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Study of maternal near miss cases in a tertiary care hospital

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Abstract
Background: Maternal near miss is defined as "A woman who nearly died but survived a complication that occurred during childbirth or within 42 days of termination of pregnancy". As maternal deaths have become so uncommon, the practice of analysing Severe Acute Maternal Morbidity (SAMM) has evolved, to improve obstetrics and perinatal care.
Because avoidance of medical errors serves to decrease the rate of maternal mortality or severe maternal morbidity, the concept of near miss or close calls have been introduced. Considering the importance of the factors revolving around the causes of maternal morbidity and mortality, this study aims at identifying such causes and their trends in a tertiary health care centre.
Aim of the study: The main aim of maternal near miss approach are the reduction of morbidity and mortality in high risk pregnancies and improve the clinical practice.
1. To determine the frequency of severe maternal near miss cases.
2. To determine the pattern of MNM occurrence and the causes of MNM
3. To evaluate health care facility
4. To identify key intervention in the prevention and management of severe obstetrics complications and child birth.
5. Improvement of the maternal health by identifying the lag in the health care facility.

Materials and Methods: Retrospective and prospective studies were performed.
Data collected about maternal 'near-miss' cases admitted in Government RSRM Lying-in Hospital during the period of January 2016 to June 2017.
Near miss cases were identified and analysed according to the maternal near miss guidelines published by NRHM, on behalf of the ministry of health and family welfare, government of India, in December 2014.

Keywords: maternal near, tertiary care, hospital

Introduction
Medicine is a field of ever changing science, and so is obstetrics.
A woman, when pregnant undergoes infinite changes, physiologically and sometimes even pathologically. The importance of obstetrics is reflected by the use of maternal and neonatal outcomes as an index of the quality of health and life among nations. Severe pathological and circumstantial factors are shared by women who develop severe acute pregnancy complications.
In *Millennium development goal* 2000, the goal number 5 was to improve the maternal health. It is falling way below our target, as our aim to reduce the maternal mortality by 75 % by 2015 has not been met.
Evaluation of obstetrics cases with severe outcomes gives us much information about the processes that set in the events of maternal morbidity and mortality.
Maternal near missis defined as *"A woman who nearly died but survived a complication that occurred during childbirth or within 42 days of termination of pregnancy".*
As maternal deaths have become so uncommon, the practice of analysing *Severe Acute Maternal Morbidity (SAMM)* has evolved, to improve obstetrics and perinatal care.
Because avoidance of medical errors serves to decrease the rate of maternal mortality or severe maternal morbidity, the concept of near miss or close calls have been introduced.
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Materials and Methods

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Inclusion criteria

- Critically ill pregnant women,
- Labouring women,
- Postpartum and
- Post-abortal women admitted in Government RSRM Lying in Hospital, Chennai.

Exclusion criteria

Non pregnant women and women who died due to maternal morbidities were excluded from this study.

Procedure

Data was collected from the records of patients admitted to the Government RSRM lying-in Hospital's critical care unit, during the period of January 2016 to June 2017, who satisfied the criteria of maternal near-miss as per the NRHM guidelines.

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, mode of termination and area of lack in health care.

Statistical analysis

Statistical analysis was carried out, taking into account the major causes of maternal morbidity, obstetrics events, outcomes of the neonate and the mother, interventions needed, and were compared, using IBM.IPSS statistics software 23.0 Version.

To describe the data, descriptive statistics frequency analysis and percentage analysis were used for categorical variables and the mean and SD were used for continuous variables.

- Total number of cases during the study period: 182 cases
- Frequency of maternal near miss= ([Total no. ofnear miss/total number of deliveries]* 1000) = 12 per 1000 live births.

Results

Table 1: Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	182	18	37	25.18	4.255
Hospital	182	5	44	13.07	6.202
Stay					
ICU Stay	182	1	85	13.16	15.876
Birth					
	127	.20	850.00	18.4052	110.02240
Weight					

The above table infer that Mean of the Age is 25.18, Hospital Stay Mean is 13.07, ICU stay mean is 13.16 and birth weight mean is 850 grams.

