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Study of Causes and Management of Maternal Near Miss Cases at a Tertiary Hospital

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ABSTRACT

In health care literature NEAR MISS refers to a severe life threatening condition that did not cause death-but had the potential to do so. Near miss cases review is a more reliable quantitative analysis can be carried out, which can provide a more comprehensive profile of health system functioning. Present study was aimed to study causes and management of maternal near miss cases at a tertiary hospital. This study was a Prospective Observational Study carried out in the cases that were given the diagnosis of maternal near miss, based on the criteria defined by WHO admitted during the study period. During study period, total number of live births were 17249, total maternal deaths were 23. Majority patients were from the age group of 20-24 years (45.9%), were registered (89.54%), were immunized (95%), were referred from other hospitals (53.63%) and were admitted in the antepartum period (87.72%). Majority cases were primigravida (40.9%) followed by gravida two (20.45%) and gravida three cases (19.09%). 202 cases (91%) were delivered at a tertiary centre. One Hundred Twenty Eight cases (58.18%) underwent LSCS, 88 cases (40%) delivered vaginally. Common diagnosis observed in near-miss cases were hypertensive disorders of pregnancy (53.18%), followed by anemia (19.09%), heart disease (9.09%), abruptio placentae (6.36%) and respiratory disease (5.45%). Near-miss cases requiring blood transfusions were 93 patients (42.27%), 15% of near-miss cases were on inotropes. Common interventions were required magnesium sulfate therapy (58%), required surgical intervention (3.18 %), emergency hysterectomy (1.36%), anti-failure measures (15%) and intravenous antihypertensive (19.09%). ICU admission was required in 107 cases (48.63%) and mean ICU stay was 03.46±01.46 days. In present study, hypertensive disorders of pregnancy and anemia related complications were the leading causes of near miss situations.

INTRODUCTION

Maternal mortality is described as "just the tip of the iceberg", implying that there is a base -maternal morbidity-which remains largely undescribed[1,2]. For each woman who dies, many will survive but often suffer from lifelong morbidity. When we reduce the risk factors for maternal deaths we can also reduce the number of women suffering from severe morbidities.

In health care literature NEAR MISS refers to a severe life threatening condition that did not cause death-but had the potential to do so. Reviewing near-miss cases helps in identifying the pattern of severe maternal morbidity and mortality, strengths and weakness in the referral system, the clinical interventions available and the ways in which improvements can be made[3]. Early identification of risk factors for preeclampsia and prompt initiation of treatment with correction of associated factors such as anemia plays a critical role in the optimal management of near-miss cases.

Near miss cases generally occur more frequently than maternal deaths and therefore a more reliable quantitative analysis can be carried out, which can provide a more comprehensive profile of health system functioning[4,5]. Corrective actions for identified problems can be taken to reduce related mortality and long term morbidity Therefore, the cause of organ dysfunction and organ system involved be identified and timely interventions be taken. Present study was aimed to study causes and management of maternal near miss cases at a tertiary hospital.

MATERIAL AND METHODS

This study was a Prospective Observational Study carried out in the Department of Obstetrics and Gynecology, at a tertiary care centre. Study approval was obtained from institutional ethical committee. All cases that were given the diagnosis of maternal near miss, based on the criteria defined by WHO[4]. Admitted during the study period (i.e. Sep 2017 to Aug 2019) were followed up in this hospital with respect to initiating the event, relevant markers and modes of management. Women with non-obstetric morbidities such as morbidity resulting from causes not related to pregnancy or its complication or management, e.g.: hepatic failure as a result of cirrhosis, malignancies like carcinoma breast, etc. OR morbidity from accidental or incidental causes no way related to pregnancy, e.g.: morbidity from automobile accident/suicide were excluded.

Data was collected from the records of patients admitted to the Dr. V. M. Government Medical College Hospital, critical care unit, during the period of September 2017 to August 2019, who satisfied the criteria of maternal near- miss. Data was compiled to include the parity, date of near-miss, obstetric score, duration of hospital stay, diagnosis, past history, treatment modalities, neonatal/maternal outcomes, and mode of termination and area of lack in health care. Statistical analysis was carried out, taking into account the major causes of maternal morbidity, obstetric events, outcomes of the neonate and the mother, interventions needed and was compared, using IBM, SPSS statistics software 23.0 Version.

