

## A Descriptive Study of Maternal Near Miss Mortality in the Department of Obstetrics and Gynaecology at SMS Medical College

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### Abstract

**Introduction:** Complications during pregnancy and childbirth remain a leading cause of illness and death among women of reproductive age in India. In the recent years, the concept of the maternal near miss has been adopted by the tertiary level hospitals, as it has an added advantage of offering a large number of cases for intervention and for the evaluation of the maternal healthcare being provided by the health care system.

**Material and Method:** This prospective observational study was conducted at SMS medical college Jaipur to identify the MNM cases based on near miss criterion based on- maternal near miss review operational guidelines near miss approach (2014).

**Aims and Objective:** to evaluate the cause, adverse events, complications, sociodemographic profile, contributing factors, mode of interventions done in cases of Maternal Near Miss.

**Result:** The total number of live births of the hospital was 12127. 208 Severe maternal outcome cases were noted, out of which 170 were of MNM cases and 38 were of MD. MNM mortality ratio was found to be 4.47%. The most common cause for maternal near miss was found to be haemorrhage (51.17%), followed by hypertensive disorders of pregnancy (28%).

**Conclusion:** Systematic review of such cases can help to bring forth various contributory factors. whether it is medical, social, economical and other factors for necessary corrective actions which could be taken at community, district or at state level for reduction in maternal mortality and morbidity.

**Keywords:** MNM, Maternal, Mortality.

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### Introduction

Maternal mortality is a critical indicator to assess the quality of services provided by a health care system. The standard indicator for measuring is the Maternal Mortality Ratio (MMR), defined as the ratio of the

number of maternal deaths per 100,000 live births. [1]

Maternal death is defined as the death of a women while pregnant or within 42 days of

termination of pregnancy, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. Maternal Near Miss 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. [2,3] (WHO,2004). The major reasons and causes are the same for both maternal near-miss and maternal death, so a review of maternal near-miss cases is likely to yield valuable information regarding severe morbidity, which could lead to death of the mother, if not intervened properly and in time. Advantage of study maternal near miss compared to maternal mortality are that these cases are more common than maternal death and investigating these instances of severe morbidity is less threatening to providers because the woman survived. [4] The advantage of using the near-miss patient is that, by definition, the woman survives and can be interviewed and observed to get a clearer picture of the events leading from good health to severe maternal morbidity. This type of study makes it possible to identify the socioeconomic and behavioural characteristics of a group of women who were very ill and required extensive medical care and resources during their treatment. [5] If reported to clinicians, managers, and policymakers, this information could be useful in assessing the bigger picture of disease patterns among patients, planning programs, and allocating health care resources to prevent maternal deaths. [6]

According to the Sustainable Development Goals (SDGs), the global target is to reduce the maternal mortality ratio (MMR) to less than 70 per 100 000 live births by 2030 and to provide universal access to reproductive healthcare. The MMR declined in India by about 70% from 398/100 000 live births (95% CI 378-417) in 1997-98 to 99/100 000 (90-108) in 2020. According to the Sample

Registration System, a household survey conducted by the Indian government, the MMR dropped from over 400 per 100 000 in the early 1990s, to 230 in 2008 and to 130 per 100 000 between 2014 and 2016. In comparison, the global MMR in 2015 was estimated at 216 (95% CI 207 to 249). However, this downward trend masks staggering within-country variations in maternal mortality. For example, in the southern state of Kerala, in India, the MMR was reported to be as low as 61 per 100 000 live births in 2013 whereas in the northern state of Bihar it was 208 per 100 000 live births. This inequality in the burden of maternal deaths between northern and southern states is reflected by other socioeconomic indicators such as poverty and education which could influence access to care during pregnancy and postpartum. [7]

The purpose of the study is that Maternal mortality is a critical indicator to assess quality of services provided by health care system. Maternal near misses have been studied as surrogates of maternal death, so the review of maternal near-miss will help in identifying the contributory factors of maternal death so that action can be taken at all level of health system.

### Methodology

This observational prospective study was conducted in the department of obstetrics and gynaecology, at tertiary hospital. It included all the cases of severe acute maternal morbidity that met the inclusion criteria and definition of near-miss maternal mortality as given by maternal near-miss review operational guidelines. On the basis of the set criteria, cases were identified and selected for data collection from January 2020 to December 2020.

Data collection was done through in-depth interviews of maternal near miss mothers, someday after their admission, to ensure survival. At the time of data collection, the purpose of the study was clearly explained to the study subjects and they were also

assured of the confidentiality of the information. The study subject was enrolled in the study only after taking written informed consent.

