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Original Research Article

Severe acute maternal morbidity: sociodemographic analysis of intensive care unit admission in pregnancy

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ABSTRACT

Background: Severe acute maternal morbidity also known as "Near Miss". SAMM occurs 5 times more frequently than maternal death. Therefore auditing women with SAMM allows rapid collection of data and this may create a rapid diagnostic tool for evaluating current standard of maternal care in an area.
Maternal NEAR MISS refers to a woman who nearly died but survived a complication that occurred during pregnancy, child birth or within 42 days of termination of pregnancy. To have a more accurate picture of life threatening obstetrical conditions. To analyze various socio demographic factors associated with SAMM.
Methods: Retrospective study over a period of one year (November 2014 to October 2015) conducted in Kamla Raja Hospital, Gwalior, department of obstetrics and gynaecology. Analysis of various socio demographic factors done.
Results: During the study period, a total of 159 near-miss cases were identified, with 43 of those patients ultimately succumbing to maternal mortality. The maternal mortality ratio was 561 per 100,000 live births and the Maternal Near-Miss Incidence Ratio was 20 per 1,000 live births. The Maternity Near-Miss to Maternal Death ratio was 3.69:1.
Conclusions: Average MNMIR in ICU was 20 per 1000 live births. Hypertensive disorders of pregnancy and postpartum haemorrhage were the main obstetric causes of MNM in ICU. These findings would guide to improve professional skills of primary health care providers and encourage vaginal birth in the absence of medical indications for caesarean birth.

Keywords: Near Miss, Severe acute maternal morbidity, Socio -demography

INTRODUCTION

Maternal mortality and severe maternal morbidity remain a significant public health concern worldwide, with developing countries bearing a disproportionate burden. Understanding the sociodemographic factors associated with severe acute maternal morbidity is crucial for targeted interventions to improve maternal health outcomes.

Severe acute maternal morbidity is defined as a "near-miss" event, where a woman nearly dies but survives a complication during pregnancy, childbirth or the postpartum period. These events are important indicators of the quality of obstetric care and can provide insights into the underlying determinants of maternal health disparities. In sub-Saharan Africa, the combined maternal mortality ratio for severe bleeding, hypertensive diseases and infections is almost 500 deaths per 100,000 live births, compared to fewer than 300 per 100,000 in South Asia and only 4 per 100,000 in high-income nations.[1]

The challenges contributing to this stark disparity are numerous and varied, including inadequate health care systems, low numbers of skilled birth attendants, high fertility rates and low levels of education.[2] Structural factors such as social, economic, educational, political and

cultural factors are seen as the root causes of these adverse maternal health outcomes.[3] Recent years have seen a shift in the approach to addressing maternal mortality and morbidity, moving away from single interventions towards more comprehensive, integrated strategies that aim to achieve high coverage.[1] The near miss conceptual framework was proposed by WHO in 2012 as shown in Figure 1.

METHODS

This was a Retrospective study over a period of one year (Nov 2014 to Oct 2015) conducted in Kamla Raja Hospital, Gwalior, Department of Obstetrics and gynaecology. All the critically ill patient who were categorized under SAMM as per WHO formulated audit, were admitted to obstetrics ICU were selected. Data was collected from case sheet records of selected patients. Analysis of various socio demographic factors done on the basis of case sheet records.

Outcome indicators

Maternal near-miss incidence ratio (MNMIR): the number of women with MNM per 1000 live births. Maternal mortality ratio (MMR): the number of maternal deaths per 100,000 live births. Mortality index (MI)=numbers of maternal deaths per total numbers of maternal deaths and MNMD

This retrospective cross-sectional study was conducted to examine trends associated with delivery related maternal in-hospital mortality and SMM between Nov 2014 and Oct 2015, using data from hospital medical records after taking ethical approval.

