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Maternal Near Miss Death among Women with Eclampsia in Tertiary Care Center

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Abstract

Introduction: Since long maternal mortality (MM) has been considered as an indicator of maternal health. Review of the cases with near miss (NM) obstetric events has come up as a new tool to investigate MM.

Objectives: To determine the prevalence of NM cases and to analyze the nature of these cases and MM in patients with eclampsia.

Materials and Methods: This study was a retrospective study done for 12 months between January and December 2014. This study was conducted in the Department of Obstetrics and Gynecology, Indira Gandhi Government Medical College, Nagpur, which is a tertiary care center and serves as a referral center for other hospitals. Geller's five-factor scoring system is used to identify NM cases among patients with eclampsia. The cut-off point for NM case is a score of 8 or greater.

Results: During the study period, 50 women were identified as eclamptic and among these 26 were identified as NM cases. The prevalence of NM obstetric case in this study was 52%. It is observed that rates are higher in areas with poor resources and whenever the organ-system based criteria are used.Among the patients who are categorized as NM, anemia was seen in 10 (38.46%) and high level of uric acid was seen in 16 (61.53%) patients, which were both statistically significant. Neonatal distress was seen in 9 (34.61%) cases, thus signifying that proper antenatal care and timely correction of anemia could have led to improvement in their health, putting these patients life at less risk.

Conclusion: The review of NM cases is helpful in improving maternal health and types of support services commonly required, as it is considered as a good guide to the standard of maternal care.

Key words: Eclampsia, Morbidity, Maternal mortality, Organ dysfunction

INTRODUCTION

Maternal mortality (MM) is frequently described as "Just the Tip of the Iceberg" alluding that there is a vast base to the iceberg in the form of maternal near miss (MNM), i.e. maternal morbidity which has remained largely undescribed.[1] In 2009, Rööst *et al.* reported MM ratio (MMR) as 187/100,000 live births (LB) and MNM as 50/1000 LB, with a relatively low mortality index (MI) of 3.6%.[2]

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In 2009, the WHO defined MNM – "A woman who nearly died but survived a complication that occurred during, pregnancy, child birth, or within 42 days of termination of pregnancy."[3] WHO standardized, identification of organ dysfunction and /or failure as main determinant of severity to identify MNM cases, after the identification of organ dysfunction and/or failure as the main determinants of severity. Clinical signs, laboratory tests, and management interventions were used, all capable of diagnosing organ dysfunction or failure.[3] These criteria were previously validated by the WHO Working Group following markers of dysfunction and total maximum sequential organ failure assessment score, applied to an obstetric population.[3-5]

It has been estimated that hypertensive disorders (HD) in pregnancy cause 50,000 maternal deaths (MD) annually in the world and the vast majority of them occur in low-income or middle-income countries.[6]

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HD increase the risk of severe complications by 3-25 times, e.g. placental abruption, thrombocytopenia, disseminated intravascular coagulation, acute pulmonary edema, cerebrovascular disorders, and other conditions, in comparison to women without hypertension.[7-9] The contrast between low or very low MMR in high-income countries, compared to low-income or middle-income countries with high MMR has been attributed to the quality of obstetric care, patient access to hospitalization, qualification of health professionals, and structural resources, including the input and availability of intensive care units.[10-12]

India has made significant progress in reducing its MM rate from 254 (SRS 2004-06) to 212 (SRS 2007-09) to 178 (SRS 2010-12) per 100,000 LB;[13] however, there is a long way to go on this journey to meet the millennium development goals.

This study is proposed due to the high association between HDs in pregnancy and severe obstetric or clinical complications. In addition, there are only few studies to date focused on severe morbidity as proposed by the WHO.[3] Therefore, the purpose of the current study was to identify the prevalence and factors associated with the risk of severe maternal outcomes (NM and MD) in a female population with eclampsia.

Objectives

- To determine the prevalence of NM cases in patients with eclampsia
- To analyze the nature of NM obstetric cases and MM in patients with eclampsia.

