MATERNAL NEAR MISS CASES IN THE INTENSIVE CARE UNIT, TEACHING HOSPITAL BATTICALOA, SRI LANKA

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Abstract: **Maternal mortality reviews (MMR) and severe acute maternal morbidity (SAMM) and used to assess the quality of health care services. Even though admission to the intensive care unit (ICU) depends on the severity of the maternal condition and facilities, the women with severe conditions are almost always provided ICU care. Therefore, clinical and epidemiological aspects of maternal near-miss cases in the ICU will a greater picture about women with SAMM and this data can be used in planning the service provision. Results; This hospital based, retrospective study was done on the obstetrics patients admitted to ICU between April and October 2014. It included 3872 deliveries with a live birth of 3949 and 108 near miss criteria in the study. There were only 3 (0.07%) maternal deaths during the period. The maternal near-miss incidence ratio of 27.3 per 1000 live births (LB), MMR of 75.9 per 100,000 live birth and maternal death to near-miss ratio of 1:2.78.58.3% (n=63) of them belong to age group of 20-30 years, followed by 35.2% of age over30 years and only 7 (6.5%) were of age less than 20 years. The mean age of the near-miss patients were 27± 5.93 years. 58.3% were multigravida (n=63) followed by primigravida in 45 (41.7%) patients. 87 case (80.6%) were beyond 28 weeks or intrapartum period and 9 cases (8.3%) were in the postpartum period showing that late pregnancy and delivery is the riskiest period. Late pregnancy-related conditions (n=68, 62.96%) were most frequently associated with maternal near-miss cases. PPH (n=17), heart disease complicating pregnancy (n=16) and followed by medical diseases (n=13) were the causative factors in maternal near-miss cases. Among the hypertensive related complications eclampsia (n=20, 18.5%) and severe preeclampsia (n=14, 13%) were the most frequent conditions. We recorded the highest maternal near-miss ratio because of eclampsia (5.06/1000 live births) in this study. Conclusion: This study showed that PPH, heart diseases complicating pregnancy, eclampsia, and severe preeclampsia were the principal causative factors in maternal near-miss cases. An improvement in the quality of care to detest hypertensive disorders and pre-eclampsia through strengthening preventive health-care delivery and improvement in curative care delivery to provide the best care to prevent mortality.**

Keywords: **epidemiology, maternal mortality, Near miss cases, intensive care units.**

1. INTRODUCTION

Globally, about 830 pregnant women die every day because of pregnancy and labor-related complications. Most of the deaths occur in developing countries and most of them are preventable. Women from a rural areas and young adolescents are more vulnerable form complications and death in pregnancy than the other age groups. Good quality antenatal and postnatal care, skilled labour care can save many lives of women and neonates [1].

The Gross Domestic Product per capita in Sri Lanka was 3759.20 US dollars in 2016. Despite its low-income, Sri Lanka has a record of relatively good health indicators compared to the high-income nations. There were several implemented

strategies within and outside the health sector for the successful reduction of MMR [2]. Expansion of community- based care led to the increasing use of antenatal services. In addition, improvement in institutional service to provide skilled labour care, specialized care and emergence obstetric care had a significant contribution in MMR reduction. As this service is free, every sector of society could reach the best possible care in the government hospital. The deaths due to unplanned pregnancies were reduced by family planning service which is an integral part of maternal health programme [2]

Women, who develop severe acute maternal morbidity (SAMM) during pregnancy, share many pathological and circumstantial factors related to their condition. Although some women die, a proportion of them narrowly escapes death. Near miss cases and maternal deaths together are referred to as serve maternal outcome (SMO)[3]

The concept of "maternal near-miss." has developed during the past two decades which means very serve maternal morbidity [4]. It is defined as a woman nearly dies but survives a complication during pregnancy, childbirth or within 42 days of termination of pregnancy. The World Health Organization (WHO) identifies a maternal near- miss for the signs of organ dysfunction that follow life-threatening conditions. Expanding the definition could make the indicator much more useful for improving maternal health outcomes in low-resource settings [5]

Using the disease-specific criteria, the prevalence of near-miss has been reported to be between 0.8% and 8.23% [6]. The present study was done to find out the incidence of near-miss and its determinant factors in patients reaching the tertiary care, Teaching Hospital Batticaloa

2. MATERIAL AND METHODS

This retrospective study was done on patients admitted to ICU at Teaching Hospital Batticaloa for 6 months between April and October 2014. All patients (n=108) who fell under near-miss criteria according to WHO were included in the study (Table 1).