RESULTS

A retrospective study was conducted over a one-year period from November 2014 to October 2015 at the Kamla Raja Hospital in Gwalior, India, within the Department of Obstetrics and Gynaecology. All critically ill patients who were categorized as experiencing Severe Acute Maternal Morbidity as per the World Health Organization's audit criteria were admitted to the obstetric intensive care unit. During the study period, a total of 159 near-miss cases were identified, with 43 of those patients ultimately succumbing to maternal mortality. The maternal mortality ratio was 561 per 100,000 live births and the Maternal Near-Miss Incidence Ratio was 20 per 1,000 live births. The maternity near-miss to maternal death ratio was 3.69:1. During the study period live births 7663, Total no. of near miss cases: 159, Total no. Of maternal deaths =43, women with life threatening conditions=MNMM+MD=202(159+43), Maternal near miss incidence ratio=MNM/LB= (159/7663-.0207), severe maternal outcome ratio=MNM+MD/LB= (0.263), maternal near miss: mortality ratio=MNM:1 MD= (3.69:1), mortality index=MD/(MNMM+MD) = (0.212)

No. of maternal deaths during the study period=43 is shown in Table 2. Socio-demographic characteristics is shown in Table 1. No. of cases in age group less than 19 years= 5. No. Of cases in age group 21 -30 years = 115. No. of cases in age group> 30 yrs =39. No. Of MNMM cases who were illiterate=64. No. Of MNMM cases who were literate (minimum primary education & above) =95. Most common adverse events associated with MNMM is shown in Figure 2. Hypertension=-56, Haemorrhage =42, Sev anemia-21, Near miss on arrival (n=104), Near miss after admission n=55 (159-104).

Sociodemographic analysis revealed that 72% of the studied patients were within the 21–30-year age group, 60% (n=95) female were literate at least till primary level and 66% were from rural backgrounds, same were the referred cases as well. Further, 81% of the patients did not attend any antenatal clinic and 61% were multigravida. Regarding the underlying causes of severe acute maternal morbidity, hypertensive disorders were the predominant factor, followed by haemorrhage and anaemia.[4-7]

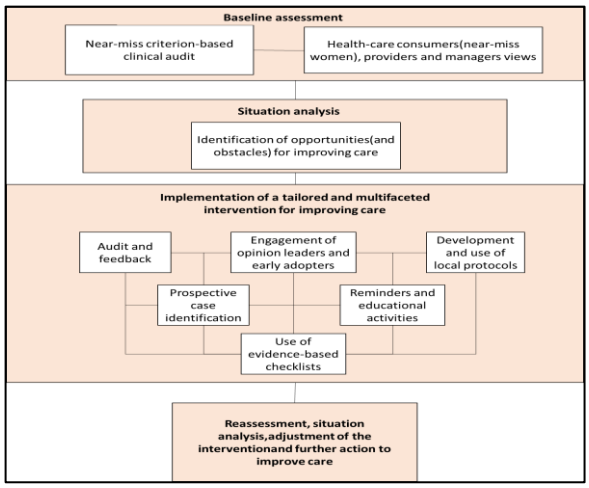

Figure 1: Near miss conceptual framework WHO 2012.

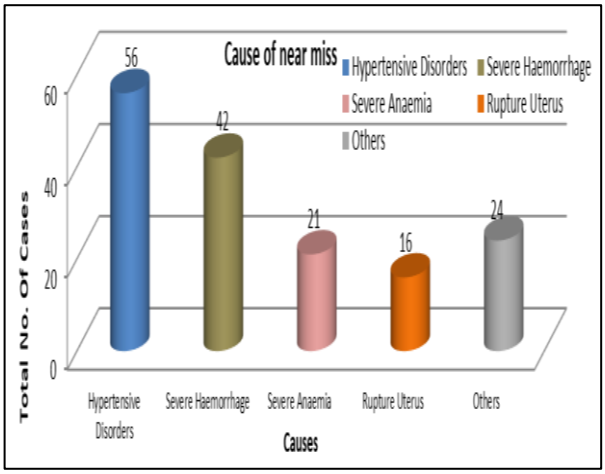

Figure 2: Causes of near miss in this study.

These findings align with previous studies that have highlighted the significant impact of socioeconomic factors, lack of access to antenatal care and underlying medical conditions on maternal morbidity and mortality in near miss patients.

Table 1: Percentage of various sociodemographic factors among studied patients.

Sociodemographic factors	Numbers (%)
Age (21-30 year)	115 (72)
Rural background	104 (66)
Referred cases	104 (66)
No ANC visits	128 (81)
Multigravida	96 (61)

Table 2: Various near miss indicators calculation in our study.

