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An Analysis of Maternal Near Miss Cases at Eden Hospital, Medical College Kolkata

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Abstract
Introduction: Maternal near- miss 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. A maternal death is one of the most devastating complications in obstetrics.
Methods: The hospital based prospective study selecting 58 patients according to maternal near-miss criterias, were analysed in respect to demographical and other outcome parameters.
Results: Analysis of the data revealed that most patients in the near- miss group were primiparas(39.7), in the third trimester (62.1%) or in the post natal period (25.9%). 75.9% in the near miss group were unbooked and were referred from a private or district , sub-division hospital. 11% of the patients presented with eclampsia or status epilepticus. Dialysis for ARF was needed in 5.2 % patients.
Conclusion: The most quoted level of delay in the near miss cases was ignorance , relative reluctance and lack of transport.
Key Words: Maternal death, Near miss, Maternal mortality

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I. Introduction:

A maternal death is one of the most devastating complications in obstetrics, with wide – ranging implications for both the family and the staff involved[1]. Maternal mortality is one of the important indicators used for the measurement of maternal health. Improvement of maternal health was one of the millennium development goals, MDG 5 with Target 5 that called for the reduction of maternal mortality ratio by three quarters between 1990 and 2015.[5]

As the MMR has improved, reviews of maternal deaths, though useful, do not completely reflect the scope of management of complications in obstetric practice. The reason for this being that although maternal mortality remains a significant public health problem, maternal deaths are rare in absolute numbers especially within a community, so that assessment of effects of care is difficult [27].To overcome this challenge, notion of severe acute maternal morbidity (SAMM) and near miss event was introduced in maternal health care to complement information obtained with review of maternal death[7].

Maternal near- miss 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. As Near miss occurs much more frequently than maternal deaths , a more reliable quantitative analysis can provide a comprehensive profile of the health system functioning. Reviews of such cases also helps identify the failures during the near miss and thereafter take corrective action. Maternal mortality and maternal near miss are collectively referred to as severe maternal outcome (SMO). Severe morbidity data are vital for policy planners to know the requirements of essential and emergency obstetric care (EmOC) to manage these. It is also assumed to be a better indicator than maternal mortality alone for designing, monitoring, follow up and evaluation of safe motherhood programs[8,9,10]. Maternal death reviews and verbal autopsies have become a common approach in investigating barriers to maternal health-care in developing countries. Reviewing near miss cases has the further advantage of having first hand information from women who have survived in understanding health-seeking behaviour. The proportion of women arriving at a health-care facility with SMO provides information about the occurrence of the first delay or second delay and factors contributing to the delays [11,12] .Understanding of these factors by the health personnel, authorities and policy makers and taking appropriate action to address them would improve utilization of maternal health-care services.

The present study is an endeavour to assess the various causes of near- miss and evaluate the trend of near miss cases at out institute. Our aims and objectives are a) to determine the frequency of maternal near miss , maternal near miss incidence ratio , maternal near miss to mortality ratio at our institute, b) to compare the nature of maternal near miss events with that of maternal mortality, c) to see the trend of near miss events.

II. Materials & Methods:

The hospital based prospective study was carried in the Department of Obstetrics and Gynaecology, Eden Hospital, Medical College Hospital , Kolkata from 1st January 2015 to 1st January 2016. 58 patients were selected for analysis according to the following inclusion criterias: major obstetric haemorrhage, eclampsia, renal or liver dysfunction, cardiac arrest, pulmonary edema, acute respiratory dysfunction, coma, cerebrovascular accident, status epilepticus, ICU admission, septicemic shock and massive pulmonary embolism. The cases with non obstetric morbidity such as malignancies, hepatic failure as a result of cirrhosis, liver rupture, accidental or incidental causes in no way related to the pregnancy were excluded. Study variables were maternal pulse rate, blood pressure, respiratory rate, urine output, interventions needed, critical care unit admission, period of hospital stay, need for Dialysis, number of units of blood transfusion needed.

