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RESEARCH ARTICLE

MATERNAL "NEAR MISS" EVENTS AND MATERNAL DEATHS IN A TERTIARY HOSPITAL IN SOUTH INDIA – A TWO YEAR STUDY

Swathi Kotha[1],Bharathi Rao[2],Pralhad Kushtagi[3] and Arun Rao[4]

Department of Obstetrics and Gynecology Kasturba Medical College, Mangalore (A Constituent of Manipal University)Karnataka

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ABSTRACT

AIM AND OBJECTIVE The aim is to assess the trends of near miss and maternal mortality in our hospital. The objectives are to determine the frequency of maternal near miss, maternal near miss incidence ratio(MNMIR), maternal near miss to mortality ratio, mortality index and maternal mortality ratio.

MATERIALS AND METHODS : Retrospective study from April 2012 to March 2014 in Lady Goschen Hospital . Maternal near miss cases and maternal deaths were identified based on WHO criteria 2009.

RESULTS: There are 10,943 live births during the study period. The number of near miss cases are 167 and number of maternal deaths are 18. Maternal near miss incidence ratio is 15.2/1,000 live births. Maternal near miss to mortality ratio is 9.2:1. Maternal mortality ratio is 164/1,00,000 live births and mortality index is 9.7%. Hemorrhage and hypertensive disorders of pregnancy are the leading causes of near miss morbidity. The near miss events are more in the primiparas (65.8%), among the age group 25 – 35years (49.7%) and more in the postnatal period(38.9%).

CONCLUSION: Hemorrhage and hypertensive disorders are the leading causes of maternal near miss events.

INTRODUCTION

One of the Millennium Development Goals(MDG 5) developed by United Nations is to reduce the maternal mortality by 75% by 2015 and to improve the maternal outcome[13]. Pregnant women's health status is not reflected by mortality indicators alone.

In the recent years, near miss or Severe Acute Maternal Morbidity(SAMM) has been extensively studied as an adjunct to maternal mortality for the evaluation of maternal health care services. In the recent years, near miss or Severe Acute Maternal Morbidity (SAMM) has been extensively studied. This concept of SAMM is increasingly becoming important in both developing and developed countries. In the developed nations as the maternal mortality has become a rare occurrence[1], the near miss study helps as it has the advantage of occurring more often than the maternal deaths and hence provides adequate statistical information.

Maternal near miss case is defined as "a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42days of termination of pregnancy[8]."In 2009 WHO has standardized the definition by taking a combination of Waterstone's and Mantel's criteria which includes clinical, laboratory and management based criteria[(4,5,8)].

Aim And Objective Of The Study

In the present study, our aim is to assess the trends of near miss and maternal mortality in our hospital. The objective is to determine the frequency of maternal near miss, maternal near miss incidence ratio(MNMIR), maternal near miss to mortality ratio, mortality index and maternal mortality ratio.

MATERIALS AND METHODS

A retrospective analysis of the near miss cases and the maternal deaths was studied from April 2012 to March 2014 in Lady Goschen Hospital, Mangalore. "Ours is a tertiary hospital providing antenatal care and obstetric services for both low risk and high risk women." It has 24 – hour blood bank facilities and is well equipped with surgical theatres and neonatal intensive care unit. An ICU facility is available at a nearby Kasturba Medical College Hospital and Wenlock Hospital. Teams of obstetricians, anesthesiologists and intensive care specialists are available round the clock.

The near miss cases were identified by the WHO criteria 2009 during the study period. The following data was collected for all the patients: age, parity, gestational age at the time of classification of near miss, previous history of morbidity, the type of delivery, booked case (more than 3 antenatal visits to our hospital), the cause of morbidity, duration of ICU stay , the cause for ICU admission, use of any blood and its products and any surgical intervention to save the life of the mother. Maternal mortality during the same period was also analysed . Patients were categorized with respect to the cause as direct, indirect and others. Direct causes included hemorrhage, hypertensive disorder of pregnancy, sepsis,

* Corresponding author: **Swathi Kotha**
Department of Obstetrics and Gynecology Kasturba Medical College, Mangalore (A Constituent of Manipal University)Karnataka

cardiac disease, and embolism. Indirect causes included severe anemia, pyrexia, acute renal failure and others included ARDS, pneumonia and associated anesthetic complications. The collected data was analyzed by frequency percentage using SPSS Software version 13.0.

Among the causes of near miss events, hypertensive disorder of pregnancy was the most leading cause (39.5%) and hemorrhage was the second most common(31.7%). Indirect causes were accounting for 11.9% and sepsis was accounting for 5.9% of the cases.

Table 1 Characteristics of near miss events and maternal deaths

		Near miss n=167 (%)			Maternal deaths n=18 (%)		
		2012-13	2013-14	TOTAL	2012-13	2013-14	TOTAL
Age(yrs)	<25	25	31	56(33.5)	1	3	4(22.2)
	25 – 35	45	38	83(49.7)	5	7	12(66.6)
	>35	15	13	28(16.7)	2	0	2(11.1)
Parity	Primi	54	56	110(65.8)	4	6	10(55.5)
	Multi	31	26	57(34.1)	5	3	8(44.4)
Gestational age(wks)	<13	3	5	8(4.7)	0	0	0
	13 – 28	20	19	39(23.3)	0	1	1(5.5)
	>28	28	27	55(32.9)	3	2	5(27.7)
	Postnatal	34	31	65(38.9)	5	7	12(66.6)

The following indices were calculated: (1) Maternal near miss incidence ratio (MNMIR) refers to the number of near miss cases per 1,000 live births. MNMIR = MNM/LB. (2)Maternal near miss to mortality ratio – Proportion of cases of near miss to maternal deaths. MNM : MD.(3) Mortality index: Number of maternal deaths divided by the total number of women with life threatening conditions expressed as a percentage . MI = MD/ (MNM + MD) X 100.(4) Maternal mortality ratio(MMR) refers to the number of maternal deaths per 1,00,000 live births. MMR = MD/LB.

