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Original Research Article

A cross sectional study on severe acute maternal morbidity near-miss at tertiary care centre in Hyderabad, Telangana, India

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ABSTRACT

Background: A maternal near-miss case is defined by World Health Organization (WHO) as “a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy.” Severe acute maternal morbidity (SAMM) is the acronym for the more popular term of ‘near-miss’ cases. There are approximately 118 life threatening events of “near miss mortality” or SAMM for each maternal death. Analysing near miss cases can prevent maternal death.

Methods: It is a retrospective study based on medical records. Sample size is all the pregnant cases admitted in Department of Obstetrics and Gynecology in AIMS, Hyderabad, Telangana, India over the period of January 2015-June 2017 (two and half years) i.e. 2276. All records were gathered and each record that satisfy near miss criteria/maternal mortality were segregated, data has been collected on the occurrence of severe pregnancy-related complications or those who require critical interventions and admission to intensive care unit as per the proforma (according to WHO near miss questionnaire). Data entry done in MS Excel and analyzed using Epi Info.

Results: Total MNM/SAMM patients were 85 out of 2276 pregnant women (3.7%). The duration of the stay, potential life-threatening conditions (PTLC), critical interventions, organ dysfunctions, mode of delivery, treatment for PPH, hypertensive disorders and associated conditions among SAMM patients were calculated. SAMM patients who has severe post-partum hemorrhage PPH were 24.7%, severe pre-eclampsia was 31.7%, eclampsia was 2.4%, patients with both severe PPH and eclampsia were 2.4%.

Conclusions: Near misses can be prevented to some extent by spreading awareness about possible obstetric complications and risk stratification. The WHO tool for analysis of maternal near miss or SAMM can identify more preventable causes of maternal death. Prospective monitoring of maternal morbidity may be useful in identifying determinants of severe maternal mortality.

Keywords: Hyderabad, Near-miss, Severe acute maternal morbidity

INTRODUCTION

In developed countries where maternal death is rare, the factors surrounding the death are often peculiar to the event and are not to be generalized, making analysis of maternal deaths less useful. A maternal near-miss case is defined by World Health Organization (WHO)¹ as

“a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy.”

Severe acute maternal morbidity (SAMM) is the acronym for the more popular term of “Near-miss” cases. There are approximately 118 life threatening events of ‘near

miss mortality' or severe acute maternal morbidity (SAMM) for each maternal death.² Death only represents a tip of a morbidity iceberg, the size of which is unknown. According to recent WHO systematic review, SAMM is defined as 'severe life threatening obstetric necessitating an urgent medical intervention in order to prevent likely death of mother.' The global prevalence of SAMM varies from 0.01% to 8.23% with an inverse trend with the development status of the country.

It is suggested that SAMM on its own or as a ratio of SAMM- mortality should be used as a quality indicator of maternity care. It is these 'near misses' or SAMMs that require high dependency care.³

Maternal death to near-miss ratio indicates a significant proportion of critically ill patients died due to suboptimal level of care for life threatening situation. This is referred to have a case fatality ratio and is a sensitive measure of standard of obstetric care. Incidence of SAMM in India ranges from 0.07-8.23% case fatality ratio. Thus, have huge impact on the lives of Indian women.

Analysing near miss cases can strengthen the understanding of the disease progression that ultimately kills women and thus empower us to prevent maternal death.

The most important causes are hemorrhage (early pregnancy loss, ante-partum hemorrhage, post-partum hemorrhage), hypertension (pre-eclampsia, eclampsia), dystocia, uterine rupture.

Analysis of near-miss cases will help to assess the quality of service and will suggest the areas where improvements are to be brought in, both in trained personnel and in equipment and can strengthen our understanding of the disease progression that ultimately kills the woman and there by empower us to prevent maternal death.

Near-miss appraisal has emerged as the new yardstick to assess the quality of health care. There is continued need to identify near miss cases to assess the quality of health care.

Hence, the present study has been conducted to identify the near miss cases (SAMM) and to document the frequency and nature of maternal near-miss, so as to identify potential preventive factors.

METHODS

This retrospective study where medical records of all pregnant mothers admitted during January 2015 to June 2017 (two and half years) in AIMS, Hyderabad, Telangana, India.

All the pregnant cases admitted in Department of Obstetrics and Gynecology over the period of January 2015-June 2017 i.e. 2276.

