

SEVERE ACUTE MATERNAL MORBIDITY AND INTENSIVE CARE IN A PUBLIC SECTOR UNIVERSITY HOSPITAL OF PAKISTAN

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Background: The study was planned to review the case series of pregnant women requiring intensive care due to severe acute maternal morbidity in the public sector university hospital, in order to identify failures and priorities in maternal health care provision in Pakistan. **Methods:** A retrospective case series study was performed of critically ill obstetrics patients admitted to general intensive care unit of Liaquat University Hospital Hyderabad, Pakistan, from January 1st to 31st December 2006. Data included demographics, disease responsible for critical illness, complications that prompted ICU admissions, intervention required, length of ICU stay and the resulting foeto-maternal mortality and morbidity. **Results:** Over the study period, 30 obstetric patients were transferred to general ICU, representing 1.34% of 2224 deliveries. Seventy three % of women belonged to rural areas, 96% were un-booked while history of surgical intervention was present in 87% of cases. Hypertensive disorders of pregnancy (50%) and sepsis (17%) were the two main obstetrical conditions responsible for maternal illness. Respiratory failure (57%) and haemodynamic instability (40%) were the major indications for ICU transfer. Mechanical ventilatory support was the commonest intervention required in the ICU followed by the inotropic support (33%). The foetal mortality rate was 43%, while maternal mortality rate was 33%. **Conclusion:** Maternal morbidity and mortality can be reduced by meticulous adaptation of safe motherhood initiative, provision of separate ICU services for critically ill obstetrical patients and early assessment and aggressive intervention through a team approach involving obstetricians, intensivists and anaesthetists. **Keywords:** Severe Acute Maternal Morbidity, Pregnancy Complications, Intensive Care.

INTRODUCTION

Each year nearly 5, 29,000 women die globally due to pregnancy related causes. For each death, nearly 118 women suffer from life threatening events of "near miss mortality" or Severe Acute Maternal Morbidity (SAMM).¹ Developed countries have been using 'near miss mortality' analysis as a tool for monitoring the quality of maternal health services. Various indicators are used to assess SAMM, in the literature. In a recent World Health Organization systemic review of maternal morbidity and mortality, transfer to an ICU was taken as an indicator for assessing the prevalence of SAMM world wide.²

Transfer to an ICU is one of the modern innovations to save the life of mothers. ICU facilities were needed in approximately one in three of all the maternal deaths in United Kingdom.³ Relatively few studies have been published from developing countries about the incidence, course and outcome of obstetrical patients who required intensive care. In fact, Pakistani data is non-existent.

The objective of the study was to find out the frequency, risk factors, indications for admission, intervention required and foeto-maternal outcome of critically ill obstetric patients who required transfer to an ICU, in order to identify failures and priorities in maternal health care provision in Pakistan.

PATIENTS AND METHODS

This Department approved study was carried out in Liaquat University Hospital (LUH) Hyderabad/

Jamshoro, an affiliate of Liaquat University of Medical & Health Sciences, Jamshoro. LUH is 1300 bed hospital, with 16-bed general intensive care unit (ICU). It is the 2nd largest hospital in the Sindh province providing tertiary care health services not only to the huge population of Hyderabad city but also to the rural population living within the radius of 250 km approximately. The Obstetrics services perform nearly 6000 deliveries per year.

A retrospective case series study was performed including those obstetrics patients who were admitted in the department of Gynaecology and Obstetrics Unit One and subsequently transferred to general ICU, from January 1st to 31st December 2006. Pregnant women up-to 6 weeks post partum were included in the study. Medical records were obtained and reviewed by the principal investigator and data was filled in a pre-designed performa. Statistical analysis was performed using SPSS version 10.0. Results were expressed as Mean±SD or number and percentages.

Data included maternal age, obstetrical history, disease responsible for critical illness, complications that prompted ICU admissions, intervention required, length of ICU stay and the resulting foeto-maternal mortality and morbidity. The complications prompting ICU admissions were categorized as homodynamic instability, respiratory compromise or neurological dysfunction.