RESULTS

In present hospital-based study, 220 near-missed cases were studied. During study period, total number of live births were 17249, total maternal deaths were 23. Majority patients were from the age group of 20-24 years (45.9%), were registered (89.54%), were immunized (95%), were referred from other hospitals (53.63%) and were admitted in the antepartum period (87.72%).

In present study, majority cases were primigravida (40.9%) followed by gravida two (20.45%) and gravida three cases (19.09%). 202 cases (91%) were delivered at a tertiary centre. One Hundred twenty eight cases (58.18%) underwent LSCS, 88 cases (40%) delivered vaginally. Common diagnosis observed in near-miss cases were hypertensive disorders of pregnancy (53.18%), followed by anemia (19.09%), heart disease (9.09%), abruptio placentae (6.36%) and respiratory disease (5.45%). In 52% of near-miss cases, vascular and hematological dysfunction were prominent followed by cerebral causes (29.54%) due to increased prevalence of severe preeclampsia and antepartum eclampsia.

Near-miss cases requiring blood transfusions are 93 patients (42.27%) Of 220 near-miss cases admitted, 127 cases did not require a blood transfusion. Of the 93 near-miss cases transfused blood, 45 cases required all blood products, PCV+FFP+PRP. 25% of near-miss cases required mechanical ventilation, 15% of near-miss cases were on inotropes. Of 220 near-miss cases admitted, common interventions were required magnesium sulfate therapy (58%) , required surgical intervention (3.18%), emergency hysterectomy (1.36%), anti-failure measures (15%), intravenous antihypertensives (19.09%). ICU admission was required in 107 cases (48.63%) and mean ICU stay was 03.46±01.46 days.

In present study, 4 cases aborted (1.81%), majority neonates alive and well (66.36%), (14.54%) were shifted to the neonatal care unit for further management. 38 cases came with intrauterine fetal demise.

DISCUSSIONS

Maternal health is an integral part of the health care system. Maternal mortality is an indicator of health and health care delivery systems. Severe morbid conditions require a comprehensive approach. Therefore, the concept of maternal near-miss cases

Table 1: General characteristics

Characteristics	No. of patients	Percentage
Total number of live births	17249	
Number of maternal near miss cases (MNM)	220	
Total number of maternal deaths	23	
Age groups (in years)		
15-19	15	06.81
20-24	101	45.90
25-29	64	29.09
30-34	21	09.54
≥5	19	08.63
Mean age (years)	25.35±05.19	
Registration status		
Registered	197	89.54
Unregistered	23	10.45
Immunization Status		
Immunized	209	95
Non-immunnized	11	05
Type Of Admission		
Referral	118	53.63
Self	102	46.36
Parturient status		
Antepartum	193	87.72
Postpartum	24	10.90
Postabortal	03	1.36

Table 2: Obstetric characteristics

Characteristics	No. of patients	Percentage
Gravida status		
Primi	90	40.90
Second	45	20.45
Three	42	19.09
Four and more	19	8.62
Place of delivery		
Tertiary centre	202	91.81
Rural hospital	05	2.27
Private hospital	11	05
District hospital	02	0.90
Mode of delivery		
Vaginal	88	40
LSCS	128	58.18
1st by vaginal,2nd by LSCS	01	0.45
Abortion	03	1.36

Table 3: Diagnosis of near miss cases

Diagnosis	No. of patients	Percentage
Severe preeclampsia	64	29.09
Antepartum eclampsia	53	24.09
Anemia	42	19.09
Heart disease	20	9.09
Abruptio placentae	14	6.36
Respiratory disease	12	5.45
HELLP syndrome	09	4.09
Postpartum hemorrhage	09	4.09
Sepsis	07	3.18
Uterine rupture	03	1.36
Placenta previa	02	0.90
Rh negative pregnancy	01	0.45

Table 4: Organ system involved

Organ system involved	No. of patients	Percentage
Vascular and hematological	115	52.27
Cerebral	65	29.54
Cardiac	25	11.36
Respiratory	16	7.27
Hepatic	05	2.27
Renal	03	1.36

has emerged. The causes of Near Miss reflect the causes of maternal death. Near miss analysis is worth presenting in national indices as a surrogate for maternal death. Majority patients were from the age group of 20-24 years (45.9%), mean age of patients was 25.35±05.19 years, were registered (89.54%), were immunized (95%), were referred from other hospitals (53.63%) and were admitted in

