STUDY ON MATERNAL MORTALITY AND NEAR MISS CASE

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ABSTRACT

BACKGROUND

Maternal mortality traditionally has been the indicator of maternal health. More recently the review of cases of near miss obstetric event is found to be useful to investigate maternal mortality. Cases of near miss are those, where a woman nearly died but survived a complication that occur during pregnancy or child birth.

Aim and Objective

1. To analyse near miss cases and maternal deaths.
2. To determine maternal near miss indicator and to analyse the cause and contributing factors for both of them.

MATERIALS AND METHODS

This prospective observational study conducted in M.K.C.G. medical college, Berhampur from 1st October 2015 to 30th September 2017. All the cases of maternal deaths and near miss cases defined by WHO criteria are taken. Information regarding demographic profile and reproductive parameters are collected and results are analysed using percentage and proportion.

RESULTS

Out of 17977 deliveries 201 were near miss cases and 116 were maternal deaths. MMR was 681, near miss incidence 1.18, maternal death to near miss ratio was 1:1.73. Hypertensive disorder of pregnancy (37.4%) was the leading cause followed by haemorrhage (17.4%). For near miss cases 101 cases fulfilled clinical criteria, 61 laboratory criteria and 131 cases management based criteria.

CONCLUSION

Hypertensive disorder of pregnancy and haemorrhage are the leading cause of maternal death and for near miss cases most common organ system involved was cardiovascular system. All the near miss cases should be interpreted as opportunities to improve the health care services.

KEYWORDS

MNM- Maternal Near Miss, Maternal Death, MMR.

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BACKGROUND

Maternal mortality is one of the important indicators used for the measurement of maternal health. Though there is fall in maternal mortality by 50%, developing countries have the maternal mortality 14 times greater than developed countries.[1] A Near Miss describes a woman who nearly died but survived a complication that occurred during pregnancy, child birth or within 42 days of termination of pregnancy.[2] Maternal near miss cases are more common than maternal deaths. Over the last decade identification of cases of severe maternal morbidity has emerged as a promising complement or alternative to investigation of maternal death. Analysis of well-defined near miss cases may be a more sensitive measure of the standard obstetric care. Hence concept of severe acute maternal morbidity (SAMM) or near miss is apt for the present health providing system.[3] Most of the burden of maternal death is carried by low income countries, but maternal mortality is still a relevant public health problem amongst developing countries. Maternal mortality is 'Just the tip of iceberg' and the vast base to the iceberg, maternal morbidity which remain undescribed.

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Aims and Objective

1. To analyse the trend of maternal mortality in department of obstetrics and gynaecology.
2. This study aims at analysing maternal death and near miss cases, the causes and contributing factors for each of them.
3. To determine different near miss and mortality indicators.

MATERIALS AND METHODS

This prospective observational study was worked out in the Dept. of Obstetrics & Gynaecology, M.K.C.G. Medical College & Hospital, Berhampur, Odisha from 1st October 2015 to 30th

September 2017. Out of all obstetric patients admitted all cases of maternal deaths were taken. Maternal mortality as defined by WHO is "the death of any woman while being pregnant or within 42 completed days of termination of pregnancy, irrespective of the duration and the site of pregnancy from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. For identification of maternal near miss cases, WHO 2009 criteria were taken into consideration. But all components could not be taken into consideration in our set up. Among laboratory based criteria measurement of pH and PaO_2/FiO_2 was not done.

In all cases, the demographic characteristics, causes of maternal death, frequency of near miss in each criterion, admission to death interval, duration of hospital stay, distribution of referral categories, mode of termination, different interventions done and foetal outcome was noted. The following indices were calculated-

$$\text{MMR: } \frac{\text{Total Number of Maternal Death}}{\text{Total Number of Live Birth Over 1 Year}} \text{ X 1, 00.000}$$

Absolute number of near miss cases: Number of near miss cases diagnosed by particular criteria. Near miss incidence ratio: Number of near miss per 1000 live births. Severe Maternal Outcome Ratio (SMOR): Number of women in life threatening situation (MD+MNM) per 1000 live birth.

Maternal near miss to mortality ratio: Ratio between near miss and maternal death.

$$\text{Mortality Index : } \frac{\text{Maternal Death}}{\text{Maternal Death + Near Miss Cases}} (\%)$$

RESULTS

During this 24 months of study period 17977 women delivered at M.K.C.G. Medical College, out of which 17024 were live births. 201 were identified as near miss cases and 116 were maternal deaths. Near miss incidence was 1.18 per 1000 live births, and maternal mortality ratio (MMR) was found to be 681 per 1, 00,000 live birth. Maternal death to near miss ratio was 1:1.73. The severe maternal outcome ratio was 18.62 per 1000 live birth and mortality index was 36.59%.