MATERIALS AND METHODS

Place of Study

The study was conducted in the Department of Obstetrics and Gynecology, Indira Gandhi Government Medical College, Nagpur, which is a tertiary care center of central India and serves as a referral center for other hospitals.

Definition of Cases

NM events are defined as acute obstetric complications that immediately threatens a woman's survival but do not result in her death either by chance or because of hospital care she receives during pregnancy, labor or within 6 weeks after termination of pregnancy or delivery.[14]

For identifying NM cases five-factors scoring system was used.[15] The five-factor scoring system has the specificity of 93.9%. It comprises of organ-system failure, intensive care unit admission, transfusion >3 units, extended intubation (>12 h), and surgical intervention (hysterectomy, relaparotomy). These factors are given the score of 5, 4, 3, 2, and 1, respectively. A five-factor scoring system can theoretically have a score from 0 to 15 (no clinical factor present to all clinical factors present). The cut-off point for NM case is a score of 8 or greater.

Study Design and Identification of Cases

This was a retrospective study done for a period of 12 months between January 1, 2014 and December 31, 2014.

For this specific analysis focusing on eclampsia, we included women diagnosed with: Severe preeclampsia (blood pressure ≥160/110 mmHg and/or symptomatology of target organ compromise and/or proteinuria determined by dipstick 2+ or over 24 h ≥2 g; and/or oliguria <30 ml/h and/or thrombocytopenia <100.000 mm^3) with presence of seizures.

Five-factor scoring system was used to identify the NM cases.

For each case of NM, variables studied were age, parity, obstetric history, history of the previous hypertensive disease, family history, mode of delivery, perinatal results, and clinical complications.

Information on MDs related to eclampsia and deliveries conducted during the study period were obtained from MM audit and the labor or delivery registers. For each case of MD, data were collected on the demographic characteristics including gestational age at the time of death and the underlying cause of death.

Data Analysis

Data were entered into a computer database using Microsoft Excel spreadsheet and statistical analysis was performed. Results are presented as frequencies, percentages, and descriptive statistics.

The frequencies of NM events are reported according to the clinical condition responsible, referral status of the patients and whether the complications were present on arrival or occurred while on admission at the hospital. MM ratio was calculated as the number of MDs per 100,000 LBs.

RESULTS

As shown in Figure 1, total 50 patients were enrolled in the study, where 26 patients were categorized as NM, and 24 were categorized as not NM.

As shown in the Table 1, on further stratifying between the groups, mean age of the patients in Group A was 23.98

Table 1: Age characteristics

Characteristics	Categories	Group A	Group B	*P* value	Remarks
		Not NM	NM		
Age group in years	Mean (year)±SD	23.98±3.65	24.98±2.91	0.06	NS
	≤19	3	0	-	-
	20-34	21	24		
	>35	0	2		

NM: Near miss

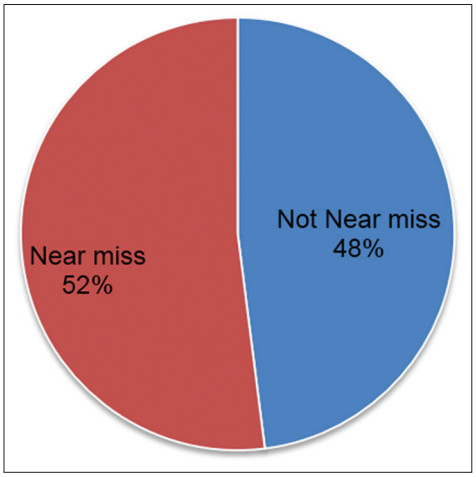

Figure 1: Prevalence of Anemia

with standard deviation (SD) of 3.6 while in Group B mean age was 24.88 with SD of 2.9 hence, it was found that all patients had almost similar characteristics with regard to age in both groups, i.e. patients with NM death and in those with not NM death.