Among the causes of maternal mortality, hemorrhage was the most common cause (38.8%) followed by sepsis (22.2%) and then hypertension(16.6%). "Mortality index for each of the causes is given and it is important to note down here that the mortality index for embolism was 100%."In our setup, among the hypertensive disorder, HELLP syndrome(17.3%) was the most common cause of near miss events followed by eclampsia (13.1%). Post partum hemorrhage was the most common cause accounting for22.1%. There were a total of 12(7.1%) cases of abruption among the near miss cases of which

Table 2 Comparison of near miss events and primary causes of maternal deaths (Among the causes of near miss)

Diagnosis		Near miss		MNMIR	Mortality		Mortality index %
		2012-13	2013-14		2012-13	2013-14	
Hypertension		36	30	6.03	1	1	4.34
	Severe preeclampsia	9	6		0	1	
	Eclampsia	12	10		1	0	
	HELLP	15	14		0	0	
Hemorrhage		8	4	4.47	1	1	12.5
	Abruption	8	4		1	1	
	PPH	16	21		3	2	
Sepsis		6	4	0.9	1	3	28.5
Cardiac disease		1	6	0.6	0	0	0
Embolism		0	0	0	2	0	100
Indirect		11	13	2.19	0	2	7.6
Others		7	4	1.0	0	1	8.3
TOTAL		85	82	15.2	8	10	9.7

RESULTS

During the study period there were a total of 10,998 deliveries and 10,943 live births. There were total of 167 near miss cases and 18 maternal deaths during the study period. Table 1 shows the characteristics of the patients.

Most of the near miss events(65.8%) and the maternal deaths(55.5%) were among the primiparas. "Majority of the events both near miss and the mortality rates were more in the puerperal period followed by third trimester." Most of the events took place in the age group between 25 - 35years and the mean age being 28.4±4.2(standard deviation) in the near miss and 29.2 ± 4.5(standard deviation) in the mortality group. Majority of the cases were referred from other hospitals - near miss(72.4%) and mortality(83.3%).

Maternal near miss incidence ratio (MNMIR) was 15.2/1,000 live births. Maternal near miss to mortality ratio was 9.2:1. Maternal mortality index was 9.72%. Maternal mortality ratio was 164/1,00,000 live births.

4(2.3%)developed disseminated intravascular coagulation. There were 8(4.7%) cases of acute renal failure post caesarean delivery and all required dialysis. There were 4(2.3%) cases of ARDS and 3(1.6%) cases of pneumonia post delivery requiring ICU admission.

DISCUSSION

In our hospital, maternal near miss incidence ratio(MNMIR) was 15.2/1000 live births which is comparable to the studies in the developing countries that vary between 15 – 40/ 1000 live births[1,7,8]. A similar study in Manipal[2] showed an incidence ratio of 17.8/1000 live births while the study in Brazil[6] showed an incidence of 4.4/1000 live births. The near miss to mortality ratio was 9.2:1 which means for every 9 – 10 life threatening conditions there was one maternal death. Higher the ratio, better the care. The near miss to mortality ratio in the Manipal[2] study was 5.6:1 and Nepal study showed 7.2:1[17]. Syrian study showed incidence of 60:1[18] and European countries have high incidences of 117:223:1. If this ratio increases over a period of time, it

reflects the improvement achieved in the obstetric care. So instead of a single estimation, yearly estimation may help us in improving the care provided. The maternal mortality ratio(MMR) in our hospital was 164/100000 live births. This is much lower when compared to the other studies. The Brazilian study showed a mortality of 260/100000 live births and Manipal study showed 313/100000 live births. The most common cause of mortality in the developed countries is the hypertensive disorders followed by hemorrhage. Sepsis as a cause of death was contributing for 28.5% of the cases in our setup and is an avoidable cause of death. There were 2 cases of amniotic fluid embolism one in 2012 and one in 2013.

The most common cause of the near miss was the hypertensive disorder of pregnancy of which HELLP(17.3%) syndrome is the commonest in our hospital. No proper checkups in the antenatal period is one of the reason for the development of such complications. The increase of such complications emphasizes the importance of proper patient counseling during the antenatal period. Eclampsia(13.1%) was the next common cause and among them most were referred cases. In Manipal study the most common cause of the near miss is the hemorrhage followed by hypertensive disorders. Hemorrhage and hypertensive disorders contributed for over 50% of near miss cases in Brazilian study also. These studies emphasize the need of being more vigilant when a patient is having either of the condition in order to prevent a mishap in the future.

CONCLUSION

Hypertensive disorders and hemorrhage are the leading causes of near miss . Identification of the near miss cases and maternal deaths help us to understand the quality of health care being provided. As standard criteria have been set by WHO to identify the near miss, cases can be identified at an early stage and can be prevented from going into a moribund state. As it represents the quality of health care, near miss indices are worth presenting in national statistics.

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