed in hospital, i.e. 622 cases.

Group B
Included low general condition patients who were critically ill, required ICU care, but could not receive care, i.e. 108 cases.

Group C
Included low general condition patients who were critically ill required ICU care and received ICU care, i.e. 320 cases.
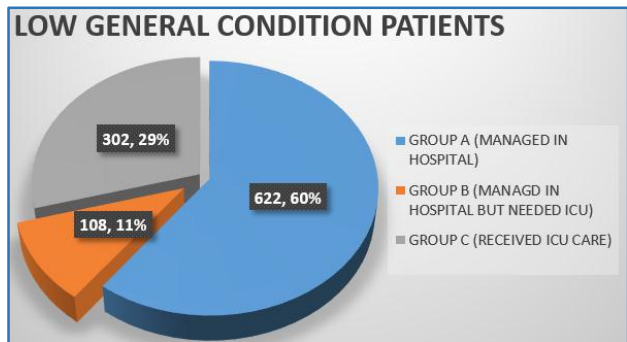
RESULTS

Figure 1. Distribution of Low General Condition Patients

In our study 8% of total obstetrical patients required ICU, but 5.8% of the total obstetric patients were admitted in ICU.
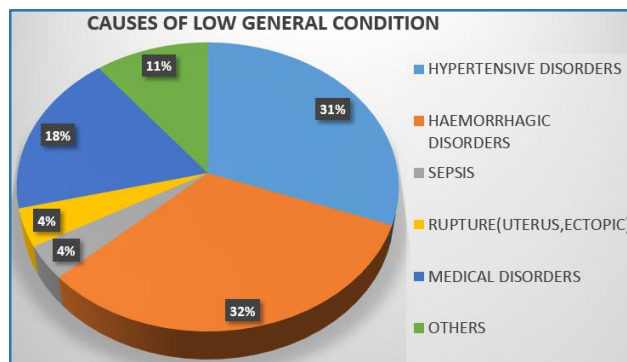

Figure 2. Distribution of Low General Condition Patients According to Cause

Both haemorrhage (32%) and hypertensive disorders (31%) were leading causes among low general condition patients.

Socio-Demo-graphic Profile	Group A- Managed in Hospital (n=622)		Group B- Managed in Hospital but needed ICU (n=108)		Group C- Received ICU Care (n=302)		P value
	No.	%	No.	%	No.	%	
Residence							
-Rural	344	55.30%	73	67.59%	216	71.52%	<0.0001
-Urban	278	44.69%	35	32.40%	86	28.47%	
Age							
-18–24 yrs.	261	41.96%	42	38.88%	104	34.43%	<0.0001
-25–31 yrs.	283	45.49%	41	37.96%	154	50.99%	
-> 32 yrs.	78	12.54%	25	23.14%	44	14.56%	
Parity							
- P0, P1	349	56.10%	59	54.62%	175	57.94%	<0.0001
- P2	115	18.48%	18	16.66%	48	15.89%	
-> P3	158	25.40%	31	28.70%	79	26.15 %	
Socio-Economic Classes							
-Upper	2	0.03%	2	1.85%	4	1.32%	<0.0001
-Middle	301	48.39 %	29	26.85%	85	28.14 %	
-Lower	319	51.28%	77	70.37%	213	70.52%	
Literacy							
- Literate	122	19.61%	20	18.51%	21	6.95%	<0.0001
-Illiterate	500	80.38%	88	81.48%	281	93.04%	
Table I. Socio-Demographic Factors of Low General Condition Patients							

