

Missed Factors in Maternal Near Miss: A Critical Review of Maternal Near Miss in Tertiary Care Centre- An Observational Study

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Abstract:

Introduction: Measuring maternal mortality is crucial for evaluating the effectiveness of healthcare services. Additionally, maternal near misses serve as important indicators of the quality of care provided to pregnant women by the healthcare system.

Aim: This study aimed to review maternal near-misses in tertiary care centres.

Methods: This prospective observational study was conducted on 59 patients over a year at the Department of Obstetrics and Gynaecology, Govt Sivagangai medical college. The patient's history included age, age at first pregnancy, direct and indirect causes, risk factors, and presenting complaints. Assessments were conducted for each MNM case to evaluate the primary obstetric complications leading to a near miss.

Results: Of the 59 patients, 49 were aged 20–34 years, five were aged < 20 years and five were aged > 35 years. Based on the stage of pregnancy, 32 and 27 patients were in the antenatal and perinatal stages, respectively. Based on obstetric parameters, 48 patients had no history of LSCS and 18 had a history of LSCS. Twenty-nine patients had a history of a second delay, 15 had a history of a first delay, and 15 had a third delay. Based on the factors influencing maternal near-misses, 39 patients were affected by haemorrhage and 19 were affected by indirect causes.

Conclusion: Maternal near-miss morbidity is linked to factors such as maternal education, antenatal care, chronic medical conditions, prior caesarean section, and initial delay in seeking obstetric care.

Keywords: Maternal near miss, Missed factors, Haemorrhage, Pregnancy, Antenatal.

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Introduction

Maternal mortality (MM) plays a crucial role in assessing the effectiveness of healthcare services within the healthcare system. The primary metric employed for this evaluation is the Maternal Mortality Ratio (MMR), which quantifies maternal deaths per 100,000 live births. It is a vital maternal health indicator, frequently recognised as the overt expression of a more extensive concern. [1]

A woman who endures life-threatening circumstances during pregnancy, abortion, or childbirth, or within 42 days of pregnancy termination, regardless of receiving urgent medical/surgical interventions, is referred to as Maternal Near Miss. [2] The examination of severe acute maternal morbidity, termed "near miss obstetric events", has proven beneficial in supplementing mortality indicators. Near miss events refer to acute obstetric complications that pose an immediate threat to a woman's survival but

do not lead to death, either coincidentally or due to the hospital care received during pregnancy, labor, or within six weeks of pregnancy termination or delivery. [3]

The advantage of examining near-miss cases alongside maternal deaths, as opposed to mortality alone, lies in the higher frequency of near-miss events. This enables the extraction of comprehensive and dependable information, thereby facilitating swift audit. Additionally, survivors themselves can serve as valuable sources of information. [4] The prevalence rates of maternal near misses tend to be higher in low-income and middle-income countries, particularly in regions such as Asia and Africa, where access to quality healthcare may be limited. Although exact prevalence rates can vary depending on the criteria used to define and identify maternal near-miss cases, research and meta-analyses have provided

estimates to indicate the magnitude of the problem. These estimates often range from around 0.2% to 1% of all deliveries, depending on the population studied and the methodology employed. [5]

Investigating near-miss incidents can boost the morale of care providers and the healthcare system, as surviving such events is largely attributed to the care provided, unlike confidential enquiries conducted for maternal deaths. Typically, severe acute maternal morbidity occurs before maternal death. Hence, identifying and analysing cases of maternal near-misses aids in understanding the factors influencing maternal mortality.

Multiple methods exist for identifying maternal near-miss cases, employing diverse criteria such as disease-, management-, and organ system dysfunction-based criteria. Among these, organ system dysfunction-based criteria are recognised for their epidemiological robustness and are less susceptible to bias when identifying maternal near-miss cases. [6]

The initial stage involved identifying mothers with severe pregnancy-related morbidities, indicating potentially life-threatening conditions. Such identification was based on a history of severe morbidities (e.g. severe preeclampsia, eclampsia, severe postpartum haemorrhage [PPH], sepsis, or ruptured uterus) or a history of critical interventions (e.g. ICU admission, laparotomy, use of blood products, and interventional radiography).