Total Deliveries	…	17977
Total live births	…	17024
Cases of near miss	…	201
Maternal deaths	…	116
Near miss incidence (per 1000 live birth)	…	1.18
Maternal mortality ratio	…	681
Maternal death to near miss ratio	…	1:1.73
Severe maternal outcome ratio (SMOR)	…	18.62
Mortality index (%)	…	36.59

Table 1. Incidence and Characteristics of Maternal Near Miss and Maternal Death

Characteristics	Maternal Death	%	Near Miss	%
Age Group (year)				
≤20	24	20.7	23	11.4
20-30	83	71.6	162	80.6
≥30	9	7.7	16	8.0
Parity				
Primi	68	58.7	113	56.2
Multi	48	41.3	88	43.8
Literacy status				
Literate	83	71.6	148	73.6
Illiterate	33	28.4	53	26.4
Habitus				
Rural	105	90.5	187	93.0
Urban	11	9.5	14	7.0
Booking status				
Booked	37	31.9	52	25.9
Unbooked	79	68.1	149	74.1
Socio-Economic Status				
Upper	9	7.7	4	2.0
Middle	24	20.7	41	20.4
Lower	83	71.6	156	77.6
Type of Delay				
Type 1 delay	83	71.6	162	80.6
Type 2 delay	4	3.4	7	3.5
Type 3 delay	29	25.0	32	15.9
Referral				
Yes	85	73.3	123	61.2
No	31	26.7	78	38.8

Table 2. Demography

Most of the patients in both maternal death (71.6%) and near miss cases (80.6%) were in the age group 20-30 years. Majority of them were primi (58.7% and 56.2%) in both groups respectively. More number of maternal deaths and morbidity occurred in illiterate people staying in rural areas, belonging to lower socioeconomic status.

Among direct obstetric causes hypertensive disorder of pregnancy (n=44) was most common. Out of them 18 were preeclampsia, 25 cases of eclampsia and only 1 case was HELLP syndrome. Next common was haemorrhage contributing 17.2%. Among 20 cases of haemorrhage 18 were PPH, 2 cases of APH and 1 case of ectopic pregnancy. In indirect causes majority were cases of malaria (n=12), followed by severe anaemia (n=10).

Majority of death occurred in post-partum period (77.6%) followed by in antepartum (18.9%) and least death occurred in intrapartum period (3.4%).

Causes	Cases (n)	Percentage
Direct Obstetric Causes	83	71.5
Haemorrhage	20	17.2
Hypertensive disorder of pregnancy	44	37.9
Obstructed labour	7	5.9
Rupture uterus	8	7.0
Septic abortion	4	3.5
Indirect Obstetric Causes	33	28.5
Severe anaemia	10	8.6
Malaria	12	9.9
Sickle cell disease	6	5.4
Heart disease	3	2.7
Asthma	2	1.9

Table 3. Causes of Maternal Deaths

Clinical Criteria	n = 101	Laboratory Based Criteria	n = 61	Management Based Criteria	n = 131
Jaundice in the presence of preeclampsia	8	Oxygen saturation <90% for ≥60 min	4	Use of continuous vasoactive drugs	66
Loss of consciousness lasting ≥ 12 hours	7	Creatinine ≥300 µmol/ Lor 3.5 mg/dL	27	Hysterectomy following infection or haemorrhage	39
Oliguria non-responsive to fluids or diuretics	3	Acute thrombocytopenia (<50,000/cumm)	12	Dialysis for acute renal failure	16
Respiratory rate >40 or <6/min Shock Stroke	1 75 7	Serum bilirubin >100 mmol/L or >6.0 mg/dL	18	Transfusion of ≥5 units red cell	10

Table 4. Distribution of Near Miss Cases According to different Criteria as per WHO

Out of all near miss cases 101 fulfilled clinical criteria, 61 laboratory based criteria, and 131 fulfilled management based criteria. In the present study, more than 1 criterion were fulfilled concurrently in the same patient. In clinical criteria shock was the most common criteria (37.3%), in laboratory criteria Creatinine ≥300 µmol/L or 3.5 mg/dL was the most common (13.4%) and in management criteria use of continuous vasoactive drugs was the most common (32.8%).

Cardiovascular system (32.3%) is the most common system involved among near miss cases, the 2nd most common system was coagulation (22.9%), followed by uterine dystocia (19.4%).

Organ System Involved	Cases	Percentage
Cardio vascular	65	32.3
coagulation	38	18.9
respiratory	7	3.5
Renal	29	14.4
Cerebral	15	7.5
Hepatic	8	3.9
Uterine dystocia	39	19.4

Table 5. Distribution of Cases According to Organ System Dysfunction

Parameters	Maternal death	Percentage	Near miss	Percentage
Mode of termination				
Vaginal				
Caesarean section	34	29.4	51	25.4
Laparotomy	42	36.1	85	42.3
Undelivered	7	6.1	65	32.0
	33	28.4	0	0
Medical intervention				
Use of vasoactive drugs	39	33.6	70	34.8
Inj magnesium sulphate	36	31.0	65	32.3
Use of diuretics	12	10.3	10	5.0
Inj artesunate	6	5.1	0	0
Dialysis	1	0.8	6	3.0