Table 2: Diagnosis

	Frequency	Percent
Abruptio Placenta	22	12.1
Anemia	17	9.3
Anemia, Hellp	1	.5
Ap Eclampsia	23	12.6
Atonic Pph	10	5.5
Gestational Hypertension	5	2.7
Imminent Eclampsia	2	1.1
Inversion Of Uterus	1	.5
Others	25	13.7
Peripartum	1	.5
Cardiomyopathy		
Placenta Previa	3	1.6
Pp Eclampsia	10	5.5
Retained Placenta	5	2.7
Rupture Uterus	3	1.6
Ruptured Ectopic	35	19.2
Pregnancy		
Severe Preeclampsia	11	6.0
Severe Preeclampsia,	1	.5
Anemia		
Traumatic Pph	7	3.8
Total	182	100.0

The above table infer that Ruptured Ectopic is 19.2 % prevalence, AP Eclampsia 12.6%, Abruptio Placenta 12.1%. others 13.7%.

Table 3: Gestational Age

	Frequency	Percent
Postpartum	28	15.4
Upto 10 Weeks	42	23.1
11 - 20 Weeks	6	3.3
21 - 25 Weeks	4	2.2
26 - 30 Weeks	16	8.8
31 - 35 Weeks	22	12.1
36 - 40 Weeks	64	35.2
Total	182	100.0

From the above table, we infer that 35.2% of women were in 36-40 weeks of GA, 23.1% of women were upto 10 weeks.

Table 4: Mode of Delivery

	Frequency	Percent
Not Terminated/ Postpartum	12	6.6
Emergency Hyserectomy	2	1.0
Emergency Hyserotomy	7	2.7
Emergency Laparotomy	40	22.0
Labour Natural With Episiotomy	37	20.3
Lscs	76	41.8
Spontaneous Expulsion	4	2.2
Suction Evacuation	4	2.2
Total	182	100.0

From the above table we infer that 41.8% of women delivered by LSCS.

Table 5: Puerperium

	Frequency	Percent
Not Delivered	12	6.6
Eventful	47	25.8
Uneventful	123	67.6
Total	182	100.0

The above table infer that 67.6% were uneventful, 25.8% were eventful.

Table 6: Blood Transfusion

	Frequency	Percent
No	55	30.2
Yes	127	69.8
Total	182	100.0

From the table we infer that 69.8% were given Blood transfusion.

Table 7: Type of Transfusion

	Frequency
Not Transused	55
Blood	66
Blood, FFP	41
Blood, FFP, Cryoprecipitate	1
Blood, FFP, Platelets	10
Blood, Packed Cells	1
Blood, Platelets	1
FFP	3
FFP, Cryoprecipitate	1
FFP, Platelets	3
Total	182

Type of transfused 66 cases were Blood, 41 were by blood, FFP.

Table 8: Baby Details

	Frequency	Percent
Early	55	30.2
Weeks/Not delivered/Postpartum		
Dead Born	22	12.1
Live Birth	105	57.7
Total	182	100.0

From the above table, we infer that 57.7% were live birth, 30.2% were Early weeks/not delivered/postpartum. 12.1% were dead born.

Table 9: NICU admission

	Frequency	Percent
Brought Dead	1	.5
Nicu admission discharged	68	37.4
Nicu death	8	4.4

From the table above infer that 37.4% were NICU admission discharged.

Discussion

On statistical analysis of the data collected from the near miss cases in our hospital, it has been found that most patients have an education of 6th standard to 12th standard(63.7%) followed by literate upto 6th standard (39%). Lack of awareness being a major cause of maternal mortality at the health care level, education plays an important role in the prevention of maternal morbidity and mortality.

The mean duration of hospital stay for a patient admitted with SAMM has been 13 days as an average with a maximum of 44 days compared to 3 days for a vaginal delivery and 5 days for an LSCS, this number is significant.

Discussing the diagnosis and hence the causes of the Maternal Near Miss cases, ruptured ectopic pregnancy as a single entity contributes significantly to Maternal Near Miss(19.2%).