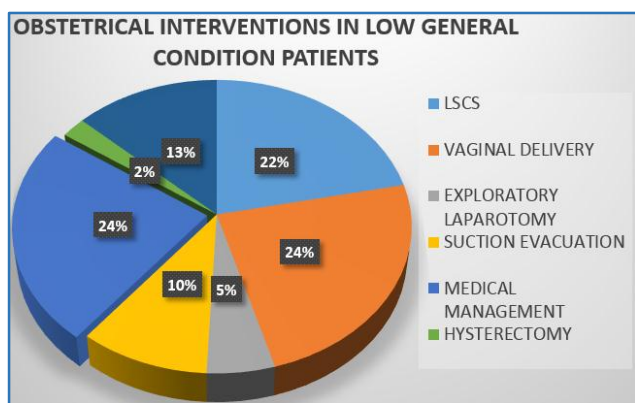| Hospital Stay	Group A		Group B		Group C	
	(n=622)	%	(n=66)	%	(n=234)	%
0-5 Days	186	29.90%	4	6.06%	4	1.71%
6-10 Days	329	52.89%	18	27.27%	26	11.11%
11-15 Days	51	8.17%	23	34.84%	101	43.16%
16 -20 Days	1	0.01%	20	30.30%	51	21.79%
>20 Days	55	8.84%	1	1.5%	52	22.22%
P value	< 0.0001					
Table II. Distribution of Low General Condition Patients According to Duration of Stay in Hospital						

Figure 3. Distribution of Low General Condition Patients According to Obstetrical Interventions Required

Interventions	Group A (n=622)	%	Group B (n=108)	%	Group C (n=302)	%
Intubation	-	-	49	45.37%	221	73.77%
Pharmacological Support	143	22.90%	103	95.37%	284	94.03%
Extensive Monitoring	614	98.71%	108	100%	302	100%
3 or >3 unit Blood Transfusion	56	9%	33	30.55%	134	44.37%
P Value	<0.0001					

Table III. Distribution of Patients According to Interventions Required

43% and 74% cases of Group B and C required intubation and ventilator support, while none of Group A patients required intubation. Almost 95% cases of Group B and C required pharmacological supports (Inotropes), while only 22% cases of Group A required pharmacological support. ICU patients had more blood transfusions, i.e. 44%.

Outcome	Group A (n=622)	%	Group B (n=108)	%	Group C (n=302)	%
Discharged	368	59.16%	24	22.22%	138	45.69%
DOPPR	184	29.58%	27	25%	68	22.51%
LAMA/ Abscond	70	11.25%	15	13.88%	28	9.27%
Could not be Revived (Expired)	-	-	42	38.88%	68	22.51%
P Value	< 0.0001					

Table IV. Distribution of Patients According to Outcome

Outcomes in terms of discharged in satisfactory condition was more in those managed in ICU (45.70%) than those in hospital (22%).

DISCUSSION
During this duration, a total of 5134 antenatal patients were admitted. Out of which 1032 cases admitted were low general condition. In our study 8% patients required ICU care, but only 5.8% of the total obstetric patients were admitted in ICU (Figure 1).

In other studies Sushil Chawla et al[3] study, 0.26% of the total obstetric patients required ICU admission, which was similar to various other studies as shown. Richa et al[4] in their study found the frequency of admissions was 0.24% of deliveries. Muench et al[5] showed critical care was required for 1.3% of 2565 women admitted for deliveries.

Most common cause of low general condition amongst obstetrical patients was haemorrhage (antepartum, postpartum) - 32%, closely followed by hypertensive disorders of pregnancy (pre-eclampsia, eclampsia) - 31% of cases sepsis - 11% (Figure 2).

Abdel Aziem A. Ali et al (2011),[6] haemorrhage accounted for the most common event (40.8%) followed by infection (21.5%), hypertensive disorders (18.0%), anaemia (11.8%) and dystocia (7.9%). Daniela N. Vasquez et al (2007),[7] hypertensive disease (40%), major haemorrhage (16%), septic abortion (12%) and non-obstetric sepsis (10%) were the principal diagnosis.

In low general condition patients, other than normal vaginal delivery (24%) and LSCS (22%) which is the most frequent intervention for normal general condition patients as well. Other interventions are also required like suction and evacuation (10%), exploratory laparotomy (5%) and hysterectomy (2%). Also medical management (24%) like administration of anti-hypertensive, anti-convulsants, cardiac drugs, vasopressors forms an important part of management of critically ill patients (Figure 3).

