

CAUSES OF MATERNAL NEAR MISS AND THEIR OUTCOME IN A TERTIARY CARE CENTRE OF ANANTHAPUR DISTRICT

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ABSTRACT:

INTRODUCTION: WHO defines “Maternal Near Miss” [MNM] 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 or surgical interventions. Maternal Near miss analysis is being examined for the assessment of obstetric care. **AIMS AND OBJECTIVES:** To determine frequency of MNM cases and identify the risk factors associated with MNM. **METHODS:** A retrospective observational study conducted during 6 months [from July 1st to December 31st, 2022] at GGH Anantapur, identified and analysed all MNM cases using the WHO criteria. Inclusion criteria: All critically ill pregnant, labouring, postpartum and post abortal women admitted to intensive care unit (ICU). **RESULTS:** There were 4265 deliveries during the study period from which 40 patients met the inclusion criteria. Among the 40 patients, 35 obstetric near-miss {survivors}, 5 maternal deaths were recorded. Statistical analysis was done using SPSS and represented as proportions and percentages. chi square test was done to test the significance. The major causes of MNM were antepartum eclampsia [20%], Anaemia [20%], respiratory failure [20%], haemorrhage [10%]. Less common near miss causes were medical and surgical conditions [12.5%], postpartum collapse [1.8%], ruptured ectopic pregnancy [5%], infections [5%], blood transfusion reactions [1.8%]. ICU stay >7 days stood at 31.33%. Critical interventions included massive blood transfusions [34.8%], ventilation [40.2%], hysterectomy [30.4%]. **CONCLUSION:**

Knowledge regarding MNM will assist health professionals to anticipate and prevent devastating maternal morbidities and improve maternal and perinatal outcomes. Proper follow up is important to monitor the maternal outcomes during the antenatal and postnatal periods. Thus, initiatives such as educational programs, campaigns and early detection of risk factors are recommended.

Keywords: maternal near miss, severe maternal outcome, Anaemia, hypertension, eclampsia, cardiac dysfunction.

INTRODUCTION

In most of the developing countries, complications during pregnancy and childbirth remain a leading cause of critical illness and death among mothers. Maternal near miss {MNM} is a useful means to examine quality of obstetric care. Since the introduction of the WHO MNM criteria in 2011, it has been tested and validated, and is being used globally [1]

“MNM 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]. “All MNM cases and maternal deaths [MDs] conjointly were categorized as “SEVERE MATERNAL OUTCOMES” [SMOs]. As the frequency of MNM cases at the facility level are generally higher than maternal deaths, a sufficient number of cases can generate consistent and actionable information to improve quality of care [1]. Hypertensive disorders of pregnancy [HDP] such as gestational hypertension, preeclampsia and eclampsia are the most common medical complications encountered during pregnancy, affecting approximately 10% of pregnancies [3]. MNM also allows to facilities to work on cases with a survival outcome, enabling open discussions and reducing the fear of blame. Sustainable Development Goals (SDG) has the target of “ending preventable maternal mortality by reducing the maternal mortality ratio [MMR] by two-thirds by 2030 [4].”

AIMS AND OBJECTIVES:

The objective of the study is to determine frequency of MNM cases and to identify the risk factors associated with MNM.

METHODS:

A RETROSPECTIVE OBSERVATIONAL STUDY was conducted over 6 months period between June 1st 2022 to December 31st 2022 in a tertiary care centre at government general hospital, Anantapur, Andhra Pradesh. The sample size was calculated from a practical estimate of 4,265 deliveries in those 6 months study period. The study tool used was WHO Near-miss form.

Inclusion criteria: All critically ill pregnant, labouring, postpartum and postabortal women admitted to intensive care unit [ICU].

The study had 40 individuals with ages ranging from 19 years to 38 years. The folders of all the near misses were reviewed and relevant data were entered into a data collection form adopted from the WHO near miss form.

Statistical methods:

The qualitative data was analysed using Chi-square test. A p value of <0.05 was considered significant. The data analysis was done using SPSS version29 software.

