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Maternal Near Miss Review at Tertiary Care Centre in Maharashtra

Dr. Dharmendra Raut[1], Dr Dhanshree Rajurkar[2], Dr. Aparna Wahane[3]
[1]*Associate Professor, Department of OBGY, Government Medical College Akola, Maharashtra*
[2]*Junior resident, Department of OBGY, Government Medical College, Akola, Maharashtra*
[3]*Professor and HOD, Department of OBGY, Government Medical College, Akola, Maharashtra*
Corresponding author: Dr. Dhanshree Rajurkar
Behind Akashwani Centre, Civil Lines, Chandrapur, Maharashtra 442401

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BACKGROUND :
Maternal mortality is one of the important indicators used for the measurement of maternal health. WHO has come up with concept of maternal near miss to overcome this challenge as a compliment to maternal death.
OBJECTIVE
The objective of study was to analyse maternal profile, obstetric outcomes in near miss cases and to study causes and associated factor for MNM (Maternal Near Miss).
METHODS
With ethical clearance from institutional ethical committee, retrospective observational study was conducted for a period of 18 months from MARCH 2019 to AUGUST 2020 at government Medical College and Hospital, Akola, Maharashtra by collecting data from hospital medical records. All the patients who fit in WHO criteria for MNM admitted to ICU at the hospital were included.
RESULTS
In this study, there were total of 108 near miss cases, 30 maternal deaths out of 6635 live births (LB) giving maternal near miss incidence ratio of 16.27 per 1000 LB, MNM: MD ratio of 3.6:1, which indicates for approximately every 4 near miss cases there is 1 maternal mortality. The mortality index was 0.21(21%). The most common cause of maternal near miss at our centre was hypertensive disorders of pregnancy (67.3%) followed by anaemia accounting for 57% and Haemorrhage (APH AND PPH) accounts for 25.2%.
CONCLUSION
Study of causes of near miss reflects the cause of maternal deaths so Near miss analysis can be used instead of maternal death review for improvement of health care system.
KEYWORDS :Maternal near miss, Maternal mortality, Hypertensive disorders of pregnancy

I. INTRODUCTION

Maternal near miss is defined as "pregnant or recently delivered woman who survived a complication during pregnancy, childbirth or 42 days after termination of pregnancy." World Health Organization published criteria based on markers of management and organ dysfunction recently which will help evaluate systematic collection of data on near miss and development of summary estimation. Severe acute maternal morbidity (SAMM) and near miss event were introduced in maternal health care to complement information obtained with review of maternal deaths.(1) The importance of reviewing near miss cases lies in the fact to identify health system failures and assess quality of maternal healthcare.(2,3) The near miss approach will be an important tool for evaluation and assessment of the newer strategies in improving maternal health. The near miss criteria developed by WHO technical group has been tested and validated as being able to provide robust and reliable data.(4) Unidentified and untreated patients die and some proportions of women are identified and treated escapes death which come under maternal near miss category.Difficulties in near miss evaluation or a breach in studies are as many maternal deaths occur at home or in transit which makes it difficult to obtain complete information regarding maternal death and its cause especially in developing countries and rural and village areas. By evaluating these cases with severe maternal outcome, one can get to know about lacking health system to deal with maternal morbidities. The WHO also developed a set of indicators to assess quality of care within a health care facility or the health system.(5) The complete WHO near-miss approach is best implemented in three steps(6)

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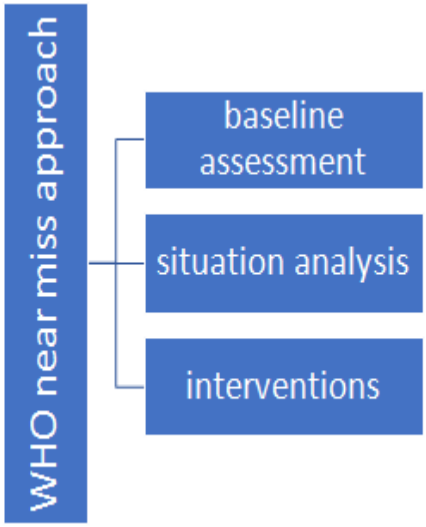