Total births	7663
Total no. of near miss	159
Maternal deaths	43
MMR	561/100,000 live births
Near miss incidence	20/1,000 live births
MNM:MD	3.69:1

DISCUSSION

In the present study, we identified women with SAMM and NM using the ACOG recommendation and the WHO criteria. The main conditions identified were hypertension, haemorrhage and sepsis. Lower educational qualification, sub-optimal antenatal visits, women in third trimester and postpartum period and other underlying factors (lack of awareness and delay in referrals of patients to specialized reference centres), were identified as the strongest determinants for SAMM and NM SAMM includes women who suffer from complications related to pregnancy, delivery and puerperium.[8] Low number of cases of postpartum haemorrhage in our study may be attributed to 100% compliance with active management of the third stage of labour and access to blood bank facilities as this provides early effective management before the development of severe acute morbidity.

In our study, primary causes of SAMM were hypertension and haemorrhage and these observations were similar to other previous studies.[8] Additionally, previous studies have studied the association of hypertension and obstetric complications including pulmonary oedema, abruptio placenta, rupture uterus and thrombocytopenia. However, it was difficult to compare with other studies as the exact criteria used to identify SAMM and NM cases were not available. This stresses the importance of uniformity in identification, which can be used for comparison and monitoring. Organization of periodic audits and evaluations in identifying gaps in prevention and management of life-threatening conditions may help improve care. Different studies have supported the presence of hypertension, haemorrhage and sepsis to be the main causes or risk factors for the development of NM.[8] We observed a change in the trend of etiological factors as morbidity progressed from SAMM to NM to Maternal Mortality. Contribution of haemorrhage and sepsis increased while hypertension decreased in the corresponding categories. Deaths occurring even after admission to ICU, with access to all life-saving interventions, stresses the importance of early recognition and prompt management of women with hypertension, postpartum haemorrhage and sepsis and timely admission of these patients to specialized reference centres.

This highlights the importance of two factors firstly, good antenatal care for the early detection of hypertension and management of severe hypertension/eclampsia with IV Labetalol and Magnesium sulphate before they progress to severe complications.[11] Secondly, prevention and aggressive management of postpartum haemorrhage (PPH) by universal implementation of active management of third stage of labour (AMTSL), training of personnel in the management of PPH (medical, nonsurgical and surgical methods) and early availability of blood and blood products.

Our study found that older women have a significantly higher risk of developing SAMM and NM. A previous study reported women30 years (OR=2.69; 95% CI, 2.34–3.06) experience a greater risk than women between 20 and 24 years.[8]

Poor maternal education significantly results in higher maternal mortality even if women have access to amenities providing intrapartum care.[9] In our study too, women with low education levels had higher odds (primary education: OR = 91.94; 95% CI: 6.87-3330.96) of developing SAMM and NM. This is supported by another observation in this study, that a lack of awareness highly increased the risk of SAMM and NM. Although not to a statistically significant degree, this highlights the need for effective prenatal education of mothers and their families for their timely access to health care facilities. Increased parity has been associated with an increased risk of maternal mortality from vascular complications, particularly haemorrhage.[8]

In our study, the risk of SAMM and NM was high in multiparous women and most maternal deaths were caused due to haemorrhage. Previous studies have also noted similar observations, but inconsistently. The current study states that the odds of SAMM and NM were high among women who had sub-optimal number of antenatal care visits than those who had optimal number of visits and also that third trimester and the postpartum period were the most vulnerable time for complications to set in. Maternal deaths are tragic events in obstetrics and constitute the most obvious manifestation of severe morbidity related to pregnancy, childbirth and puerperium. The poor outcome was related to the severe morbid state at admission, highlighting the importance of early recognition of acute cases of morbidity, aggressive management and early

admission to specialized referral centres. In contrast, a study by Roopa et al, reported sepsis to be the leading cause of maternal mortality, followed by haemorrhage, cardiac disease and hypertension, while Norhayati et al, also reported that most maternal deaths were due to haemorrhage.[10]

This study attempts to elaborate the causes of (severe acute maternal morbidity) SAMM and maternal (near miss) NM among pregnant women and the associated risk factors. Although this is a single centric study with small study population, it is hoped that this study would provide insight into the causes of (severe acute maternal morbidity) SAMM and maternal (near miss) NM among pregnant women and the associated risk factors and stimulate further multi-centric study with larger study population in future. This study gave an overview of various aspects of SAMM, but limitations being a retrospective study shows a theoretical aspect.

CONCLUSION

Average MNMIR in ICU was 20 per 1000 live births. Hypertensive disorders of pregnancy and postpartum haemorrhage were the main obstetric causes of MNM in ICU. These findings would guide to improve professional skills of primary health care providers and encourage vaginal birth in the absence of medical indications for caesarean birth.

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

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