RESULTS:

A total of 35 maternal near miss cases and 5 maternal deaths were identified between July 1st 2022 and December 31st 2022. There was therefore a total of 40 women with Severe Maternal Outcomes (SMO). There were 4265 deliveries at GGH Anantapur during the same time period. Out of 40 cases ,28[70%] were booked cases and remaining 12[30%] were unbooked cases.

There was only 1[2.5%] HIV case among them. In this study, one twin pregnancy case, and one thrombocytopenia case meeting MNM criteria was noted. Another case of unmarried girl with septic abortion was also categorized under MNM cases in this study.

Table 1 shows the maternal near miss indicators. There was total 4265 deliveries in those study period and 4284 live births during the same time period. The NMR was 8.22 near miss cases per 1,000 live births, and the MMR was 117.5 per 1,00,000 live births. The SMOR was 9.4 per 1,000 live births.

Table 1: MATERNAL NEAR MISS INDICATORS

Near miss indicator	
Near miss cases, n	35
Maternal deaths, n	5
Total deliveries, N	4265
Live births, n	4254
NMR	8.22
MMR	117.5
SMOR	9.4
	<ul style="list-style-type: none"> ▪ $NMR = \frac{NMs}{\text{live births}} \times 1000.$ ▪ $MMR = \frac{MDs}{\text{live births}} \times 100000 \text{ live births.}$ ▪ $SMOR = \frac{MDs+MNMs}{\text{live births}} \times 1000.$

In age wise distribution of MNM cases,25% cases fall between 19-21 years age group,20% fall between 22-24 years age group,30 % cases between 25-27 years age group which is the highest percentage recorded under this age group in our study,20 % cases come between 28-30 years age group, and lastly 5% cases fall between 34-36 years age group. (Chart 1).

