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**ORIGINAL ARTICLE**

# The Result of Acute Maternal Morbidity and Management at A Tertiary Care Hospital's Critical Care Unit: A Cross-Sectional Study

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## ABSTRACT

**Aim:** To evaluate the results of the management of severe acute maternal conditions in a public hospital's critical care unit.
**Study design:** A cross-sectional study
**Place and Duration:** From 19-09-2018 to 18-03-2019, the ICU and Department of Obstetrics and Gynecology at Liaquat University Hospital in Hyderabad
**Methodology:** This study comprised 50 women who needed admission to an ICU and care during pregnancy and/or puerperium for up to 6 weeks. The information was entered into a pre-designed proforma with factors including complete biodata and a detailed history. Clinical findings, overall health, length of hospital stay, treatment results, and problems
**Results:** The women were 29 years old on average in 18 to 45. 63 years. Pre-eclampsia affected 16% of women (n = 8) and eclampsia affected 38% of women (n = 19). Similar obstetric bleeding conditions were seen, including postpartum haemorrhage (24%; n=12), abruptio placenta (2%), placenta previa (8%), ectopic pregnancy (2%), and abortion (2%).
Dystocia-related conditions included 4% (n=2) prolonged or obstructed labours, 2% (n=1) uterine ruptures, and 2% (n=1) cases in which an approaching rupture was noted. The findings indicated that women who need to be admitted to be cared for in an ICU throughout pregnancy and puerperium experience multiple complications.

The most frequent reasons for admission to the intensive care unit were respiratory failure, hemodynamic instability, and neurologic dysfunctions. The majority of the women who were admitted to the ICU in shock and required emergency care were kept on a ventilator. Five women experienced difficulties during their 9.8+18.8 day average stay in the ICU. Deaths were noted in 54% (n=27) of the cases, with 40% (n=20) receiving discharges and 6% (n=3) being referred to another hospital.
**Practical Implication:** Cases of severe maternal morbidity warrant quality evaluation, much like cases of maternal fatality. Institutions and systems should either use an existing screening criterion or develop their own list of outcomes that warrant evaluation in the absence of agreement on a comprehensive list of disorders that reflect severe maternal morbidity.
**Conclusion:** PPH (Eclampsia and Preeclampsia) and the hypertensive condition of pregnancy were significant contributors to maternal illness in this study. Carefully securing the mother's adaption, particularly in distant places, will lessen the issues that necessitate the transfer to the ICU. Obstetrician intensivists and anesthetists can further reduce maternal morbidity and mortality in these circumstances. The obstetrics department of the high-dependency unit also helps to decrease mortality.
**Keywords**: Women, preeclampsia, post-partum hemorrhage, morbidity, mortality, intensive care unit

## INTRODUCTION

Birth and pregnancy are significant life events. Given the importance of the beginning of a new life and the fact that pregnancy and birth can have a negative impact on the mother's health, they are typically referred to as joyful events in high-income countries. [1]

However, there are situations when pregnancy and labour are seriously hampered, endangering the mother's life. [2] Along with the current maternal mortality data, severe acute maternal morbidity (SAMM) is becoming recognized as a crucial indication of reproductive health in high-income nations. [3]

In order to evaluate the quality of reproductive and public health care provided globally, the World Health Organization permits comparisons of national maternal mortality ratios on a global scale. [4] Maternal mortality in high-income nations has dropped to exceptionally low levels. [5]

It takes years to compile enough data to make trustworthy predictions about trends in maternal mortality. Additionally, maternal deaths do not accurately reflect the primary problems that occur in standard obstetric practice. [6] For instance, substantial obstetric haemorrhage, once a rare cause of maternal mortality, is now a leading cause of SAMM. [7]

The quality of obstetric treatment will probably no longer be significantly impacted by additional reductions in maternal mortality, notwithstanding the critical relevance of studying cases of maternal death. [8] On the other hand, by reducing SAMM, the quality of care could be greatly improved. [9]

Because of its unpredictable nature, providing care for severely ill pregnant patients is a special challenge in the field of obstetrics. Hemorrhage, toxemia, anaemia, and septicemia are the most common causes of death in pregnant women. [10]

This study aims to evaluate the prognosis of severely unwell obstetric patients who need ICU management in public sector university hospitals. This study will be useful in raising awareness of the need for all at-risk women to be transferred immediately to the intensive care unit (ICU), and proper and effective management will help to lower the rate of maternal morbidity and mortality.

## METHODOLOGY

The ICU and Department of Obstetrics and Gynecology at Liaquat University Hospital in Hyderabad conducted this cross-sectional study from September 19, 2018, to March 18, 2019. The study was approved by the ethical review committee. The technique employed was non-probability, purposive sampling. The ethical review committee granted authorization.

