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Research Article

Retrospective study of maternal near misses in a tertiary care institute

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ABSTRACT

Background: Traditionally, the analysis of maternal deaths has been the criteria of choice for evaluating women's health and the quality of obstetric care. The objective of the study was to determine the (Maternal near miss incidence ratio) frequency of maternal near miss and to study the demographic profile, etiology and lifesaving interventions done in near miss cases.

Methods: A retrospective study was conducted in department of Obstetrics and Gynecology in Chirayu medical college, Bhopal. This is a tertiary care institution and a referral hospital. The study was done during a period of one year from August 2014 to August 2015. During this period 1500 antenatal patients were admitted; of which 30 patients with potentially life threatening conditions were diagnosed; who met WHO 2009 criteria for near miss; along with clinical/laboratory evidence for the same, were selected for the study.

Results: The Maternal near miss incidence ratio was 20/1000 live births in our study. In our study 53.3% were in 21-25 years age group with a mean age of the patients was 26.3 + 5 years. 93.3% were unbooked, 66.6% were primigravidas, 73.3% were term patients, 60% were low income group, 73.3% were urban residents, and 76.7% were antenatal cases. In our study 60% patients presented with bleeding PV, 56.3% presented with PPH, 13.3% presented with eclampsia and 26.7% had pregnancy with jaundice. All patients required ICU for monitoring and interventions as multiple blood transfusions (60%), dialysis (13.3%), liver function monitoring (26.7%), encephalopathy (3.3%) and DIC monitoring (20%). 6.7% required ventilator and 13.3% were managed for multiorgan failure in our study. 26.6% were managed with uterine packing and MRP, 16.7% were managed with uterine balloon tamponade and post-partum hysterectomy in 16.7% cases and internal iliac ligation was done in 13.2% cases in our study. Cesarean section was done in 16.7% cases, 66.6% had vaginal delivery and 16.7% underwent hysterectomy due to haemorrhage and post-partum endometritis in our study.

Conclusions: The study concludes that maternal near miss could be an important tool to assess maternal morbidity burden. We can utilize our knowledge of maternal near miss cases to reduce maternal mortality by identifying preventable factors and doing vigilant timely interventions.

Keywords: Maternal mortality ratio, Maternal near miss, Haemorrhage, Anaemia

INTRODUCTION

Traditionally, the analysis of maternal deaths has been the criteria of choice for evaluating women's health and the quality of obstetric care. Due to the success of modern medicine such deaths have become very rare in developed countries, which have led to an increased interest in analysing so-called "near miss" events.

Maternal mortality is a sentinel event to assess the quality of a health care system. The standard indicator is the Maternal Mortality Ratio, defined as the ratio of the number of maternal deaths per 100,000 live births. Due to improved health care the ratio has been declining steadily in developed countries. For example, in the UK 1952-1982 the ratio was halving every 10 years.¹ The global maternal mortality ratio is 210/100,000 births while it is

about 240 in developing countries as compared to 14/100,000 in developed countries.^{1,2} In the European Union the ratio has now stabilized at around 10 to 20.² The latest Sample Registration Report of the Registrar-General of India that gives the new MMR estimate for the country shows an overall decline from 254 (2005-2006) to 212 (2007-09).^{3,4} The two targets for assessing progress in improving maternal health (MDG 5) are reducing the maternal mortality ratio (MMR) by three quarters between 1990 and 2015, and achieving universal access to reproductive health by 2015. Target is to bring MMR as maternal health Millennium Development Goal (MDG) is 109 per one lakhs live births by 2015. The global effort is to achieve the Millennium Development Goal of reducing maternal mortality ratio by three-quarters (from 1990 levels) by 2015.

The World Health Organization defines a maternal 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”.⁵

There are several advantages of investigating near miss events over events with fatal outcome as near miss are more common than maternal death, their review is likely to yield useful information on the same pathways that lead to severe morbidity and death, investigating the care received may be less threatening to providers because the woman survived, one can learn from the women themselves since they can be interviewed about the care they received, all near misses should be interpreted as free lessons and opportunities to improve the quality of service provision, it is also clear that maternal deaths merely are the tip of the iceberg of maternal disability. For every woman who dies, many more will survive but often suffer from lifelong disabilities.

The objective of the study was to determine the (Maternal near miss incidence ratio) frequency of maternal near miss and to study the demographic profile, etiology and lifesaving interventions done in near miss cases.

METHODS

A retrospective study was conducted in department of Obstetrics and Gynecology in Chirayu medical college, Bhopal. This is a tertiary care institution and a referral hospital. In addition to providing twenty-four-hour emergency obstetric services, the hospital also provides antenatal care and delivery services for both low and high risk pregnant women. Hospital has 24-hour facility for blood and component therapy. High dependency unit (HDU) in labor room complex and intensive care ICU with 24-hour facility for multidisciplinary specialty also function well in our setup.