Subsequently, the focus shifted to identifying organ dysfunction in life-threatening scenarios (near-miss criteria), encompassing cardiovascular, renal, respiratory, coagulation/haematological, hepatic, neurological, and uterine dysfunction. [7]

Aim: To study the prevalence of maternal near misses, evaluate the contributing factors for near misses, and identify missed factors in devising strategies for better maternal health outcomes.

Materials and Methods

This prospective observational study was conducted on 59 patients who met the criteria for identification as a maternal near miss according to the MoHFW, in the Department of Obstetrics and Gynaecology at Govt Sivagangai Medical College for a year. All patients and their relatives were

informed of the study design at enrolment and detailed consent regarding their willingness to participate was obtained. Ethical committee approval was obtained before the commencement of the study.

Inclusion criteria: Women who were admitted to hospitals because of complications related to pregnancy, delivery, abortion, or within 42 days after the termination of pregnancy were included in the study.

Exclusion criteria: Women who were not pregnant, those who were not admitted to a tertiary care centre for maternal near misses, those with pre-existing medical conditions that may confound the analysis, and those with gestational age or pregnancy-related uncertainties were excluded from the study. A comprehensive patient history was documented, encompassing details such as the patient's name, age, date of admission, and presenting symptoms. Obstetric history, including previous pregnancy and labour experiences, complications during the current pregnancy, and past and present medical issues, were also noted. In each maternal near miss (MNM) case, the primary obstetric complications leading to a near miss were assessed.

Statistical analysis: The gathered data were input into Microsoft Excel and subjected to analysis and statistical evaluation using the SPSS-25 version. Mean values were used to express quantitative data, whereas percentages were used to convey qualitative data.

Results

Of the 59 patients in the study, 49 were aged 20–34 years, five were < 20 years, and five were > 35 years. Of these, 28 patients were >18 at first pregnancy, and two were <18 at first. Based on their locality, 29 patients were from rural areas, and 20 were from urban areas. Based on their literacy status, 31 patients were higher secondary, 19 were secondary literate, five were primary literate, and four were illiterate. Based on the stage of pregnancy, 32 and 27 patients were in the antenatal and perinatal stages, respectively. Based on the antenatal care status of a pregnant woman, 46 patients were booked and 13 patients were unbooked (Table 1).

Table 1: Demographic data of the study population

	Number of patients	
Age group in (years)	<20	5
	20-34	49
	>35	5
Age at first pregnancy	<18	2
	>18	28
Locality	Rural	29
	Urban	20

Literacy	Illiterate	4
	Primary	5
	Secondary	19
	Higher Secondary	31
Stages	Antenatal	32
	Peri natal	27
Status of a pregnant woman's antenatal care.	Booked	46
	Unbooked	13

Based on obstetric parameters, 31 patients had 2-4 times, 27 patients had a single time, and one patient had five times of gravida. Forty-two patients had 1-4 times of parity, and 15 patients had grade 0 parities. Fifty-six patients had no history of abortion, and only three patients had a history of abortion. Forty-eight patients had no history of LSCS and 18 had a history of LSCS. Twenty-nine patients had a history of a second delay, 15 had a history of a first delay, and 15 had a third delay (Table 2).

Table 2: Obstetric parameters of the study population

		Number of patients
Gravida	1	27
	2-4	31
	5	1
Abortion	Yes	3
	No	56
Parity	0	15
	1-4	42
	5	0
Prev LSCS	Yes	18
	No	42
Delay	First delay	15
	Second delay	29
	Third delay	15

Based on the factors influencing maternal near-misses, there are two causes: direct and indirect. In direct cause, a total of 39 patients were directly affected by haemorrhage.

In particular, 26 patients were affected during the late pregnancy onset. Of these, nine patients had abruption, five patients had placenta previa, five patients had atonic postpartum haemorrhage (PPH), and five had other causes of PPH, such as secondary PPH, traumatic PPH, and retained placenta), and the remaining 13 patients were affected during the early onset of pregnancy. At

early onset, six patients had ectopic pregnancies, five had abortions, and two had molar pregnancies. Ten patients had hypertension. Of these, six patients had eclampsia, two had severe preeclampsia, and two had haemolysis, elevated liver enzymes, and low platelet count (HELLP).