This study comprised 50 women who needed admission to an ICU and care during pregnancy and/or puerperium for up to 6 weeks. The information was entered into a pre-designed proforma that included variables such as a complete biodata section, a detailed medical history, clinical findings, general conditions, length of stay in the intensive care unit, and problems. The study excluded pregnant women who needed ICU admissions for other causes, such as trauma, accidents, hazardous ingestions, or cerebral malaria.

Using SPSS version 22, data was entered and analysed. Age, gestational age, and parity are examples of quantitative variables for which mean and standard deviation was determined.

For categorical variables like SAMM, frequency and percentage were computed.

## RESULTS

This study comprised 50 women in all, including those who were pregnant or in the puerperium and needed acute care monitoring. Women were between the ages of 20 and 25 in 32% of the population, 26 to 30 in 38%, and 31 to 40 in 30%.

The women's average gestational ages were 36.59:3.00 weeks and 29.185.63 years, respectively. The parity status of the women was 16% nulliparous, 38% primiparous, 34% multiparous, and 12% grand multiparous. In general, the women came from rural areas (As shown in Table 1).

A private doctor referred 62% (n=31) of the 50 ladies, a nurse referred 36% (n=18), and Dai only referred 2% (n=1). Most women who were admitted had altered awareness in general, including neurologic dysfunction, respiratory failure 76% (n=38), and shock 24% (n=12).

Pre-eclampsia, eclampsia, seen in 16% (n=8) and eclampsia in 38% (n=19) of women are given as obstetric disorders that cause Severe Acute Maternal Morbidities (SAMM). Postpartum haemorrhage occurred in 24% (n=12) of cases, placenta abruption in 2% (n=1), placenta previa in 8% (n=4), and ectopic pregnancy in 4% (n=3). Dystocia, prolonged/obstructed labour, uterine rupture, and impending rupture of the uterus were all observed in 2% (n=1) cases each (As shown in Table 2).

Respiratory failure was noted as a reason for ICU admission in 2% (n=1), hemodynamic instability as a reason for 9% (n=9), neurologic dysfunctions as a reason for 7% (n=14), respiratory failure and hemodynamic instability as a reason for 12% (n=6), respiratory failure and neurologic dysfunction as a reason for 16% (n=8), hemodynamic instability as a reason for 18% (n=9), and respiratory failure and hemodynamic instability as (As shown in Table 3).

The majority of the women admitted to the ICU came from the ward, and 48% (n=24) had shock while 52% (n=26) had emergency care on a ventilator. ICU stays were 9.84+18 on average. 8 days 54% (n=27) of the cases had mortality, 40% (n=20) had discharges, and 6% (n=3) had their cases forwarded to another institution (As shown in Table 4)

Table 1: General demographics of the study participants (n=50)

| Age (Years) | Frequency | Percentage |
|---|---|---|
| 20-25 | 16 | 32 |
| 26-30 | 19 | 38 |
| 31-40 | 15 | 30 |
| Parity | | |
| Nulliparous | 8 | 16 |
| Primiparous | 19 | 38 |
| Multiparous | 17 | 34 |
| Grand multiparous | 6 | 12 |
| Residency | | |
| Urban | 12 | 24 |
| Rural | 38 | 76 |
| Intrapartum Care | | |
| Private doctor | 31 | 62 |
| Nurse/Midwife | 18 | 36 |
| Dai | 1 | 2 |

Table 2: Conditions responsible for severe maternal morbidity (n=50)

| Conditions | Frequency | Percentage |
|---|---|---|
| Preeclampsia | 8 | 16 |
| Eclampsia | 19 | 38 |
| Ectopic pregnancy | 1 | 2 |
| Abortion | 1 | 2 |
| Placenta Previa | 4 | 8 |
| Abruption Placenta | 1 | 2 |
| Postpartum hemorrhage | 12 | 24 |
| Impending rupture of the uterus | 1 | 2 |
| Ruptured uterus | 1 | 2 |
| Prolonged/Obstructed labor | 2 | 4 |

Table 3: Indications for ICU admissions (n=50)

| Condition | Frequency | Percentage |
|---|---|---|
| Respiratory failure | 1 | 2 |
| Hemodynamic instability | 9 | 18 |
| Neurologic dysfunction | 7 | 14 |
| Respiratory failure and hemodynamic instability | 6 | 12 |
| Respiratory failure and neurologic dysfunction | 8 | 16 |
| Hemodynamic instability and neurologic dysfunction | 9 | 18 |
| Respiratory failure, hemodynamic instability and neurologic dysfunction | 10 | 20 |

Table 4: Maternal Outcome (n=50)

| Outcome | Frequency | Percentage |
|---|---|---|
| Duration of ICU stay (days) | 9.8±18.8 | |
| Refereed to other place | 3 | 6 |
| Discharge | 20 | 40 |
| Died | 27 | 54 |