Inclusion criteria

- Severe maternal complications
 - Severe postpartum hemorrhage,
 - Severe pre-eclampsia,
 - Eclampsia,
 - Sepsis or severe systemic infection,
 - Ruptured uterus,
 - Severe complications of abortion.
- Critical interventions or intensive care unit use
 - Admission to intensive care unit,
 - Interventional radiology,
 - Laparotomy (includes hysterectomy, excludes caesarean section),
 - Use of blood products.
- Life-threatening conditions (near-miss criteria)
 - Cardiovascular dysfunction- shock, cardiac arrest (absence of pulse/ heart beat and loss of consciousness), use of continuous vasoactive drugs, cardiopulmonary resuscitation, severe hypo perfusion (lactate >5 mmol/l or >45 mg/dl), severe acidosis (pH <7.1),
 - Respiratory dysfunction- acute cyanosis, gasping, severe tachypnea (respiratory rate >40 breaths per minute), severe bradypnea (respiratory rate <200),
 - Renal dysfunction- oliguria non-responsive to fluids or diuretics, dialysis for acute renal failure, severe acute azotemia (creatinine \geq 300 μ mol/ml or \geq 3.5 mg/dl),
 - Coagulation/ hematological dysfunction- failure to form clots, massive transfusion of blood or red cells (\geq 5 units), severe acute thrombocytopenia (100 μ mol/l or >6.0 mg/dl),
 - Neurological dysfunction- prolonged unconsciousness (lasting \geq 12 hours)/coma (including metabolic coma), stroke, uncontrollable fits/status epilepticus, total paralysis,
 - Uterine dysfunction- uterine hemorrhage or infection leading to hysterectomy.
- Maternal vital status
 - Maternal death.

Exclusion criteria

Any morbidity from causes not directly related to pregnancy or its complication or management, e.g. hepatic failure because of cirrhosis, malignancies, carcinoma breast, liver rupture, accidents and any morbidity after 42 days of termination of pregnancy.

Data collection

Medical records from January 2015 to June 2017 (two and half years) were gathered and each record that satisfy near miss criteria/maternal mortality, data was be collected on the occurrence of severe pregnancy-related complications or those who require critical interventions

and admission to intensive care unit as per the proforma (according to WHO near miss questionnaire).

Data entry and analysis

Data entry was done in MS Excel (which would be stored as mdb-MS Access file). Analysis would be done using Epi Info (version 7) and SPSS (version 17).

Ethical considerations

As the study is retrospective, record-based study where there is no direct involvement of humans, institutional ethical review board has issued a waiver of the consent and approved the Study.

RESULTS

Total number of pregnant women records screened from January 2015 to June 2017 using WHO near miss questionnaire were 2276 (Table 1).

Table 1: Distribution of pregnant women admitted during January 2015 to June 2017.

| Total= 2276 | 2015 (353) | 2016 (1374) | 2017 (549) |
|-------------|------------|-------------|------------|
| January | 19 | 108 | 120 |
| February | 26 | 122 | 113 |
| March | 29 | 108 | 67 |
| April | 28 | 88 | 110 |
| May | 34 | 103 | 82 |
| June | 34 | 114 | 57 |
| July | 33 | 110 | |
| August | 23 | 188 | |
| September | 41 | 115 | |
| October | 29 | 84 | |
| November | 26 | 114 | |
| December | 31 | 120 | |

Out of all pregnant women the patients who have at least one positive in screening questions of WHO near miss questionnaire are considered as Maternal Near miss (MNM) or Severe Acute Maternal Morbidity (SAMM). Total MNM/SAMM patients were 85 out of 2276 pregnant women (3.7%).

The duration of the stay, potential life-threatening conditions, critical interventions, organ dysfunctions, mode of delivery, treatment for PPH, hypertensive disorders and associated conditions among SAMM patients were calculated and depicted in following figures.

Figure 1 shows duration of hospital stay among SAMM patients. The mean duration of hospital stay is 7.8 days. SAMM patients who stayed for less than 5 days are 20 (23.5%), 5-10 days are 42 (49.5%), 11-15 days are 19 (22.3%) and more than 15 days are 4 (4.7%) respectively.