RESULTS

Over the study period, 30 obstetric patients were transferred to general ICU of LUH, representing 1.35% of 2224 deliveries. All the admissions were required during the postpartum period.

Table-1 outlines the demographics and obstetrical characteristics of the patients. Majority were residents of rural area and most of them were young, multiparous and having pre-term gestation. Surgical intervention was required in significant number of women. 73% were admitted following Caesarean section, 7% followed Caesarean Hysterectomy while 7% followed laparotomy. The length of ICU stay varied from 1-8 days. Respiratory failure was the major indication for transfer to the ICU. It was precipitant of admission in 9 (53%) cases of hypertensive disorder of pregnancy. Only one eclamptic patient required ICU admission because of neurologic dysfunction and subsequently developed cerebrovascular accident and quadriplegia.

Table-1: Characteristics of obstetric admissions to ICU (n=30)

Characteristics	Result
Maternal age (years)	29.7±5.9
Gestational age (weeks)	35.3±6.0
Parity	3.2±2.61
Duration of ICU stay (days)	2.17±1.9
Place of residence	
• Rural	22 (73%)
• Urban	8 (27%)
Booking status	
• Un booked	29 (96%)
• Booked	1 (3%)
Surgical Intervention required	26 (87%)
Indication for ICU admission	
• Respiratory failure	17 (57%)
• Hemodynamic instability	12 (40%)
• Neurologic dysfunction	1 (3%)

Data presented as mean± standard deviation or number and percentage.

Table-2 shows the diagnosis of disease responsible for illness. Hypertensive disorders of pregnancy were the leading cause of maternal illness, responsible for half of all obstetrics ICU admissions. Ten (33%) were of eclampsia while 6 (20%) were of pre-eclampsia. Puerperal sepsis was the 2nd most common diagnosis, which was preceded by history of prolonged and neglected labour in all the cases. Obstetrics haemorrhage was the perpetrator of ICU transfer in 4 (13%) cases. Causes of haemorrhage include uterine atony in 3 cases and HELLP syndrome in one patient. In one patient, uterine atony followed severe placental abruption. Hysterectomy was performed to control the intractable haemorrhage. Medical disorders responsible for obstetrics ICU admission included hepatic encephalopathy secondary to Hepatitis C viral

infection (n=1), cerebral malaria due to plasmodium vivax (n=1) and pulmonary embolism (n=1).

Table-2: Disease responsible for illness (n=30)

Disease	Result
Hypertensive disorders of pregnancy	15 (50%)
Sepsis	5 (17%)
Obstetric Haemorrhage	4 (13%)
Medical disorders complicating pregnancy	3 (10%)
Ruptured uterus	1 (3%)
Ectopic Pregnancy	1 (3%)
Anaesthesia Complications	1 (3%)
Co-Factors present	
• Anaemia	11 (37%)
• HCV infection	4 (13%)
• Diabetes mellitus	3 (10%)
• HELLP Syndrome	1 (3%)

Data presented as number and percentages.

There were 10 maternal deaths, making maternal mortality rate of 33%. Mortality was highest in women with diagnosis of sepsis (40%) followed by postpartum haemorrhage (20%). Cause of death was multiple organ failure (40%), disseminated intravascular coagulation (40%), cerebro-vascular accident (10%) and renal failure (10%). The foetal mortality rate was 43%. Out the 13 cases, 12 (92%) foetuses died *in utero* before hospital admission.

Table-3: Intervention required in ICU.

Intervention	Number
Mechanical Ventilation	16 (53%)
Vaso-active infusion	10 (33%)
Intensive monitoring	4 (13%)
Blood Transfusion	12 (40%)
MgSO ₄ therapy	10 (33%)

Data presented as number and percentage.

DISCUSSION

We observed that 1.34% of obstetrics patients were transferred to general ICU, corresponding to 1.34⁴ and 1.4%⁵ of developing countries reports. However rate seems to be slightly raised from 0.26⁶ and 0.17⁷ documented from developed world.

