Study Of Maternal Near Miss Events At The Tertiary Care Hospital

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Abstract: Background: A maternal near miss case is defined as a "a woman who nearly died but survived a complication that occurred during pregnancy, child birth or within 42 days of termination of pregnancy"[1]. MMR is defined as ratio of number of maternal deaths per 1000 live births. All pregnant women deserve a good quality of care especially Emergency Obstetric Care including proper infrastructure, human resources that can detect and manage such complications earliest. The objective of this study was to evaluate the causes of maternal near miss cases, various management modalities performed and maternal and fetal outcome in near miss cases. Material And Methods: A retrospective study was carried out in obstetrics and gynaecology department of SCL municipal general hospital, Ahmedabad for identification of MNM as per MNM-R operational guidelines (2014) in a tertiary care hospital from August 2020 to March 2022. Result: Total deliveries during our study period were 9266 out of which 535 number of patients developed complications, 75 patients ended up becoming near miss cases and 30 maternal mortalities were observed. Hypertensive disorders (38.6%) followed by severe anemia (18.6%) and haemorrhage (13.3%) were the commonest underlying causes leading to MNM. More than one management modality was followed in one case. 25% of patients required blood transfusion. Out of which 11 patients required massive blood transfusion (>5 units of blood) and 16% of patients required blood products along with blood resulting from either severe anemia or altered coagulopathy (DIC). 69.3% of patients required ICU stay of <5 days and majority of patients required hospital stay of 9-14 days.63.6% of patients required ICU stay of 1-4 days. Live birth rate was 82.6%. Conclusion: Maternal health is the direct indicator of prevailing health status in a country. Reduction in maternal mortality is one of the targets of MILLENIUM DEVELOPMENT GOALS[13] for 2015 but in spite of full efforts by all the health care professionals, it still remains a challenge in developing countries. There should be prompt and proper management of high-risk groups by frequent antenatal visits. Aggressive management of each complication and close monitoring of women in labour, decision making in mode and time of termination of pregnancy are important to prevent further complications. [Mandaliya M Natl J Integr Res Med, 2022; 13(3): 62-66, Published on Dated: 10/05/2022]

Key Words: Maternal Near Miss Cases(MNM), Maternal Mortality, Emergency Obstetric Care(Emoc), Eclampsia, Vasopressor Drugs, Intrauterine Growth Retardation(IUGR), Severe Acute Maternal Morbidity(SAMM)

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Introduction: A maternal near miss case is defined as a "a woman who nearly died but survived a complication that occurred during pregnancy, child birth or within 42 days of termination of pregnancy"[1]. MMR is defined as ratio of number of maternal deaths per 1000 live births.

A maternal death is the most devastating event in obstetrics which affects family and medical personnel. Any pregnant woman can develop life threatening complications before, at the time of delivery or in post-partum period with little or no signs which should be looked for with immediate effect. All pregnant women deserve a good quality of care especially Emergency Obstetric Care including proper infrastructure, human resources that can detect and manage such complications earliest. Corrective actions for identified problems can be taken to reduce maternal mortality and morbidity. Maternal mortality in practical terms is the tip of iceberg while the maternal near miss cases remains invisible, infect which is very important to reduce maternal mortality. For every woman who dies, many more will survive but often with lifelong disabilities. The first step in implementing the near miss approach is to systematically identify the women with severe complications of pregnancy. Severe maternal outcome refers to number of women with life threatening conditions (maternal near miss + maternal death)[2]. Government of India launched MATERNAL NEAR MISS REVIEW (MNM-R)

OPERATIONAL GUIDELINES in December 2014 to identify gaps, health system response to maternal emergencies and to ensure best practice[3]. The objective of this study was to evaluate the causes of maternal near miss cases, various management modalities performed and maternal and fetal outcome in near miss cases.

Material & Methods: A retrospective study was carried out in obstetrics and gynaecology department of SCL municipal general hospital, Ahmedabad for identification of MNM as per MNM-R operational guidelines (2014) in a tertiary care hospital from August 2020 to March 2022.