But when gestational hypertension, AP eclampsia, PP eclampsia, severe preeclampsia and imminent eclampsia are clubbed together as hypertensive disorders of pregnancies, 28% of the Maternal Near Miss has had the disorder. Hence, it can be taken that hypertensive disorders of pregnancy are the most important cause of maternal morbidity in this study group.

Others (25 patients, 13.7%) in the study have come out to be the next major cause; they have no significant numbers when calculated as a single entity. These include, TB meningitis, Leptospirosis, portal hypertension, ARDS, septic abortion, bowel injury, seizure disorder etc.

When the condition on admission was studied it has been found that 69% of patients were admitted with severe illnesses at the time of admission, 16% of them were admitted with no disorder and 15% were admitted with disorder at the time of admission, and later became a ‘near- miss’ case.

Most of the Maternal Near Miss cases have come under referral (54%) which indirectly indicates the lack of resources at the primary health care level.

Another conclusion from the same statistics can be drawn that at the primary health care level, the patients seek medical help only when the illness becomes severe enough and thus are being referred to a tertiary care centre, contributing to a delay in referral.

58% of patients classified as ‘Near-miss’ and admitted in ICU were mutiparas women and 42% being primiparas women.

Although previous studies on near miss cases have shown a significant relationship between obstetric score of the patient and the outcome, in this study no such significance has been made out.

An analysis of the frequency of gestational age among these patients has shown that 35.2% of them were between 36 and 40 weeks of gestation, 23.1% of them were up to 10 weeks of GA, 15.4% of them were postpartum women, 12.1% of them were between 31 and 35 weeks of gestation, 8.8% of the patients were between 26 and 30 weeks of GA, 3.3% of them between gestational age 11 to 20 weeksand2.2% between 21 to 25 weeks of gestation.

In this study, most patients who satisfied the criteria of maternal ‘near-miss’ did not have any significant past history, but a few had morbidities like gestational hypertension, anemia, hypothyroidism, seizure disorders.

On analysing the mode of delivery of the MATERNAL NEAR MISS cases, it can be concluded that LSCS has been the most common mode of delivery. LSCS (41%) has been the mode of termination for these patients.

Except a few patients who have had PP eclampsia, acute kidney injury, ARDS, all maternal near miss cases have had an uneventful puerperium.

Taking into account the need for blood transfusion among these cases, 69.8% of them have needed blood transfusion emphasising the need for blood transfusion facilities at the referral centres. Non availability of blood and blood products at the primary level of health care have contributed significantly to maternal morbidity and mortality. In cases of obstetric hemorrhage, immediate volume replacement should be done,

which otherwise will result in fatal outcomes to the mother. Anemia being a major contributor of MATERNAL NEAR MISS, timely replacement of the lost blood volume in cases of post partum haemorrhage and APH should be emphasised. In PIH patients who are presenting with obstetric hemorrhage, the ongoing blood loss is often seriously underestimated considering the vital signs of the patients. The blood pressure is almost always normotensive and the pulse rate doesn't increase unless there is very significant blood loss. Hence monitoring of these parameters doesn't help in the quantification of blood loss and hence the proper management of these conditions. Health education at the referral level about the lethal combination of Post Partum Haemorrhage and PIH and the importance of timely blood transfusion should be encouraged. In this group, 30.2% of the patients have needed transfusion of blood (Whole blood and packed cells).

Discussing the fetal outcome of these cases, it has been found that 83% of the births among the cases has been live births, with an average birth weight of 2 kilograms.

88% of the babies born to these mothers have been admitted to NICU either for the maternal or the fetal indications. The fetal indications include fetal distress, perinatal asphyxia, high risk mother, meconium stained liquor, respiratory distress. The maternal indications include circumstances in which the mother is sick enough not to feed her baby, admission of mother in an ICU requiring cardio respiratory support and inotropic support. NICU death has been recorded among 11% of the babies and 1% have been brought dead.

115 number of patients (63.2%) have had involvement of more than one systems in setting of the morbidity. 50 patients (27.5%) have had single system involvement. This indicates that maternal morbidity is due to multisystem involvement and one is related to the other.