Pre-eclampsia and eclampsia were the leading cause of maternal ill health and subsequent transfer to ICU, consistent with other published reports.^{8,9} Sepsis was the second most common cause of illness in contrast to other studies that report Obstetric haemorrhage as the second common cause.^{10,11} This discrepancy may be due to the fact that most of the cases of haemorrhage were successfully managed in the labour ward and did not require transfer to ICU. In all septicemic cases, sepsis followed prolonged and neglected labour in un-booked patients. Majority of them developed multiple organ failure and died. Afessa B, *et al* also report that Sepsis was the most common cause of Systemic inflammatory response Syndrome (SIRS) and organ failure in critically ill obstetric patients treated in ICU.¹² Provision of clean & safe delivery services will decrease infection related morbidity and

mortality as 83%¹³ of deliveries took place at home by untrained traditional birth attendants who do not follow infection prevention measures.

Obstetrics Haemorrhage was the 3rd common cause of illness responsible for ICU transfer. Most of the women were multiparous and developed post partum haemorrhage due to uterine atony. Scarcity of blood and blood products was a big hurdle in the timely intervention, thus leading to increased morbidity and mortality. Provision of free and safe blood banking services round the clock at tertiary care hospitals will be likely to yield better results.

The duration of ICU stay ranges from 1–8 days, although majority stayed for 48 hours. Prolonged stay was more common in women suffering from hypertensive disorders of pregnancy and respiratory insufficiency.

Bhagwangee S, *et al*¹⁴ reported that respiratory failure was the commonest organ failure in eclamptic patients in the ICU of a South African hospital.

Similar trend was observed in our study where respiratory failure was the leading organ failure responsible for ICU transfer. Ventilatory support was required in 53% of subjects, mostly in women suffering from eclampsia. The rate is nearly similar to 45% reported by Selo-Ojeme DO, Omosaiye M, Bhattacharjee P and Kadir RA.¹⁵ High rate of mechanical ventilation required in eclamptic patients with favourable maternal outcome, i.e., one maternal death strongly supports the need of Obstetric ICU care.

In our study, proportion of maternal death was 33%, comparable to maternal death rate of 25% reported from an Indian hospital.¹⁶ However, it seems to be alarmingly high when compared to 1.3%¹⁷ and 3.3%¹⁸ documented from developed countries. The perinatal mortality rate (43%) was high in our series. The large number of intra-uterine deaths (n=12) contributed to this increased rate. Another study from an Indian hospital also quote foetal death rate of 52% in Obstetric patients treated in ICU.¹⁹

Evidently, high foeto-maternal death rate is influenced by the population characteristics and quality of reproductive health care. For healthy mother and baby, care during pregnancy, labour and puerperium is mandatory. However, women belonging to rural areas are less likely to receive safe motherhood services as compared to their urban counterparts. According to Pakistan Reproductive Health and Family Planning Survey 2000–01, 59.5% of rural women did not receive pre-natal care and 86.5% delivered at home by untrained birth attendants.²⁰ These untrained birth attendants do not follow clean and safe delivery rules and are unable to predict and handle pregnancy complications. Further more, lack of emergency obstetric care services and integrated referral system at remote and far-flung area adds misery to already

jeopardized patients. Lack of high dependency units in obstetrics department, and shortage of beds in general ICU were also responsible for high morbidity and mortality.

Our study has two limitations, first the data was collected retrospectively and sample size was small. Despite these limitations, analysis of such important maternal vital statistics gave insight about the magnitude of the problem of maternal morbidity, conditions posing continuous threats to maternal health and the type of support services most commonly required. It will help health care providers and policy makers to design strategies to improve maternal health services in Pakistan and to achieve millennium development goal.

CONCLUSION

The two most common indications for admitting obstetric patients to ICU were hypertensive disorders of pregnancy and sepsis. Ventilatory support for respiratory insufficiency was the commonest intervention required. Un-booked status, rural residence and caesarean delivery were the major risk factors.

The meticulous adaptation of safe motherhood initiative especially in remote areas would reduce the complications which require ICU transfer. Maternal morbidity and mortality in such cases can be further minimized significantly by early assessment and aggressive intervention by a team work involving obstetricians, intensivists and anaesthetists. Provision of high dependency units in the obstetrics department is also advocated.

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