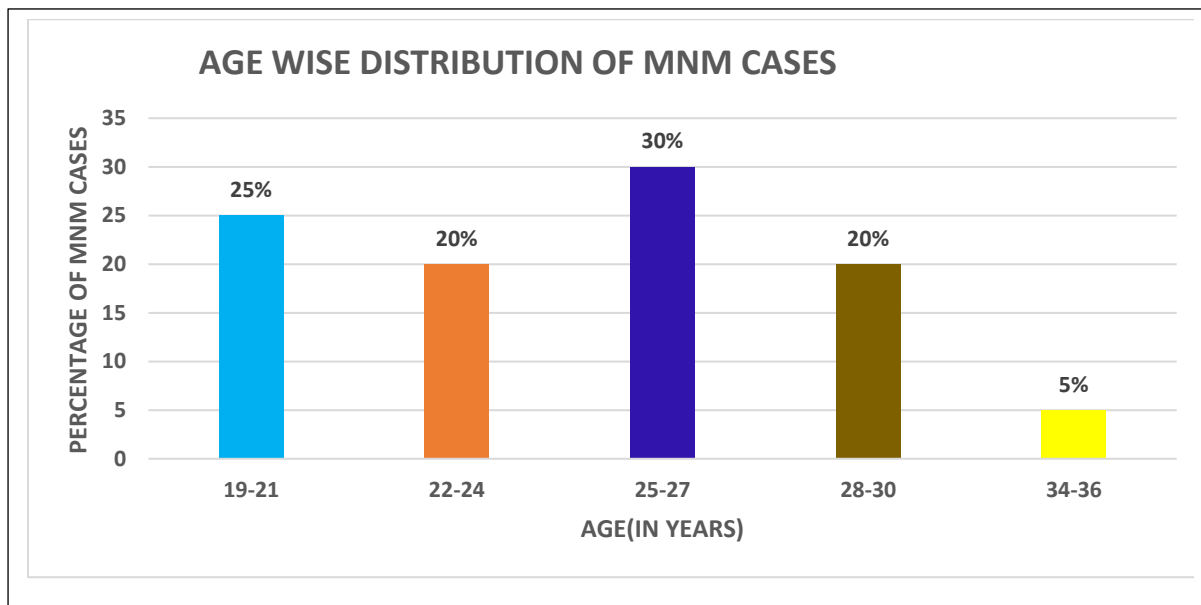


chart 1: Bar diagram shows the age wise distribution of MNM

Comparison of patient status across mode of delivery was done.22 cases [90.9%] underwent lscs, of which 20(90.9%) cases were live and 2 (9.1%) patients died.3 cases were delivered by normal vaginal delivery in which 2 (9.1%) patients died, and 1 (33.3%) patient alive.one patient underwent hysterotomy and was died,3patients (100%) underwent laparotomy and were alive,2patients (100%) underwent dilatation and curettage and were alive. Chi square value was found to be 17.281, and was statistically shows significant p value of (0.04).

CATEGORY	PATIENT (LIVE)	PATIENT (DIED)	TOTAL
NOT DELIVERED	9 (100%)	0 (0%)	9 (100%)
NVD	1 (33.3%)	2 (66.67%)	3 (100%)
LSCS	20 (90.9%)	2 (9.1%)	22 (100%)
HYSTEROTOMY	0 (0%)	1 (100%)	1 (100%)
LAPOROTOMY	3(100%)	0(0%)	3 (100%)
DILATATION & CURETTAGE	2 (100%)	0 (0%)	2 (100%)
TOTAL	35 (87.5%)	5 (12.5%)	40 (100%)
Chi-square value :17.281, df =5, p = 0.04(significant)			

(Table2)

TABLE 2: COMPARISON OF PATIENT STATUS ACROSS MODE OF DELIVERY

Table 3 presents the clinical complications causing maternal near misses and maternal deaths. Hypertension, obstetric haemorrhage, respiratory dysfunction, anaemia were the most clinical complications causing the near-misses accounting for 9[81.8%],8[100%], and

4[100%],3[75%] respectively. Less common conditions causing near misses were medical /surgical conditions, infections, sepsis accounting for 1[100%],2[100%],1[100%] near misses respectively. Chi square value was 18.182 and shows statistically significant [p=0.05].

TABLE 3: COMPARISON OF PATIENT STATUS ACROSS UNDERLYING DISORDERSTABLE

CATEGORY	PATIENT (LIVE)	PATIENT (DIED)	TOTAL
HEMORRHAGE	8(100%)	0(0%)	8 (100%)
SEPSIS	1(100%)	0(0%)	1(100%)
HYPERTENSION	9(81.8%)	2 (18.2%)	11(100%)
OBSTETRIC LIVER DYSFUNCTION	2(100%)	0(0%)	2(100%)
OBSTETRIC CARDIAC DYSFUNCTION	0(100%)	2(100%)	2(100%)
ANAEMIA	3(75%)	1(25%)	4(100%)
RESPIRATORY DYSFUNCTION	4(100%)	0(0%)	4(100%)
ENDOCRINE DISORDERS	1(100%)	0(0%)	1(100%)
SURGICAL/ACCIDENTAL PROBLEMS	4(100%)	0(0%)	4(100%)
ANAPHYLAXIS	1(100%)	0(0%)	1(100%)
INFECTIONS	2(100%)	0(0%)	2(100%)
TOTAL	35(87.5%)	5(12.5%)	40(100%)
Chi-square value :18.182, df = 10, p = 0.05			

Table 4 shows that the 40 women underwent 49 critical interventions (some women had more than one). These included 17[42.5%] who had massive blood transfusions (>5 units of red cells),2 [5%] who had a hysterectomy,16[40%] who required intubation and ventilation and 14[35%] who were given cardio tonics.

TABLE 4: DISTRIBUTION OF MNM CASES ACCORDING TO CRITICAL INTERVENTIONS

CRITICAL INTERVENTIONS	n =40(MNM Cases)
Blood transfusion	17 (42.5%)
Hysterectomy	2 (5%)
Ventilation	16 (40%)
Cardiotonics	14 (35%)

Table 5 shows comparison of patient status across kept on mechanical ventilation. Total 16 patients were kept on mechanical ventilation, of these 11 [68.8%] women were alive, 5[31.3%] women were died.24[100%] women were not on mechanical ventilation and are alive. Chi square value shows 8.571 and is statistically significant with value [0.03].