Inclusion Criteria: Women who were pregnant/ aborted/ in labour/ delivered, up to 42 days from termination of pregnancy and Patients fulfilling criteria for MNM-R operational guidelines(3) having the most frequencies in the present scenario are listed below:

- Hypertensive disorders in pregnancy
- Severe post-partum haemorrhage
- Sepsis
- Rupture of uterus
- Uterine infections
- Severe acute thrombocytopenia (platelets <50,000/ml)
- Admission to Intensive Care Unit
- Medical cause like cardiovascular/ respiratory/ renal /hepatic /neurological dysfunction
- Massive blood transfusion (>5 units of blood)
- Use of vasopressor drugs
- Cardiopulmonary resuscitation

Exclusion Criteria: All uneventful pregnancies, abortions, deliveries and post-natal patients up to 42 days and patients who did not give consent. All the details of patients were noted including obstetric score, time of complications (antenatal/intranatal/postnatal), ICU admission, neonatal outcome, management in ICU and duration of hospital stay.

Results: Total deliveries during our study period were 9266 out of which 535 number of patients developed complications, 75 patients ended up becoming near miss cases and 30 maternal mortalities were observed.

Table 1: Distribution According To Maternal Variables

Maternal Variables		Total (%)	Kaur L et al (%)[4]
Age(Years)	<20	46(61.33)	004(03.30)
	20-35	19(25.33)	118(95.90)
	>35	10(13.33)	001(00.80)
Parity	Primi	23(30.66)	039(31.70)
	Multi	52(69.33)	084(68.30)
Gestational Age (Weeks)	<28	03(04.00)	037(30.08)
	>28	72(96.00)	086(69.90)
Booking Status	Booked Cases	23(30.66)	-
	Emergency Cases	52(69.33)	-
Mode Of Termination	Vaginal Delivery	14(18.66)	020(24.70)
	Caesarean Section	58(77.33)	035(43.20)
	Laparotomy	05(6.66)	008(12.20)

This table shows distribution of cases according to maternal variables. Out of 75, 46(61.33%) patients fell in the age group of 18-25 years which corresponds to the reproductive age group of India. Multipara forming majority of cases i.e., 69.33% which is comparable to Kaur L et al[4] as the number of complications increases with successive pregnancy. Majority of the patients were emergency case i.e., 69.33%. Out of them, 40% cases were referred from rural health facilities after development of complications which shows poor implementation of maternal health care programmes further challenging the existing health care services. In present study, 77.33% of the cases underwent caesarean section same as in Patankar et al[5] while Gupta et al[6] showed majority of patients underwent normal vaginal delivery. 5 patients of MNM case underwent Emergency laparotomy, out of which peritonitis following caesarean section was the indication in two of the patients where as one was performed for ruptured uterus following

VBAC on post-partum day 8 and two laparotomies were performed for small bowel obstruction following caesarean section.

Table 2: Underlying Disorders Leading To Maternal Near Miss Events

Causes	Total (%)	Ingole SJ et al[8] (%)
Pre-Eclampsia/ Eclampsia	29(38.66)	133(42.22)
Severe Anemia	14(18.66)	036(11.42)
Haemorrhage	10(13.33)	097(30.97)
Sepsis	08(10.66)	030(09.52)
Shock	04(05.33)	-
Severe Pneumonia (Covid-19 Infection)	03(04.00)	-
Medical Cause	03(04.00)	019(6.03)
Ruptured Uterus	01(01.33)	-
Others	01(01.33)	-

Hypertensive disorders (38.6%) followed by severe anemia (18.6%) and haemorrhage (13.3%) were the commonest underlying causes leading to MNM. Similar findings were observed in Samant PY et al[7] and Ingole SJ et al[8] where 51% and 42.2% cases had hypertensive disorders respectively. Screening and early detection of cases of PIH and prescribing antihypertensive drug and proper monitoring is very important to prevent acute and chronic life-threatening organ dysfunction for better maternal and perinatal outcome. Labetalol (alpha and nonselective beta blocker) and nifedipine (CCB) are most commonly used antihypertensive drugs in pregnancy.

