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Maternal Near Miss and Mortality in Tertiary Care Hospitals

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ABSTRACT

Aim –To analyse the maternal near miss cases,maternal deaths and to determine MNM indicators, to analyse the causes and contributing factors for the maternal near miss and mortality,hospital access indicators and intra hospital indicators. Materials and methods- This prospective cross sectional study conducted in KMC Mangalore affiliated hospitals from 1st August 2014 to July 31st 2016.Results-There were 12802 live births, number of near miss cases were 176 and maternal deaths were 26. MNMIR was 13.74/1,000 live births. Maternal near miss to mortality ratio was 6.76:1. Maternal mortality ratio was 204/1,00,000live births and mortality index was 12.87%. Hypertensive disorders of pregnancy and Hemorrhage were the leading causes of maternal near miss and mortality respectively.Conclusion-As near miss indices are better predictors of standard of care they help us to make comparison, learn from the past to apply in the present for better future.

KEYWORDS Near miss, Maternal mortality.

INTRODUCTION

"Women who experienced and survived a severe health condition during pregnancy, childbirth or postpartum" are considered as near miss or severe acute maternal morbidity (SAMM) cases.[1,2] Since 1990, Though there is fall in maternal mortality by 50% , developing regions have the maternal mortality 14 times greater than the developed regions. Nearly half of the women do not receive adequate health care.[3]

The concept of near miss is better than the maternal mortality as an indicator of maternal health because it occurs more frequently than mortality and still not in large number to burden the health personnel. [2,4] The improvement in the maternal care needs effective audit system. The importance of maternal near miss mortality audit is to improve the antenatal care and resources required. Audit also is necessary to assess the functioning of the referral system and to see health system response to obstetric emergency.

AIM AND OBJECTIVES -

- To analyze the "maternal near miss cases and maternal deaths"
- To determine "Maternal near miss incidence ratio, maternal near miss to mortality ratio, and mortality index".
- To analyze the causes and contributing factors for the maternal near miss and mortality.
- To assess hospital access indicators and intra-hospital indicators.

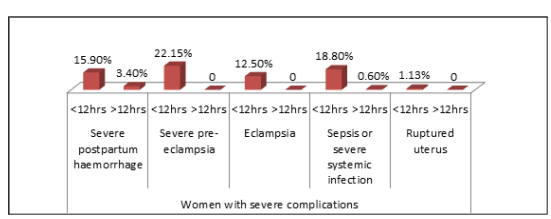
MATERIALS AND METHODS – This Prospective cross sectional study was conducted in KMC Mangalore affiliated hospitals from 1st August 2014 to July 31st 2016. Patients with the "potential life threatening conditions" were screened and near miss cases were identified using WHO 2009 criteria. Data analyzed using SPSS ver. 16.

OBSERVATION AND RESULTS

In our institution and affiliated hospitals, total number of deliveries were 13132, of which 12802 were live births. Total number of near miss cases were 176 and maternal death were 26. Severe maternal outcome ratio was 15.77 per 1000 live births, Maternal near miss incidence was 13.74 per 1000 live births, Maternal near miss to mortality ratio was 6.76:1 and Mortality index was 12.87%.

Most common near miss cases were primipara and maternal deaths were multipara,and the gestational age group in near miss and mortality were post delivery. 77.27% among near miss and 83.33 % of maternal deaths were booked outside.

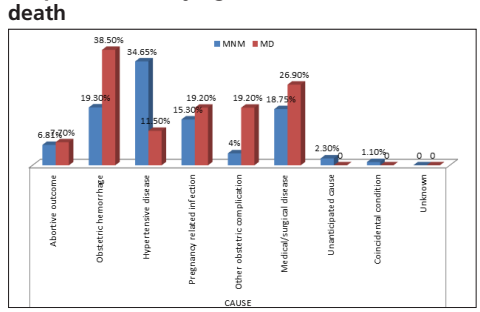
Graph 1 - Women with severe complication



Most common critical intervention done in near miss cases was admission to ICU (77.3%) and organ system involved was hematological system dysfunction(45.5%).