TABLE 5: COMPARISON OF PATIENT STATUS ACROSS KEPT ON MECHANICAL VENTILATION

Category	Patient (live)	Patient(died)	Total
Mechanical ventilation	11(68.8%)	5(31.3%)	16(100%)
Not on mechanical ventilation	24(100%)	0(0%)	24(100%)
Total	35(87.5%)	5(12.5%)	40(100%)
Chi-square value :8.571, df = 1, p = 0.03(significant)			

DISCUSSION:

Studying cases of women who nearly died but survived a complication during pregnancy, childbirth or postpartum [maternal near miss] is increasingly recognized as a useful means to examine the quality of obstetric care [5].

Nevertheless, routine implementation and wider application of this concept in reviewing clinical care has been limited due to the lack of a standard definition and uniform case identification criteria [6]. WHO initiated a process aiming to develop a uniform set of criteria for identifying maternal near miss cases.

According to the new WHO criteria near miss cases are identified by dysfunctional system (cardiovascular, respiratory, renal, haematology, hepatic, neurologic) based on a set of criteria, laboratory markers, or management -based proxies which were strictly defined [7]. The rationale of using the organ-system dysfunction-based criteria [8] is that women with such dysfunction are likely to die unless adequate prompt care is provided. For instance, obstetric haemorrhage constitutes a maternal near miss through vascular dysfunction (hypovolemia, shock and circulatory collapse), renal dysfunction (oliguria, acute kidney injury, renal failure), or coagulation dysfunction. The criteria rely heavily on availability of laboratory or other investigation facilities.

The current study used the WHO near-miss audit tool for defining and investigating near-miss, as well as calculating rates and ratios [9]. The WHO criteria for organ dysfunction and critical interventions were strictly followed in order to identify cases as near-misses. In our setting we were able to apply the WHO criteria for ascertaining near misses because of ready availability of laboratory services for evaluating organ failure and sufficient access to life saving interventions such as blood products and intensive care. In many poorly resourced settings these are not available, which would limit the identification of near-misses cases [10]. Our study identified 5 maternal deaths and 35 maternal near-misses. The NMR was 8.22 per 1000 live births which is comparable to studies in India, Pakistan, Baghdad with rates of 4.4, 8.6 and 5.06 respectively [11]. Affected organ systems were mainly hematologic and respiratory systems. Although in other MNM reviews in low-resource settings, severe haemorrhage and sepsis were often highly prevalent however incidences in our study were relatively low [12,13]. In this study normal vaginal deliveries were associated with occurrence of MNM when compared with Teshome et al study where caesarean section cases were more prone to MNM events [14]. Mechanical ventilation was required for one-quarter of cases in this study when compared to a 5 years retrospective study of 194 MNM cases [in Brazil] in which almost half of the near miss patients requiring mechanical ventilation [15].

CONCLUSION:

Clinical characteristics were the most frequently used criteria in finding out near-miss criteria. Severe preeclampsia, eclampsia and anaemia were the leading conditions associated with SMOs. More incidence of maternal deaths is seen in cardiac dysfunction followed by anaemia and hypertensive cases in this study. As countries progress through the stages of obstetric transition, and as maternal mortality decreases and women increasingly deliver in facilities, tracking and evaluating maternal morbidity, specifically, MNM is a necessary step in improving the quality of care. Strategies toward ending preventable maternal mortality (EPM) and the Every New born Action Plan have been important efforts to set out agreed

targets and priorities. These are now also embedded in the Global Strategy for Women's Children's and Adolescent's Health, and have gained political momentum in shaping national strategies [1].

RECOMMENDATIONS:

Improving antenatal care to help early identification of high-risk pregnancies. Developing protocols to prevent/manage post-partum hemorrhage Training obstetric health professionals on managing infrequent but fatal conditions like sepsis.

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Conflicts of interest: none declared

Limitations: Retrospective nature of the study, so the final outcomes in case of referrals could not be followed up. The study did not assess the impact on their subsequent physical and emotional wellbeing.

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