The detailed history of patients such as name, age, date of admission, and death, and presenting complaints were recorded. Obstetric history such as a complication during present pregnancy and labour, complications in a previous pregnancy and medical problems were also recorded. All the necessary information was entered in the checklist.

The permission from the head of the intuition was obtained before commencing the study. Statistical analysis was done for calculating mean ± SD and other parameters using SPSS version 20. Frequencies were generated for all categorical variables and the difference between proportions were examined using t-test and Person's chi-squared test. Continuous variables were summarized using means. A p-value of < 0.05 was considered being significant in the present study. A p-value of <0.05 was considered for statistically significant data.

Table 1: Maternal near- miss terminologies

Code	Category	Definition
1	Major obstetric hemorrhagr	Estimated blood loss of >2500 ml or transfused 5 or more units of blood or received treatment for coagulopathy
2	Eclampsia	Seizure in presence of preeclampsia
3	Renal or liver dysfunction	Acute onset of biochemical disturbance, urea >15 mmol/L, creatinine >400mmol/L, AST/ALT>200µ/l
4	Cardiac arrest	No detectable major pulse
5	Pulmonary edema	Clinically diagnosed pulmonary edema associated with acute breathlessness and O2 saturation < 95%, requiring O2, diuretics or ventilation
6	Acute respiratory dysfunction	Requiring intubation or ventilation for > 60 min
7	Coma	Including diabetic coma, unconscious for 12 hours
8	Cerebrovascular events	Stroke, cerebral/cerebellar hemorrhage or infarction, subarachnoid hemorrhage, Dural venous sinus thrombosis

9	Status epilepticus	Unremitting seizures in patients with known epilepsy.
10	Anaphylactic shock	An allergic reaction resulting in collapse with severe hypotension, default in breathing and swelling/ rash
11	Anesthetic problem	Shock in association with infection, no other cause for decreased blood pressure, Pulse of 120 bpm or more
12	Anesthetic problem	Aspiration, failed intubation, high spinal or epidural Anesthetic.
13	Massive pulmonary embolism	Increased respiratory rate, tachycardia, hypotension, diagnosed as high probability V/Q scan, Positive spiral chest CT scan, treated by heparin, thrombolysis or embolectomy
14	Intensive care admission, coronary care admission	Unit equipped with all instrument to ventilate adults, admission for one of the above problems for any other reason, Includes CCU admission.

3. RESULTS

We observed a total 3872 deliveries during the six months' period of study, out of that 108 (2.7%) were near-miss cases and 3 (0.07%) maternal deaths. Total live births were 3949. The present study revealed maternal near-miss incidence ratio of 27.3 per 1000 live births (LB), MMR of 75.9 per 100,000 live births and maternal death to the near-miss ratio of 1:2.78.

Table 2: Distribution of factors in relation to the near- miss and maternal death

Factors	Near-miss		Maternal death	
Age (years)	No	%	No	%
<20	7	6.5%	0	0.0%
20-30	63	58.3%	2	66.7%
>30	38	35.2%	1	33.3%
Gestational Age				
<12 weeks	3	2.8%	0	0.0%
12-28 weeks	9	8.3%	1	33.3%
>28 weeks	87	80.6%	2	0.0%
Post-partum	9	8.3%	0	
Parity				
Primiparous	45	41.7%	1	33.3%
Multiparous	63	58.3%	2	66.7%

Out of 108 near-miss cases, 58.3% (n=63) of them belong to the age group of 20-30 years, followed by 35.2% of age over 30 years and only 7 (6.5%) were of age less than 20 years (Table 2). Among three maternal deaths, there were two in the age category of 20-30 years while only one above 30 years. The mean age of the near-miss patients was 27 ± 5.93 years, while that of mortality group was 30 ± 7.63 years.

Among the near-miss cases, 58.3% were multigravida (n=63) followed by primigravida in 45 (41.7%) patients. And, 87cases (80.6%) were beyond 28 weeks or intrapartum period and 9 cases (8.3%) were in the postpartum period showing that late pregnancy and delivery is the worst affected period.

In the mortality group, 66.7% of cases were age group of 20-30 years (n=2). In this group, 66.7% were multigravida. Similarly, the third trimester of pregnancy along with labour complications occurred in 66.7% of mortality cases.

