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Original Research Article

MATERNAL OUTCOME IN OBSTETRICS ICU: A RETROSPECTIVE STUDY FROM A TEACHING HOSPITAL IN NORTH INDIA

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ABSTRACT

Background: Obstetric population has a versatile risk profile which keeps on changing throughout pregnancy and even postpartum. This makes the management quite challenging and often, need for intensive care arises even in a low-risk group. Contributors of maternal mortality and morbidity in developing nations are considerably different than those in developed nations. Thus, this study aims to assess the leading causes of maternal ICU admission and its outcome. **Materials and Methods:** This was a retrospective analysis of 76 obstetric patients admitted to the ICU during a period of 2 years from January 2023 to December 2024 in the department of Obstetrics and Gynaecology, Government Medical College, Kathua. Basic demographic details, underlying condition, time of presentation, outcome, risk factors and supportive care needed were analysed. **Result:** ICU admission rate was 0.6% of all obstetric admissions and 0.8% of total deliveries. 51.3% of cases were referred from rural centres and constituted about 4.2% of all referred cases in the hospital. Higher rate was seen in the age group 21-30 years (60.5%) and in primigravida (36.8%). Women in antepartum period had increased rate than in the postpartum period; more so in the 3rd trimester (39.5%). Haemorrhage throughout pregnancy and post-partum, and hypertensive disorders remained the main underlying cause of admission. LSCS and salpingectomy for ectopic pregnancy were the main surgical interventions performed in these patients. Need for ventilator and blood transfusion was needed in 28.9% and 56.6% of patients, respectively. Maternal deaths were noted in 6.6 % of the patients and were more common in postpartum patients. Sepsis, anaemia and hypertensive disorders were observed as the main risk factors. **Conclusion:** It was observed from this study that obstetric haemorrhage was the leading cause of maternal ICU admissions as well as maternal mortality. Therefore, the need of the hour is to provide and reinforce maternal care services for high-risk groups.

INTRODUCTION

Maternal mortality remains a critical public health issue in India. It serves as a key indicator of healthcare quality and accessibility, reflecting the effectiveness of maternal health services. Its primary causes are haemorrhage, hypertensive disorders of pregnancy, postpartum sepsis, obstructed labour, uterine rupture, abortion, and anaemia.[1] Maternal Mortality Ratio (MMR) of India for the period 2018-20, as per the latest report of the National Sample Registration system (SRS) data, is 97/100,000 live births, declining by 33 points, from 130/ 100,000 live births in 2014-16.[2] Admissions of obstetric patients to the intensive care unit (ICU) occur in approximately 2-4/1,000 deliveries.[3]

Various scoring systems like simplified acute physiology score (SAPS), acute physiology and chronic health evaluation (APACHE), and mortality probability models (MPM) have been used to predict the outcome of obstetric patients in the developed world but a dedicated ICU for obstetric patients is not yet widely available in developing countries.[4,5] In any stage, women who develop severe acute morbidity during pregnancy share many pathological and circumstantial factors related to their condition. While some of these women die, a proportion of them narrowly escape death. By evaluating these cases with severe maternal outcomes (both “near-miss”

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cases and maternal deaths), much can be learnt about the processes in place (or lack of them) to deal with maternal morbidities. [6-8] Individuals with severe maternal morbidity (SMM) are at an increased risk for mental health condition-related hospitalisation or emergency department (ED) visits up to 13 years after delivery.[9]

MATERIALS AND METHODS

This study was conducted in the department of Obstetrics and Gynaecology, Government Medical College, Kathua. After obtaining the approval of the Ethics committee of our institute, we undertook the retrospective study of obstetric patients who were admitted to ICU for one cause or another between JAN 2023 to DEC 2024 for a period of 2 years.

Ours is a hospital associated with a medical college and is a 500-bedded institution with more than 60 beds in the department of obstetrics and gynaecology. It has a 7-bedded medical ICU for medical, surgical, obstetric, and gynaecological patients. Being a tertiary care centre, we also receive quite a number of high risk pregnancies and patients from referral centres in rural and hilly areas. Patients included in this study were women in antenatal period or puerperium who either developed complications during the course of hospital stay or presented in critically ill condition. Patients who require ventilatory support or were hemodynamically unstable even after preliminary administration of intravenous fluids, oxygen and inotropes and may need ventilatory support anytime soon, were admitted to the ICU.