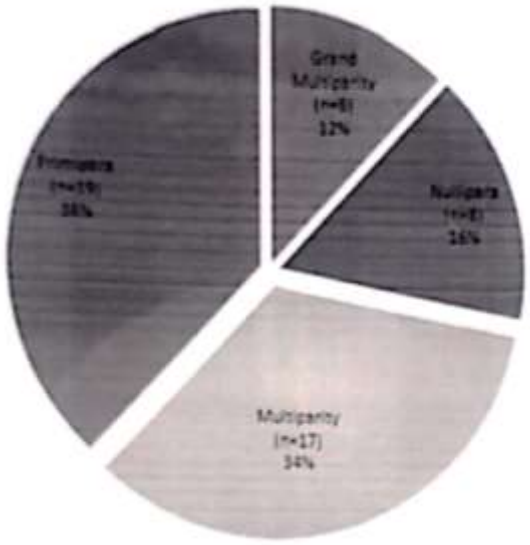


Figure 1: Parity distribution of the women

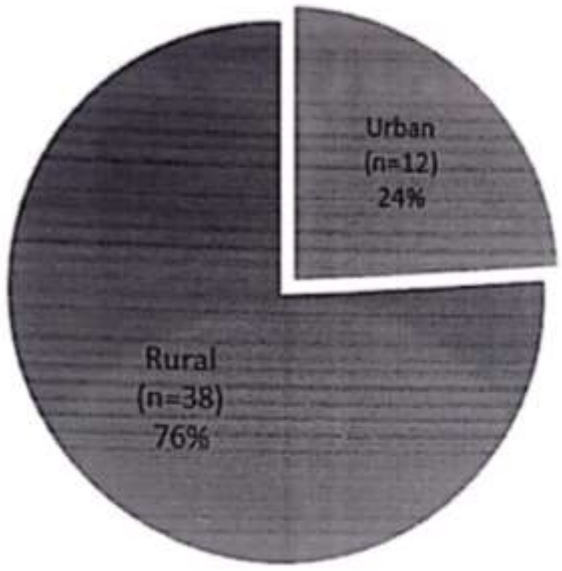


Figure 2: Locality status of women

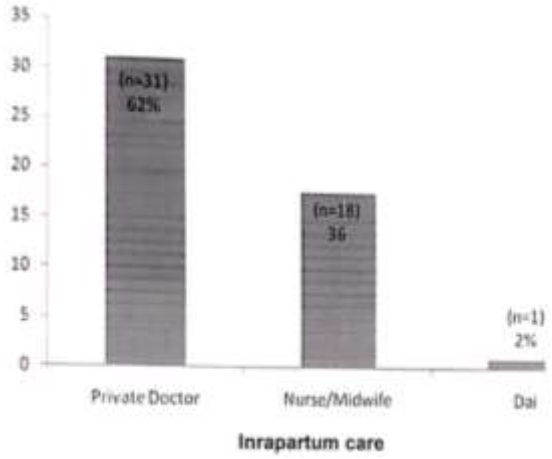


Figure:3: Intrapartum care of women

## DISCUSSION

This study comprised 50 women in all, including those who were pregnant or in the puerperium and needed acute care monitoring. Women were between the ages of 20 and 25 in 32% of the population, 26 to 30 in 38%, and 31 to 40 in 30%. In a global survey, there were 9,555 (11.6%) mothers with SMM out of 82,388 deliveries made over the time period, and the MM ratio was 170.4/100,000 live births. Only 2,059 (25.3%) of the 8,135 patients who were managed at facilities with ICUs had actually been admitted to the ICU. Only poor care and MSS were significantly related with MM in the models that were employed. [11]

With a mean age of 25.07±5.65 years, nearly half (49.7%) of the clientele were young pregnant women (15–24 years old). A ruptured uterus had a death rate of 25% (95% CI 10%-51%), a severe postpartum haemorrhage had a mortality rate of 9% (95% CI 4%-17%), and eclampsia had a mortality rate of 11% (95% CI 3%-30%). The most significant contributing factors to the occurrence of maternal near-misses were anaemia, haemorrhage, and dystocia. [12]

In our study, the proportion of nulliparous women was 16% (n=8), primiparous women were 38% (n=19), multiparous women were 34% (n=17), and grand multiparous women were 12% (n=6). The women were mostly from rural areas. Major blood loss (39.4%), diseases linked to preeclampsia (23.3%), and severe sepsis (14.1%) were shown to be the most frequent causes of SMM in the study.