Clearances and permission were obtained from the scientific and ethical research

committee. All the interviews were taken in local language in a semi structured questionnaire. All the results were compiled and tabulated and maternal near-miss ratio, maternal near-miss mortality ratio, and maternal mortality index was calculated

**Table 1: Near miss indices. [Table/fig-1]**

Indices	Number
Total no of live births	12127
Number of near miss cases (MNM)	170
Number of maternal mortality cases (MM)	38
Maternal near miss incident ratio	14.01 per 1000 live births
Maternal mortality ratio	313 per 100000 live births
Maternal near miss: maternal mortality ratio	4.6:1
Mortality index	18.26%

**Table 2: Demographic characteristics of near miss cases in the study.**

Patient Characteristics	Near Miss (170)	
Age Groups	Frequency	Percent
<20 Yrs	4	2.35
20-25	86	50.59
26-30	48	28.24
31-35	24	14.12
>35	8	4.71
Booking Status		
Booked at periphery	55	32.35
Booked at tertiary care	23	13.53
Un booked	92	54.12
Referral		
Referral	118	69.41
Self	52	30.59
AREA		
Rural	134	78.8
Urban	36	21.2
Education		
Illiterate	50	29.41
Up to 5 <sup>th</sup> class	70	41.18
6 <sup>th</sup> to 12 <sup>th</sup> class	38	22.35
Beyond 12 <sup>th</sup> class	12	7.1
Socioeconomic Status (Modified BJ Prasad scale)		
Lower	76	44.7
Lower middle	54	31.8
Middle	30	17.6
Upper middle	10	5.9
Condition at Time of Admission		
Admitted with no disorder became near miss	6	3.53

Admitted with disorder became near miss	40	23.53
Admitted with severe illness	124	72.94
Parity		
Primigravida	73	42.94
Multigravida	97	57.05
<b>Gestation at Presentation</b>		
First trimester	18	10.59
Second trimester	8	4.7
Third trimester	116	68.24
Postpartum	28	16.5

Table 2 shows the sociodemographic profile of maternal near miss cases in the present study. In our study maximum number (50.59%) patients were in age group of 20-25 years followed by (28.24%) in the age group of 26-30 years. Most of the women were un booked. Many of the subjects in the study group were referred cases, residing in rural areas. The majority of subjects were educated till primary level. 44.7% belonged to lower socioeconomic class. 72.94% of women in the study group were admitted with severe illness. Many of

the subjects in the study group were multigravida and most of them presented in the third trimester of pregnancy. Most (97.65%) of the cases were admitted within 12 hours of beginning of symptom. The most common cause for maternal near miss was found to be haemorrhage (51.17%), followed by hypertensive disorders of pregnancy (28%). Other causes were sepsis (2.35%) and in medical disorders majority of patients (44.12%) presented with anaemia of pregnancy [Table-3].

**Table 3: causes of near miss events in the study.**

	Frequency	Percent
<b>Hemorrhage (n=87)</b>		
<b>Early pregnancy (13)</b>		
Abortion	6	3.52
Ectopic pregnancy	5	2.94
Gestational trophoblastic disease	2	1.17
<b>Late pregnancy (36)</b>		
Antepartum hemorrhage (placenta previa)	24	14.11
Antepartum hemorrhage (placentalabruption)	4	2.35
Antepartum bleeding (rupture uterus)	5	2.94
Antepartum hemorrhage with scardehiscence	3	1.76
<b>Post-partum hemorrhage (n=38)</b>		
Atonic PPH	23	13.52
Traumatic PPH	13	7.6
Coagulation defect	2	1.17
Mixed	2	1.17
<b>Hypertensive disorder of pregnancy(n=48)</b>		
Eclampsia	36	21.17
Preeclampsia	12	7.05
<b>Obstetrical sepsis</b>		
Post abortal sepsis	4	2.35
<b>Medical disorder(n=109)</b>		

Hematological dysfunction including anemia (75)	85	50.0
Endocrinological dysfunction	2	1.18
Heart dysfunction	8	4.71
Hepatic dysfunction	10	5.88
Renal dysfunction	4	2.36

**Table 4: Critical Lifesaving Intervention Done in Maternal Near Miss cases**

Intervention	Frequency	Percent
ICU admission requiring	114	67.05
Blood transfusion	92	54.12
Intubation/Resuscitative procedure	40	23.53
Obstetric hysterectomy	36	21.18
Mechanical ventilation	20	11.76
Use of Vaso Pressors	20	11.76
Drug to reduce cerebral oedema (mannitol)	14	8.24
Repair of genital injuries	10	5.88
Anticoagulant therapy	8	4.71
Dialysis	4	2.35
Internal iliac ligation	3	1.76
Reposition of inverted uterus	2	1.18

Table-4 shows Majority (67.05%) of the cases in the study group required ICU admission for cardiorespiratory support, followed by blood transfusion (54.12%). A small % of patients required internal iliac ligation and reposition of inverted uterus. Many near miss cases required more than one intervention during their management which shows that properly timed interventions to the near miss patients saved their lives.

