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Study of Maternal Near Miss Cases at A Tertiary Care Hospital

Dr. Mahatta Bhalodia

MS (Obstetrics & Gynaecology), Senior Resident, Department of Obstetrics and Gynaecology, B. J. Medical College, Ahmedabad, Gujarat, India

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Corresponding Author:

Dr. Mahatta Bhalodia
MS (Obstetrics & Gynaecology), Senior Resident, Department of Obstetrics and Gynaecology, B. J. Medical College, Ahmedabad, Gujarat, India

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ABSTRACT

Background: Maternal near miss are women who survived a complication that occurred during pregnancy , childbirth or within 42 days of termination of pregnancy. Maternal near miss are more common than maternal deaths.
Methods: A prospective study done from 1st November to 20TH July 2024 at our tertiary care teaching hospital
Results: Out of 8100 deliveries , there were 7859 live births , 87 were maternal near miss cases and 15 maternal deaths. Severe maternal outcome ratio was 12.98 per 1000 live births. Mortality index at our institute was 0.15. Haemorrhage was the most common cause of maternal near miss.
Conclusion: Most of the maternal Near miss experienced delay in decision to seek health care, which resulted from underestimating the severity of illness during pregnancy.

Keywords: *Maternal near miss, severe maternal outcome ratio, mortality index.*

INTRODUCTION

"Women are not dying because of diseases we cannot treat . They are dying because societies are yet to make the decision that their lives are worth saving."
Mahmoud Fathalla , WHO

India is committed to achieving Millennium Development Goal 5, which focuses on reducing maternal mortality. To support this goal, the country has implemented the Maternal Death Review system. While maternal deaths are the most visible indicators of this issue, they represent only the tip of the iceberg.

Many women experience life-threatening complications during pregnancy, childbirth, or within 42 days postpartum, and these complications can nearly result in death.

According to the World Health Organization (WHO), a Maternal Near Miss (MNM) case refers to a woman who narrowly survives a serious complication during pregnancy, childbirth, or within 42 days following the end of pregnancy. These near-miss cases are significant because they involve severe health issues that, if untreated, could ultimately lead to maternal death. The causes and risks associated with maternal near-miss cases are similar to those of maternal deaths, making the review of MNM cases essential for understanding the factors that contribute to severe complications.

Studying maternal near-miss events provides critical insights into gaps in the healthcare system and offers opportunities for improvement. The maternal near-miss ratio has increasingly been used as a tool to assess the quality of obstetric care, particularly in low-income countries. Incorporating this approach into healthcare systems can help track severe maternal complications, evaluate the effectiveness of healthcare interventions, and enhance efforts to reduce serious outcomes.

Since maternal near-miss cases often precede maternal deaths, investigating these incidents can help identify underlying causes and allow for the implementation of preventive measures. This prospective study conducted at our tertiary care

hospital aims to estimate the proportion, clinical presentation, causes, and maternal outcomes of near-miss cases to improve maternal health outcomes

MATERIALS AND METHODS

STUDY DESIGN

Prospective Observational

STUDY SITE

Department of Obstetrics and Gynaecology, Tertiary care teaching hospital

STUDY PERIOD

1st November,2022 to 20th July,2024

INCLUSION CRITERIA

Patient fulfilling criteria for identification of near miss cases as per Maternal Near miss Review Operational Guideline, maternal health division, Ministry of health and family welfare, Government of India (December 2024)

Patient who survived a complication that occurred during pregnancy, childbirth or within six weeks after pregnancy having Minimum 3 criteria: one from each

1 Clinical findings
2 Investigations
3 Interventions done

OR any single criterion which signifies cardiorespiratory collapse. Those who give consent.

EXCLUSION CRITERIA

1 Obstetric cases delivered uneventfully without any complication and who don't fulfil criteria of near miss cases
2 Those who don't give consent
3 Mothers who died due to complications

METHODOLOGY

All obstetrics admissions in the study setting during the study period were followed till 42 days after delivery, and cases were included as per inclusion criteria.

All the relevant data was collected in the proforma based on FACILITY BASED MATERNAL NEAR MISS REVIEW FORM (MNM –R FORM) in detail regarding demography, obstetrics history, gestational age, clinical findings, investigations,interventions taken, maternal outcome, causes and relevant details of near miss. Data was analysed with help of appropriate statistical tools.

OBSERVATION AND DISCUSSION

TABLE 1 : OBSTETRIC STATISTICS OF TERTIARY CARE HOSPITAL

Obstetric statistics of tertiary care hospital	Total
Total number of admissions	10216
Total number of deliveries	8100
Total number of live births	7859
Maternal near miss cases	87
Maternal deaths	15

As shown in Table 1 , there were 10,216 obstetric admissions. Out of these , 8100 patients were delivered at our hospital and there were 7859 live births. Maternal deaths were 15.

