# A Prospective Observational Study of Near-Miss Maternal Cases in A Tertiary Care Hospital

**Saumya Niviti[1], Shreya Prabhoo[2], Chandrashekhar Hegde[3]**

**ABSTRACT**

**Introduction:** WHO estimates that 15% of all pregnant women will develop direct obstetric complications such as hemorrhage, obstructed or prolonged labor, pre-eclampsia or eclampsia, sepsis, ruptured uterus, ectopic pregnancy and complications of abortion. Exploring the similarities, the differences and the relationship between the women who died and those who survived life-threatening conditions provide a more complete assessment of quality in maternal health care. The present study was done to determine the near miss cases and to determine the main causes of this situation.

**Material and methods:** A prospective cross-sectional study was carried out in the department of obstetrics and gynecology, in a tertiary referral center for a period of 8 months. The total number of near miss cases, maternal mortalities and total live births were used to calculate the following indices: Maternal mortality ratio, Severe morbidity ratio and Mortality index. All the data was arranged in a tabulated form and analyzed using SPSS software.

**Results:** The study enrolled 100 subjects; the mean age was 27.63 years. Forty one percent(41.0%) of the cases were primigravida and 19.0% of the cases each were secondary and third gravida. There were 55.0% of the cases that had clinical criteria followed by 16.0% of the cases that had both Clinical and Management criteria by WHO identification. Organ dysfunction was seen in 5% cases. Severe post partum hemorrhage and anemia was seen in 14% and 13% cases respectively. Severe acute thrombocytopenia and ruptured uterus was seen in 4% cases. Liver dysfunction was also seen in 4% cases. Eclampsia was seen in 12% cases. Cardiac and neurological dysfunction was seen in 1% cases each.

**Conclusion:** We conclude that studying near-miss cases can provide valuable information and their review is likely to yield information on the same pathways that lead to severe morbidity and death. The number of maternal near-miss cases is more than the maternal deaths and the cases are alive to directly inform on problems and obstacles that had to be overcome during the process of health-care

**Keywords:** Deaths, Maternal, Mortality

## INTRODUCTION

Maternal death is defined as the death of a woman who dies from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy or child birth or within 42 days of termination of pregnancy, irrespective of the duration and site of pregnancy.[1] WHO estimates that 15% of all pregnant women will develop direct obstetric complications such as hemorrhage, obstructed or prolonged labor, pre-eclampsia or eclampsia, sepsis, ruptured uterus, ectopic pregnancy and complications of abortion. If left untreated, they will lead to death or severe disability.[2] A child with a dead or ill mother is less likely to attend school or to receive health care. This is particularly true for daughters. A motherless child is also four times more likely to die than a child whose mother is still alive.[3] Traditionally, maternal mortality is considered to be an indicator of economic development and of the quality of obstetrical care. A 75% reduction in maternal mortality by 2015, i.e. less than 100/1,00,000 live births, was one of the Millennium Development Goals.[4] Maternal mortality has been the main way of ascertaining the outcome of maternal and obstetric care. For these reasons, increased attention has been directed towards reviews of obstetric morbidity. The investigation of severe acute maternal morbidity, also referred to as near-miss, has been recommended as providing superior information about burden of disease and quality of care in pregnant women. It can also broaden understanding of factors that contribute to both maternal morbidity and mortality.[5] WHO defines maternal near miss as a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy. Women who survive from life-threatening conditions arising from complications related to pregnancy and childbirth have many common aspects with women who die of such complications. This similarity led to the development of near miss concept in maternal health. Exploring the similarities, the differences and the relationship between the women who died and those who survived life-threatening conditions provide a more complete assessment of quality in maternal health care. The present study was done to determine the near miss cases and to determine the main causes of this situation.

## MATERIAL AND METHODS

A prospective cross-sectional study was carried out in the department of obstetrics and gynecology, in a tertiary referral center for a period of 8 months. Subjects falling in the Maternal near-miss cases as per WHO classification

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for near-miss 2009 were included in the study. Some of the cases were maternal cases of severe complications like postpartum bleeding, cases with eclampsia, severe sepsis, cases with ruptured uterus etc. Subjects with life threatening organ dysfunction were also included in the same. Patients failing to fall under there criteria were excluded from the study. Patients were interviewed before discharge from the hospital. Their antenatal records were checked. Age, parity, gestational age, condition on admission, referred or not, any surgical intervention, blood and blood products given, ICU admission or not, duration of hospital stay was found out. The mode of delivery and fetal outcome was also taken into consideration. The total no. of near miss cases, maternal mortalities and total live births were used to calculate the following indices: Maternal mortality ratio, Severe morbidity ratio and Mortality index. Maternal mortality ratio is defined as Number of maternal deaths during a given time period per 100,000 live births during the same time period. Mortality index is defined by the ratio of maternal deaths to the sum of maternal deaths and near-miss cases, represented as a percentage.