The study was done during a period of one year from August 2014 to August 2015. During this period 1500 antenatal patients were admitted; of which 30 patients with potentially life threatening conditions were

diagnosed; who met WHO 2009 criteria for near miss; along with clinical/laboratory evidence for the same, were selected for the study. WHO criteria included a set of clinical, laboratory, and management-based criteria.

Maternal mortality during the same period was also analysed. Patient characteristics including age, parity, gestational age at admission, booked (more than three antenatal visits to our hospital irrespective of the gestational age), mode of delivery, ICU admission, and surgical intervention to save the life of mother were considered. Patients were categorized by final diagnosis with respect to hemorrhage, hypertension, sepsis, pregnancy with jaundice contributing to maternal near miss.

Identification Criteria as defined by WHO

According to the World Health Organization, if a woman presents any of the conditions below during pregnancy, childbirth or within 42 days of termination of pregnancy and survives, she is considered as a maternal near miss case.

Cardiovascular dysfunction

- A. Shock
- B. Cardiac Arrest
- C. Severe hypoperfusion (lactate >5 mmol/L or >45 mg/dL)
- D. Severe acidosis (pH<7.1)
- E. Use of continuous vasoactive drugs
- F. Cardio-pulmonary resuscitation

Respiratory dysfunction

- A. Acute cyanosis
- B. Gaspings
- C. Severe tachypnea (respiratory rate>40 breaths per minute)
- D. Severe bradypnea (respiratory rate<6 breaths per minute)
- E. Severe hypoxemia (O₂ saturation <90% for ≥60min or PAO₂/FiO₂<200)
- F. Intubation and ventilation not related to anaesthesia

Renal dysfunction

- A. Oliguria non responsive to fluids or diuretics
- B. Severe acute azotemia (creatinine >300 μmol/ml or >3.5 mg/dL)
- C. Dialysis for acute renal failure

Coagulation dysfunction

- A. Failure to form clots

B. Severe acute thrombocytopenia (<50,000 platelets/ml)

C. Massive transfusion of blood or red cells (≥ 5 units)

Hepatic dysfunction

A. Jaundice in the presence of pre-eclampsia

B. Severe acute hyperbilirubinemia (bilirubin>100 μmol/L or >6.0 mg/dL)

Neurologic dysfunction

A. Prolonged unconsciousness or coma (lasting >12 hours)

B. Stroke

C. Uncontrollable fit/status epilepticus

D. Global paralysis

Uterine dysfunction

A. Hysterectomy due to uterine infection or haemorrhage

The results were tabulated and data analysed as frequencies, percentages and descriptive statistic.

RESULTS

Table 1: Distribution of cases according to demographic profile of patients (Characteristics of near miss cases).

Age in years	Number of cases (n = 30)	%
15 -20	02	6.7
21 - 25	16	53.3
26 - 30	10	33.3
31- 35	02	6.7
ANC status		
Booked	02	6.7
Unbooked	28	93.3
Gravida		
1	20	66.6
2	08	26.7
3	02	6.7
Gestational age		
Term	22	73.3
Preterm	08	26.7
Socioeconomic status		
Low income group	18	60
Medium income group	08	26.7
High income group	04	13.3
residence		
Urban	22	73.3
Rural	08	26.7
Pregnancy status		
Antenatal	23	76.7
postnatal	07	23.3

Table 2: Distribution of cases clinical presentation at the time of admission.

Signs and symptoms	Number of cases (n=30)	%
Bleeding p v	18	60
Icterus	08	26.7
High BP	04	13.3
Nausea/vomiting	08	26.7
Pruritus	04	13.3
Abdominal pain	07	23.3
Fever	06	20

During the period of study there were a total of 1500 deliveries and 30 near miss cases. The Maternal near miss incidence ratio was 20/1000 live births in our study.

Table 3: Distribution of cases depending on diagnosis.

Diagnosis	Number of cases (n=30)	%
Preeclampsia-Eclampsia	04	13.3
Traumatic PPH	03	10
Atonic PPH	13	43.3
Post-partum endometritis with secondary PPH	02	6.7
Pregnancy with jaundice	08	26.7

Table 4: Distribution of cases depending upon complication.

Complication	Number of cases (n=30)	%
ARF/Dialysis	04	13.3
DIC	06	20
Encephalopathy	01	3.3
Multiorgan failure	04	13.3
ICU admission	30	100
Multiple Blood/Blood products transfusions	18	60
Shock/Ventilator	02	6.7
Hepatic dysfunction (s. bilirubin >6 mg%)	08	26.7

In our study 53.3% were in 21-25years age group with a mean age of the patients was 26.3 + 5 years. 93.3% were unbooked, 66.6% were primigravidas, 73.3 % were term patients, 60% were low income group, 73.3% were urban residents, and 76.7% were antenatal cases.