At the end of study,87 near miss cases were reported as per inclusion criteria.

TABLE 2 : SEVERE ACUTE MATERNAL MORBIDITY INDICATORS TABLE 2A

Severe Maternal Outcome Ratio(SMOR)	MNM + MD / LIVE BIRTHS
	87+ 15/ 7859
	12.98 per 1000 live births

As shown in Table 2A , 12.98 women suffer from life threatening condition per 1000 live birth. SMOR gives an estimate of the amount of care and resources that would be needed in an area or facility. According to WHO, SMOR higher than

10 per 1000 live births indicates that a large percentage of women will need lifesaving interventions to survive their complications.

TABLE 2B

Maternal Near Miss Ratio	MNM/ LIVE BIRTHS
(MNMR) Or Severe Acute Maternal Morbidity Ratio	87/ 7859
	11.07 per 1000 live births

As shown in Table 2B , for every 1000 live birth, 11.07 women survived from life threatening complications.

TABLE 2C

Maternal Near Miss Mortality Ratio (MNM : 1MD)	MNM/ MD
	87/15
	5.8

As shown in Table 2C , for every 1000 live birth , 5.8 women survived from life threatening complications.

TABLE 2 D

MORTALITY INDEX	MD/(MD+MNM)
	15 / (15+87)
	0.15

As shown in TABLE 2D, for each maternal death 0.15 women faced life threatening complications during pregnancy. Lower rates indicate better quality of care.

TABLE 2E

Morbidity to Admission Ratio	MNM/ Total obstetrics admission
	87/10216
	8.52 per 1000 obstetrics admission

As shown in Table 2E, for every 1000 admission in obstetrics , 8.52 women were maternal near miss.

TABLE 2F

Mortality To Admission Ratio	MD/ Total obstetrics admission
	15/ 10216
	1.47 per 1000 obstetric admission

As shown in Table 2F, for every 1000 obstetrics admission , 1.47 maternal deaths occurred.

TABLE 3

GRAVIDA	NUMBER	%
1	20	23
2	18	20.6
3	16	18.4
MORE THAN EQUAL TO 4	25	28.7
PARITY	NUMBER	%
PRIMI PARA	2	2.3
MULTI PARA	6	6.9

As shown in Table 3 , majority of MNM cases 25(28.7%) were gravida 4 or more while gravid 3, gravid 2 and primigravida were 16(18.4%), 18(20.6) and 20(23%) respectively. Out of 87, 2(2.3%) patients were primi para and 6(6.9%) were multi para patients.

TABLE 4

Presenting Symptoms	Number	%
Abdominal pain	44	50.57
Fever	15	17.24
Bleeding per vaginum	14	16.09
Convulsions	5	5.95
Headache	3	3.45
Breathlessness	2	2.30
Vomiting	2	2.30

Shock	2	2.30

As shown in Table 4, most common presenting symptom was abdominal pain in 44 (50.57%) of MNM cases. Fever, bleeding per vaginum and convulsion were presenting symptoms in 15(17.24%),14(16.09%) and 5(5.95%) cases respectively.

TABLE 5

Criteria for identification of maternal near miss cases	Adverse Event	Number	%	Total
Pregnancy specific obstetric and medical disorder	Haemorrhage	27	31	53 (60.8%)
	Hypertensive disorders	20	22.9	
	Sepsis	4	4.6	
	Liver dysfunctions	2	2.3	
Preexisting disorders aggravated during pregnancy	Anaemia	10	11.5	24 (27.59%)
	Respiratory dysfunctions	8	9.19	
	Neurological dysfunctions	2	2.3	
	Cardiac dysfunctions	2	2.3	
	Autoimmune disorders	1	1.15	
	Endocrine disorders	1	1.15	
Incidental and accidental causes in pregnancy	Infections	10	11.5	10 (11.5%)

As shown in Table 5, pregnancy specific obstetric and medical disorders were reported in 53 (60.8%). Haemorrhage occurred in 27 (31%) cases. Hypertensive disorders of pregnancy were present in 20 (22.9%). Sepsis was present in 4 (4.6%). Liver dysfunction was present in 2 (2.3%) patients , both of them had acute fatty liver of pregnancy with severe jaundice.

