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Study of Maternal Near Miss Morbidity in a Tertiary Care Centre of Western Rajasthan

Dr. Kamal Kumar Yadav[1], Dr. Rizwana Shaheen[2], Dr. Vinita[3]

[1]Resident Doctor, Department of Obstetrics and Gynaecology, Umaid Hospital, Dr. S N Medical College, Jodhpur, Rajasthan, India

[2]senior Professor and Unit Head, Department of Obstetrics and Gynaecology, Umaid Hospital, Dr. S N Medical College, Jodhpur, Rajasthan, India

[3]Resident Doctor, Department of Obstetrics and Gynaecology, Umaid Hospital, Dr. S N Medical College, Jodhpur, Rajasthan, India

1. Introduction

According to millennium development goals (MDG) in 2015, the goal number five was to improve the maternal health is falling way below our target. Our aim in reducing maternal mortality by 75% has not been met with MDG.[1] Pregnant women's health status is not reflected by mortality indicators alone hence the concept of severe acute maternal morbidity (SAMM) is an apt for the present health providing system.[2-3] SAMM has been studied extensively in the recent past as a complement for maternal mortality and also to evaluate the quality of obstetric care in that particular institution. This concept is superior over maternal death in drawing attention to surviving women's reproductive health and lives and is equally applicable in developing countries as well as developed countries. In many developed countries, maternal mortality has fallen to single digits whereas near miss cases are more and hence useful in evaluation of the present system. Moreover, they have the advantage of not being as rare as maternal deaths for providing adequate information, as well as still being rare enough not to overload clinicians and data collection personnel within the facility.[4]Till recently there were no criteria set for identification of these cases for routine implementation, and wider application of this concept was limited.[5] But in2009, WHO has come up with clinical, laboratory, and management criteria for the identification of these cases.[6] Maternal near miss case is defined as "a woman who nearly died but survived a complication that occurred during pregnancy, childbirth, or within 42 days of termination of pregnancy".[6] In our study, we aimed to determine the frequency of maternal near miss, MNM incidence ratio (MNRM), maternal near miss to mortality ratio, and mortality index. Our second objective was to analyse the nature of near miss events and compare the causes of near-miss cases with that of maternal mortality. We had also observed the trend of near-miss events and maternal deaths in one year.

Aims and Objectives

1) To study the frequency of maternal near miss cases in Mathura Das Mathur hospital and Umaid hospital Jodhpur, tertiary care hospitals in Western Rajasthan.
2) To calculate maternal near miss incidence ratio, maternal near miss to mortality ratio and mortality index.
3) To find out risk factors associated with near miss.

2. Methods

A retrospective analysis of data collected from April 2020 to September 2020 is done. Ours is a tertiary care centre covering area of Western Rajasthan , India. It is a referral centre for both private and public hospitals in Jodhpur and surrounding districts. Potentially life threatening conditions were diagnosed and those cases which met WHO 2009 criteria were selected. Maternal mortality during the same period was also analysed. Patients were categorised by final diagnosis with respect to hemorrhage, hypertension and sepsis etc. as direct causes whereas anemia and other medical disorders were considered as indirect causes contributing to maternal near miss and death.

Following indices were calculated

1) Maternal near miss incidence ration per 1000 live births.
2) Maternal near miss to death ratio
3) Mortality index
4) Maternal mortality ratio

3. Results

There were 11,157 deliveries in our hospital from April 2020 to September 2020. There were 9,832 live births ,208 maternal near miss cases and 14 maternal deaths.

Table 1: Distribution according to age

Age in Years	*No. of Patients*	*Percentage*
< 20	18	8.6
21-25	99	47.82
26-30	58	27.88
31-35	24	11.53
>36	9	4.32

Table 2: Distribution based on gravidity

Gravida	No. of Patients	Percentage
Primigravida	91	44
Multigravida	117	56

Table 3: Period of Pregnancy at the Time of Admission

Gestational Age (Week)	Number	Percentage
1-12	8	4
13-28	21	10
>28	124	60
Postnatal	54	26

Table 4: Clinical Based Criteria

Clinical Criteria	No. of Patients
Acute Cyanosis	4
Gasping	30
RR>40 OR <6 /Min	43
Shock	23
Oligouria	12
Clotting Failure	10
Loss of Conciousness	7
Stroke	4
Uncontrollable Fits/ Total Paralysis	5
Jaundice In Presence of Pre Eclampsia	14
Cardiac arrest	1

Table 5: Laboratory Based Criteria

Laboratory based criteria	No. of Patients
Oxygen saturation <90% for > 60 min	39
Creatinine >3.5 mg /l	9
Acute Thrombocytopenia < 50000	29
Bilirubin > 6 mg/dl	8
Presence of glucose and ketoacids in urine	3

Table 6: Management Based Criteria

Management Based Criteria	No. of Patients
Blood transfusion >5 units of PRBCs	15
VENTILATOR Support > 60 min	30
USE of continuous Vasoactive drugs	24
Hysterectomy following hemorrhage or infection	11
Dialysis for acute renal failure	7
Cardio-pulmonary resuscitation	3