The objectives of this study are

1. to determine maternal near miss incidence ratio, maternal near miss to mortality ratio, mortality index
2. to analyse and evaluate the causes and associated sociodemographic factors for near miss cases

II. MATERIAL AND METHODS

This is retrospective observational study held at Government Medical College and Hospital, Akola, Maharashtra during study period of 18 months from March 2019 to August 2020. All cases satisfying the WHO criteria(4) for near miss including those referred from peripheral hospitals, patients directly admitting to tertiary care centre were included.

After proper permission from ethical committee, Detailed history of patients (including antenatal, postpartum, referred patients, home delivered patients) taken regarding pregnancy, delivery and data on specific complications and management. It is taken as in proforma and from medical records (registers of the hospital admissions and ICU records) of all the eligible women admitted to the studied hospital. Each case was further analysed to evaluate for care given at hospital, its effect and fallacies. Data complied to make final conclusion.

The following operational definitions were used for the study purpose:(6)

- MNMR:

It refers to the number of MNM cases per 1000 live births (LBs) (MNMR = MNM/LB)

•MI (Mortality Index):

It refers to the number of MDs divided by the number of women with life-threatening conditions. (MI = MD/ [MNM + MD]). The higher the index the more women with life-threatening conditions die (low quality of care), whereas the lower the index the fewer women with life-threatening conditions die (better quality of care)

- MNM to mortality ratio:

It is the proportion between MNM cases and MDs (MNM: 1 MD)

- MD:

MD is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy and from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

III. RESULTS

Total maternal near miss cases :108
Total maternal deaths during study :30
Total number of patients :9070
Total live births: 6635
The maternal near miss incidence ratio is 16.27 per 1000 LB
The maternal near miss to mortality ratio is 3.6:1 which indicates for indicates for approximately 4 near miss cases there is 1 maternal death.
The mortality index is 21.7% (0.21)
Mortality index compares the observed to expected mortality rates. A score of less than 1 means that more patients survived than were predicted to. A score of more than 1 means that more patients passed away than were predicted to. So, lower score is better.(7)

Table 1 comparison of different studies

Study	MNM Incidence Ratio (%)	Mortality (%) index	Near miss: death ratio
Our study	16.27	21.7	3.6:1
Kalra et al.(8)	4.8	32.53	2:1
Roopa et al.(9)	17.80	14.9	5.6:1

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Rathod et al.(10)	7.56	29.07	3.4:1

Table 2 sociodemographic factors for Near Miss

Characteristics	**Near miss (n=108)**	**Percentage (%)**
Mean Age(years)	26.54	
Education		
Illiterate	22	20
Primary education	50	47
Secondary education	32	30
Graduates	4	3
ANC	84	78
Gravidity (ANC)		
Primigravida	26	30.95
Multigravida	58	69.05
PNC (including post abortal)	24	22
Gestational age		
<28 weeks	13	11.5
28-36.6 weeks	61	57
>37 weeks	34	31.5
No. of ANC visits		
Nil	28	26
1-3	69	64
>4	11	10
Mean duration of hospital stay	9.14 days	
Mean duration of ICU stay	5.32 days	
Mode of termination		
C-section	70	64.9
Vaginal	35	20.4
Exploratory laparotomy (ruptured ectopic pregnancy)	3	2.7

Table 3 condition of patient at admission

Condition at admission	**No of patients**	**Percentage**
As near miss	54	50
As high-risk cases	48	44.4
With no disorder	6	5.5

NOTE

High risk cases – All the women admitted in labor with pregnancy induced disorders but no life-threatening event leading to morbidity or mortality.

Near miss cases – All the women admitted in labor with pregnancy life threatening events needing immediate lifesaving intervention.

