

Maternal Near Miss: A Bigger Challenge

Abstract

Introduction: Maternal near-miss case is a new concept and is defined as “a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy”. The objectives of the present study were: to identify among all women admitted to hospital during pregnancy, delivery and in the postpartum period those that were indicative of severe acute maternal morbidity; to find out and analyse the cause of hospitalization.

Materials & methods: This was a descriptive study done for a period of 24 months between 1st January 2013 and 31st December 2014 in our hospital. Cases of severe obstetric morbidity were analyzed in regard to characteristics like age, parity, and gestational age at admission, Intensive Care Unit (ICU) admission, and surgical intervention to save the life of the mother were considered. Maternal near miss (MNM) indices were calculated.

Results: There were 150 cases of near miss, 3123 live births and 9 cases of maternal deaths. Maternal near miss incidence ratio is 48.03. Maternal near miss mortality ratio is 16.66. Mortality index (MI) is 5.66%. Mostly near miss cases were antenatal at >28 weeks of gestation with hemorrhage and hypertension being commoner causes responsible. The highest mortality index was found with cardiac causes (25%) followed by sepsis (16.6%) and eclampsia (14.2%).

Conclusion: All near misses should be interpreted as free lessons and opportunities to improve the quality of service provision.

Keywords: Maternal near miss; Maternal mortality; Mortality index

Research Article

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Abbreviations: ICU: Intensive Care Unit; MNM: Maternal Near Miss; MI: Mortality Index; LB: Live Births

Introduction

Women who survive life-threatening complications related to pregnancy and delivery have many common aspects with those who die of such complications. This similarity brought forth the near-miss concept in maternal health. Analysis of the similarities, differences and the relationship between those two groups of women provide a complete assessment of quality in maternal health care. The concept of maternal near miss has been evolving during the past two decades as deaths from complications of pregnancy and childbirth is progressively decreasing in many countries, while number of survivors of those life-threatening complications exceeds the number of those who die. Therefore, studying those women who nearly died but survived, identified as the near-miss cases, would give a better indication of care provided for those women who survived the near-miss event [1]. Currently, a maternal near-miss case is defined as “a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy” [2].

The objectives of the present study were: to identify among all women admitted to hospital during pregnancy, delivery and in the postpartum period those that were indicative of severe acute maternal morbidity; to find out and analyse the cause of hospitalization.

Materials and Methods

This was a descriptive study done for a period of 24 months from 1st January 2013 to 31st December 2014 in our hospital. It is a tertiary care hospital with well equipped 24 hour labour ward facility, with High Dependency Unit and intensive care facility. Cases of severe obstetric morbidity who met WHO criteria were identified during daily morning rounds and all new admissions in last 24 hours including serious inpatient cases were discussed. All the cases were followed up during their hospital stay till their discharge or death. Patients were analyzed for age, parity, and gestational age at admission, Intensive Care Unit (ICU) admission and life saving surgical intervention were considered. Patients were then categorized by their final diagnosis with respect to hemorrhage, hypertension, sepsis or indirect causes. Medical disorders were considered as indirect causes of maternal near miss and deaths.

The following maternal near miss (MNM) indices were calculated.

- a) MNM incidence ratio refers to the number of maternal near miss cases per 1,000 live births

$$(LB). \quad \frac{MNM \ IR = MNM}{LB \times 1000}$$

- b) Maternal near miss mortality ratio is the proportion between

maternal near miss cases and maternal deaths. Higher ratio indicates better care. MNM: 1MD.

- c) Mortality index (MI) = Number of maternal deaths divided by the number of women with life threatening conditions, expressed as a percentage.

$$\left(\frac{M I = M D}{M N M + M D} \right) \times 100$$

Higher index means more women with the life threatening condition die (low quality of care), while low index suggests better quality of health care.

Results & Observation

During the study period, there were 150 cases of near miss, 3123 live births and 9 cases of maternal deaths. In our study, following indices were calculated:

Maternal near miss incidence ratio is

$$\frac{MNM}{LB} \times 1000 = \frac{150}{3123 \times 1000} = 48.03 .$$

Maternal near miss mortality ratio is

$$\frac{MNM}{MD} = \frac{150}{9} = 16.66 .$$

For this indicator, higher ratios indicate better care, meaning more women under near miss rather than becoming maternal deaths.

Mortality index:

$$(MI) = \frac{M D}{(M N M + M D) \times 100} = \frac{9}{(9+150) \times 100} = \frac{9}{159 \times 100} = 5.66\% .$$

Higher indices indicate that more women with life-threatening conditions die (low quality of care), whereas lower indices signify better quality of care.

Table 1 shows the demographic profile of 150 near miss cases and 9 maternal deaths. We analyzed the mean age, parity, gestational age and causes of maternal near miss and mortality. In near miss cases, the maternal mean age was 25 years and primiparas were more in number. Mostly near miss cases were antenatal at >28 weeks of gestation with hemorrhage and hypertension being commoner causes responsible.