## STATISTICAL ANALYSIS

All the data was arranged in a tabulated form and analyzed using descriptive statistics with the help of SPSS.

## RESULTS

The study enrolled 100 subjects; the mean age was 27.63 years. Out of which 41.0% of the cases were primigravida and 19.0% of the cases each were secondary and third gravida. Ten percent (10%) of patients were admitted in a critical condition, 74% were serious and only 16% were stable (Graph 1). Amongst the patients admitted 84% were antenatal, 5% were postpartum, 6% had a miscarriage and 4% had undergone termination of pregnancy (Table 1, graph 2). Classification of patients according to WHO criteria included 55% who had clinical criteria, 15% who had both clinical and management criteria, 5% had organ dysfunction, 4% had clinical organ and system dysfunction, and in 7% there was organ system dysfunction and management (Table 2). On Classification of cases based on diagnosis there were 34% cases of severe pre eclampsia, 1 case of coagulation disorder. Severe post partum hemorrhage and anemia was seen in 14% and 13% cases respectively. Severe acute thrombocytopenia and ruptured uterus was seen in 4%

| Status of admission | No. of cases (N = 100) | Percentage |
|---|---|---|
| Abortion | 04 | 04.0 |
| Miscarriage | 06 | 06.0 |
| Post abortion | 01 | 01.0 |
| Postpartum | 05 | 05.0 |
| Pregnant | 84 | 84.0 |

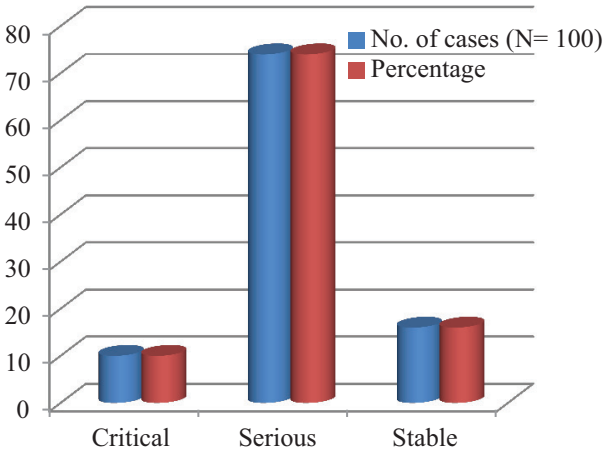
**Table-1:** Status on admission among study cases

| Criteria | No. of cases (N = 100) | Percentage |
|---|---|---|
| Clinical | 55 | 55.0 |
| Management | 01 | 01.0 |
| Organ system dysfunction | 05 | 05.0 |
| Clinical and Management | 16 | 16.0 |
| Management and OSD | 07 | 07.0 |
| Clinical and OSD | 04 | 04.0 |
| All | 11 | 11.0 |

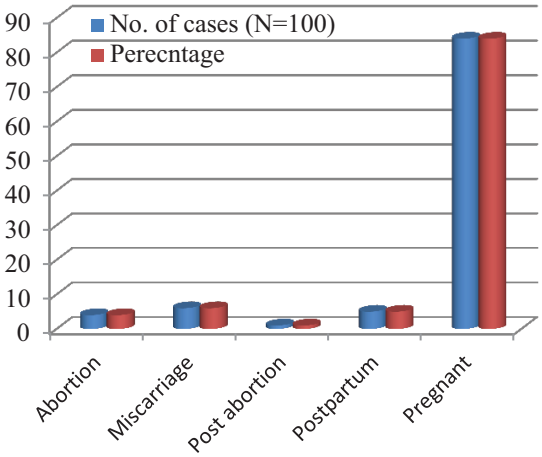
**Table-2:** Criteria by who identification for near – miss cases