Discussing the indirect cause of maternal mortality and morbidity among the near miss cases at the level of community, it can be seen that lack of awareness among the population contributes primarily to illnesses in such women. In this study 36.3% of the women had no awareness regarding pregnancy and pregnancy related conditions. Also lack of availability of blood and blood products 30% at the primary level contributes widely to maternal near miss.

As earlier discussed 68% of women admitted as near miss have needed blood or blood product transfusion emphasising the need for making transfusion facilities available at the primary health care level.

Summary

The frequency of near miss in this study is 12/1000 live births which is less when compared to other study group in the mentioned literature. The frequency has been 16.8%/1000 live births in a study conducted at Kasturba hospital, Manipal. The frequency of near miss cases depends on the level of health care at each level of the society, the health seeking behaviour of the population, quality of resources at the referral level and available manpower.

Although 63.7% of the patients who come under near miss are literate upto 12th standard, health awareness has been low and hence have caused such morbidities. Providing health education at the primary and middle school level should be considered. 28% of the patients in the study group have hypertensive disorders of pregnancy, which is the most common cause of morbidity in this study group.

69% of the patients were admitted with severe illnesses at the time of admission itself and 54% have been referred from other centres, which indicates lack of health care and resources at the primary level.

Almost one third (35%) of these patients had a gestational age of 36 to 40 weeks. 68% of the patients in the study group have needed blood transfusion during any period, antenatal or postnatal which indicates the need for making blood transfusion facilities more accessible to the primary health care level. Almost 30% of the near miss cases have been referred to higher centre due to lack of blood transfusion facilities at the referral level. 36% of these patients have had no awareness of the complications of the disorders that come along with pregnancy emphasising the need for education about pregnancy related problems during antenatal period.

Although haemorrhage has been the most common cause of morbidity in the previous studies mentioned, in this study group, hypertensive disorders of pregnancy followed by ruptured ectopic pregnancy.

This is primarily due to timely identification and prompt replacement of blood and blood products in the hospital of this group. Since most of the cases have been referred from this indirectly indicates that facilities for storage and transfusion of blood should be made available.

Hence, it can be concluded that the occurrence of near-miss cases is primarily due to:

1. Lack of Material
2. Lack of Manpower
3. Lack of Infrastructures.

Facilities for blood transfusion, blood storage, quick referral should be made available at the primary level. Prompt replacement of the lost blood volume is of vital importance in cases like post- partum and ante- partum haemorrhage.

Lack of manpower can be alleviated by appointing skilled health care providers at least at the district level and community level. Educating staffs about the emergencies in obstetrics, conducting mock drills to handle emergency situations, conducting training programmes for improving obstetric skills can help.

Lack of infrastructure can be solved by the joint effort of the health providers at the Primary health care level and the government by providing adequate funds and facilities. The government and the health care providers must also ensure that these facilities and funds are utilised for the maximum benefit to the patients.

The success of reducing the incidence of near miss cases also depends upon the proper patient education and raising the awareness among the expecting mothers.

Conclusion

It can be concluded from this study that hypertensive disorders of pregnancy are the most common cause maternal morbidity in the study group, followed by ruptured ectopic pregnancy. Hence, facilities at the community level that aid in early identification, treatment and proper referral of pregnancy induced hypertension should be made available. Education of the primary health care staff about the normal blood pressure among antenatal mothers, causes of hypertension, diagnosis, quantification of proteinuria and further evaluation of the disorder and timely referral should be given.

The next major cause of maternal near miss is ruptured ectopic pregnancy. Creating awareness among the general population about ectopic pregnancy and its complications, motivating them to do ultra sonogram of abdomen and pelvis at the early weeks of pregnancy would alleviate the morbidities due to ruptured ectopic pregnancy.

Further in this study, it can be concluded that apart from health education, making facilities for blood transfusion at the primary health care level or setting a tertiary health care centre in every district can undoubtedly prevent morbidity. Establishment of tertiary care centre in each district is essential. Delayed diagnosis, inappropriate transfer and inadequate utilisation of resources are the other major causes of morbidity.

Along with health education, proper utilisation of resources at primary level of care and awareness on ones' own health, quality of obstetrics care can be improved.

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