### Discussion

Maternal mortality remains unacceptably high in India, about 120 maternal deaths occur in a day, Apart from maternal death several women survive lifethreatening events during pregnancy and childbirth referred to near maternal miss. We screened all women who got admitted with pregnancy-related complications at SMS hospital, Jaipur over a period of January 2020 to December 2020 to identify cases of maternal near miss. 170 cases were selected for study as they met. The analysis of maternal deaths has long been used for the evaluation of women's health and the quality of obstetric care. [8]

It has been suggested that with the observed decline in maternal mortality, analysis of well-defined near-miss cases may be a more sensitive measure of the standard of obstetric care. Maternal near-miss ratio was 14.01/1000 live births with present study studies done in developing countries like Nepal, Pakistan, Africa, showed the same trend and vary from 15 to 40/live births. [9]

The near miss to mortality ratio was 4.6:1 which means for every 4-5 life threatening condition there was one maternal death. Higher the ratio indicates better care. Most of cases of maternal near miss in our study were young between age group of 20-25 years which is similar to other studies 2-5 . The reason being it is the most common reproductive age group. In this study, the lack of antenatal care visits, was positively related to maternal near miss and is tandem with studies conducted in Nigeria, Brazil, Morocco and Ethiopia, which support the receipt of adequate ANC as a shielding factor against severe maternal outcomes and near miss. Maternal near miss was significantly high in unbooked women as compared to booked cases in this study.it may be because high risk cases remain

undiagnosed till complications develop and lead to maternal near miss if not managed timely. Antenatal care is the most favourable contact point for mothers to get more information about the pregnancy and discussions with health professionals on danger signs of pregnancy and delivery. Majority (69.41%) of the cases were referred to our hospital from other public or private hospitals as was the case in other studies. [2,6,7] And these were near-miss events on admission itself, rather than becoming near-miss after admission to our hospital, which is consistent with other studies.<sup>8</sup> Women who did not have formal education had higher number of near maternal miss compared to those who had formal education. This is comparable with studies in Bolivia, Morocco, Brazil, and Northern Ethiopia, where illiterate mothers had higher odds of the maternal near miss. Possibly women with no formal education lack access to relevant information, which in one or another way may influence mothers' awareness of the obstetric complications and the need to seek better medical services. [10]

In our study majority of women becoming near miss were multipara which is supported by other studies [2,9,10]. Third trimester was the worst time for the pregnant women to land up in life threatening situation followed by postpartum period in the present study and it may be because most complications develop during the third trimester of pregnancy and our centre is in an urban area and cover a large rural population so patients from all referral centres come to us. Sometimes, they deliver at home or at other centres and then referred to our centres or come on their own if any complications occur. 124 patients had multiple system involved. Haematological system (12.94%) was the most common single system, other system involvement was cardiovascular system (10.6), genitourinary system (3.53%). various studies conducted in Nepal, Karachi, and Syria also concluded

that haematological dysfunction most commonly present. [11]

The most common cause for maternal near miss in the present study was found to be haemorrhage (51.17%) followed by hypertensive disorder of pregnancy (28.82%). Obstetrical sepsis was seen only in 2.35% of cases. 109 patients presented with medical disorder of which anaemia with pregnancy was the commonest presentation (44.12%). African studies have also show similar results. Similar to our study haemorrhage was the most common cause for near miss mortality in studies from Bhopal, Moradabad, Delhi, Ethiopia, and Karachi. [1,2,5,8] Studies also from developed countries like Australia and Netherlands have reported obstetric haemorrhage as the most frequent cause of severe acute maternal morbidity. In contrast to our study, a study conducted in Syria, Nigeria, north India showed HDP to be the most common cause and a study in Ethiopia concluded obstructed labour (45%) to be the most predominant cause. The studies from Africa also revealed infections to be amongst the common causes for near-miss along with haemorrhage, while in the present study infections were amongst the rare causes for near miss. In our study mortality due to haemorrhage was less common compared to hypertension. This may be explained by aggressive management of third stage offered routinely to all women and easy availability to blood and blood components at our centre. ICU admissions were needed in 67.05% of our near miss patients which is similar to other studies in Nepal, Delhi, Uttar Pardes, whereas in a study in Damascus, only 27% needed ICU admissions. Massive blood transfusion was needed in 54.12% of patients which were similar to few studies. Obstetrics hysterectomy was done in 36 cases in our study, Intubation was needed to save the life of patient in 23.53%, and Small % of patient required internal iliac ligation and reposition of inverted uterus. Many near

miss cases required more than one intervention during their management which shows that properly timed interventions to the near miss patients saved their lives. [12,13]

### Conclusions

Maternal mortality is a critical indicator to assess the quality of services provided by the health care system. Maternal near misses and maternal mortality pass through the same pathway with different outcome. MNM and MD are complementary to each other. Systematic review of such cases can help to bring forth various contributory factors for necessary corrective actions which could be taken at community, district or at state level for reduction in maternal mortality and morbidity.

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