Surgical intervention				
Hysterectomy	12	10.4	23	11.4
B lynch suture	10	8.6	39	19.4
IIA ligation	1	0.8	0	0
Relaparotomy	1	0.8	1	0.5

Table 6. Mode of Termination and Type of Intervention Done

Admission to Death Interval	Cases	Percentage	Duration of hospital stay in MNM	Cases	Percentage
≤24 hours	66	56.8	≤7 Days	88	43.8
24 hours - 7 days	43	36.9	>7 Days	113	56.2
>7 days	7	6.3	Mean duration of hospital stay		8.37 day

Table 7. Duration of Hospital Stay in Near Miss Cases

Maximum number of cases were delivered by caesarean section in both maternal deaths (36.2%) and near miss cases (42.3%). Among maternal death, in 7 cases laparotomy was done, out of which 5 cases due to rupture uterus, one because of uterine perforation due to S&E at a peripheral hospital and one in case of ruptured ectopic pregnancy.

The most common medical intervention done was use of vasoactive drugs in both maternal death (33.6%) and near miss cases (34.8%). Among surgical intervention most common was hysterectomy, done in 10 cases of maternal death and 39 cases in near miss.

Most of the death (28.4%) occurred within 2-12 hours of admission followed by between 2-7 days (20.6%) and ≤1 hour (19.8%). 8.6% death occurred within 13-24 hour, 16.3% in 25-48 hour and only 6.3% after 7 days of admission. The hospital stay, among near miss cases ranged between 4 and 20 days, and the mean duration was 8.37 days.

DISCUSSION

Women who survive life threatening conditions arising from complications related pregnancy and child birth have many common aspects with those who die of such complications. This similarity lead to development of near miss concept in maternal health.

In our study MMR was found to be 681 which is in concordance with Bansal M et al (2016) (MMR = 580).[4] Maternal near miss to be 1.18 per 1000 live birth. Study showing similar result is Patnakar et al (2014).[5] and Uygur D et al (2016).[6] Maternal death to near miss ratio was 1:1.73, which is in agreement with Bansal M et al (2016).[4]

In the present study maximum number of maternal death (71.6%) occurred in the age group 20-30 years like in Vidyadhar B. (2011) et al[7] Amongst the near miss cases 80.6% patients were in the age group 20-30 years like in Sujata P et al (2016).[8] 58.7% were primipara, 71.6% were illiterate and 90.5% belonged to rural area among the patients of maternal deaths which is in concordance with Ratan Das et al (2014).[9] 68.1% of maternal death and 74.1% of near miss cases contributed by unbooked cases which is in agreement with Vidyadhar B. Bangal et al (2011).[7] Type 1 delay was the most common type of delay among maternal deaths (71.6%) and near miss cases (80.6%) followed by type 3 and type 2 delay like Anju Taly et al (2004).[10] showed the most common level of delay identified was at the patient level.

Maximum patients (71.55%) died because of direct obstetric cause and that to hypertensive disorder of pregnancy (37.9%) was the leading direct cause of maternal mortality followed by haemorrhage. Similar results are seen in Dilek uygur et al (2016).[6] Rajarajeswari R et al (2016).[11] Sujata P et al (2016).[8] and Mamta Bansal et al (2016).[4] In our institution we can effectively manage cases of PPH with medical and surgical management. Blood and blood products are readily available. Experienced obstetricians with efficient anaesthesia team are available round the clock. But the cases that died because of haemorrhage are mostly caused by PPH that were referred from PHC or CHC in a state if irreversible shock. Majority of death occurred in postpartum period (77.6%) followed by in antepartum period like in Bangal VB et al (2016).[7]

Among near miss cases fulfilling clinical criteria shock was the most common criteria (37.3%) and continuous vasoactive drugs was the most common in management based criteria (32.8%) which is in accordance with Pandey Amita et al (2014).[12] and Beenu Kuswah et al (2014).[13] Cardiovascular system (32.3%) is the most common system involved among near miss cases which correlates with Sujata P et al (2016).[8]

Present study showed in 19.4% of near miss cases hysterectomy was done which is in well agreement with Shaheen et al (2014) reported 18.6% of peripartum hysterectomy.[14] 56 .8% death occurred within 24 hours of admission like in Varsha N Patil et al (2013).[15] The mean duration of hospital stay among near miss cases was 8.37 days, which is in concordance with Asma Ansari et al (2016).[16] and in 56.2% of near miss cases it was more than 7 days like in Pandey Amita et al (2014).[12]

CONCLUSION

This study showed the maternal deaths are the tip of iceberg. For every woman who dies, many will survive but with lifelong disabilities. Even today most maternal deaths are seen in patients from rural areas, unbooked, illiterate patients from low socioeconomic status. Pregnancy induced hypertension, haemorrhage and infection are the major causes of maternal death.

Maternal near miss has emerged as an adjunct to investigations of maternal death as the two represent similar pathological and circumstantial factors leading to severe

maternal outcome. As the number of maternal near miss cases is more than the maternal death and the cases are alive to directly inform on problems and obstacle that had to be overcome during the process of health care, they provide useful information on quality of health care at all levels.

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