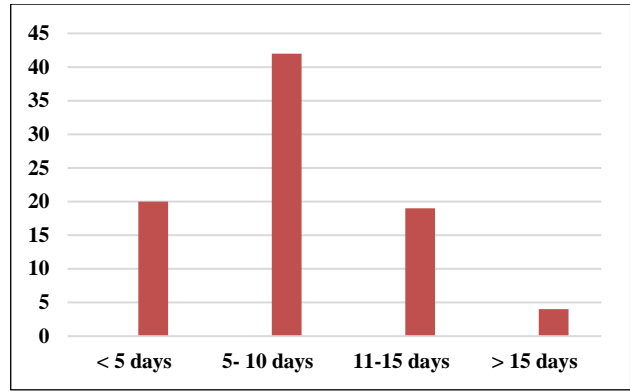


Figure 1: Duration of hospital stay in SAMM patients.

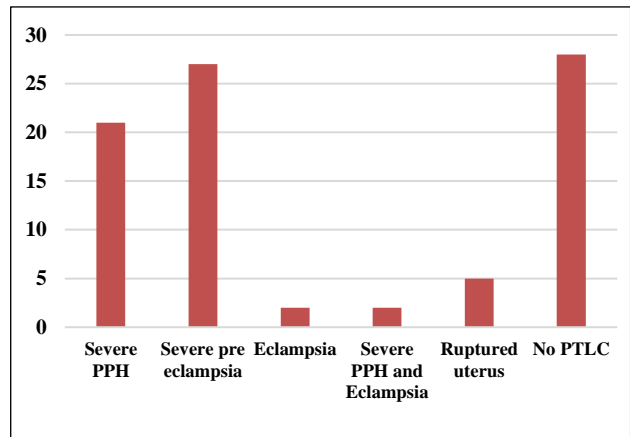


Figure 2: Potential life-threatening conditions (PTLC) in SAMM patients.

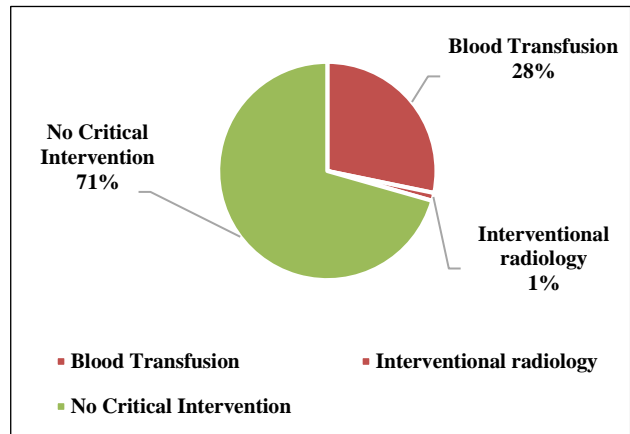


Figure 3: Critical intervention performed in SAMM patients.

Figure 2 shows Potential Life-Threatening Conditions (PTLC) among SAMM patients. SAMM patients who has severe post-partum hemorrhage PPH were 21 (24.7%), severe pre-eclampsia were 27 (31.7%), eclampsia were 2 (2.4%), patients with both severe PPH and eclampsia were 2 (2.4%), ruptured uterus were 5 (5.9%), and patients who have no PTLC were 28 (32.9%) respectively.

Figure 3 depicts percentage of critical intervention done on SAMM patients. About 28% required blood Transfusion, 1% required interventional radiology and remaining 71% had no requirement of critical intervention.

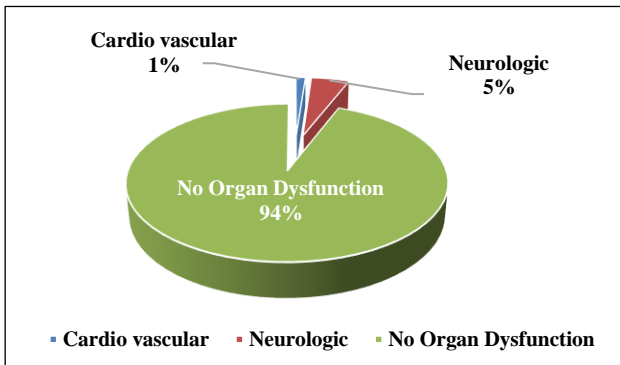


Figure 4: Organ system dysfunction in SAMM patients.

