

Maternal Near Miss Cases of a Tertiary Care Hospital of Central India: A Record Based Cross Sectional Study

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Abstract

Introduction: Maternal mortality amounts for the tip of iceberg but many maternal near miss cases are present which can be prevented. So, this study was conducted to find the causes of maternal near miss and maternal deaths occurred and to estimate the indicators of severe maternal outcome and overall near miss indicators during the study period at a tertiary care hospital in Nagpur. *Methodology:* A thorough review of the eligible records of the patients who got admitted in the year 2015 from January to June period was done and this data was collected in the period from September 2016 to March 2017. A modified version of WHO near miss tool was used to collect the data. *Results:* A total of 105 cases were included in the analysis. The mean age of near miss cases was 24.98±4.00 years and of the maternal deaths was 26.92±4.93 years. The severe maternal outcome ratio, maternal near miss ratio, maternal near miss mortality ratio and mortality index were 55.97 per 1000 live births, 49.57 per 1000 live births, 7.75% and 11.42% respectively. The data was collected, compiled and analysed using Epi Info version 7.2 and expressed in terms of percentages and means. *Conclusions:* We found that hypertensive disorders were the most common underlying cause and anaemia being the most common secondary cause of near miss and maternal

death. Majority of the near miss cases were primiparous. Among the organ dysfunction, coagulation dysfunction was most common and neurological dysfunction was the least common.

Keywords: Near Miss; Maternal Deaths; Severe Maternal Outcome; Indicators.

Introduction

Maternal and child health is an important aspect that reflects the health economics of a country [1]. One of the leading causes of critical illness and death among low and middle income countries are the complications during pregnancy and child birth [2]. An estimated 10 million women worldwide develop severe complications during pregnancy and majority of the deaths occurring among these in developing countries [3]. According to the sample registration system of India, the maternal mortality ratio has reduced from 212 in 2007-2009 to 178 in 2010-2012 [4].

Maternal near miss approach is a novel tool to evaluate the quality of care in maternal health [5]. Maternal mortality amounts for the tip of iceberg but many maternal near miss cases are present which can be prevented. Greater acceptability and possibility of interviewing the women in person are the advantages in considering near miss cases [6]. So, this study was conducted to find the causes of maternal near miss and maternal deaths occurred and to estimate the indicators of severe maternal outcome and overall near miss indicators during the study period at a tertiary care hospital in Nagpur.

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Materials and Methods

Our tertiary care hospital caters patients from Nagpur district (Both rural and urban) Maharashtra, few patients around Nagpur district like Amravati, Bhandara etc. and a small amount of patients from Chindwara District of Madhya Pradesh. A record based cross sectional study was done by the Department of Community Medicine of tertiary care hospital in Nagpur. A thorough review of the records of the patients who got admitted in labour ward, intensive care unit, discharge summaries and admission records in the year 2015 from January to June period was done. This retrospective data was collected in the period from September 2016 to March 2017. The specific year of 2015 was chosen because of the year's link for end of Millennium development goals and start of sustainable development goals. Necessary permission to access the data from the record section were taken before the start of the study.

The proforma used to collect the data was a revised version of the near miss tool provided by the World Health Organisation. The revision was done after a pilot study was conducted on first 60 records. After the revision by a team of experts from Department of Community Medicine and Department of Obstetrics and Gynaecology, the case record form was finalised and data was collected. The questions on the process indicators have been omitted in the final proforma since it was very difficult to extract the same from the hospital records. All records were reviewed and the records which fitted the criteria were included for the analysis. All records of maternal deaths were

extracted in co operation with the Department of Obstetrics and Gynaecology. The inclusion criteria of the records were as per the definitions and guidelines of the World health Organisation criteria for severe maternal complications, critical interventions, life threatening conditions and maternal deaths. Severe maternal complications were eclampsia, severe post partum haemorrhage, severe pre Eclampsia, sepsis/ severe systemic infections and ruptured uterus. Critical interventions done were admission to intensive care unit, interventional radiology, use of blood and blood products and laparotomy. The records were further reviewed for details according to the criteria for life threatening conditions (Near miss criteria) and maternal deaths [5].

Statistical Analysis

The data was collected, compiled and analysed using Epi Info version 7.2. All qualitative data were expressed in terms of percentages and all quantitative data was either categorised in groups or expressed in terms of mean and standard deviation.

Results

Out of 537 eligible records reviewed, we found 93 near miss cases and 12 maternal deaths which have been included in the analysis.

