

# A Study On Maternal Near-Miss Cases in A Tertiary Care Center

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## ABSTRACT

**Background:** The WHO defines a maternal near-miss (MNM) case as “a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy.”<sup>[1]</sup> In practical terms, women are considered near-miss cases when they survive life-threatening conditions (i.e., organ dysfunction). MOHFW defines a MNM case as a woman who survives life-threatening conditions during pregnancy, abortion, and childbirth or within 42 days of pregnancy termination, irrespective of receiving emergency medical/surgical interventions.<sup>[6]</sup> The criteria given by the WHO and MOHFW are taken into consideration, and this study has been conducted to identify the factors and etiology contributing to near-miss events so that to prevent maternal mortality and morbidity. **Materials and Methods:** The study was conducted in the Department of Obstetrics and Gynecology at K.A.P.V. Government Medical College from April 2017 to November 2018. For each case of near miss, data were collected on demographic characteristics including gestational age at the time of sustaining the near-miss morbidity, nature of obstetric complications, presence of organ-system dysfunction/failure, intensive care unit admission, and timing of near-miss event with respect to admission. **Results:** The total near-miss case during the study period was 38 and maternal death was 69, and total deliveries were 16152 total livebirths were 16042. The age for MNM incidence was higher among 26–30 years (34.2%). Primipara was the most affected (36.8%). The most common etiology among the causes noted was hypertensive disorders complication accounting for 34.2%. Antepartum (AP) eclampsia was found to be the common cause in this group. Second most common etiology being AP hemorrhage (APH) with 31.5% and abruption placenta is the most common cause of APH. In both the extreme ages younger and older the most common cause. The MNM rate was 4.3/1000 deliveries. The maternal near miss incidence is 2.4/1000 live births which indicates the quality of care needed. The MNM-to-mortality ratio was 55:1 which means that, for every 55 near-miss case, there was one mortality. Higher the ratio, better the care. The ratio indicates that our institute being a tertiary care center receiving cases from the primary and secondary level of health facility has given a promising care. **Conclusion:** Enlightening the causes, enumerating the protocols, monitoring and improving the needs of near-miss cases can prevent the mothers from getting into the tip of iceberg, i.e., mortality which is more important to achieve the millennium development goal and better maternal care.

**Key words:** High dependency unit, Intensive care unit, Maternal near miss, Maternal outcome

## INTRODUCTION

Maternal health is an integral part of a country's health-care system and fifth Millennium Development Goal.<sup>[1,2]</sup> It reflects the status of obstetric health

and helps in reviewing the achievements of facility/country. Around 20% of all maternal deaths occur in India.<sup>[1]</sup> The maternal mortality ratio (MMR) in India is 212 with figures up to 390 in some states.<sup>[2]</sup> A mother's death has ruinous upshot on the family unit and compromises subsistence of the kid at

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least up to a decade.<sup>[3]</sup> MM is believed to be a consequence of the innate risks related with gravidity and parturition, as well as the monetary and sociocultural aspects keeping women away from the available health services. Even after being successful to reach a health infirmary, non-availability of vital facilities and subnormal care may compromise maternal survival.<sup>[4]</sup> Conventionally, MM has been used as an indicator of maternal health. It is a sentinel event.<sup>[5]</sup> It is judged by MMR, i.e. no of maternal deaths per 1 lakh live births. For this purpose, maternal death review was launched by the MOHFW in India in 2010.<sup>[6]</sup> However, now, it is not considered sufficient for the evaluation of obstetric health in isolation. MM is “just the tip of iceberg” with a vast base to the iceberg maternal morbidity, which remains undescribed, relatively unevaluated.<sup>[7]</sup> Globally, the MMR dropped from 385 maternal deaths per 1,00,000 live births in 1990 to 210 in 2013<sup>[8]</sup> to 150 in 2015 with 45% reduction. In 2016, MMR in India is 130/1,00,000 live births. MMR in Tamil Nadu is 66/1,00,000 live births. A sustainable developmental goal for 2030 is to reduce the global MMR to 70/1,00,000 live births and for no country to exceed 2 times the ratio.<sup>[5,6]</sup> For every woman who dies, many survive a pregnancy complication. Estimated 2, 89,000 women died in 2013.<sup>[8]</sup> In contrast, 300 million survived and suffered a long-/short-term disability due to pregnancy and childbirth. Despite therapeutic advances during this century and a growing perception of the safety of childbirth, morbidity and mortality continue to occur in obstetric patients. More than one woman dies every minute from such causes; 585,000 women die each year. In addition to maternal death, women experience more than 50 million maternal health problems annually. For every maternal death, there are many serious life<sup>[9-12]</sup> threatening complications of pregnancy. Yet relatively little attention has been given to identifying a general category of morbidity that could be called near misses. Stones *et al.* were the first to use the term “near miss morbidity” to define a narrow category of morbidity encompassing “potentiality life-threatening episodes.”<sup>[13,14]</sup> The WHO defines it as “a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy.” In practical terms, women are considered near-miss cases when they survive life-threatening conditions (i.e., organ dysfunction). MOHFW defines a MNM case as a woman who survives life-threatening conditions during pregnancy, abortion, and childbirth or within 42 days of pregnancy termination, irrespective of receiving emergency medical/surgical interventions. Currently, maternal near-miss (MNM) ratio is increasingly used to evaluate the quality of obstetric care in low-income countries. It is, therefore, quite obvious that, for adequate evaluation of maternal health, all the survivors should also be included in analyses.