Sepsis cases (56%) had the highest potential for avoidance, followed by preeclampsia and severe blood loss (34.3% and 30.9%). [13] The obstetric comorbidity index can be used routinely in clinical settings to identify at-risk women whose conditions call for closer monitoring and more specialized care to avert negative mother outcomes. [14]

In our study, out of 50 women, referral before tertiary care was made by a private doctor 62% (n=31), a nurse 36% (n=18), and Dai just 2% (n=1). Most women who were admitted had altered awareness in general, including neurologic dysfunction, respiratory failure 76% (n=38), and shock 24% (n=12).

In our study, pre-eclampsia, eclampsia, which was observed in 16% of women (n=8), and eclampsia, which was observed in 38% of women (n=19), are among the obstetrical illnesses that cause Severe Acute Maternal Morbidities (SAMM). Postpartum haemorrhage occurred in 24% (n=12) of cases, placenta abruption in 2% (n=1), placenta previa in 8% (n=4), and ectopic pregnancy in 4% (n=3).

Observed cases of dystocia, prolonged/obstructed labour (4%; n = 2), uterine rupture (2%; n = 1), and imminent rupture (2%; n = 1), The most common causes of intensive care unit admission in low- and middle-income countries include obstetric haemorrhage, sepsis, preeclampsia, complications from the human immunodeficiency virus, and tropical diseases. [15]

Additionally, major bleeding (58.3%), severe pre-eclampsia/eclampsia (27.8%), medical conditions (8.3%), and sepsis or severe systemic infection (5.6%) were listed as the most common causes of SMOs. The most frequent factor in serious bleeding was abnormally invasive placenta (61%) [16]

The most prevalent SMM symptoms were postpartum haemorrhage requiring blood transfusion (31 [17.1%]), problems with obstetric surgery or procedures (32 [17.7%], cardiac disorders (69 [38.1%], invasive ventilation (77 [42.5%]), and intensive care unit hospitalisation (81 [44.8%]. [17]

The probability of overall severe acute maternal morbidity during and after delivery was higher in women with gestational anaemia after controlling for covariates (adjusted OR (95%CI) 1.8 (1.5-2.1)).

Even after removing the transfusion criterion, this association was still observed for severe postpartum haemorrhage (adjusted OR (95%CI) 1.7 (1.5-2.0)), as well as for severe acute maternal morbidity due to causes other than haemorrhage or pregnancy-related hypertensive disorders (adjusted OR (95%CI) 2.7 (1.9-4.0). [18]

According to our study, the following conditions were listed as reasons for admission to the intensive care unit, respiratory failure and hemodynamic instability 12% (n=6), respiratory failure and neurologic dysfunction 16% (n=8), hemodynamic instability and neurologic dysfunction 18% (n=9), and respiratory failure and Hemodynamic instability and neurologic dysfunction 20% (n=10).

Mother mortality is strongly correlated with caesarean section (CS), younger maternal age, lower parity, placental abruption, and pulmonary edema. [19]

The combination of indirect causes of maternal illness and mortality in middle-income countries indicates some improvements in the scope of obstetric transition but also highlights the vulnerability of health systems. H1N1 flu, sepsis, cancer, and cardiovascular disease were the primary indirect causes of maternal death. [20]

Average ICU stays in our study were 9.84 plus 18.8 days. A mortality rate of 54% (n=27 cases) was noted, followed by a discharge rate of 40% (n=20) and a referral rate of 6% (n=3) to another hospital. Obstetric patients made up 3.8% of all ICU admissions in a local research, and the total mortality rate was 11.1%. Regarding the presenting illness, there was no statistically

significant difference in the mortality rate; nevertheless, morality was highest (37.5%) in patients with pre-eclampsia.

Hemorrhagic/hematological causes accounted for the majority (54.2%) of ICU admissions, followed by cardiovascular causes (33.1%). Individuals admitted via emergency were shown to have a statistically higher mortality rate than patients admitted from within the hospital (P 0.0005). [21]

In a different local study, obstetric haemorrhage (42.4% of cases) and hypertensive problems of pregnancy (45.4%) were the two most frequent reasons for ICU admission. Age 21 to 35 was the range for 75% of the cases. 60% of patients had parity between P2 and P4. A ventilator was used to support 9% of patients throughout their stay in the ICU, blood products were transfused in 40.9% of patients, and antihypertensive and anticonvulsant medication was given to 45% of patients. Mortality among mothers was 4.5%. [22]

## CONCLUSION

PPH (Eclampsia and Preeclampsia) and the hypertensive condition of pregnancy were significant contributors to maternal illness in this study. Carefully securing the mother's adaption, particularly in distant places, will lessen the issues that necessitate the transfer to the ICU. Obstetrician intensivists and anesthetists can further reduce maternal morbidity and mortality in these circumstances. The obstetrics department of the high-dependency unit also helps to decrease maternal mortality.

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