Pre-existing low haemoglobin level in antenatal period leads to MNM as there is increased requirement of iron in pregnancy. Ante partum haemorrhage as in case of abortion, ectopic pregnancy, placenta previa, abruption placenta or post-partum haemorrhage (atonic/traumatic PPH) leading to acute severe blood loss causing maternal near miss events. Almerie et al[9] showed majority of MNM cases were of haemorrhage and treated with blood and blood product transfusion. Sepsis, despite of being a preventable cause remains an important factor leading to near miss cases particularly in developing countries like India. Anemia, malnutrition, poor hygiene, home deliveries, unsafe abortion and taboos in rural area leads to majority of cases of septicaemia.

Various pre-existing maternal medical conditions like jaundice, overt diabetes, chronic hypertension, immune compromised state, autoimmune diseases further more complicate the pregnancy leading to ICU stay. In present study 4% of cases had pre-existing medical disorder (overt diabetes, thyroid, cardiac and respiratory dysfunction) and 4% cases had acute respiratory distress following Covid-19 infection for which some patients necessitated ventilatory support.

Table 3: Various Modalities Of Management In Present Series

Management Modalities		No Of Patients (%)
Medical Management	Antihypertensive Drugs	29(38.60)
	Anticonvulsant Drugs	12(16.00)
	Blood Transfusion	19(25.30)
	Blood Product Transfusion	12(16.00)
	Higher Antibiotics	15(20.00)
Surgical Management	Obstetric Hysterectomy	06(08.00)
	Laparotomy	05(06.66)
Supportive Care	Vasopressor Drugs	21(28.00)
	Non-Invasive Ventilatory Support	46(61.33)
	Invasive Ventilatory Support	04(05.33)

Apart from critical care management, this table depicts specialized management modalities done in MNM cases out of which majority of cases were managed medically. More than one management modality was followed in one case. 25% of patients required blood transfusion. Out

of which 11 patients required massive blood transfusion (>5 units of blood) and 16% of patients required blood products along with prevention of primary and recurrent eclamptic seizure. Magnesium sulphate in the form of Pritchard regimen was used in majority of cases[10]. Emergency surgical intervention as a life saving measure was needed in 14.6% of patients while according to Umadevi S et al[11]. 62.5% of patients underwent surgical intervention.

Obstetric hysterectomy was performed in 6 patients out of which 4 had morbidly adherent blood resulting from either severe anemia or altered coagulopathy (DIC). Magnesium sulphate therapy is most commonly used for the placenta and 2 cases were of atonic PPH following caesarean section. Incidence of Placental accrete spectrum (placental adherence) is increasing with increased number of primary caesarean section having high mortality ranging from 7-10% .Vasopressor drugs were given to 28% of patients who presented with severe hypotension. Ventilatory support unrelated to anaesthesia was given in the form of O2 mask, BIPAP, intubation according to the need.

Table 4: Duration Of Stay

Stay (Days)		Total (%)	UMADEVI et al[11] (%)[11]
Icu Stay	<5 Days	52(69.33)	56(63.6)
	>= 5 Days	23(30.66)	28(31.8)
Hospital Stay	<8 Days	20(06.66)	-
	9-14 Days	44(58.66)	-
	>15 Days	11(14.66)	-

Table 4 shows duration of ICU stay and hospital stay of MNM cases. Shorter ICU stay indicates early diagnosis and prompt treatment of patients. Prediction of complication, complication- intervention interval in associated pre-existing high-risk women and patient's response to treatment are determining factors for ICU stay. 69.3% of patients required ICU stay of <5 days and majority of patients required hospital stay of 9-14 days same as the study UMADEVI et al[11] where 63.6% of patients required ICU stay of 1-4 days.. Longer ICU stay was observed in patients having pre-existing medical disorders, septicaemia, severely anaemic patients having massive blood transfusion and a case of laparotomy for ruptured uterus following VBAC. Hospital stay of >45 days were recorded in 2 patients having multisystem involvement following caesarean section.

Table 5: Fatal Status In MNM

Outcome	Present Study (%)	Pumma Mehak et al[12] (%)
Live Birth	62(82.66)	112(70.8)
Intrauterine Death	12(16.00)	031(19.60)
Still Birth	01(01.33)	-

Discussion: In present study, live birth rate was 82.6% which is comparable to PUMMA MEHAK et al[12] having 70.8% live births. Total 13(17.33%) babies had perinatal mortality as shown in this table. Most common causes were: birth asphyxia, sepsis and low birth weight.