Table 5: Other characteristics

Characteristics	No. of patients	Percentage
Required Blood transfusion	93	42.27
Blood Products Transfused		
PCV 38	17.27	
PCV + FFP	10	4.54
PCV + FFP + PRP	45	20.45
Required Mechanical ventilation	56	25.45
Required inotropic support	33	15
Received Magnesium sulphate	129	58.63
Required surgical intervention	07	3.18
Emergency hysterectomy	03	1.36
Anti-failure measures	33	15
Intravenous antihypertensives	42	19.09
ICU admission required	107	48.63
Mean ICU stay (days)	03.46±01.46	

Table 6: Fetal outcome of near miss cases

Fetal outcome	No. of cases	Percentage
Live and well	146	66.36
Shifted to NICU	32	14.54
IUFD 38	17.27	
Abortion	04	1.81

the an tepartum period (87.72%). Similar findings were noted by Mansuri *et al.*[6] as mean age of maternal near-miss cases was 25.79±3.70 years. In study by Manjunatha *et al.*[6] study there were majority cases were from 21-25 years of age (40%). Panda *et al.*[8] found that 86.5% of near-miss cases were from 20-34 years of age group Junu *et al.*[9] noted that most of the maternal near-miss cases (90%) were between 20-35 years of age.

In present study, common diagnosis observed in near-miss cases were hypertensive disorders of pregnancy (53.18%), followed by anemia (19.09%), heart disease (9.09%), abruptio placentae (6.36%) and respiratory disease (5.45%). In study by Patankar *et al.* [10] hypertensive disorder of pregnancy was a major obstetric factor, (51.02%), out of these, 29 (29.59%) had severe pre-eclampsia, 16 (16.32%) had eclampsia and 5 (5.1%) had HELLP. Next in order of frequency were cases of obstetric hemorrhage the total being 43 (43.87%), out of 43 patients, 12 had APH amounting to 12.24%, 28 (28.57%) had PPH and 3 cases (3.06%) were of rupture uterus. Similar findings were observed in present study.

Mansuri *et al.*[6] noted that eclampsia, was the leading cause of potentially life-threatening conditions (29.45%) followed by preeclampsia (25.46%) and severe postpartum hemorrhage (22.39%), respectively. In the present study also hypertensive disorders and anemia were leading causes which is consistent with their observations. Contrast findings were noted by Anuradha *et al.*[11] as hemorrhage was a major life-threatening cause identified (41%) followed by the hypertensive disorder of pregnancy (39%).

In 52% of near-miss cases, vascular and hematological dysfunction were prominent followed by cerebral causes (29.54%) due to increased prevalence of severe preeclampsia and antepartum eclampsia. Very similar to our study Patankar *et al.*[10] showed that

the majority of near-miss cases had vascular dysfunction and coagulation dysfunction (28.57%). In study by Junu *et al.*[9] hematological system dysfunction was commonly found in cases of maternal near-miss requiring massive transfusion of more than five units. This was followed by neurological system dysfunction.

In study by Patankar *et al.*[10] blood transfusion needed in only 19.38% of near-miss cases while in our study it is much higher in i.e. 46.36%. Panda *et al.*[8] noted that blood products needed in 35.9% of near-miss cases. Manjunatha *et al.*[7] noted that in near-miss cases 08% required per partum hysterectomy while the majority of 48% cases of near-miss required multiple blood transfusion and 08% required laparotomy.

In study by Anuradha *et al.*[11] massive blood transfusion i.e. more than 5 units of blood transfusion was required in 40% of the cases but in our study, the same is much less i.e. 23.63% in form of PCV+FFP+PRP. In study by Anuradha *et al.*[11] 32% of cases required per partum hysterectomy,40% required multiple blood transfusions,6.18% required dialysis secondary to multiple organ dysfunction due to shock or renal failure secondary to abruption and due to sepsis .45.7% near-miss cases were on mechanical ventilation and 32.3% required magnesium sulfate.

In study by Patankar *et al.*[10] there were 13 cases of respiratory dysfunction with Spo2 <90% for more than 60 min who will be intubated and mechanically ventilated 13.26% patient required intubation with mechanical ventilation in the intensive care unit. Anuradha *et al.*[11] 46% of near-miss cases required mechanical ventilation. In the present study also 25.45% of near-miss cases admitted in the intensive care unit were intubated and kept on mechanical ventilation.

CONCLUSION

In present study, hypertensive disorders of pregnancy and anemia related complications were the leading causes of near miss situations. Hence, facilities at the community level that aid in early identification, treatment and proper referral in cases of pregnancy-induced hypertension as well as anemia should be made available.

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