The mean age of near miss cases was 24.98±4.00 years and of the maternal deaths was 26.92±4.93 years. Majority of the cases belonged to Hindu

Table 1: Demographic characteristics

Demographic characteristics	Near miss cases (n=93)		Maternal deaths (n=12)	
	No ^r	%	No ^r	%
Age group (years)				
<20	5	5.38	0	0
20 to 30	73	78.49	8	66.67
>30	15	16.13	4	33.33
Mean		24.98		26.92
SD		4.00		4.93
Religion				
Hindu	59	63.44	8	66.66
Muslim	22	23.65	2	16.67
Others	11	12.91	2	16.67
Place of residence				
Rural	37	39.78	8	66.66
Urban	56	60.22	4	33.34
Parity				
0	49	52.68	2	16.67
1	25	26.88	8	66.66
≥2	19	20.44	2	16.67

No^r- Number, %-Percentage

Religion. Near miss cases were more from urban areas and the maternal deaths from the rural areas. About 52.68% near miss cases were parity of zero and 66.66% of maternal deaths were having parity of one. (Table 1)

The most common organ dysfunction among near miss cases was coagulation dysfunction (81.72%) followed by renal dysfunction (27.95%) and hepatic dysfunction (33.34%). Among the maternal deaths, respiratory dysfunction (83.34%) was the most common followed by cardiovascular (50.00%) and hepatic dysfunction (10.75%). (Chart 1).

Among both the near miss cases and maternal deaths, hypertensive disorders were the most common underlying cause of death and anaemia being the most common associated cause of death. (Table 2)

We found 105 cases of severe maternal outcomes during the study period among which 88.58% were near miss cases and 11.42% were maternal deaths. The severe maternal outcome ratio, maternal near miss ratio, maternal near miss mortality ratio and mortality index were 55.97 per 1000 live births, 49.57 per 1000 live births, 7.75% and 11.42% respectively. (Table 3).

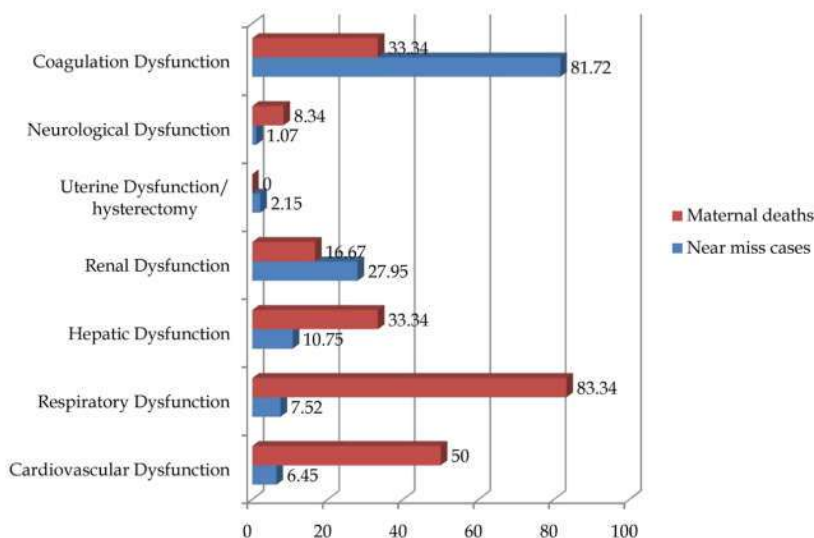


Chart 1: Distribution based on the records having severe maternal outcomes

Table 2: Distribution based on the underlying cause and associated causes of near miss/ death

Cause of near miss / death	Near miss cases		Maternal deaths	
	No ^r	%	No ^r	%
Underlying causes of death				
Hypertensive disorders	55	59.13	5	41.67
Medical/surgical/ mental diseases	29	31.18	4	33.33
Obstetric haemorrhage	5	5.37	2	16.67
Pregnancy related infection	3	3.22	1	8.33
Coincidental	0	0	0	0
Other obstetric disease	1	1.10	0	0
Associated causes/ contributory conditions				
Malaria	3	3.22	2	16.67
HIV	6	6.45	1	8.33
Hepatitis	5	5.38	2	16.67
Anaemia	57	61.30	5	41.67
Previous caesarean section	15	16.12	1	8.33
Swine flu	2	2.15	1	8.33
Others	5	5.38	0	0

No^r- Number, %-Percentage

Table 3: Indicators of maternal near miss and severe maternal outcomes

Outcomes	Near miss indicators
All live births in the population under surveillance	1876
Severe maternal outcomes	105 (5.60)
Maternal deaths	12 (11.42)
Maternal near miss cases	93 (88.58)
Over all near miss indicators	
Severe maternal outcome ratio (per 1000 live births)	55.97
Maternal near miss ratio (per 1000 live births)	49.57
Maternal near miss mortality ratio (%)	7.75
Mortality index (%)	11.42

