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Study of Maternal Near Miss Cases at a Tertiary Hospital

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ABSTRACT

For every maternal death, there are many serious life-threatening complications of pregnancy. Currently the near-miss audit has been considered a better approach than a maternal death audit and can be used to identify what needs to be done to improve the quality of maternal health care. Present study was aimed to study maternal near miss cases at a tertiary hospital. Present study was single-center, prospective, observational study, conducted in women who were pregnant or in labor or delivered or aborted up to 42 days from termination of pregnancy, admitted in the obstetric department, which met the comprehensive criteria of WHO admitted during study period and survived. In present hospital-based study, 220 near-missed cases were studied. Most of the patients were from the age group of 20-24 years (45.9%) followed by 25-29 years (29.09%) and 30-34 years (9.54%). Majority cases were primigravida (40.9%). 128 cases (58.18%) underwent LSCS, 88 cases (40%) delivered vaginally. Hypertensive disorders of pregnancy (53.18%) contributed to the majority of near-miss cases, 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. Hypertensive disorders of pregnancy are the most common cause of maternal morbidity in the study group, followed by anemia.

INTRODUCTION

Maternal health is an integral part of a country's health-care system and the fifth Millennium Development Goal. The maternal mortality ratio (MMR) in India is 212 with Figures up to 390 in some states[1]. It reflects the status of obstetric health and helps in reviewing the achievements of the facility/country. Around 20% of all maternal deaths occur in India[2]. Improvement of maternal health is one of the millennium development goals, MDG 5 with Target 5 A that calls for the reduction of maternal mortality ratio by three quarters between 1990 and 2015[3].

For every maternal death, there are many serious life-threatening complications of pregnancy. Yet relatively little attention has been given to identifying a general category of morbidity that could be called near misses. Stones *et al.* were the first to use the term "near-miss morbidity" to define a narrow category of morbidity encompassing "potentiality life-threatening episodes."[4] The WHO defines it as "a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy"[5].

In practical terms, women are considered near-miss cases when they survive life-threatening conditions (i.e., organ dysfunction). MOHFW defines a MNM (maternal near-miss) case as a woman who survives life- threatening conditions during pregnancy, abortion and childbirth or within 42 days of pregnancy termination, irrespective of receiving emergency medical/surgical interventions[6]. Currently the near-miss audit has been considered a better approach than a maternal death audit and can be used to identify what needs to be done to improve the quality of maternal health care. Present study was aimed to study maternal near miss cases at a tertiary hospital.

MATERIAL AND METHODS

Present study was single-center, prospective, observational study, conducted in Department of Obstetrics and Gynecology, Dr. V.M. Government Medical College and Shri Chatrapati Shivaji Maharaj Sarvopchar Rugnalaya, Solapur, India. Study duration was of 2 years (August-September 2017-2019). Study approval was obtained from institutional ethical committee.

Inclusion criteria: Women who were pregnant or in labor or delivered or aborted up to 42 days from termination of pregnancy, admitted in the obstetric department, which met the comprehensive criteria of WHO[5] admitted during study period and survived.

Exclusion criteria: 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. Morbidity from accidental or incidental causes no way related to pregnancy, e.g. morbidity from automobile accident/suicide

The number of cases that were given the diagnosis of maternal near miss, based on the criteria defined by WHO were followed up in this hospital with respect to initiating the event, relevant markers, modes of management. Data was collected from the records, 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. 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.

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. Maternal mortality ratio was 133.3, MNM incidence ratio was 1.27, MNM/mortality rate was 9.56, SMOR (severe maternal outcome ratio) was 14.08 and Mortality index (MI) was 9.46%.

Most of the patients were from the age group of 20-24 years (45.9%) followed by 25-29 years (29.09%) and 30-34 years (9.54%). Majority of near-miss cases belonged to rural area (59.09%). Based on occupation status, majority of near-miss cases were housewives (41.81%) followed by laborers (37.27%). According to socioeconomic status, majority of near-miss cases belonged to class III (29.09%). Based on education status, majority of near-miss cases were illiterate (55.90%). Of 220 cases, 197 and 89.54% were registered. According to the immunization status of the patients in the antenatal period, 20 cases and 95% of patients were immunized and 11 cases were non immunized. Majority cases were referred from other hospitals (53.63%). majority of near-miss cases (87%) were admitted in the antepartum period.