### Aims and objectives

The objectives of this study were as follows:

- To assess the incidence of near-miss instances

- To analyze the causes of near-miss instances
- To identify associated factors responsible for near-miss instances.

## MATERIALS AND METHODS

### Place of the study

This is a prospective study conducted in Mahatma Gandhi Memorial Government Hospital attached to K.A.P.V Government Medical College, Trichy, Tamil Nadu, South India.

### Period of study

The study duration was from April 2017 to November 2018.

### Criteria for Maternal Near Miss

#### Two criteria were considered for the study

1. WHO recommended three approaches

- Disease specific criteria (e.g., severe preeclampsia/eclampsia, severe hemorrhage/severe sepsis/uterine rupture.)<sup>[1]</sup>
- Management/intervention based (e.g., admission to intensive care unit [ICU] and procedures such as obstetric hysterectomy, massive blood transfusion, intubation, and ventilation.)
- Organ dysfunction-based criteria - based on apparent clinical diseases, clinical markers and management needs. The aim is toward correction of that organ dysfunction to arrest MNM progression to MD. For example, CVS. respiratory, renal, coagulation, hepatic, neurological, and uterine dysfunction.

2. Indian recommendations for diagnosing MNM.

These criteria were divided into three groups.<sup>[15]</sup>

- Pregnancy-specific medical/obstetric disorders
- Pre-existing disorders aggravated by pregnancy
- Incidental/accidental disorders.

For identifying case as MNM, minimum of three criteria (minimum 1 from each of following) must be met:<sup>[4]</sup>

- Clinical findings (s/s)
- Investigations
- Interventions or

Any single criteria which signify cardiorespiratory collapse.

### Study design

A facility-based descriptive study design was used to address the objectives of the current study in KAPV Government Maternity Hospital from October 2016 to October 2018. Case identification was prospective and data collection was performed concomitantly. The population studied is of low socioeconomic level and the vast majority depends on

the public health system. This institution is responsible for 800–1000 deliveries per month and is the reference maternity hospital for low-, medium-, and high-risk cases.

### Data analysis

Data were entered into a computer database using Microsoft

Excel spreadsheet and statistical analysis was performed. The prevalence of near-miss cases is defined as the numbers of near-miss cases divided by the number of deliveries in the hospital. The frequencies of near-miss events are reported according to the clinical condition responsible, referral status of the patients, and whether the complications were present on arrival or occurred while on admission at the hospital.