No disorder- All the women admitted in emergency labor room only for delivery with no high risk as mentioned above.

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Table 4 cause of near miss

1	Hypertensive disorders -	67.3%
	Eclampsia (33.33%)	
	Pre-Eclampsia (17.6%)	
	HELLP (5.5%)	
	PRES (5.5%)	
2	Anaemia	57%
3	Haemorrhage	25.1%
4	Sepsis	9.3%
5	Liver dysfunction	7.4%
6	Others	24.8%

Table 5 management options for near miss

Sr No.	**Management**	**Incidence (%)**
1	Mechanical ventilation	26(24%)
2	Vasopressors	40(37%)
3	Obstetric hysterectomy	12(11.1%)
4	Vaginal exploration	6(5.5%)
5	Bladder repair	5(4.6%)
6	Internal iliac ligation	12(11.1%)
7	Exploratory laparotomy	3(2.7%)
8	Hemodialysis	15(13.9%)
9	Balloon tamponade	15(13.9%)
10	Manual removal of placenta	2(1.85%)
11	Osmotic agent (decrease ICP)	21(19.44%)

Table 6 systemic involvement

Sr No.	**System involvement**	**Incidence (%)**
1	Coagulation	36.49%
2	Respiratory	18.48%
3	Hepatobiliary	18%
4	Cardiovascular	15.65%
5	Genitourinary	3.27%

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Table 7 transfusion done

Sr No	Transfusion required	No of patients	Percentage
1	Yes	101	93.5%
2	No	7	6.5%
Total		108	100%

Transfusion includes all forms of blood and blood products like fresh frozen plasma, platelets, packed cell volume.

Table 8 condition at discharge

Sr No	Condition	No of patients	Percentage
1	Complete recovery (physical)	85	78.70%
2	Residual morbidity(physical)	3	2.7%
3	Referral to higher centre	20	18.5%
Total		108	100%

3 patients were referred to Higher Centre for endocrinologist, haematologist and uterine artery embolization one each whereas rest of 15 were referred for dialysis.

IV. DISCUSSION

Obstetric deaths represent the quality of maternal care. But for present scenario it may not reflect the global situation with regard to obstetric care. Hence new "near miss" criteria have taken over maternal mortality ratio. The maternal near miss incidence ratio for our study is 16.27 per 1000 LB. MNMR index is an estimation of the amount of care and resources that would be needed in an area or facility. Higher the near-miss incidence ratio, more the need for care and resources in the form of infrastructure and transport. Mortality index is 21.7 % (0.21) and maternal near miss to maternal death is 3.6:1 which indicates for every approximate 4 MNM cases there will be 1 maternal death. MI less than 1 indicates better maternal care. It indicates good maternal care at our institute.

Mean age for near miss cases in this study is 26.54 years, maximum cases belong to age group 2530 years. studies done in various parts of India by Sharma et al(11), Kalra et al(8), Abha et al(12) have similar results with average age group ranging from 21- 30 years.

In our study, illiteracy rate is 20% and educational levels below primary and secondary education accounts for approximately 47% and 30% respectively attributing to 97%, while number of cases who are graduates is 4(3%) which demonstrates lower education and illiteracy correlates with increased percentage of cases of near miss in each group. In study done on socio demographic variables by Barbde et al.(13) in Chhattisgarh near miss cases were highest in secondary education – 77.1%. Mothers properly educated in pre pregnancy period, regular antenatal visits and interventions leads to early identification and treatment of high-risk cases.

Lower education and illiteracy are some of the reasons for higher number of patients who are admitted to our hospital as near miss on arrival (50%). Delay in decision to seek care, lack of transportation facility, higher number of home delivery in peripheral and remote areas around us and delay in referral on the part of PHCs are amongst other reasons. In our study, 48(44.4%) patients presented to our centre with severe illness, 54(50%) presented to us as near miss cases, remaining patients presented to us with no illness at admission but later became near miss due to several causes during course of pregnancy or delivery. Hence, near miss cases supersedes high risk cases in our study.