| Diagnosis | No. of cases (N = 100) | Percentage |
|---|---|---|
| Anesthetic accident | 01 | 01.0 |
| Cardiac dysfunction | 01 | 01.0 |
| Eclampsia | 12 | 12.0 |
| HELLP syndrome | 05 | 05.0 |
| Neurological Dysfunction | 01 | 01.0 |
| Hepatic and coagulation dysfunction | 01 | 01.0 |
| Liver dysfunction | 04 | 04.0 |
| Respiratory dysfunction | 05 | 05.0 |
| Rupture uterus | 04 | 04.0 |
| Severe acute thrombocytopenia | 04 | 04.0 |
| Severe anemia | 13 | 13.0 |
| Severe Postpartum hemorrhage | 14 | 14.0 |
| Severe Pre - Eclampsia | 34 | 34.0 |
| Coagulation Dysfunction | 01 | 01.0 |

**Table-3:** Diagnosis among study cases




**Graph-1:** Condition on admission




**Graph-2:** Status on admission among study cases

cases each. Liver dysfunction was also seen in 4% cases. Eclampsia was seen in 12% cases. Cardiac and neurological dysfunction was seen in 1% cases each (Table 3).

## DISCUSSION

As the majority of the patients were referred from peripheral hospitals with delay at multiple levels and sometimes inappropriate management, patients presented with increased severity of their illnesses. There is a wide range of difference in this observation across the globe which could be a result of difference in demography and infrastructure of various regions. In our study 74% of near miss patients arrived in serious condition, 10% in a critical state and 16% were stable. In contrast, a study in three African countries by Filippi et al[6] showed that most of the women with near-miss events (83%) were already in a critical condition on arrival at the hospital (range 54-90%). In another study in Ipoh, Malaysia by N Sivalingam et al[7] in 1999, it was found that a majority of the patients (75.4%) were in stable condition when first evaluated. Being a tertiary referral center with a large catchment area and situated at a location easily accessible by road and railway, it is the one of the most preferred referral center by the peripheral hospitals. Out of 100 near miss cases 73 were referred to the hospital. This was in accordance with the study conducted by a hospital in Jaipur, India by Anju Taly et al[8] in 2004 where out of 100 maternal near miss cases 63 patients were referred from peripheral hospitals. According to WHO identification criteria for near-miss cases, 55% patients were identified by clinical criteria whereas 16% patients had both clinical and management based criteria for identification which shows that using the clinical criteria identifies the most near-miss cases.

The most common causes of near-miss cases in our study fall under the diagnostic categories of hypertensive disorders in pregnancy, hemorrhage and severe anemia. Hypertensive disorders including 34% severe pre-eclampsia, 5% HELLP syndrome and 12% eclampsia were most common and accounted for 51% of the total 100 near miss cases. 14% patients had severe post-partum hemorrhage requiring obstetric hysterectomy. 13% of the patients had underlying severe anemia therefore requiring blood transfusion. Uterine rupture occurred in 4% patients. The results of this study was comparable to a study conducted in 2003-2004 in Sagamu, Nigeria; Olufemi T Oladapo et al where hypertensive disorders and hemorrhage accounted for most of the near miss cases i.e. 35.4% and 26.1% respectively. Most events of near-miss due to hemorrhage developed in the later part of pregnancy with 41.1% occurring in the postpartum period. Uterine rupture occurred in 4.61% and 12.3% patients had underlying anemia. Sepsis was responsible for 9.2% of the total near miss cases. In contrast to the above studies Adisasmita et al[10] in his study of near miss cases in Banten, Indonesia in 2003-2004 observed that hemorrhage was the most common diagnosis of 694 patients with an incidence of 42.35% with hypertensive disorders as the second leading cause with an incidence of 21.75%. A higher rate of preterm delivery was found in the group with near miss cases. It may have been affected by the greater number of admissions due to severe pre-eclampsia/eclampsia, a situation in which premature interruption of pregnancy is more common. In our study out of 82 deliveries, 64.6% of the deliveries were preterm. This finding was very different from a study conducted by J P Souza et al[11] in 2007 in Sao Paolo, Brazil, where the rate of preterm deliveries among near miss patients was 30.58%. In the study conducted by Fatima Aparecida Lotufo et al[12] in Sao Paulo, Brazil; The maternal mortality ratio (MMR) for the institution was 51.6 per 100,000 live births, the maternal near-miss ratio (MNMR) was 4.4 per 1,000 live births and the morbidity/mortality ratio (MNMR: MMR) was 8.6 cases for every death. The overall mortality index was 10.4%. Large discrepancies exist between the surveys. Most of the variation in the rates and ratios described is due to different inclusion criteria. Many studies used deliveries as the denominator, making it easier to compare data. Canada presents the lowest morbidity ratio (less than 1). The other studies present similar incidence/ prevalence ratios, varying between 1.1 – 8.23%. All four studies from Africa report the highest case- fatality ratios: about 1 of 5 women with severe maternal morbidity died in this country. In Nigeria 1 out of 11 women with life-threatening complications died as compared to the United Kingdom where 1 of 118 or France where 1:222 maternal deaths are reported. The very high case- fatality rate in Africa may be due to different definitions or differences in perinatal care quality. The measured markers for severe maternal morbidity were different, and hemorrhage, sepsis, eclampsia are included in all the studies. Dystocia and cesarean section as a cause of severe morbidity are reported only from studies conducted in developing countries, as they are less threatening conditions in developed countries.[13]