In our study 60% patients presented with bleeding PV, 56.3% presented with PPH, 13.3% presented with eclampsia and 26.7% had pregnancy with jaundice. All patients required ICU for monitoring and interventions as multiple blood transfusions (60%), dialysis (13.3%), liver function monitoring (26.7), encephalopathy (3.3%) and

DIC monitoring (20%). 6.7% required ventilator and 13.3% were managed for multiorgan failure in our study. 26.6 % were managed with uterine packing and MRP, 16.7% were managed with uterine balloon tamponade and post-partum hysterectomy in 16.7% cases and internal iliac ligation was done in 13.2% cases in our study. Cesarean section was done in 16.7% cases, 66.6% had vaginal delivery and 16.7% underwent hysterectomy due to haemorrhage and post-partum endometritis in our study.

Table 5: Distribution of cases depending upon complication.

Intervention done	Number of cases (n=30)	%
MRP	08	26.7
Internal iliac ligation	04	13.2
Uterine packing	08	26.7
Uterine balloon tamponade	05	16.7
Post-partum hysterectomy	05	16.7

Table 6: Causes of near missed mortality in relation to maternal outcome.

Cause	Caesarean	Vaginal delivery	Hysterectomy
Hypertensive disorders	02	02	-
Haemorrhage	02	11	03
Sepsis	-	-	02
Pregnancy with jaundice	01	07	-
Total	05 (16.7%)	20(66.6%)	05(16.7%)

DISCUSSION

During the period of study there were a total of 1500 deliveries and 30 near miss cases. The Maternal near miss incidence ratio was 20/1000 live births, comparable to study by Roopa PS et al⁶ with Maternal near miss incidence ratio was 17.8/1000 live births. The incidence of severe maternal morbidity was 3.3/100 deliveries in study by Chhabra P et al⁷ and Waterstone et al⁸ reported a severe obstetric morbidity rate of 12.0/1000 births.

In our study 53.3% were in 21-25years age group with a mean age of the patients was 26.3+5 years. 93.3% were unbooked, 66.6% were primigravidas, 73.3 % were term patients, 60% were low income group, 73.3% were urban residents, and 76.7% were antenatal cases. More than half (55.5%) were uneducated while 4.8% were graduates. Only 38.1% of the cases were registered, the majority were antenatal admissions (68.3%), 31.7% were postdelivery or postabortion in study by Pragti Chhabra et al.⁷

In our study 60% patients presented with bleeding per vaginum, 56.3% presented with PPH, 13.3% presented with eclampsia and 26.7% with pregnancy with jaundice. The conditions recorded were; eclampsia or severe preeclampsia (34%), haemorrhage (34%), sepsis (12%) obstructed labour (9.5%) and others 14.5% in study by Chhabra P et al.⁷ Hemorrhage was the leading cause of presenting symptom (44.2%), and hypertension was 23.6% in study by Roopa et al.⁶ Study by Souza JP et al⁹ had incidence of Severe preeclampsia in 36.3%, Eclampsia 9.7%, HELLP syndrome 5.6%. Severe hemorrhage 10.5%, severe sepsis 6.4%, hypertensive disorders in pregnancy and haemorrhage were responsible for 61.1% of near-miss cases in study by Olufemi T et al.¹⁰ Cesarean section was done in 16.7% cases, 66.6% had vaginal delivery and 16.7% underwent hysterectomy due to haemorrhage and post-partum endometritis in our study. Only 43.5% were normal vaginal deliveries, 55.5% were delivered by caesarean section; Hysterectomy was performed in 14.3%: the proportion of hysterectomies was higher in those who had obstructed labour and those who had a haemorrhage in study by Chhabra P et al.⁷

Haemorrhage and hypertensive disorders are major contributors to maternal deaths in developing countries. These data should inform evidence-based reproductive health-care policies and programmes at regional and national levels. Capacity-strengthening efforts to improve the quality of burden-of-disease studies will further validate future estimates.¹¹ Study conducted by Mehta M et al showed out of 60 maternal deaths Thirty nine (65%) mothers died of direct causes in which the most common was haemorrhage in i.e. 21 (35%) Twenty one (35%) mothers died of indirect causes in which 7 (11.66%) mothers died because of anaemia.¹²

Study of factors leading to near miss events which would be factors related to maternal mortality also should be undertaken routinely to identify preventable ones and actions required for the same. Appropriate modifications to the WHO criteria, evolved and validated for local needs, are required as they currently underestimate near misses in India.¹³ So we emphasize that we can utilize our knowledge of maternal near miss cases to reduce maternal mortality by identifying preventable factors and doing vigilant timely interventions.

CONCLUSION

The study concludes that maternal near miss could be an important tool to assess maternal morbidity burden. We can utilize our knowledge of maternal near miss cases to reduce maternal mortality by identifying preventable factors and doing vigilant timely interventions.

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