Only two patients were affected by sepsis. One patient had a septic infection, and one had a septic abortion. Indirect causes influenced eight patients: four were affected by cardiac disorders, three by neurological disorders, and only one patient had respiratory dysfunction (Table 3).

Table 3: Life-threatening condition of maternal near miss of the study population

Direct causes		No. of patients	
Haemorrhage	Early Onset	Ectopic	6
		Abortion	5
		Molar pregnancy	2
	Late-onset	Abruption	9
		Placenta previa	5
		Atonic PPH	5
		Other PPH	5
		Ruptured uterus	2
Hypertensive disorders	Severe pre-eclampsia	2	
	Eclampsia	6	
	HELLP	2	
Sepsis	Septic infection	1	

	Septic abortion	1
Indirect causes		
Disorders	Neurological	3
	Cardiac	4
	Respiratory dysfunction	1

Discussion

Maternal near miss serves as a valuable addition to maternal mortality investigations for evaluating the maternal health status and obstetric care quality. Although the prevalence of near-miss cases surpasses that of mortality, the underlying causes tend to align closely. Maternal near-miss indicators have been proposed as reliable measures to gauge the standard of care provided. [8] The maternal near-miss mortality ratio was determined by dividing the number of near-miss cases by the number of maternal deaths. A higher ratio suggests a higher quality of care.

In our study, the majority of the patients (49) were age group–20–34. This result is similar to the study done by Assarag et al., in their study they reported that in both the near-miss and control groups, the 20–29 age group was dominant, accounting for 47% and 52% of the participants, respectively. [9]

Based on obstetric parameters in our study, 56 patients had no history of abortion, and only three patients had a history of abortion. This result is similar to the study by Gebremariam et al., who reported that a history of abortion emerged as a preceding complication associated with an elevated risk of developing Maternal Near Misses (MNM). Individuals with a past abortion were 2.5 times more prone to MNM compared to those without any abortion history. [10]

In our study, other obstetric parameters such as 29 patients had a history of a second delay, 15 had a history of a first delay, and 15 had a third delay. This result is similar to that of Carvalho et al., who found that obstetric care delays increase the likelihood of neonatal near-miss events and mortality. The most common delays included insufficient or missing prenatal care and postponed healthcare access due to the absence of specialised services, falling under the category of the second delay. Improper patient handling is categorized as the third delay, followed by the next most frequent cause. [11]

This result is also similar to the study by Ojha et al., who reported that the main issues were predominantly centred on delays in healthcare seeking and postponed referrals. The initial two delays are directly linked to factors within the family and community, while the third delay is associated with facility-related aspects and the quality of care. [12]

Most cases in our study (46 patients) were booked and only 13 were unbooked. Upon analysing the life-threatening obstetric events leading to maternal near misses, it was found that the two major contributors were haemorrhage (39 patients) and hypertensive disorders (10 patients). Postpartum haemorrhage (PPH) was observed in 10 patients. Septic infection and abortion were also factors in two maternal near-miss cases, while uterine rupture was observed in two cases. In the case of maternal mortality, the majority of the patients were affected by direct causes, and a few of them were affected by indirect causes, including cardiac disorders, neurological disorders, and respiratory dysfunction.

Similarly, a study done by Shrestha et al. concluded that 50% was attributed to direct obstetric causes such as PPH and hypertensive disorders, while indirect factors caused the remaining 50% of deaths. [13]

Conclusion

Maternal near-miss cases outnumber maternal deaths by nearly a hundredfold. The incidence of maternal near miss is 59 per 1000 live births, while the maternal mortality ratio is 5.59 per 1000 live births. Hypertensive disorders and severe haemorrhage emerge as the primary causes of maternal near misses, which is a major cause of maternal death. Therefore, initiatives targeting the enhancement of near-miss case management can contribute significantly to reducing maternal mortality rates. Assessing instances of maternal near misses is strongly advised to drive enhancements in the delivery of maternal healthcare services.

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