Table 7: Distribution of Risk Factors

Risk Factors	No. of Patients
Hypertensive Disorders	108
Hemorrhage	61
Rupture Uterus	11
Ruptured Ectopic	10
Sepsis	8
Others	26

Table 8: Risk Factors Associated with Near Miss

Risk Factors	No. of Patients
Antepartum eclampsia	74
Post partumeclampsia	20
Severe pre eclampsia	16
HELLP syndrome	7
Placenta previa	10
Abruptio placenta	12
Placenta accrete	4
Inversion uterus	3
Rupture uterus	11
Postpartum hemorrhage	38
Pregnancy with seizure disorder	6
Molar pregnancy with bleeding	4
Ruptured ectopic	10
Septic abortion	3
Puerperal sepsis	2
Pregnancy with respiratory distress	8
Pregnancy with heart disease	5
Pregnancy with viral hepatitis	2
Severe anemia without hemorrhage	5
Intra uterine fetal death with DIC	4
Vaginal hematoma	4

Table 9: Type of Surgical Intervention

Surgical Intervention	No. of Patients
LSCS	101
Laparotomy	15
Hysterotomy	2
Subtotal Hysterectomy	12
Surgical Evacuation	4
Bladder Repair	5
Hematoma Drainage	6
Uterine Artery Embolisation	1

Table 10: Maternal Deaths and Causes

Disease	*No. of Death*
Hypertensive Disorder	4
Hemorrhagic Disorder	3
Septicemia	2
Others (Embolism, infection, hepatic disorder)	5

Maternal mortality ratio of our hospital was **142.39 / 1 lakh live births**. Maternal near miss incidence ratio was **18.24 /1000 deliveries**. Maternal near miss to death ratio was 14.85 and Mortality index was 6.73.

Table 1 shows that maternal near miss is most common among in 20-30 yrs age group which accounts to 75.7 %. With maximum cases in 21-25 years age group.

Table 2 shows the most of the maternal near miss cases were multigravida (56). Primigravida are about 44%.

Table 3 shows that 60% cases were of gestational age at the time of admission. 26% cases were postpartum. 4 % cases were early pregnancy cases. 10% cases were 13 to 28 week age group.

Table 4 shows that when clinical criteria was used as suggested by WHO to identify MNM cases, we found that 94 patients had seizures, 43 cases had respiratory rate >40 /min, 30 patients were in gasping state, 23 had shock, 14 cases had jaundice and 12 had oligouria, 4 have stroke, with 7 patients have loss of consciousness.

Table 5 shows that 39 MNM cases have O2 saturation <90% for >60 min. 29 patients had acute thrombocytopenia. 9 patients have s. creatinine >3.5 mg /dl. 8 patients had bilirubin levels > 6mg / dl. 3 patients have glucose and ketoacids in urine.

Table 6 shows that maximum near miss cases have required blood transfusions. Ventilator support was required by 30 patients. Vasopressors like dopamine and nor adrenaline support was required by 24 patients. Subtotal hysterectomy was done in 11 cases. 7 patients having acute kidney injury required dialysis. 3 patients revived after cardio pulmonary resuscitation.

Most of the near miss cases were suffering from hypertensive disease of pregnancy. 61 cases was suffered from hemorrhage which include post partum and antepartum hemorrhage. 11 patients was having ruptured uterus with hemodynamically unstable. 10 patients was having ruptured ectopic pregnancy with hemoperitonium. 8 patients was having sepsis which included septic abortion and puerperal sepsis.

Most common surgical intervention was LSCS which was done in 101 cases. Laparotomy was done in 15 cases. Subtotal hysterectomy was done in 12 MNM cases. Hysterotomy was done in 2 cases. LSCS with bladder repair was done in 5 cases. Surgical evacuation was done in 4 cases. Uterine artery embolization was done in one patient with placenta accreta. Vaginal hematoma drainage was done in 6 patients.

4. Discussion

Maternal mortality is a grave complication in developing world and an inadequate measure of quality or success in developing world. Therefore attention has been shifted to alternate indicators of care such as maternal near miss morbidity and mortality. Obstetric deaths represents the quality of maternal care, but for the present scenario it may not reflect the global situation with regard to obstetric care. Hence, the focus has been taken over from maternal mortality ratio to maternal near miss.

- Near miss cases are more common than maternal deaths.
- 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 herself, since they can be interviewed about the care they received.
- All near misses can be interpreted as free lessons and opportunities to improve the quality of health care[17].

With this view in mind and fact that department of Obstetrics and Gynaecology, Dr. S.N. Medical College, Jodhpur a tertiary care hospital caters most of the population of western Rajasthan, this study was conducted from April 2020 to September 2020 for a period of 6 months. All the near miss cases in hospital, which included patients who delivered in Umaid and MDM hospital and also the patients who delivered outside the hospital and then admitted in critical condition were studied.