Records of these admissions were retrieved from the medical record section of the hospital. The details noted included basic demographic data, obstetric and medical history. Modified early obstetric warning system (MEOWS) was used to score the patients at the time of admission. The status before hospital admission, hospital and ICU course, treatment taken and the specific interventions done were noted. Note was made of the underlying conditions necessitating ICU care and associated morbidities. Data on total obstetric mortalities were also noted from the hospital records.

RESULTS

During the period from January 2023 to December 2024, a total of 13197 patients were admitted in the labor and gynae ward and 9022 deliveries were conducted during this period. Out of these, about 76 patients were admitted in the ICU. The ICU admission was 0.6% of all admissions and 0.8% of all deliveries.

The mean age of the patients in the study was 26.07 years (SD ± 5.69) within the range of 16-40 years. Table 1 shows the age distribution of the patients. Out of the total 76 patients, about 46 patients (60.5%) were aged 21-30 years Among the study, primigravida constituted the majority of the patients (36.8%) while Gravida 2 constituted about 26.3% of the patients. Out of the 76 patients admitted in ICU, 17 patients (22.4%) presented in the postpartum period. The remaining 59 patients were in the antepartum period, with 30 patients (39.5%) in the third trimester of pregnancy.

Table 1: Demographic and obstetric details of the patients

Maternal variable	Frequency	Percentage
Age groups		
<20 years	14	18.4%
21-30 years	46	60.5%
31-40 years	16	21.1%
Gravid status of patient		
Primigravida	28	36.8%
Gravida 2	20	26.3%
Gravida >3	28	36.9%
Period of gestation		
1st trimester	25	32.9%
2nd trimester	4	5.2%
3rd trimester	30	39.5%
Post partum	17	22.4%
MEOWS score at admission		
0-2	19	25%
3-5	24	31.6%
≥6	33	43.4%

MEOWS score evaluated at the time of admission in hospital showed that approximately 25% of the patients had a low score of 0-2 whereas 43.4% of the patients presented with score of high score of 6 and more.

[Table 2] shows the distribution of causes for ICU admission. APH was the presenting complaint in 11 patients (14.5%); out of which 3 patients had abruption, 5 patients had placenta previa, and 3 patients had a ruptured uterus. 12 patients (15.8%) had PPH. Bleeding in the first trimester was seen in 22 patients (28.9%), which included miscarriage in 7 patients and ectopic pregnancy in 15 patients.

Hypertensive disorders in pregnancy constituted about 23.7% of cases and consisted of eclampsia in 12 patients, HELLP in 2 patients and severe preeclampsia in 4 patients. In this study, 4 patients (5.3%) presented with sepsis and 4 patients (5.3%)

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had respiratory distress. Heart failure was present in patients (6.5%), and the majority of cases were due to severe anaemia.

Table 3 shows that about 52 patients (68.4%) had some form of surgical intervention. Among these, 22 patients (28.9%) underwent LSCS, 3 patients (3.9%) had repair of the uterus for rupture uterus, while 2 patients (2.6%) had bladder repair during LSCS. 4 patients (5.3%) underwent LSCS followed by caesarean hysterectomy.

Table 2: Distribution of causes for ICU admission.

Condition	Frequency	Percentage
APH	11	14.5%
PPH	12	15.8%
1st trimester Bleeding	22	28.9%
Hypertensive disorders	18	23.7%
Sepsis	4	5.3%
Respiratory distress	4	5.3%
Heart failure	5	6.5%
Total	76	100%

Table 3: Distribution of surgical interventions in the patients.