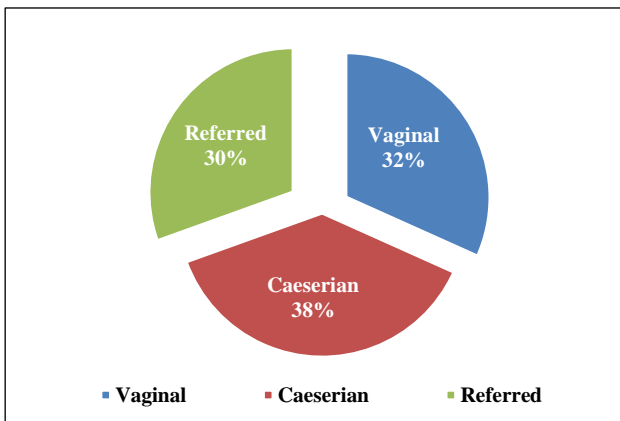


Figure 5: Mode of delivery in SAMM patients.

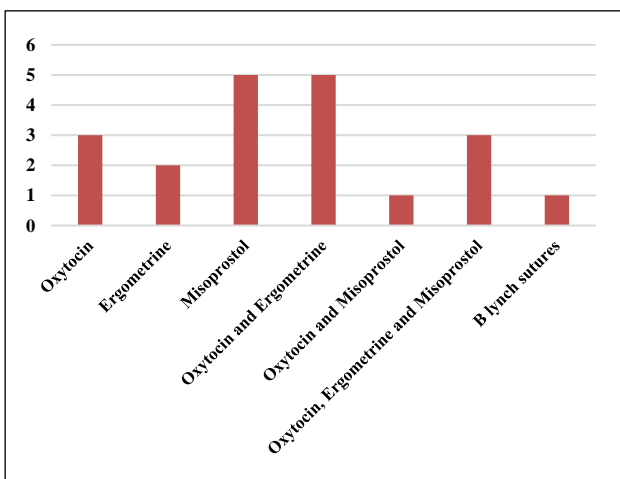


Figure 6: Mode of treatment for post-partum hemorrhage in SAMM patients.

Figure 4 depicts percentage of organ system dysfunction among SAMM patients. About 5% had neurologic

dysfunction, 1% had cardio vascular dysfunction and remaining 94% had no organ system dysfunction.

Figure 5 depicts percentage of mode of delivery among SAMM patients. About 32% vaginal delivery, 38 % had caesarian section and 30% were referred to higher center for proper care of maternal morbidities.

Figure 6 shows mode of treatment for post-partum hemorrhage among SAMM patients. Out of 21 patients of severe PPH, oxytocin was given in 4 (19.2%), ergometrine in 2 (9.5%), misoprostol in 5 (23.8%), oxytocin and ergometrine in 5 (23.8%), oxytocin and misoprostol in 1 (4.7%), oxytocin, ergometrine and misoprostol in 3 (14.3%), B lynch sutures in 1 (4.7%) respectively.

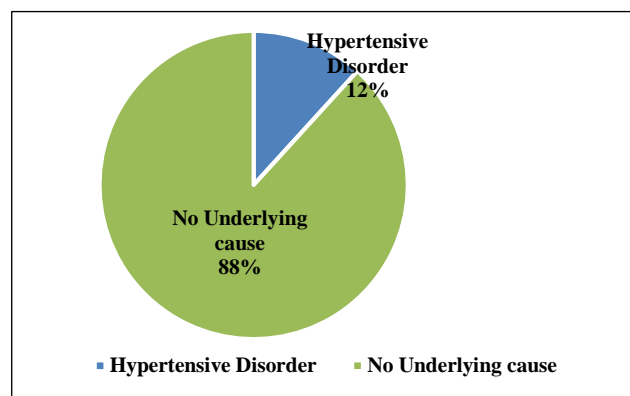


Figure 7: Frequency of hypertensive disorder among SAMM patients.

Figure 7 depicts percentage of hypertensive disorders among SAMM patients. About 12% had hypertensive disorders whereas remaining 88% are having no underlying hypertensive disorders.

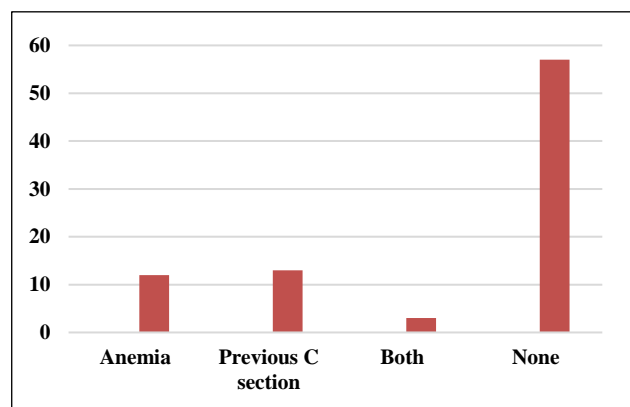


Figure 8: Associated conditions in SAMM patients.