The number of multigravida (69.05%) under the near miss cases at our centre is higher than primigravida which is similar to that observed by Abha et al.(12) Out of 108 near miss, 84 cases (78%) are from antenatal period which include 3 ruptured ectopic pregnancy and maximum number of cases from third trimester, postnatal near miss account for 24 cases (22%). In a study conducted by Barbde et al(13) in Balod, Chhattisgarh, 65.7%

near miss were in antepartum period followed by intrapartum (25.7%), postpartum (8.5%). In Sharma et al(11) study 76.3% cases belong to antenatal period.

In our study, 88.5% cases of near miss were in third trimester including preterm: 28-37weeks (57%), above 37 weeks: Term (31.5%). In Chandran et al(14) states 58% delivered babies were preterm and of low birth weight (< 2.5 kg) as caesarean section was needed to terminate pregnancy in interest to save baby and / or mother. As is evident the rate of caesarean section at our institute is higher than normal delivery as patient referred to us are already high-risk cases requiring immediate intervention so needing C-section for benefit of mother or baby. Ours is a tertiary centreso the number of patients referred to us in critical condition is higher than those getting admitted directly at our centre. Also due to dedicated government maternity hospital in our area the cases referred to us are only high risk and those requiring additional treatment than the routine maternity care like ICU admissions, surgical interventions like balloon tamponade, emergency obstetric hysterectomy.

Hypertensive disorders and crisis are the most common reason identified for near miss accounting for 67.3%. This includes cases of eclampsia (33.33%), preeclampsia (17.6%), HELLP (5.5%), PRES (5.5%). Anaemia accounting for 57% cases of near miss morbidity. Haemorrhage accounts for 25.1%. Haemorrhage includes 1) Postpartum haemorrhage accounting for 10.2% 2) Antepartum haemorrhage accounts for 11.1% (abruption =7.4%, placenta previa =3.7%), placenta increta and accrete accounting for 1.9% each. Sepsis accounts for 9.3% which includes 2 cases of septic shock.

Less prominent causes are as follows – heart diseases and its sequalae accounts for (3.7%), Liver dysfunction (jaundice and hepatic encephalopathy) accounts for 7.4%, respiratory diseases, pulmonary edema, acute renal failure accounts for 3.7% each respectively, ruptured ectopic pregnancy accounts for 2.8%, COVID-19, previous 2 and 3 LSCS, epilepsy, MgSO4 toxicity accounting 0.9% each respectively. Abha et al(12) states hypertensive disorders prevails as the highest occurrence in near miss- 33% followed by obstetric haemorrhage -27.48%. Barbde et al(13) and Roopa et al(9) have similar results.

ICU admission was needed for all cases of Near Miss whereas 27 patients needed assisted ventilation, obstetric hysterectomy as last resort of treatment was needed in 12 cases (11.11%). Exploratory laparotomy was done for 3 cases of ectopic pregnancy. Multiple interventions were performed on each patient according to the need of hour. One patient needed uterine artery embolization for arteriovenous malformations, so the patient was referred to higher centre after the baseline investigations and diagnosis. The rate of complete recovery following treatment is high at our institute due to early diagnosis, immediate treatment and availability of necessary trained staff and medical aids like blood banks, pathology department and ICU facility.

The high rates of recovery or presence of residual morbidity is concerned with the physical well-being of the mothers at discharge however Maternal Near Miss events have long term effects on the mental and social status of the partners and families dealing with them. What happens after 6 weeks postpartum also needs evaluation and follow up. Patients land up in fear of future pregnancies and also those undergoing obstetric hysterectomies may yearn for child. Some may suffer from post-traumatic stress disorders, post-partum psychosis and need psychiatric consultation for long duration. 1 patient who developed hemiparesis post Near Miss event had to take physiotherapy taking extra toll over her mental and physical health. These events leave a permanent mark on the lives of the mothers and families.Thus study of MNM events along with its long term impacts on the mother and her families is of prime importance.