As shown in the Table 2, while analyzing gravidity, NM death was seen to be more common in primigravida. However, the occurrence of NM death was not statistically significant between multigravida and primigravida. Thus, suggesting that increase in gravidity is not an isolated risk factor for the occurrence of NM death.

As shown in Table 3, most of the deliveries were at term period of gestation in both group A and in group B and in control, thus *P* value at 0.191 was found to be insignificant.

As shown in the Table 4, the presence of hypertension in previous pregnancies was not found in any of the multigravida in both Group A and Group B.

As shown in the Table 5, the presence of family history between the NM cases and not NM cases was not found to be statistically significant with *P* value of 0.480.

As shown in the Table 6, among patients in Group B, 10 patients had anemia (38.46%) which was found to be statistically significant with *P* value of 0.004, using cut-off for anemia as 11 g% in third trimester, as defined by WHO.

Table 2: Gravidity

Characteristics	Categories	Group A	Group B	*P* value	Remarks
		Not NM	NM		
Gravidity	Primigravida	15	18	0.308	NS
	Multigravida	9	8		

NM: Near miss

Table 3: POG

Characteristics	Categories	Group A	Group B	*P* value	Remarks
		Not NM	NM		
POG at delivery	Pre-term	4	7	0.191	NS
	Term	20	19		
	Postdate	0	0		

POG: Period of gestation, NM: Near miss

Table 4: Past history of hypertension

Characteristics	Categories	Group A	Group B	*P* value	Remarks
		Not NM	NM		
Past history	Present	2	3	0.462	NS
	Absent	22	23		

NM: Near miss

Table 5: Family history

Characteristics	Categories	Group A	Group B	*P* value	Remarks
		Not NM	NM		
Family history	Present	1	0	0.480	NS
	Absent	23	26		

NM: Near miss

Three patients in Group B had thrombocytopenia with platelets <100,000 which was statistically not significant with *P* value of 0.133.

Uric acid was high in 16 patients (61.53%), which was found to be statistically significant with *P* value of 0.00003.

Creatinine was raised in 7 patients which was statistically insignificant with *P* value of 0.33.

Additionally, among other laboratory investigations such as prothrombin time or international normalized ratio, bleeding time, and clotting time no statistically significant association was found with NM death.

Table 6: Laboratory investigations

Characteristics	Categories	Group A	Group B	*P* value	Remarks
		Not NM	NM		
Hemoglobin	Anemia present	19	10	0.004	Significant
	Anemia absent	5	16		
Platelets	Normal	24	23	0.133	NS
	Thrombocytopenia	0	3		
PT/INR	Normal	24	26	-	NS
	Abnormal	0	0		
Bleeding time	Normal	24	26	-	NS
	Abnormal	0	0		
Clotting time	Normal	24	26	-	NS
	Abnormal	0	0		
Uric acid	Normal	23	10	0.00003	Significant
	Abnormal	1	16		
Creatinine	Normal	24	19	0.33	NS
	Abnormal	0	7		

PT: Prothrombin time, INR: International normalized ratio, NM: Near miss

Table 7: Management

Characteristics	Categories	Group A	Group B	*P* value	Remarks
		Not NM	NM		
Induction of labor	Done	12	11	0.293	NS
	Not done	12	15		

NM: Near miss

As shown in the Table 7, in the management of the patients, the presence of induction of labor (42.30%) was not statistically significant in patients with NM death.

As shown in the Table 8, meconium staining of amniotic fluid was seen in 4 (15.38%) cases in Group B which was found to be statistically not significant with *P* value of 0.189.

In the study, the rate of cesarean section in Group B ($n = 26$) was 38.4% while 57.7% patients had spontaneous vaginal delivery and 3.9% patients had Instrumental delivery. No statistical significance was seen between the two groups when comparing the mode of delivery.

As shown in the Table 9, in the study, neonatal distress after delivery was seen in 9 (34.61%) cases in Group B which was found to be statistically significant with *P* value of 0.037.