(Table 1) analyse the socio-demographic factors amongst the low general condition patients. Majority of low general condition patients were at extremes of reproductive age group, i.e. either < 24 yrs. or > 32 yrs. Olufemi et al (2005)[8] found the mean age to be 25 years in maternal mortality cases; 61.33% cases of low general condition patients and 70.48% of critically ill patients (Group B and C came from rural areas). It is comparable to study done by Rajendra Wakankar et al (2015),[9] where 63.52% cases were from rural areas. Abdel Aziem A. Ali et al (2011)[6] found in their study that 64.9% of near miss cases and 65% of mortality cases were from rural areas; 46.80% cases of low general condition patients were nullipara or primipara, i.e. 40% of Group A, 55% of Group B and 58% of Group C. According to Cdr Sushil Chawla et al (2013)[3] approximately 2/3rd patients were primigravida. In our study majority of the patients were having low educational status, i.e. 80% of Group A, 80% of Group B and 93% cases of Group C were illiterate.

Table showing percentage of illiteracy in different studies.

Gebrehiwot Y et al (2014)[10]	Abdel Azem A Ali et al (2011)[6]	Present Study
60.3% cases were illiterate	50% cases were illiterate	80 % cases were illiterate

(Table II) Low general condition patients managed in hospital (65%) had shorter duration of stay (< 10 days) due to better prognosis; they reached tertiary care hospital in the golden hour when their resuscitation resulted in better revival, faster recovery and better outcomes. However, those who were critically ill and required ICU care (67% of Group B and 77% of Group C) had longer duration of stay in hospital.

According to Raksha Sharma et al (2016),[11] the mean length of stay in ICU was 5.6 days.

Although, the stay in hospital was prolonged, but it added constraints on resources and facilities of ICU due to paucity of resources in general wards and emergency rooms of hospital to monitor and treat critically ill patients revived after ICU care.

This highlights the need for establishment of High Dependency Unit (HDU) with intermediate facilities of ICU care, so that it can share the responsibilities of ICU in treating low general condition patients that require minimal but intensive care and monitoring.

(Table III) In our study 43% and 74% cases of Group B and C required intubation and ventilator support, while none of Group A patients required intubation. Almost 95% cases of Group B and C required pharmacological supports (inotropes), while only 22% cases of Group A required pharmacological support. This clearly indicates cardiorespiratory failure and shock as one of the major causes of ICU admission.

Extensive monitoring was required in all patients (100%). ICU patients had more blood transfusions, i.e. 44%.

Sunanda Gupta et al (2011),[12] inotropic support was required in 22 patients (91.66%), while 17 patients (70.83%) required ventilatory support.

Sandeep et al (2014)[13] 85% of patients required mechanical ventilation and 78% required inotropic support.

(Table IV) In our study, low general condition amongst patients not admitted in ICU - 60% cases were discharged and 30% went DOPPR.

Of the critically ill patients (Group B and C), 45.69% of patients who received ICU care were discharged in satisfactory condition as compared to those who did not receive ICU care, i.e. 22% cases. Mortalities in Group B and C were 39% and 22% respectively. Satinder et al (2014)[14] maternal mortality rate was 31.1% (47 deaths) for patients admitted to ICU. Sunanda Gupta et al (2011)[13] maternal mortality was (n = 10, 41.67%).

CONCLUSION

Awareness among the population to seek proper antenatal care can prevent greater number of maternal complications. This will help us to curb the first delay: delay to seek care due to poverty, illiteracy, community, ignorance, etc.

Of the critically ill patients, outcome for obvious reasons were way more better in Group C than Group B due to proper monitoring and titration of treatment (Example - Titration of inspiratory and expiratory pressure in intubated patients, titration of vasoactive drugs in patients on inotropic supports) and thus had lesser mortalities.

To avoid first and second delay apart from winning over socio-demographic factors, better implementation of Government Programmes like ASHA Bahu under NRHM is essential for saving critically ill obstetrical patients.

To avoid third delay, i.e. delay in receiving appropriate care: High Dependency Units (HDU) should be established to avoid unnecessary consumption of ICU resources. On the other hand, ICU's facilities should also be upgraded to suffice the requirements for treating critically ill patients.

Indeed, filling these small pitfalls can go a long way in saving our critically ill patients.

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