Procedure	Frequency	Percentage
LSCS	22	28.9%
Caesarean hysterectomy	4	5.3%
Repair of a ruptured uterus	3	3.9%
LSCS with bladder repair	2	2.6%
LSCS followed by reexploration	1	1.3%
Laparotomy with salpingectomy	14	18.4%
Laparotomy with hysterectomy	1	1.3%
Suction evacuation	7	9.2%

Out of 76 patients, 14 patients (18.4%) had laparotomy followed by salpingectomy, presenting in the first trimester with ectopic pregnancy. 1 patient required laparotomy followed by hysterectomy for intractable bleeding in cornual ectopic pregnancy. Suction evacuation was performed in 7 patients (9.2%), while in one patient, re-laparotomy was done for burst abdomen.

As ours is a tertiary care hospital which caters to patients from rural and hilly terrains, we have a high percentage of referral cases in our study. Table 4 shows that out of 76 cases in ICU, about 39 patients (51.3%) were referred cases from peripheral centres. There was a total of 927 referral cases to our hospital during the study period and 4.2% of the referred cases needed ICU care.

We found that in the present study, the mean duration of stay in hospital was 6.5 days, and the period varied from 2 days up to >10 days. 23 patients (30.2%) had a short stay period of 2-5 days; it also included patients who were referred to a multi-speciality centre. The majority of the patients, however, had a stay period of 6-9 days, seen in 60.5%. Prolonged hospital stays >10 days were seen in 9.3% of patients only. These patients were mainly cases of extensive surgical procedures and their complications.

Table 4: Distribution of maternal morbidity.

Indicators	Frequency	Percentage
Duration of Hospital stay		
2-5 days	23	30.2%
6-9 days	46	60.5%
>10 days	7	9.3%
Ventilator Support	22	28.9%
Blood transfusion	43	56.6%
Referred cases	39	51.3%
Maternal deaths	5	6.6%
Multi-speciality care	10	13.1%

Out of 76 patients, 43 patients (56.6%) required blood transfusions. The majority of these were patients presenting with APH and abortion and needed massive blood transfusions either in the operating theatre or post-delivery period. A very small portion of patients presented with severe anaemia and cardiac failure. Out of 76 patients, 22 patients (28.9%) required mechanical ventilation. Out of these 22 patients, 9 patients presented with eclampsia, 9 patients were in haemorrhagic shock and rest were contributed by ARDS and sepsis. 10 patients (12.8%) developed multi organ dysfunction syndrome and needed multidisciplinary care and were shifted to specialised centre.

There were 5 maternal deaths (6.6%) in the study patients. Out of 5, 4 patients died in the post-partum period while one patient was in the antenatal period at 26 weeks. 2 patients had puerperal sepsis while 2 had PPH resulting in decompensated shock and end-organ damage. One patient was in second trimester of pregnancy presenting with severe respiratory distress and required mechanical ventilation.

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DISCUSSION

In our study, we found a higher rate of admission to the ICU, almost 60% in the age group 21-30 years. Rathod et al,[10] found that 56.20 % of the cases in their study were in the age group of 20–25 years, followed by 22.61 % in the 26–30 years. The majority of the cases were in the age group 25-35 years (50%), followed by 18-24 years (46%) in the study by Sunanda N et al.[11] However, Aoyama et al,[12] found that extremes of age have a higher risk of developing morbidity.

More than one-third of the patients (36.8%) consisted of primigravida in our study. Similarly, 54.16% of patients were primigravida in a study by M. Vijayasree et al.[13] On the other hand, increased parity was observed to have more complications in studies by Sunanda N et al,[11] and Koski-Rahikkala et al.[14]

It was observed in our study that the highest no. of patients requiring intensive care presented in the third trimester (39.5%), where the major causes were hypertensive disorder and haemorrhage. First trimester also showed a 32.9% rate, owing mainly to undiagnosed ectopic pregnancy presenting in shock and illegal abortions. In contrast, only 5.2% of cases were in the second trimester, mainly due to non-obstetric conditions. The postpartum period had 22.4% cases where the main reason was puerperal sepsis, PPH and hypertensive disorders. Sunanda N et al,[11] observed that the majority (79.8%) of cases were in the late trimester, 28 weeks onwards. About 80.9 % of women were admitted in puerperium in a study by Rathod et al.[10]