In our study about 14852 cases were admitted in labour room, ICU and high dependency unit during the study period. There were 11157 deliveries, 208 MNM CASES and 14 maternal deaths. Near miss accounts 1.4% of all patients admitted to our hospital. The percentage of near miss cases among patients delivered at our hospital is 1.8%. 459 patients delivered outside and referred. Among them 52 cases were near miss and 6 maternal deaths. Near miss cases constituted 11.32% cases of delivered outside and referred which is quite high.

Our study shows the period of gestational age at the time of admission where maximum number of obstetric admissions occurred during the antepartum period (74%). when compared to the post-partum period (26%). Among the ante-partum admissions maximum admissions were in the third trimester after 28 weeks of gestation (60%), only 10% of admissions were in second trimester. Highest time of occurrence of complications was in the postpartum period though the women were admitted antenetaly. These aspects of gestational age highlights that the maximum occurrence of complications is seen in the third trimester and postpartum period and thus advocates the importance of close supervision of patients during this time. Any pregnancy can turn into a high risk one at any time during its course. Impending near miss cases should be identified at an earlier state in order to have an effective intervention strategy to deal with its complication. Here we emphasize on the fact that every pregnancy should be closely supervised as obstetrics at one stage is unpredictable.

In our study on evaluating the primary obstetric complication leading to MNM, hemorrhage and hypertensive disorders of pregnancy were the commonest complications associated with near miss as well as maternal death. In our study, most of the MNM cases were due to direct obstetric complications viz. hemorrhage. Hypertensive disorders of pregnancy, sepsis, and obstructed labour/rupture uterus.
Obstetrical hemorrhages and medical disorders of pregnancy were the most common indications requiring maternal transfer to Medical Intensive Care Unit which is similar to our study. This also shows a changing scenario of maternal deaths and maternal near miss from hemorrhage to hypertension. Hypertension and hemorrhage rates have assumed greater significance as a yard stick of obstetric care.

In our study among patients who had obstetric hemorrhage, maximum number had postpartum hemorrhage. 22 cases had antepartum hemorrhage. Majority of them needed surgical intervention. Some cases needed repair of cervical/vaginal tears, 3 cases needed reposition of uterus following uterine inversion and some cases needed exploration of uterine cavity. Antepartum hemorrhage included mainly abruption and placenta previa.

Anemia without hemorrhage was the commonest indirect cause of MNM (24%). It contributed significantly to maternal mortality (Mortality index 28.6%) and also increased the severity of other causes of MNM. A high prevalence ratio of 0.36 indicates poor antenatal prophylaxis and management of anemia at community level. Western Rajasthan is endemic for anemia due to practices high prevalence of infections like malaria, poor nutrition, poverty and cultural.

On analysing our study it was seen that of 208 cases of near miss, surgery was done in 148 Cases which is significantly high. It ensures that surgery was a statistically significant protective factor. The caesarean section was done in 101 cases, subtotal hysterectomies in 12 cases and remaining lifesaving laparotomies which included compression sutures, B-lynch suture, internal iliac artery ligation, rupture uterus repair and rupture ectopic constituted 27 cases. The high percentage of subtotal hysterectomy was due to PPH, rupture uterus where surgery was the only solution for the case of morbidity as these patients arrived at a stage where surgery was the only option as prolongation of the condition could lead to maternal death.

As per our study Hypertensive disorders, hemorrhagic disorders and septicemia are the leading causes of maternal deaths. Certain factors which have lead to these maternal deaths directly or indirectly have been analysed. Delayed referral, delay in seeking medical help, inappropriate

transfer, delayed diagnosis and inadequate utilization of resources being the most important fallouts. Attempts to reduce maternal deaths may be best achieved by developing evidence based intervention strategies and protocols for the management of severe hypertension and hemorrhage especially for critically ill patients.

5. Conclusion

With all the available statistics we can conclude that, Obstetric emergencies are the leading causes of maternal mortality worldwide and particularly in developing countries where literacy, poverty, lack of antenatal care, poor transport facilities and inadequate equipment/staffing combine to magnify the problem. The consequences of the increasing prevalence of near miss mortality are wide-ranging and include higher health service use, higher direct medical costs, extended hospitalization stays, and long-term rehabilitation. Near miss mortality includes physical and psychological conditions that result from or are aggravated by pregnancy and have an adverse effect on a woman's health. Rises in near miss mortality are likely driven by a combination of factors, including increases in maternal age, pre-existing chronic medical conditions, and cesarean delivery. Delayed diagnosis, inappropriate transfer, and inadequate utilization of resources have been the cause for maternal morbidities and mortalities in our study.

Today, pregnancy care cannot be restricted to the care that obstetricians give periconceptionally, during pregnancy, delivery and postnatally but it needs to be holistic since the problems identified or occurring during pregnancy often affect and extend throughout the women's lifetime. Antepartum care should be aimed not only to improve the pregnant women's outcome but should encompass her complete family. There is a need to develop awareness in the general public about the importance of maternal and fetal heath. At the same time, appropriate resource allocation, utilization and accountability needs to be enhanced so that the culmination of healthy parturient with a healthy child becomes a reality over the country.

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