Antenatal patients and post partum patients within 42 days of delivery meeting the inclusion criteria were identified. Maternal mortality during the same period was analysed. Patient characteristics including age , parity , gestational age at admission , booked (more than 3 antenatal visits), mode of delivery , duration of CCU stay , total hospital duration and surgical intervention to save the life of the mother were considered .Patients were categorized by final diagnosis with respect to haemorrhage , hypertensive disease of pregnancy , sepsis . Anaemia and other medical disorders were considered as indirect causes contributing to maternal near miss or death.

The following maternal near miss indices will be calculated ;

1) Maternal near miss incidence ratio refers to the number of maternal near miss cases per 1000 live births .MNM IR = MNM/LB
2) Maternal near miss : Mortality ratio : Proportion between maternal near miss cases and maternal deaths .
3) Conversion rate : (Maternal death / near miss + maternal death) X 100

III. Data Analysis:

Categorical variables are expressed as Number of patients and percentage of patients.The statistical software SPSS version 20 has been used for the analysis and Microsoft Excel 2007 have been used to make the diagrams. An alpha level of 5% has been taken, i.e. if any p value is less than 0.05 it has been considered as significant.

IV. Results &Analysis:

The present study is a hospital based prospective study commencing from 1st January 2015 to 1st January 2016 .During this time 50 patients (antenatal and postnatal within 42 days of delivery)meeting the inclusion criteria as per the WHO near – miss definition are identified. Maternal mortality during the same period is analysed as well. Patient characteristics including age, parity , gestational age at admission , booked (more than 3 antenatal visits), mode of delivery interventions done were recorded. Final diagnosis is recorded and classified. Maternal near miss incidence ratio was calculated (MNM IR = MNM/LB) Maternal near miss : Mortality ratio was calculated. Conversion rate (Maternal death/near miss + death) X 100 was calculated Categorical variables are expressed as Number of patients and percentage of patients and compared across the groups using Pearson _s Chi Square Test for Independence of Attributes. The statistical software SPSS version 20 has been used for the analysis . An alpha level of 5% has been taken , i.e if any p value is less than 0.05 it has been considered as significant. A total of 11800 live births took place at our institute during the study period and there were 62 maternal deaths during the same period. MNM IR that is MNM / LB came out to be 58/11800=0.0049 MNM:Maternal mortality ratio was 58/62=0.016. Conversion rate (Maternal death / MNM+Maternal death)X 100 was 62/120X100=51.66 %

The table 1 shows demographic parameters and basic investigations and findings of the study population. The mean age of the study population was 25.33 years. Mean BMI was 22.23.Mean duration of hospital stay of the near miss cases was 22.67 days. Mean haemoglobin was 7.74 gm%. The table 2 shows that most of the patients in the study group were primiparas.(39.7%). 13.8 % of the patients in near miss group were second gravidas. 25.9% patients presented in the post natal period .62% patients presented in the third trimester revealing that most life threatening events related to pregnancy occur in the peripartum period. 75.9% patients were unbooked. Most of the patients were delivered at our facility but were unbooked and were referred from a private or sub division or district hospital.The incidence of still borns was 12.1% . 60.3% patients in the study group were admitted to intensive care for several reasons. 35.5% patients needed 5 of blood or blood

products.25.8% patients needed massive blood transfusions. 17.2% patients presented with eclampsia and rate of subtotal hysterectomy was 20.7%.

The table 3 classifies the patients presenting as near – miss cases into organ systems and their mean duration of hospital stay. Most of the patients (19%) presented with hematological system involvement .20.7 % patients had neurological involvement secondary to eclampsia.

The table 4 depicts the reason why the patients were classified as near- miss cases. 60% patients needed ICCU admission, 20.7% patients needed emergency hysterectomy , 19% patients had hematological complications. Table 5 showed the different types of delay for deteriorating maternal condition.