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 of which many were referred in antenatal period for high-risk management. 128 cases (58.18%) underwent LSCS, 88 cases (40%) delivered vaginally. Hypertensive disorders of pregnancy (53.18%) contributed to the majority of near-miss cases, followed by anemia (19.09%) heart disease

Table 1: General parameters

Parameters	Numbers/percentage
Total number of live births	17249
Number of maternal near miss cases (MNM)	220
Total number of maternal deaths	23
Maternal mortality ratio	133.3
MNM incidence ratio	1.27
MNM/mortality rates	9.56
SMOR (severe maternal outcome ratio)	14.08
Mortality index (MI)	9.46%

Table 2: General characteristics

Characteristics	No. of patients	Percentage
Age groups (in years)		
15-19	15	06.81
20-24	101	45.90
25-29	64	29.09
30-34	21	09.54
≥ 35	19	08.63
Mean age (years)	25.35±05.19	
Residential status		
Rural `	130	59.09
Urban	90	40.90
Occupation		
Housewife	92	41.81
Laborer	82	37.27
Worker	46	20.90
Socioeconomic status		
I	08	3.63
II	41	18.63
III	64	29.09
IV	55	25
V	52	23.63
Education status		
Illiterate	123	55.90
Upto 8th std	86	39.09
Above 8th std	11	05
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 3: Obstetric characteristics

Characteristics	No. of patients	Percentage
Obstetric score		
Primigravida	90	40.90
Second gravida	45	20.45
Gravida three	42	19.09
Gravida four	06	2.72
Gravida five and more	13	5.90
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 4: 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 5: 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

Table 6: 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
Hospital stay (days)		
≤8	10	4.54
9-14	150	68.18
≥15	60	27.27
Mean hospital stay	20.35±07.69	
ICU admission required	107	48.63
ICU stay (days)		
1-4	103	46.81
5-7	03	1.36%
≥8	01	0.45%
Mean ICU stay (days)	03.46±01.46	

Table 7: 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

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 while 74.5% did not require mechanical ventilation. 15% of near-miss cases were on inotropes. i.e. 33 patients of 220 near-miss cases admitted, 129 cases (58%) required magnesium sulfate therapy. 150 cases had hospital stay of 9-14 days (68.18%) ICU admission was required in 107 cases (48.63%). Majority cases had ICU stay of 1-4 days (46.81%) and mean ICU stay was 03.46±01.46 days. 146 cases and 66.36% were alive and well, 32 cases and 14.54% were shifted to the neonatal care unit for further management. 38 cases came with intrauterine fetal demise.

(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.

DISCUSSION

Maternal mortality has, since times immemorial been accepted as a traditional indicator and as a conventional criterion of choice in evaluating women's health in general and in assessing the quality of obstetric care in particular. So a better knowledge of the spectrum, characteristics and outcomes of the disease involving this group of patients is the first step towards achieving prevention and hence reducing both maternal morbidity and mortality. Thus, in recent times, due to improvements in health care and increased awareness among the masses to seek the same, there has been a decline in maternal mortality although it does continue to remain as a significant public health problem.

In present study, mean age of patients was 25.35±05.19 years, similar findings were noted by Patankar et al.,[7] (27.84±3.43 years) Mansuri et al.[8] (25.79±3.70). Junu et al.[9] noted that most of the maternal near-miss cases (90%) were between 20-35 years of age. Most of them were multiparous 82%) and were in the third trimester (85%) at the time of near-miss event. In present study, majority cases were primigravida (53.18%). Panda et al.[10] studies on near-miss cases 47.2% were primigravidas while a similar study Manjunatha et al.[11] 55% near-miss cases were primigravida. In present study, hypertensive disorders of pregnancy (53.18%) contributed to the majority of near-miss cases, followed by anemia (19.09%) heart disease (9.09%) abruptio placentae (6.36%) and respiratory disease (5.45%).

In study by Patankar et al.[7] hypertensive disorder of pregnancy was a major obstetric factor, (51.02%) followed by obstetric hemorrhage (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.

Rathod et al. noted that amongst near-miss cases, hemorrhage (26.70%) was the leading cause, followed by anemia (24.84%) hepatitis (16.77%) and hypertensive disorders of pregnancy (11.80%). In study by Junu et al.[9] hypertensive disorders of pregnancy were the leading cause of maternal near-miss cases followed by postpartum hemorrhage.