## CONCLUSION

The pattern of maternal mortality was very different from that of near-miss cases. Most maternal mortalities were due to non-obstetric conditions with fulminant hepatitis responsible for more than half the cases. These were natural and unavoidable deaths. We conclude that studying near-miss cases can provide valuable information and their review is likely to yield information on the same pathways that lead to severe morbidity and death. As the number of maternal near-miss cases is more than the maternal deaths and the cases are alive to directly inform on problems and obstacles that had to be overcome during the process of health-care, they provide useful information on quality of health-care at all levels

## REFRENCES

1. K Rajyalakshmi, Koram Ananya Jyothi. A study on aetiology of abdominal pain in females of repproductive age group in rural area of Srikakulam District, Andhra Pradesh. International Journal of Contemporary Medical Research 2017;4:1991-1994.
2. Souza J, Cecatti J, Parpinelli M, et al. Appropriate criteria for identification of near-miss maternal

morbidity in tertiary care facilities: a cross sectional study. BMC Pregnancy and Childbirth. 2007;7:20.
3. Amaral E, Souza J, Surita F, et al. A population-based surveillance study on severe acute maternal morbidity (near-miss) and adverse perinatal outcomes in Campinas, Brazil: the Vigimoma Project. BMC Pregnancy and Childbirth. 2011;11:9.
4. Morse ML, Fonseca SC, Gottgtroy CL, et al. Severe maternal morbidity and near misses in a regional reference hospital. Rev Bras Epidemiol. 2011;14:310–322.
5. M Ro ö sť VAJLÉ. Priorities in emergency obstetric care in Bolivia—maternal mortality and near-miss morbidity in metropolitan La Paz. BJOG An International Journal of Obstetrics and Gynaecology. 2009;: p. 1210-1217.
6. Filippi V, Ronsmans C, Gohou V, Goufodji S, Lardi M, Sahel A, et al. Maternity wards or emergency obstetric rooms? Incidence of near-miss events in African hospitals. Acta obstetricia et gynecologica Scandinavica. 2005; 84:11-6.
7. N Sivalingam KWL. Clinical Experience with M anagement of "Near-Miss" Cases in Obstetrics. Med J Malaysia. 1999; Vol 54(No 4).
8. Anju Taly SGNJ. Maternal intensive Care and Near Miss Mortality in Obstetrics. Indian Journal of Obstetrics and Gynaecology. 2004; 54: 478-482.
9. Olufemi T Oladapo AOSOAOOaOJD. Near-miss" obstetric events and maternal deaths in Sagamu, Nigeria: a retrospective study. Reproductive Health. 2005;2:9
10. Asri Adisasmita PEDFNCSaCR. Obstetric near miss and deaths in public and private hospitals in Indonesia. BMC Pregnancy and Childbirth. 2008;8:10.
11. JP Souza JCMPSSaEA. Appropriate criteria for identification of near-miss maternal morbidity in tertiary care facilities: A cross sectional study. BMC Pregnancy and Childbirth. 2007;7:20.
12. Fátima Aparecida Lotufo MAPSMHFGSaJGC. Applying the new concept of maternal near-miss in an intensive care unit. Clinics (Sao Paulo). 2012; 67:225–230.
13. Meile Minkauskiene. Incidence/prevalence of severe maternal morbidity - a literature review. In 12th Postgraduate Course in Reproductive Medicine and Biology,; Geneva, Switzerland.

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