Among maternal deaths, most common severe complication associated was Severe PPH (34.6%), critical intervention was ICU admission (80.8%) and organ system involved was cardio vascular dysfunction (65.4%).

Graph 2 - Underlying causes of near miss and maternal death



Most common underlying cause of near miss was Hypertensive disease and in mortality was Obstetric hemorrhage. Most common mode of delivery in near miss was caesarean section and in mortality it was vaginal delivery. Anemia was present in 42 % of maternal near miss cases and 30.8% of maternal deaths.

Severe maternal outcome cases presenting within 12 hours (SMO 12) were 189, proportion of SMO 12 among all SMO case was 0.93 ,proportion of SMO 12 coming from other facility was 0.86 and SMO 12 mortality index was 12.16%.

Intra hospital SMO was 13, Intra-hospital SMO rate was 1.01 per 1000 LB and intra hospital mortality index was 23.07%.

DISCUSSION

Maternal death and near miss represent the quality of health care. Maternal deaths alone does not reflect the global burden with respect to obstetric care. Hence near miss is the better indicator to assess maternal morbidity across the globe.

Following the introduction of WHO 2009 criteria for near miss, the chances of missing cases are reduced since it includes both Mantel and Waterstone's criteria[6,9].

In our institution and affiliated hospitals, total number of deliveries was 13132, of which 12802 were live births. Total number of near miss cases was 176 and maternal death was 26.

The maternal near miss incidence ratio is 13.74 per 1000 live births in this study, which is comparable to study conducted by Roopa PS et al [7] (17.8 per 1000 LB), in different studies conducted by L Say et al, J van Roosmalen, J P souza in developing countries showed an incidence of 15-40 per 1000 live births [4,8,9].

Table 1 - Comparison of various indicators -

Indicators	Our study	Roopa PS et al [7]	Chandran JR et al [10]	Galvao etal [11] (Brazil-study)	Gupta S study [12]
Total live births	12802	7390	15604	16243	6767
Near miss	176	131	267	77	27
MD	26	23	24	17	8
MNMIR/ 1000 LB	13.74	17.8	17.03	5.8	3.98
MNMR	6.76 : 1	5.6 :1	11:1	4.5 :1	3.37:1
MI	12.87 %	14.9%	8.2%	18%	14.9 %

Similar finding was seen in a study conducted by Shrestha NS [13] et al in which MNMR was 7.2 : 1 , and in study by Lotufu et al [14] it as 8.6 :1. Higher the ratio of MNMR , better is the level of hospital care .

Table 2 - Demographic characteristics

Demography	Our study	Roopa PS et al [7]	Chandran JR et al [10]
Age	27.09 ± 4.22	27 ± 4.8	20-34 yrs
Parity	P – 94(53.4 %)	P – 74(56.4%)	P – 119(44.5%)
	M – 82(46.6 %)	M-57(43.6%)	M-148(55.4%)
Gestational age	Post-delivery(62.6%)	>28 wks – 57.2 %	Preterm

In Lotufu et al [14] among near miss cases primipara were 29.1% and multipara were 71.9% which was contradictory to our finding.

Maternal mortality rate in our study was 204/lakh live births which was higher comparable to national statistics of 178/lakh live births. In a study conducted by Chandran JR et al [10] MMR was 154/lakh live birth and Roopa PS et al [7] it was 313/lakh live birth. Similar study conducted in Brazil [11] showed 104/lakh live births.

Majority of the near miss were Booked outside 77.27 % (n-136) and were referred here, number of booked cases in our facility was 13.63 % (n- 24) and unbooked were 9.09% (n-16). Most of the maternal mortality cases were referred cases and were already in moribund state during admission.