Maternal complications leading to perinatal mortality were hypertensive disorders of pregnancy, oligohydramnios and rupture of uterus. Out of them 59% babies were admitted to NICU for transient tachypnoea of new born, birth asphyxia and respiratory distress. Majority babies were full term. Pregnancy related complications like anemia, hypertension, and ante partum haemorrhage can lead to uteroplacental insufficiency resulting in intrauterine growth restriction (IUGR) and prematurity.

Conclusion: Maternal health is the direct indicator of prevailing health status in a country. Reduction in maternal mortality is one of the targets of MILLENIUM DEVELOPMENT GOALS[13] for 2015 but in spite of full efforts by all the health care professionals, it still remains a challenge in developing countries. Maternal near miss (MNM) / severe acute maternal morbidity (SAMM) has gained international attention with timely intervention of these cases having major role in reduction of maternal deaths. Regular

audit of MNM cases should be done by tertiary care hospitals.

The pathology of maternal near miss events and cases of maternal mortality is the same. The common direct causes of maternal near miss cases are hypertensive disorders, anemia and haemorrhage. There should be prompt and proper management of high-risk groups by frequent antenatal visits. Aggressive management of each complication and close monitoring of women in labour, decision making in mode and time of termination of pregnancy are important to prevent further complications. The identification of patient's condition and need of referral should be looked for and health system should emphasize on 'when' and 'where to refer' for saving maternal health. Managing near miss case is a team work. A multidisciplinary approach with prompt intervention can avert a maternal death bringing joy to the family.

References:

1. World Health Organization. WHO, UNICEF, UNFPA, and the World Bank Estimates. Geneva, Switzerland: World Health Organization; 2012. Trends in Maternal Mortality: 1990-2010.
2. World Health Organisation. Evaluating the Quality of Care for Severe Pregnancy Complications: The WHO Near-Miss Approach for Maternal Health. Geneva, Switzerland: World Health Organisation; 2011
3. Maternal near miss review, operational guidelines, December 2014, Maternal health division, MOHFW, GOI.
4. Kaur L, Mohi MK, Kaur B, Singh B. A study of maternal near miss cases in tertiary health centre in north India. Int J Reprod Contracept Obstet Gynecol 2018;7:3239-43.
5. Patankar A, Uikey P, Rawlani N. Severe Acute Maternal Morbidity (Near Miss) in a Tertiary Care Center in Maharashtra: A Prospective Study. Int J Sci Stud 2016;4(1):134-140.
6. Gupta D, Nandi A, Noor N, Joshi T, Bhargava M. Incidence of maternal near miss and mortality cases in central India tertiary care centre and evaluation of various causes. The New Indian Journal of OBGYN. 2018; 4(2): 112-6
7. Samant PY, Dhanawat J. Maternal near miss: an Indian tertiary care centre audit. Int J Reprod Contracept Obstet Gynecol 2019;8:1874-9. International Journal of Reproduction, Contraception, Obstetrics and Gynecology Volume 8. Issue 5 Page
8. InGOle SJ, CHAUDHARY SN. Maternal Near Miss Events in Tertiary Care Hospital: A Retrospective Observational Study. Journal of Clinical & Diagnostic Research. 2021 Apr 1;15(4).
9. Almerie et al.: Obstetric near-miss and maternal mortality in maternity university hospital, Damascus, Syria :a retrospective study. BMC Pregnancy and Childbirth 2010 10:65.
10. Pritchard JA: The use of magnesium ion in the management of eclamptogenic toxemias. SurgGynecolObster 100:131,1955
11. Umadevi S, Ayesha S, Radha S, Nair ATS, Sulochana KD. Burden and causes of maternal mortality and near-miss in a tertiary care centre of Kerala, India. Int J Reprod Contracept Obstet Gynecol 2017;6:807-13.
12. PurrunaMehak Evaluation of Maternal Near Miss Cases at a Tertiary Care Hospital at Amritsar International Jo al of Scientific and Research Publications, Volume 8, Issue 1, January 2018 467 ISSN 2250-3153
13. WHO/ Millenium DEVELOPMENT GOAL 5: Improve maternal health.

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