Patankar et al.[7] noted that the maximum number of cases were delivered by cesarean section (46.93%) followed by vaginally delivered (44.89%). In study by Manjunatha et al.[11] common mode of delivery was Cesarean section (76.47%). In the present study, 58.8% were delivered by cesarean section followed by 41.20% by vaginal which is consistent with above findings. Patankar et al.[7] noted that 89.8% of near-miss cases were admitted in the antenatal period while 8% in the postnatal period. Manjunatha et al.[11] 80% of near-miss cases were admitted in the antenatal period.

Study results of both are similar to the present study with a maximum near-miss cases being detected and admitted in the antenatal period. In present study 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 Junu et al.[9] noted that 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 present study, out of 220 near-miss cases, 25.45% were intubated and kept on mechanical ventilation, while 15% of near-miss cases required inotropic support. Since hypertensive disorders of pregnancy are the predominant cause, 129 cases i.e. 58.63% required magnesium sulfate therapy. 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. The fetal outcome of near-miss cases was mostly live and well-baby i.e. 69.55%. In study by Panda et al.[10] live birth rate was 92.1% (82) from near-miss cases which is 69.55% in our study. Junu et al.[9] noted that 65% of near-miss cases delivered an alive and well-baby, while 20% were stillbirth and 05% died in the neonatal period.

The government and the health care providers must also ensure that these facilities and funds are utilized for the maximum benefit to the patients. The success of reducing the incidence of near-miss cases also depends upon proper patient education and raising awareness among expecting mothers. Delayed diagnosis, inappropriate transfer and inadequate utilization of resources are the other major causes of morbidity. Along with health education, proper utilization of resources at the primary level of care and awareness on one's own health, quality of obstetrics care can be improved.

CONCLUSION

Hypertensive disorders of pregnancy are the most common cause of maternal morbidity in the study group, followed by anemia. 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.

REFERENCES

1. Assembly, U.G., 2000. United Nations millennium declaration. United. Nations. General. Assembly., 8: 45-47.
2. Say, L., R.C. Pattinson and A.M. Gülmezoglu, 2004. Who systematic review of maternal morbidity and mortality: The prevalence of severe acute maternal morbidity (near miss). Reprod. Health, Vol. 1 .10.1186/1742-4755-1-3.
3. WHO, U., 2012. UNFPA, the World Bank. Trends in maternal mortality: 1990 to 2010. World Health Organization, UNICEF, UNFPA. World Health Organization, Switzerland, ISBN-17: 978 92 4 150363 1, Pages: 64.
4. 4. Geller SE, Rosenberg D, Cox SM, Kilpatrick S 2002. Defining a conceptual framework for near-miss maternal morbidity. J. American. Med. Women's. Asso., 57: 135-139.
5. Pattinson, R., L. Say, J.P. Souza, N.V. Broek and C. Rooney, 2009. Who maternal death and near-miss classifications. Bull. World. Health. Orgization., 87: 734-734.
6. Ganvir, P.P. and S. Thakare, 2018. A study on maternal near miss cases in tertiary care center, chandrapur, maharashtra, India. Int. J. Reprod., Contraception, Obstet. Gynecol., 2: 1-5.
7. Mitchell, P., B. Gopinath, C.M. McMahon, E. Rochtchina, J.J. Wang, S.C. Boyages and S.R. Leeder, 2009. Relationship of type 2 diabetes to the prevalence, incidence and progression of age-related hearing loss. Diabetic Med., 26: 483-488.
8. Shrestha, J., R. Shrestha, R. Tuladhar, S. Gurung and A. Shreshta., 2015. Maternal near miss in a tertiary care teaching hospital. J. N., 3: 17-21.
9. Panda, B., S.K. Panda, D.M. Satapathy and R.P. Mishra, 2018. Maternal near miss: An indicator for maternal health and maternal care. Infection., Vol. 2 .10.4103/0970-0218.137145
10. , M.S., H.T.N. and D.H. R, 2018. A study of maternal near miss at a district teaching hospital: A retrospective observational study. Int. J. Reprod., Contraception, Obstet. Gynecol., 7: 1421-1426.
11. Rathod, A.D., R.P. Chavan, V. Bhagat, S. Pajai, A. Padmawar and P. Thool, 2016. Analysis of near-miss and maternal mortality at tertiary referral centre of rural India. J. Obstet. Gynecol. India, 66: 295-300.