V. Discussion

Women who survive life-threatening conditions arising from complications related to pregnancy and childbirth have many common aspects with those who die of such complications. This similarity led to the development of the near-miss concept in maternal health. Exploring the similarities, the differences and the relationship between women who died and those who survived life-threatening conditions provide a more complete assessment of quality in maternal health care. The near-miss concept and the criterion-based clinical audit have been proposed as useful approaches for obtaining useful information on maternal and newborn health care. In a systematic review by Say et al. (2004) to determine the prevalence of severe acute maternal morbidity (‗near miss') world-wide, it was found that most designs were cross-sectional and mostly conducted in tertiary hospitals[13]. Wilson and Salihu (2007) found that serious forms of maternal morbidity occur in about 1% of women in the United States compared to about 3% in some developing countries. The mean age of the study population was 25 yrs (ranging from 18- 37 %). Majority of the patients in the study group were primiparas and from low socioeconomic status (Mean per capita income being Rs.1815).Most of the patients were either in the third trimester(62%) or postnatal(25%).the findings are in keeping with previous studies. A study by Roopa PS et al at Kasturba Hospital , Manipal concluded that primiparas were more in the near miss group . Majority of the patients (57%) were in the third trimester[2]. The findings corroborate the fact that most pregnancy related life threatening events occur in the peripartum period.

A huge majority of the patients who fell under the near miss criteria were referred from district , subdivision and private hospitals(75%). These findings corroborate with similar studies at other tertiary care hospitals. The Roopa PS study[2] concluded 96% of their near miss cases were referred .A similar observation was made by a cross sectional study conducted in the Department of Obstetrics & Gynaecology of a Medical College and Hospital of Western Rajasthan[3] .The findings emphasize the importance of booking of antenatal patients and minimum of 3 antenatal visits for better pregnancy outcome. Good antenatal follow up allows for early diagnosis of many preventable causes of severe maternal pregnancy outcome even to the extent that it can avoid maternal deaths. It is imperative to impose upon the general population the importance of antenatal booking and check up.Pregnancy is in fact nature‗s precious gift which has to be nurtured throughout the nine months for good maternal and foetal outcome.

The most common causes identified for near miss in our study was haemorrhage and pregnancy induced hypertension . Haemorrhage and PIH have been identified as major causes of maternal near miss even in previous studies like the study by Almeria Y[4]et al at Damascus identified haemorrhage in 34% patients and hypertensive disorders in 52% patients .Our study identified eclampsia in 17.2 % patients and eclampsia in 6.9 % patients. Pregnancy induced hypertension is one of the commonest medical problems encountered during pregnancy.

Jaundice was another important cause of maternal near miss identified in our study with the prevalence as high as 13.8% in the study population . The cut – off for jaundice was taken as S.Bilirubin 6 gm% a.Not just near miss cases but jaundice accounted for as high as 22.4% of maternal deaths in the study period.

12 % patients in the maternal death group and 5.2 % patients in near miss group suffered from Acute renal failure and needed dialysis. Most of these patients were identified with either pre renal or intrinsic renal causes.

Obstetric hysterectomy was needed in 20.7 % of the patients again emphasizing that PPH is a major cause of maternal mortality and morbidity.Most of the patients requiring a hysterectomy had had previous cesarean section which is a risk factor for uterine rupture. Prolonged labour and obstructed labour leading to uterine rupture is a rare event in modern obstetrics although does occur.The main organ systems involved in near miss events in our study were haematological (19%), neurological(20.7% secondary to convulsions due to eclampsia) and hepatobiliary (13.8%).

VI. Conclusion

Most studies including ours reflect that most of the life threatening events related to pregnancy including near miss and maternal death occur more commonly in women who are not booked for antenatal care (that is 3 or less antenatal visits). Obstetric haemorrhage more importantly PPH , PIH and its sequelae ,

Jaundice in pregnancy accounted for most of the near miss cases and maternal deaths in our study. Most commonly involved organ system in our study was haematological system and neurological system. The level of delay most prominently quoted in our study subjects was ignorance regarding the condition and its implications.