Table 2 compares the various causes for maternal near miss and mortality with the mortality index calculated. The highest mortality index was found with cardiac causes (25%) followed by sepsis (16.6%) and eclampsia (14.2%).

Discussion

The maternal near-miss concept has been developed and used as an indicator for health care system for evaluation and improvement. Overall, there had been three major approaches to the identification of near miss cases:

- i) Clinical criteria related to a specific disease entity (i.e., pre-eclampsia, postpartum haemorrhage).
- ii) Management-based criteria (i.e., admission to ICU, need for a blood transfusion).
- iii) Organ system dysfunction based criteria [3]. Prevalence of near miss varies because of the difference in these approaches. According to a recent systematic review, prevalence rates of near miss varied between 0.6 and 14.98% for disease-specific criteria, between 0.04 and 4.54% for management-based criteria and between 0.14 and 0.92% for organ-based dysfunction based on Mantel criteria [4]. Women in poor resource settings experience a higher prevalence in all these categories. However, due to wide variation in identification of cases as well as the variation within each category, it has not been possible to pool the data and make a summary estimate [1,4].

In an attempt to standardize the identification of maternal near-miss events, the WHO working group for maternal mortality and morbidity classifications developed a consensus on maternal near-miss identification, which is based on two components [2]:

- a. Identification of potentially life-threatening conditions, which may or may not be near-miss cases, (i.e. specific complications such as severe preeclampsia and/or critical interventions such as blood transfusion).
- b. Identification of near-miss cases based on organ system dysfunction and organ-dysfunction proxies including clinical, laboratory and management criteria.

In developing countries very little attention has been given to the near-miss obstetric cases. This probably is a result of the persistently high maternal mortality that has overshadowed other severe obstetric complications and near miss cases.

Comparing the major causes of near-miss cases and maternal deaths, obstetric haemorrhage and hypertension were the most common underlying causes of severe maternal outcomes, which is comparable to other studies in developing countries [5,6].

The maternal near-miss ratio which this study describes (48.03 per 1000 live births) is within the wide range of ratios reported in studies from other developing countries which used similar criteria for near-miss definition (12.3 - 82.3 per 1000 deliveries) [7,8]. In the current study, there is a total mortality index for near-miss cases of 5.66 %, which means that for every maternal death there are around 20 near miss-cases. This low mortality index signifies better obstetric care. Despite the high morbidity from haemorrhage and hypertensive disorders (44%, 39.33%, respectively) their mortality index was lower than that of the other events. This could be due to the availability of prompt blood bank services and the use of magnesium sulphate in both prevention and cure of eclampsia. Better care and effort is required to deal with near-miss events with a high mortality index, e.g., cardiac disease, sepsis.

There are several advantages of investigating near miss events over events with fatal outcome

Table 1: Demographic characteristics of near miss morbidities and mortality.

	Near Miss (150)	Maternal Death (9)
Mean age (in years)	25 (15-38)	27 (18-40)
Parity		9
Primipara	84	4
Multipara	66	5
Gestational age		
1-14 weeks	24	1
14-28 weeks	11	
>28 weeks	94	3
Postnatal	21	5
Causes		
Hemorrhage	66	2
Hypertension	59	3
Sepsis	8	1
Cardiac	4	1
Indirect	13	2

Table 2: Comparison of near miss events and primary causes of maternal deaths.

Hypertensive Disorders	Near Miss Events	Maternal Deaths	Mortality Index
Severe Preeclampsia	30		
Eclampsia	21	3	14.2%
Chronic Hypertension superimposed with severe Preeclampsia	6		
HELLP Syndrome	2		
Hemorrhage in Early Pregnancy			
Ectopic Pregnancy	14		
Abortion	19	1	5.2%
Hemorrhage in Late Pregnancy			
Placenta Praevia	13		
Abruptio Placentae	11		
PPH	9	1	1.1%
Sepsis			16.6%
Septic Abortion	2		
Antepartum Sepsis	2		
Cardiac			25%
Severe Mitral Stenosis	2		
Peripartum Cardiomyopathy	2	1	
Indirect			7%
Pregnancy with Cerebral Malaria	8	1	
Pregnancy with Jaundice	3		
Pregnancy with GBS	2	1	

- a) Near miss are more common than maternal deaths [6].
 - b) Their review is likely to yield useful information for the conditions that lead to severe morbidity and death.
 - c) Investigating the care received may be less threatening to providers because the woman survived
 - d) Information derived from interviews of survivors regarding the care they received.
 - e) All near misses should be interpreted as free lessons and opportunities to improve the quality of service provision [9].
 - f) It is also clear that maternal deaths merely are the tip of the iceberg of maternal disability. For every woman who dies, many more will survive but often suffer from lifelong disabilities [10].
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Conclusion

With incorporation of near miss cases in maternal death enquiry, audits would get strengthened by more rapid reporting and robust conclusions. Again, comparisons made with maternal deaths and reinforcing the lessons learnt further establishes intensive care requirements and also calculation of comparative indices.

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