Figure 8 shows associated conditions among SAMM patients. Anemia was seen in 12 (14.1%), previous C section in 13 (15.3%), both anemia and C section in 3 (3.5%) and remaining 57 (67.1%) has no associated conditions.

DISCUSSION

Post-partum haemorrhage (24.7%) was the primary determinant for near miss cases in our study. This also collaborates with FOGSI and Brazilian studies.^{4,5}

The finding that postpartum haemorrhage contributes the largest proportion is in line with the findings of other severe maternal morbidity and maternal near miss studies (36.1 to 48.5%).⁶⁻⁸ PPH was the leading initiating event in near misses indicating good quality care. This agrees with many Indian studies and that of Rwanda.⁹⁻¹³

Hypertensive disorders, specifically pre-eclampsia, were the second highest cause of morbidity 12% in this study. In spite of the high proportion of pre-eclampsia cases, the relatively low proportion of eclampsia cases may suggest adequate prevention of seizures.

Strict maternal surveillance with more frequent BP check-ups and urine examination for albuminuria have to be strictly adhered to for early detection of pre-eclampsia.

Appropriate and timely obstetrical care such as administration of magnesium sulphate and delivery of the placenta is crucial for preventing of morbidity and mortality.

This study strictly adhered to the WHO 2009 criteria leading less number of near miss events. Near miss rates are generally found higher in resource poor settings.¹⁴

Prompt replacement of blood and blood products in case of obstetric hemorrhage and early identification and treatment of sepsis before DIC sets in, are the preventive options.

Organ dysfunction leading to severe maternal outcome like neurologic dysfunction, cardio vascular liver dysfunction, etc. although the actual number were less.

The outcome of critically ill patients, such as patients with severe obstetric complications, is dependent on clinical and individual factors, previous health status, physiologic reserve, disease severity and adequacy of care provided.^{15,16}

The severity depends on the inherent risk of disease progression and the quality of care received in terms of timeliness, adequacy and comprehensiveness.

Since, near miss cases share characteristics with maternal deaths, they may be used to provide information about hurdles that needed to be overcome after onset of or worsening of complications. In that way, near misses provide invaluable information on obstetrical care.

The WHO maternal near miss tool may be used as a scoring tool for severe obstetric morbidity. The complications that are unique to pregnancy or childbirth

and the changed physiologic parameters (as a result of pregnancy changes) make pregnancy, childbirth and the puerperium unique situations where routinely used scoring systems for disease severity may be inappropriate or inadequate.¹⁷

Women presenting with obstetric complications may require a higher level of care. Organ dysfunction like cardiovascular accounted for 5% and neurologic for 1% of SAMM patients in this study. In this study, ICU admission with obstetric complications corresponded to 28 % SAMM patients which is relatively good.

Those women with organ dysfunction would be more appropriately managed in the ICU to provide optimum care and to minimize the number of multiple organs failures.¹⁸ Although an evidence-based triage system to assist clinicians regarding maternal utilization of intensive care services is lacking, hemorrhagic and hypertensive disorders were the two most common disorders in which admission into the ICU was deemed necessary.¹⁹

The use of oxytocin for the prevention and treatment of postpartum hemorrhage, of magnesium sulphate for the treatment of eclampsia, of prophylactic antibiotics for caesarean section and of parenteral antibiotics for the treatment of sepsis was covered almost 100%. The coverage of recommended interventions below 95% should be interpreted as an opportunity to improve care. Good adherence to the measurable standards of the WHO guidelines suggests good quality of care in these facilities.

In poor-resource settings, a lack of information regarding organ dysfunction and an inadequate assessment of severity may contribute to the suboptimal implementation of essential interventions and clinical management. However, in this study, the process indicators of basic interventions seemed to be widely practiced.

Coverage of essential interventions was suggested as the first important step in analyzing the issues related to the quality of care.

In this study, more than half of the pregnancies were terminated via caesarean section 38% and vaginal delivery 32% and remaining were referred to other higher centre for better management before 36 weeks. Timely referral after first line therapy would play a very important role.

The babies delivered are all alive and no single case of abortion has been accounted in this study. This is one of the indicators of quality of maternal care.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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