Figures in paracentesis are percentages

Discussion

World health organisation defines near miss case as “a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy.” We conducted a record review to investigate the causes of maternal near miss and deaths and to find the near miss indicators at our tertiary care setup. In our study, the most common age group among the near miss and maternal death cases was between 20 to 30 years. Studies conducted by Singh A et al. [7], Das I et al. [8], Bashour H et al. [9] and Kotha S et al reported similar age groups. A study conducted by Sarma HKD et al. [10] reported younger age group than our study. Among the near miss cases primiparous were higher than multiparous in our study. Studies conducted by Sarma HKD et al. [10], Roopa PS et al. [11] and Kotha S et al. [12] were in accordance with our study and studies conducted by Singh A et al⁷ and Das I et al. [8] reported that more multiparous were in their study when compared to primiparous. This reflects that maternal morbidity and mortality are affected to the most important age group during a woman’s life and primiparous are more vulnerable.

The most common dysfunction among the near miss cases was of coagulation system and the least common was neurological and among the maternal deaths, the most common was respiratory dysfunction and least common was uterine dysfunction. Similar reports were inferred by studies done by Singh A et al. [7] and Rathod AD et al. [13], but the latter reported the least common dysfunction was of cardiovascular system. To add up to the pool another study conducted by Rulisa S et al. [14] reported that least common organ dysfunction was neurologic in their study. A study by Luexay P et al. [15] reported respiratory dysfunction to be the most common organ dysfunction in their study. A multi

centric study conducted by Bashour H et al. [9] reported that coagulation dysfunction was the most common in centres of Egypt, Palestine and Syria but hepatic dysfunction was most common in Lebanon. We reported hypertensive disorders to be the most common cause of near miss and maternal deaths. Some studies conducted across the world by Singh A et al. [7], Sarma HKD et al. [10], Das I et al. [8], Litorp H et al. [16], Kotha S et al. [12], Olivera FC et al. [17], Venkatesh S et al. [18] and Rulisa S et al. [14] were in concordance with our study findings. Studies by Rathod AD et al. [13], Pandey A et al. [19], Luexay P et al. [15], Bashour H et al. [9] and Roopa PS et al. [11] reported haemorrhage either during pregnancy or during and after child birth to be the most common cause in their study.

Among the 1876 births that occurred during the study period, 105 cases were found to be either near miss cases or maternal deaths. The maternal near miss mortality ratio was 7.75%. Studies by Singh A et al. [7], Sarma HKD et al. [10], Roopa PS et al. [11], Das I et al. [8], Kalra P et al. [20], Bakshi RK et al.[21], Luexay P et al. [15], Olivera FC et al. [17] and Bashour H et al. [9] reported lower ratios in their study. Studies by Kotha S et al. [12] and Nacharaju M et al. [22] reported higher ratios when compared to our study. Our study had higher mortality index when compared to studies by Nacharaju M et al. [22], Das I et al. [8], Bashour H et al.[9], Kotha S et al. [12] and Rathod AD et al. [13]. But, most of the studies reported higher compared to our studies. This difference in the near miss indicators depends on the geographical location, quality of care, health care services provision etc.

We found 105 cases of severe maternal outcomes during the study period among which 88.58% were near miss cases and 11.42% were maternal deaths. The severe maternal outcome ratio, maternal near miss ratio, maternal near miss mortality ratio and mortality index were 55.97 per 1000 live births,

49.57 per 1000 live births, 7.75% and 11.42% respectively.

Our study had limitations, first of all was it was a record based study. The quality of care provided at the tertiary care hospital is reflected by the process and outcome indicators. These have been excluded from the study. Second limitation being, it was a single centre study. In spite of the limitations, this study had a larger sample size and coincided with many studies conducted across the world.

Conclusions

We found that hypertensive disorders were the most common underlying cause and anaemia being the most common secondary cause of near miss and maternal death. Majority of the near miss cases were primiparous. Among the organ dysfunction, coagulation dysfunction was most common and neurological dysfunction was the least common. We found high severe maternal outcome ratio, maternal near miss mortality ratio and mortality index in our study. Targeting a simple measure of testing of blood for complete blood count, bleeding time and clotting time will have a huge impact on early diagnosis and treatment of the most common organ system involved in decreasing maternal morbidity and mortality. Hypertensive disorders and haemorrhage are still the most important cause effecting the maternal morbidity and mortality. These are not difficult to tackle at a tertiary care level and can help in reducing the high indicators.

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