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TABLE 1: DESCRIPTIVE STATISTICS OF STUDY POPULATION

Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation
Age (years)	18.00	37.00	25.33	4.84
BMI (kg/m2)	17.30	33.60	22.23	3.36
Per capita income (Rs/month)	1000.00	3210.00	1815.09	567.98
Hospital stay (Days)	6.00	120.00	22.67	23.86
Blood loss at delivery/termination (mL)	500.00	3000.00	1708.28	742.75
Blood transfusion (U)	0.00	26.00	3.41	4.40
preeclampsia/eclampsia related SBP (mm Hg)	10.00	210.00	111.40	36.22
preeclampsia/eclampsia related DBP (mm Hg)	40.00	120.00	73.52	21.00
Temp (ºC)	98.00	104.00	98.89	0.96

TLC (103/mL)	2.00	36.00	7.37	6.12
Pulse rate (/min)	90.00	138.00	112.52	11.00
pH of blood	7.28	7.60	7.42	0.10
SpO_2	78.00	100.00	96.16	3.83
Duration of mechanical vent. (hrs)	0.00	82.00	15.00	20.99
Resp. rate (/min)	14.00	29.00	22.09	3.42
Urine output (mL/hr)	5.00	80.00	45.47	13.91
Ser. Creatinine (mg/dL)	0.40	4.80	1.06	0.75
Platelet count (105/mL)	0.02	5.50	1.94	1.37
Ser. Bilirubin (mg/dL)	0.20	18.00	2.27	4.10
Haemoglobin (g/dL)	4.00	10.20	7.74	1.76

TABLE 2 : FREQUENCY DISTRIBUTION OF OTHER PARAMETERS

PARAMETERS	NO OF PATIENTS	PERCENTAGE
Primigravida	23	39.7%
Multigravida	35	60.3%
Post natal period	15	25.9
1^{st} trimester	4	6.9
2^{nd} trimester	3	5.2
3^{rd} trimester	36	62.1
Unbooked cases	44	75.9
Booked cases	14	24.1
Instituutional delivery	42	72.4
Outside delivery	16	27.6
Stillbirth	7	12.1
ICCU admission	35	60.3
Massive blood transfusion required	11	18.96%
Eclampsia	10	17.2
Cardiac arrest	3	5.2%
Mechanical ventilation needed	32	55.2
Dialysis needed	3	5.2%
Jaundice present	8	13.8
Hysterectomy needed	12	20.7
H/O previous LSCS	12	20.7
H/O prolonged labour	2	3.4

TABLE 3: MAIN ORGAN SYSTEM INVOLVED IN NEAR MISS CASES

Main Organ System involved	Frequency	Percentage	Hospital Stay
Renal	3	5.2	48

Respiratory	4	6.9	16.25
Cardiac	3	5.2	18
Neurological	12	20.7	16.83
Hepatobiliary	8	13.8	44.38

TABLE 4: REASON FOR PATIENTS BEING CLASSIFIED AS NEAR MISS

Reason For Being Classified As Near Miss	Frequency	Percentage
Emergency Hysterectomy	12	20.7
Jaundice	8	13.8
Oliguria	3	5.2
ICU Adimission	35	60.3
Blood Transfusion>5	11	19
Acute Thrombocytopenia	4	6.9
Relook Laparotomy	4	6.9
Acute Pulmonary Edema	4	6.9
Anaphylactic Shock	1	1.7

TABLE 5: LEVEL OF DELAY IN NEAR MISS CASES

Level of delay in near miss cases	Frequency	Percent
Patient Problem		
Money	5	8.6
Ignorance	15	25.9
Relative/Patient Reluctance	15	25.9
Administrative Problem		
Transport:	14	24.1
Lack Of Blood Product	4	6.9
Busy Operation Theatres	0	0
Initial Assessment	1	1.7
Problem Identification	1	1.7
Management Plan	1	1.7
Follow Up Monitoring	1	1.7
Missing Information	1	1.7

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