**Table 1: Demographic distribution of patients**

Age (years)	Number of cases	% of cases
<20	6	15.7
21–25	8	21
26–30	13	34.2
31–35	9	23.6
36–40	2	5.2
Total	38	

**Table 2: Distribution among gravida**

Gravida	Number of cases	% of cases
Primi	14	36.8
Second gravida	11	29.5
Multi gravida	13	34.2
Total	38	

**Table 3: Distribution of etiology among patients**

Etiology	Number of cases	% of cases
Hypertensive	13	34.2
APH	12	31.5
PPH	4	10.5
Heart disease	2	5.2
Anemia	1	2.6
Jaundice	1	2.6
Fever	1	2.6
Sepsis	2	5.2
Transfusion reaction	2	5.2

## RESULTS

The total near miss cases during the study period was 38 and maternal death was 69 and total deliveries were 16152 total livebirths were 16042. The age for maternal near miss incidence was higher among 26 to 30yrs (34.2%) as evident from Table 1. Primi para was the most affected (36.8%) which is shown in Table 2. The most common etiology among the causes noted was hypertensive disorders complicationg accounting for 34.2% which is evident from Table 3. AP eclampsia was found to be the common cause in this group. Second most common etiology being Antepartum Haemorrhage with 31.5% (Table 3) and abruption placenta is the most common cause of APH. In both younger and older age the most common cause being hypertensive disorder (50%) which is shown in Table 4. The MNM incidence is 2.4/1000 live births which indicates the quality of care needed. The maternal near miss to mortality ratio was 55:1 which means for every 55 near miss case there was 1 mortality.

## DISCUSSION

The analysis of maternal deaths has long been used for the evaluation of women’s health and the quality of obstetric care. It has been suggested that, with the observed decline in MM, analysis of well-defined near-miss cases may be a more sensitive measure of the standard of obstetric care. By Mantel *et al.*, a near miss case is described as a patient with acute organ system dysfunction, which if not treated appropriately, could result in death. Prual *et al.* defined severe maternal morbidity as severe complications from the 28<sup>th</sup> week of gestation to 42<sup>nd</sup> day postpartum that would have resulted in death of the mother or a definite invalidating sequela without medical intervention. Some studies have used ICU admissions

**Table 4: Distribution of etiology among various age groups**

Age (year)	Hypertensive (%)	APH (%)	PPH (%)	Heart disease (%)	Jaundice (%)	Fever (%)	Sepsis (%)	Anemia (%)	Transfusion reaction (%)	Total
<20	3 (50)		1 (16.6)	1 (16.6)	1 (16.6)					6
21–25	4 (50)	2 (25)					1 (12.5)		1 (12.5)	8
26–30	2 (15.3)	5 (38.4)	3 (23)			1 (7.6)	1 (7.6)		1 (7.6)	13
31–35	1 (11.1)	5 (13.1)		1 (11.1)			1 (11.1)	1 (11.1)		9
36–40	2 (100)									2
Total	13	12	4	2	1	1	2	1	2	38

to define near-miss morbidity. According to Murphy *et al.*, all women admitted for ICU in pregnancy or up to 42-day postpartum are considered as near-miss MM. By Pattinson *et al.*, severe acute maternal morbidity also known as “near-miss” case means a woman with organ dysfunction or failure who would have died had it not been that luck or good care was on her side. During an international seminar held in Morocco, a near-miss case was defined as “any pregnant or recently delivered or aborted woman whose immediate survival is threatened and who survives by chance or because of the hospital care received in different studies, and the primary obstetric causes of severe maternal morbidities have been found to be hypertensive disorders of pregnancy, massive obstetric hemorrhage, and sepsis. In an analogy with the study conducted by Roopa *et al.*, women with “near miss” outcome at gestational age 1–12, 13–28, >28 weeks, and postnatally were 17 (12.9%), 6 (4.6%), 75 (57.2%), and 33 (25.1%), respectively.<sup>[16-34]</sup>

## CONCLUSION

Enlightening the causes, enumerating the protocols, and monitoring and improving the needs of near-miss cases can prevent the mothers from getting into the tip of iceberg, i.e., mortality which is more important to achieve the millennium development goal and better maternal care. While a biological complication is assigned as a cause of MNM, in fact, most MNM cases result from a chain of events that include many social, cultural, and medical factors. In India, the tools for MNM-R have been developed with the objective of identifying gaps and reasons for severe maternal morbidities which could also lead to maternal deaths so that corrective actions to fill such gaps can be taken for improving service delivery. Private sector providers may also find this useful in instituting MNM reviews. The guideline will help program managers, medical superintendents, officer in charges, and district program managers who are routinely engaged in the delivery of maternal health interventions in the implementation of this program.

Individual facilities should ensure availability of all the relevant data both in hard and soft copies.

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