TABLE 6

STUDY	**Adverse Event : Comparison with Other Studies**			
	Haemorrhage	**Hypertensive Disorders**	**Sepsis**	**Medical Disorders**
Roopa PS et al	44.3%	23.7%	16.0%	4.6%
Purandare et al	72%	26.5%	3.8%	29.9%
Yelikar et al	41.3%	47.1%	11.5%	-
Sangeeta G et al	40.7%	26%	7.4%	-
Bansal M et al	43.5%	12.8%	5.1%	-
Patankar A et al	43.9%	51.0%	3.1%	13.3%
Rakesh HJ et al	42%	32%	-	-
Kansara V et al	37.5%	62.5%	-	6.25%
Present study	31%	22.9%	4.6%	27.59%

As shown in table 6 , most common adverse event leading to MNM cases was haemorrhage in our study. Roopa PS et al , Purandare et al, Sangeeta G et al, Bansal M et al and Rakesh HJ et al also reported haemorrhage as the most common cause of MNM . Whereas Yelikar KA et al , Patankar A et al and Kansara V et al reported hypertensive disorders as the most common cause of MNM.

TABLE 7

Gestation at the time of admission	Management and Obstetric Outcome of near miss cases	Number	%
ANTENATAL 76(87.4%)	Suction and evacuation	2	2.3
	Laprotomy for ectopic pregnancy	2	2.3
	Hysterotomy	2	2.3
	Normal vaginal delivery	15	17.2
	Vaginal birth After caesarean section	1	1.15
	Lower segment caesarean section	42	48.27
	Caesarean section followed by laparotomy	2	2.3

	Medical management	10	11.5
POST ABORTAL 1 (1.15%)	Suction and evacuation	1	1.15
POSTNATAL 10 (11.5%)	Postpartum suction and Evacuation	1	1.15
	Laparotomy	4	4.6
	Medical management	5	5.7

As shown in Table 7, among antenatal admission , LSCS was done in 42 (48.27%) of the cases, 15 (17.2%) had normal vaginal delivery, 1 (1.15%) had vaginal birth after Caesarean (VBAC). Although undesirable, high rates of caesarean section may be accepted among near miss patients due to the urgency required to resolve the gestation and the factors that may make vaginal delivery difficult to occur . in two cases laparotomy was done following caesarean section on post operative day 4 for bowel obstruction and the other one was done on post operative day 2 for hematoma. Laparotomy was done in two cases for ectopic pregnancy. Hysterotomy was done in two cases, one case was of eclampsia and one case was of abruption placenta.

TABLE 8

STUDY	**Intervention done in Near Miss Cases**					
	Ventilatory support	Use of vasopressor	Dialysis	Repair of genital injury	Hysterectomy	Laparotomy
Yelikar KA et al	41.3%	12.5%	-	-	-	-
Patankar A et al	13.3%	25.5%	5.1%	-	9.2%	-
Anuradha J et al	45.7%	80.6%	3.5%	-	6.6%	41.02%
Rakesh HJ et al	19%	19%	8%	-	27%	-
Naik SS et al	-	-	12.1%	-	1.4%	-
Kansara V et al	62.5%	31.2%	-	-	37.5%	-
Ingole et al	9.8%	8.8%	1.3%	3.8%	2.2%	0.9%
Present study	20.7	14.9	1.15	2.3	10.3	8.0

As shownin table 8, Yelikar KA et al , Kansara V et al , Ingole et al reported ventilatory support as the most common intervention done in MNM cases . Patankar A et al , Anuradha J et al reported vasopressor use as the most common intervention done in MNM cases.

TABLE 9

BLOOD TRANSFUSION	NUMBER	%
YES	52	59.8
NO	35	40.2

As shown in table 9, 52 (59.8%) cases required blood and/or blood products transfusion whereas 35(40.2%) cases didn't require any type of blood or blood products transfusion.

CONCLUSIONS

Majority of maternal near miss cases were multigravida. Majority of maternal near miss cases were admitted in hospital with severe illness during antenatal period. Haemorrhage and hypertensive disorders were leading causes of maternal near miss cases. Anemia and infections were the third leading cause of maternal near miss cases. Ventilator support, vasopressor use , obstetric hysterectomy and laparotomy were the major interventions required in maternal near miss cases .Majority of maternal near miss cases required transfusion of blood and blood products. Perinatal mortality was high.

Therefore anticipation , early diagnosis and prompt treatment of maternal complications can reduce the feto maternal morbidity and mortality. A well equipped centre with HDU/ICU, operation theatre, blood bank, and multidisciplinary team along with NICU can go a long way in saving a critical mother and her baby.

Education and women empowerment , importance of antenatal care, importance of nutrition , awareness about warning

signs , institutional delivery, timely reference of high risk patients to tertiary care hospital and awareness of various methods of contraception must be promoted in addition to strengthening of peripheral health systems. All the maternal near miss cases are living lessons , who in spite of their misery can enlighten us to fill in the gaps that has led to maternal near miss cases.

The most vital purpose of near miss approach is to improve clinical practice and reduce preventable morbidity and mortality through use of best evidence based practices.

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