V. CONCLUSION

The near miss cases are often under reported so there is need to maintain the record of these cases as they are an important resource to improve maternal and child health care in our system. Implementation of preliminary education to the population andstrengthening the referral system, improvement of transportation facilities is necessary in transforming the maternal health care scenario. Hypertensive disorders, anaemia are major contributors to maternal near miss so implementation of national programme to improve overall health of women is mandatory. So also training of health care professional to manage emergency obstetric situations at primary health care centres is necessary.

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CONFLICT OE INTEREST: None declared.
ETHICAL APPROVAL: The study was approved by institutional Ethics Committee.

BIBLIOGRAPHY

[1]. Kaur L, Mohi MK, Kaur B, Singh B. A study of maternal near miss cases in tertiary health centre in north India. Int J Reprod Contraception, Obstet Gynecol. 2018;7(8):3239.
[2]. Chhabra P. Maternal near miss: An indicator for maternal health and maternal care. Indian J Community Med [Internet]. 2014 Jul [cited 2020 Apr 22];39(3):132–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25136152
[3]. Discussion and conclusions - Beyond maternal death: improving the quality of maternal care through national studies of 'near-miss' maternal morbidity - NCBI Bookshelf [Internet]. [cited 2020 Apr 22]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK368637/?report=reader
[4]. GOI. Maternal Near Miss Review Operational Guidelines. OperGuidelMatern Heal DivMinist Heal Fam Welf Gov India. 2014;(December):1–46.
[5]. WHO guidelines for the management of postpartum haemorrhage and retained placenta.
[6]. Organization WH. Evaluating the quality of care for severe pregnancy complications: the
[7]. WHO near-miss approach for maternal health [Internet]. World Health Organization; Available from: https://apps.who.int/iris/handle/10665/44692
[8]. Edwards T-QH. Mortality Index: Understanding the intersection of population health and healthcare delivery. 2019.
[9]. Kalra P, Kachhwaha CP. Obstetric near miss morbidity and maternal mortality in a Tertiary Care Centre in Western Rajasthan. Indian J Public Health. 2014;58(3):199–201.
[10]. Ps R, Verma S, Rai L, Kumar P, Pai M V., Shetty J. "near miss" obstetric events and maternal deaths in a tertiary care hospital: An audit. J Pregnancy. 2013;2013.
[11]. Rathod AD, Chavan RP, Bhagat V, Pajai S, Padmawar A, Thool P. Analysis of near-miss and maternal mortality at tertiary referral centre of rural India. J ObstetGynecol India. 2016 Oct 1;66:295–300.
[12]. Sharma S, Aherwar R, Jawadhe S. Retrospective study of maternal near misses in a
[13]. tertiary care institute. Int J Reprod Contraception, ObstetGynecol [Internet]. 2016 Dec 27
[14]. [cited 2021 Jun 30];5(4):1114–8. Available from: http://dx.doi.org/10.18203/23201770.ijrcog20160868
[15]. Abha S, Chandrashekhar S, Sonal D. Maternal Near Miss: A Valuable Contribution in Maternal Care. J ObstetGynecol India. 2016 Oct 1;66:217–22.
[16]. Sachin D, Barbde R. A study to explore physical, psychological, social and economic consequences over 18 months following maternal near miss (MNM) events among women who delivered in a Secondary Care Hospital, Balod district, Chhattisgarh, in the year 2016. SCTIMST; 2017.
[17]. Chandran J, Raj S, D. S, Ramachandran A. Maternal near miss review from a tertiary care center in South India. Int J Reprod Contraception, ObstetGynecol [Internet]. 2016 Jan 11
[18]. [cited 2021 Jun 30];5(8):2657–60. Available from: http://dx.doi.org/10.18203/23201770.ijrcog20162640