Table 3: Distribution of cases of Near-miss Events of causes of Near-miss Events

Diagnosis	Near-miss	MNM ratio/ 1000LB
Hypertensive disorders (38)		
Serve preeclampsia	14	3.54
Eclampsia	20	5.06
HELLP syndrome	04	1.01
Early Pregnancy (2)		
Ectopic pregnancy	02	0.5
Miscarriage	00	
Late pregnancy (68)		
APH	7	1.77
PPH	17	4.30
Medical complications	13	3.29
Heart Diseases complicating	16	4.05
Sepsis	08	2.02
Surgical complications	6	1.51
Uterine rupture	1	0.25

(APH; antepartum haemorrhage, PPH; postpartum hemorrhage, MNM Ratio (MNMR) refers to the number of maternal near-miss cases per 1000 live births)

The distribution of causes of near-miss events is shown in table 3. Late pregnancy-related conditions (n=68, 62.96%) were most frequently associated with maternal near-miss cases. Among them Postpartum haemorrhage (n=17), heart disease complicating pregnancy (n=16) and followed by medical diseases (n=13) were the causative factors in maternal near-miss cases.

Among the hypertensive related complications, eclampsia (n=20, 18.5%) and severe preeclampsia (n=14, 13%) were the most frequent conditions. Highest maternal near miss ratio was recorded due to eclampsia (5.06/1000 live births) in this study. Medical complications were found to be the main contributing factors for maternal death in this study.

4. DISCUSSION

Near-miss cases occur more frequently than maternal deaths and therefore a more reliable quantitative analysis can be carried out, which can provide a more comprehensive profile of the health system of a country. Maternal near-miss mortality ratio (MNM: 1 MD) refers to the ratio between maternal near-miss cases and maternal deaths. Higher ratios indicate better care (7). Similar to the SMO, this indicator gives an estimation of the amount of care and resources that would be needed in an area or facility.

Identify the drawbacks and gaps in the health care system and a coordinated approach to achieve the necessities will provide a better health care system to all. The weighted pooled worldwide prevalence of MNM, was 18.67/1000 (95% CI: 16.28- 21.06) (8). The present study, near miss cases were only 2.78% and it is significantly less when compared to the other countries which is partly because of the great maternal care in the health system of srilanka.

As Teaching Hospital Batticaloa is a tertiary care hospital which receives critically ill patients from all small hospitals in the region such as Primary Care Units (PCU), Divisional Hospitals (DH) and Base hospitals (BH). And most of the pregnancy related towards the time of delivery is attended and complicated deliveries take place here. Among the observed cases the major causes of potentially life-threatening conditions and near-miss cases were late pregnancy related complications (63%) and hypertension related conditions (35.2%), findings that are comparable to those of other studies in low resource countries (3, 9).

PPH, Heart diseases and other medical diseases were the main diagnosis associated with near miss in our study, which is contrast with the findings in Brazilian study in which severe pre-eclampsia was the main diagnosis (10). This finding differs from the studies conducted in developed countries where hemorrhage is ranked first (11).

This study showed that 7.4% of patients were admitted with sepsis. It is less than a study by Sousa,M.H et al. found 23.7% in their study population (12). Although the sepsis is not one of the most frequent complications, many studies consider it is a cause for higher mortality rates; surpassing hemorrhagic (2.8%) and hypertensive (0.4%) disorders (13).

This study showed, in 38 patients (35.19%) with hypertensive disorders were responsible for the most of the near-miss cases. Tunçalp O et al in 2013 have also reported anemia contributed to most cases with a severe maternal outcome (7).

An Indian Study done by Kalra et al in Rajasthan reported hemorrhage accounting for 56% cases (28.5% was due to postpartum and remaining were due to antepartum hemorrhage) and second leading cause was hypertension in form of eclampsia and preeclampsia accounting for 20 (17.8%) near-miss cases (9)

The present study showed that haemorrhage accounting for 22.2% cases, which is considerably lower than that of India (15.7% was due to postpartum and remaining was due to antepartum hemorrhage). This may be due to our specialised mother and child care facilities with a tertiary referral from all primary and secondary hospitals on time.

Tertiary care setting is a best place for studying the near miss cases as almost all the near miss cases are being attended here from various places. MNM incidence ratio in our study was 27.35 per 1000 live births, comparable to studies done in developing countries (9).

5. CONCLUSION

The present study showed that the maternal near miss ratio and mortality ratio are greatly in a low phase when compared to the other developing countries because of the well-organized maternal and child care health system in Sri Lanka. In addition, given the high occurrence of certain diseases such as hypertensive related illnesses especially pre-eclampsia within the study population gave us an idea about on which aspects, we have to improve the facilities of maternal and child care. Further, issues related to the management indicators specific to these conditions should be addressed and integrated. And evaluating the disease process at an early stage and an early referral from all the primary health care levels is of utmost important to save lives of both mother and the baby.

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ETHICAL APPROVAL

is not applicable

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