In this study, about 31.6% of cases had no surgical procedure done during hospital stay. The most common surgical procedure done was LSCS and laparotomy with salpingectomy in 28.9% and 18.45% of cases, respectively. Caesarean section was resorted to in 28 patients by Tempe Anjal et al,[15] while 9.67 % of LSCS were converted to hysterectomy by Rathod et al.[10] Obstetric haemorrhage in the form of first trimester bleeding, APH and PPH constituted about 58.9% of patients. This was followed by hypertensive disorders in pregnancy (23.7%). Rathod et al,[10] concluded that obstetric haemorrhage (44.05 %) was the commonest condition requiring ICU admission, followed by hypertensive disorder of pregnancy (28.88 %). M. Vijayasree et al,[13] found that complications like septicaemia were present in 8.33%, pregnancy-induced hypertension in 16.66%, and Obstetric haemorrhage in 62.5% of patients. Tempe Anjal et al,[15] found that the most common reasons for transfer to the ICU were haemorrhagic shock (52.6%) and respiratory support (35%). Other reasons were uncontrolled and severe hypertension in pregnancy with/without eclampsia (7%) and medical complications (6%). From the observations in various studies, it can be inferred that haemorrhage remains one of the major causes of maternal morbidity in developing nations like ours, which can be prevented and mostly managed effectively.

Bajwa SK et al,[16] in their study found that the mean duration of stay of patients in their study was 6 days. In this study, the need for ventilator support was seen in 28.8% of the cases, which was mainly seen in patients with eclampsia and haemorrhagic shock. M. Vijayasree et al,[13] analysed critical patients admitted to the obstetric care unit and found that ventilator support was a major indication for ICU admissions in about 70.83% of the cases. Furthermore, he observed that the mean duration of ventilation and ICU stay was significantly longer in survivors versus non-survivors. Similarly, Rathod et al.[10] observed that 40.5% of cases had ventilator support.

In our study, maternal mortality was 6.6% of cases, which was significantly lower than other study results. But we observed that while there was a high number of patients admitted in the antepartum period, the mortality rate was high in the postpartum period. In the study by M. Vijayasree et al,[13] the mortality rate among the patients was 41.67%, which was quite high and multi-organ failure, including heart failure, shock, lung and acute renal failure, was found to be the leading cause of maternal mortality. On the other hand, maternal mortality was seen in 15.55 % of ICU cases by Rathod et al,[10] and the commonest causes of maternal mortality were haemorrhagic shock and multiorgan dysfunction syndrome (MODS). Bajwa SK et al,[16] reported higher death rates in post-partum cases than antepartum (32.65% vs 16.67%) .About half (51.3%) of patients in this study were referred from rural areas for one reason or another. The majority of these patients are already in a state of decompensation and are admitted straight to the ICU. The time taken to reach the hospital, and a lack of adequate facilities endangers the maternal health and increases the prognosis from bad to grave. In a study by Bajwa SK et al,[16] 84% of the patients who were admitted in a critically sick condition hailed from rural areas, while only 16% of the population comprised urban society, which again turned out to be a highly significant value ($P < 0.001$) on statistical analysis. Approximately 56.6% of patients required blood transfusions in the present study. This high rate of transfusions needed in obstetric patients, as opposed to the general population, is attributed to haemorrhage occurring due to various reasons in pregnancy. Haemorrhage is one of the leading causes of maternal deaths, and thus, maternal mortality could be prevented by early and rapid replacement of blood loss. High blood transfusion rates could also be seen in other studies. In one such study by Rathod et al,[10] support via blood transfusion and blood component transfusion was seen in 51.37 % and 26.93 % of cases, respectively.

CONCLUSION

It was concluded from this study that about 0.6% of all obstetric admissions required intensive care unit.

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The majority of these cases were referred cases and belonged to the 21-30 years age group. Risk factors noted were anaemia, sepsis, hypertension, placenta previa and ectopic pregnancy. Haemorrhage was the main associated event in maternal deaths. The need for blood transfusions, ventilator support and multidisciplinary care was significantly raised in the study.

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