As shown in the Table 10 post-partum hemorrhage (PPH) was observed in 1 case (2%) in Group A, with no cases in Group B.

DISCUSSION

In this study, the prevalence of MNM among eclamptic patients was found to be 52%. The mean age among NM was seen to be 24 years.

The result of present study is in accordance with the study done by Zanette *et al.*[16] where there were 82,144 LBs in the 27 maternity hospitals participating in the study and 9555women received a diagnosis of severe maternal morbidity. Severe HDs were associated with 70% of these hospital admissions (6706/9555), corresponding to 81.6 cases per 1000 deliveries. Among the total number of women with severe HDs, 94% were classified as potentially life-threatening condition (6315/6706), while 349 cases had organ dysfunction or failure, with prevalence of 4.2 NM cases per 1000 LBs, a MI of 10.7% (42 MD per 391 cases of NM plus MD), and the MNM to MD ratio was 8.3 NM cases to 1 MD. The mortality was almost half of that for non-HD conditions.

In another study done in Kathmandu valley by Rana *et al.* (2013),[17] out of 157 cases identified with NM rate of 3.8 per 1000 LBs, severe complications were PPH 62 (40%) and preeclampsia-eclampsia 25 (17%).

As per study another a cross-sectional observational study done by Kalra and Kachhwaha (2014)[18] there were 27,958 deliveries and 26,734 LBs. Totally 112 patients were identified as NM as per Geller's five-point scoring system while there were 54 MDs, NM rate was 4.18/1000 LBs. As far as NM obstetric morbidity was concerned the most common complication was hemorrhage accounting for 56% cases. The second leading cause was hypertension in the form of eclampsia and preeclampsia accounting for 20 (17.8%) of total NM cases.

The prevalence of NM case was 2.3% in the study done by Shrestha *et al.*[19] HD of the pregnancy accounted for 27.8% of the NM cases in this study.

This wide variation in range was seen due to the difference in the criteria used for the identification of the NM cases

Table 8: Maternal outcome

Characteristics	Categories	Group A	Group B	*P* value	Remarks
		Not NM	NM		
Meconium staining of amniotic fluid	Yes	1	4	0.189	NS
	No	23	22		
Mode of delivery	Cesarean section	6	10	0.204	NS
	Spontaneous vaginal delivery	18	15		
	Instrumental delivery	0	1		

NM: Near miss

Table 9: Fetal outcomes

Characteristics	Categories	Group A	Group B	*P* value	Remarks
		Not NM	NM		
Neonatal distress after delivery	Yes	4	9	0.037	Significant
	No	22	15		

NM: Near miss

Table 10: Post-delivery complications

Characteristics	Categories	Group A	Group B	*P* value	Remarks
		Not NM	NM		
PPH	Yes	1	0	0.411	NS
	No	23	26		

PPH: Post-partum hemorrhage

and the place of study. Rates were higher in resource-poor setting area and whenever the organ-system based criteria was used.[18]

Among the eclamptic patients who were categorized as NM, anemia was seen to be statistically significant among these patients thus signifying that proper antenatal care and correction of anemia could have lead to improvement in their health putting these patients life at less risk.

In the study patients of eclampsia who were categorized as NM were seen to have high levels of uric acid, which was statistically significant.

Fetal distress was also found to be statistically significant in patients categorized as NM (9/26 patients). Thus, signifying that fetal life was also in jeopardy along with mother's. So, proper care of the mother is the key to reducing neonatal morbidity and mortality.

CONCLUSION

The review of NM cases, especially in patients with eclampsia, helps delineate continuing threats to maternal health and types of support services the most common required. The NM can be used as a guide to the standard of maternal care, as NM analysis indicated the quality of healthcare. The major causes of NM cases were similar to the causes of MM. Lessons can be learned from cases of NM which can serve as a useful tool in reducing MM ratio. Need for development of an effective audit system for maternal care which includes both NM obstetric morbidity and mortality is felt.[19]

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