Table 3 - Cause of near miss -

Cause of near miss	Our study	Roopa PS et al [7]	Chandran JR etal [10]	Gupta S study [12]
Most common cause	Hypertension (34.65%)	Hemorrhage (44.2 %)	Hypertension (46 %)	Hemorrhage (40 %)
2nd cause	Hemorrhage (19.31%)	Hypertension (23.6%)	Hemorrhage (37 %)	Hypertension (26 %)

In studies conducted by Souza JP et al, Fillipi V et al , Oladapo OT et al and Souse MH et al , hemorrhage was most common cause followed by hypertensive disease and sepsis.[5,15,16,17-19]

Table 4 - Cause of maternal mortality

Cause of mortality	Our study	Roopa PS etal [7]	Chandran JR etal [10]	Gupta S study [12]
Most common cause	Hemorrhage 10 (38.5 %)	Sepsis (52.2%)	Hypertension (25 %)	Hypertension (37.5%)
2nd cause	Med/ surgical (26.9%)	Hemorrhage (23.6%)	Hemorrhage (17 %)	Med/surgical (25%)

In this study patients with pregnancy related infection as a cause for near miss were 15.3 % (n- 27) and for mortality 19.2 %(n- 5),where as in studies conducted by Roopa PS et al [7] it was 16.03 % and 52.2 % and in Gupta S study [12] it was 7.4% and 12.5 % .

In our study , among near miss cases a total of 30.7% (n-54) had vaginal delivery , one case was vacuum assisted delivery and 52.84 %(n- 93) cases underwent caesarean section where as in a study done by Singh N NK[20] caesarean section was done for 32.8 % and 21.9% by instrumental vaginal delivery and 10.9% by normal vaginal delivery, where as in study done by Chandran JR et al [10] there were 43.07 %(n-115) vaginal delivery, 3.7 % (n- 10) instrumental delivery, 53.1 %(n- 142) caesarean sections.

In our study Among vaginally delivered patients, 38 babies were alive at birth of which 37 were alive at 7th postnatal day and among caesarean section patients 89 were alive at birth of which 86 were alive on 7th postop day.

Study by Zanette et al [21] and Van dillen J et al[22] consider caesarean section as a factor that increases the odds of a women becoming a case of near miss by up to 5 times, however, this association may be affected by confounding factors.

In our study most common condition associated with cause of near miss and mortality was anemia 42 % (n- 74) and 30.8% (n- 8) which was similar to a study conducted by Gupta S et al[12] where it was 74 % and 62.5 % .

In our study most common organ dysfunction involved was hematological / coagulation dysfunction 45.5%(n- 80) followed by respiratory dysfunction 24.96%(n- 44) in near miss and cardiovascular system 65.4 %(n- 17) followed by respiratory dysfunction 57.68%(n- 15) in mortality, whereas study done by Singh N NK [20] in which uterine dysfunction was the most common cause of near miss 39.1%(n- 25) followed by cardiovascular dysfunction 31.3% (n- 20) and for mortality common cause was cardiovascular dysfunction 50% (n- 4)followed by coagulation dysfunction 25%(n- 2).

In a study conducted by Gupta S et al[12], the most common organ dysfunction involved was hematological / coagulation dysfunction 60% (n- 21) and uterine dysfunction 37 %(n- 13) in near miss and respiratory dysfunction 17 %(n- 6) and hematological / coagulation dysfunction 14.2 % (n- 5).

In our study uterine dysfunction was 14.8%(n- 26) in near miss and 34.6%(n- 9) in mortality group where as in study

done by Gupta S et al [12] it is uterine dysfunction 37 % (n-13) in near miss and nil in maternal death.

CONCLUSION

Hypertensive disorders and hemorrhage are the leading causes of maternal near miss and mortality. As near miss indices are better predictors of standard of care they could help us to make comparison and learn from the past, apply in the present and practice in the future. WHO has set a standard criteria that helps in detecting the ongoing complication early and to take appropriate action preventing the patient going in to moribund state.

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