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Original Article

Overview of Maternal Near Miss in a Teaching Hospital in Eastern Nepal

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Abstract

Background
A maternal near-miss case study measures life-threatening pregnancy complications and allows the assessment of the quality of obstetric care.

Materials and Methods
A Cross-Sectional study was carried out for a year in the maternity ward of a teaching hospital and a descriptive analysis was performed.

Results
There were 162 maternal near-miss cases, 9 maternal deaths, and 6779 live births witha maternal near-miss ratio of 23 per 1000 live births. The mean age of the near-miss women was 26.4±6.3 years. Haemorrhage, hypertensive disease in pregnancy, ruptured uterus, and Intensive Care Unit admissions are the commonest complications arising in such cases.

Conclusion
Maternal near-miss incidence is similar to global data but the mortality indexappears slightly low.

Keywords: *Maternal Death, Near miss, Pregnancy outcome*

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Introduction

Maternal near miss (MNM) can be a proxy for maternal death and it describes women who nearly died but survived a complication that has occurred during pregnancy, childbirth, or within 42 days of termination of pregnancy [1].Though the primary indicator of maternal health care and hence the quality of obstetric care is the maternal mortality ratio (MMR), by measuring maternal death only at institutions, very few lessons can be learned to prevent further deaths. In 2009, the WHO introduced the concept of maternal near miss (MNM) for evaluating the quality of care for severe pregnancy complications [2].

The maternal mortality ratio (MMR) has decreased from 539 in 1998 to 229 in 2008 and recently to 151 per 100,00 live births [3] and this high figure needs to be reduced further. The detailed elaborated studies of the near miss cases will play a vital role in identifying the aetiologies and deficiencies in courses of maternal deaths and also be useful in correcting and strengthening obstetrical care hence further reducing maternal death.It is estimated that for every woman who dies, 20 or more survive severe maternal complications as a result of the pregnancy or delivery. So, the WHO recommends that the MNM approach be considered in national plans for improving maternal health care.

There are several advantages of using MNM indicators such as the greater number of cases which allows a rapid and precise assessment of the quality of care, greater acceptability by involved health workers, institutions, and patient and patient party as well since a death has not occurred and the patient can be interviewed. Thus, maternal near-miss audits have been considered a useful approach to improve maternal health care [4].This study aimed to evaluate the exact frequency and aetiology along with required management options for such cases.

Material and Methods

A Cross-Sectional study was conducted in the Department of Obstetrics and Gynaecology, and Intensive Care Unit (ICU) ofNobel Medical College Teaching Hospital, Biratnagar, Nepal from 2023 July to 2024 June. Ethical approval was taken from the IRC of the Nobel Medical College and Teaching Hospital (NMCTH). Sample size was calculated by a single population proportion formula by assuming the prevalence of maternal near-miss is Nepal to be 2.3% [5], 5% margin of error and 95% confidence interval (CI) minimum 35 cases was required.All cases (census) of near miss according to modified WHO criteria [1, 2, 6] Table (1) who were admitted during the period of study were taken.Those who do not satisfy one of these inclusion criteria were excluded from this study. Family members and relatives of the parti-cipants were also interviewed to gather relevant information. Patientprofiles, clinical presentation, diagnosis, diagnostic investigations, and management methods were analysed. The data obtained were entered into a computer database using Microsoft excel spreadsheet and statistical analysis was done. The results were presented as frequencies, percentages and descriptive statistics is SPSS software.

Table 1: WHO near-miss criteria

Original WHO criteria	Modified near-miss criteria
Clinical criteria	
Acute cyanosis	Acute cyanosis
Gasping	Gasping
Raspiratory rate >40 or <6/min	Respiratory rate > 40 or < 6/min
Shock	Shock
Oliguria non responsive to fluids or diuretics	Oliguria non -responsive to fluids or diuretics
Failure to form clot	Failure to form clots
Loss of consciousness lasting >12 h	Loss of consciousness lasting > 12 h
Cardiac arrest	Cardiac arrest
Stroke	Stroke
Uncontrollable fit/total paralysis	Uncontrollable abnormal body movement
Jaundice in the presence of preeclampsia	Jaundice in the presence of preeclampsia
Laboratory based criteria	
Oxygen saturation <90% for >60 min	Oxygen saturation < 90% for ⩾ 60 min
PaO2/FiO2 <200 mmHg	
Creatinine > 3.5 mg/dL	Creatinine ⩾ 300 µmol/L or ⩾ 3.5 mg/dL
Bilirubin > 6.0 mg/dL	Bilirubin > 100 µmol/L or > 6.0 mg/dL
pH <7.1	
Lactate > 5mEq/mL	
Acute thrombocytopenia (< 50,000 platelets/mL)	Acute thrombocytopenia (< 50,000 platelets/mL)
Loss of consciousness and ketoacids in urine	
Management based criteria	
Continuous vasoactive drugs	Admission to intensive care unit
Hysterectomy following infection or hemorrhage	Hysterectomy following infection or hemorrhage
Transfusion of ⩾ 5 units of blood	Transfusion of ⩾5 units of blood
Intubation and ventilation for ⩾ 60 min not related to anesthesia	Intubation and ventilation for ⩾ 60 min not related to anesthesia
Dialysis for acute renal failure	Dialysis for acute renal failure
Cardiopulmonary resuscitation	Cardiopulmonary resuscitation
SMC	Eclampsia
	Sepsis or severe systemic infection
	Uterine rupture

Results

During the study period of one year, there were 162maternal near-miss cases, 9 maternal deaths, and 6779 live births in this hospital with the maternal near-miss ratio of 162/6779 =23per 1000 live births. Among the near-miss cases, there were 140 deliveries, and among them, 112 were live births, 28 cases had IUFD/Stillbirth, 12 cases of neonatal death and only 100 babies were alive at the time of discharge on 7th postpartum day. Thirty cases had first-trimester-complications, and 8 cases had twin pregnan-

cies. (Table 2)

Table 2: Frequency and characteristics of near miss

Maternal Near-miss indicators	Indices	Value
Maternal near miss, MNM	162	162
Maternal death, MD	9	9
Live birth, LB	6779	6779
Severe maternal outcome rate (SMOR) =(MNM+MD)/LB	(162+9) *1000/6779	25.22
Near-miss rate, NMR=MNM/LB	162*1000/6779	23.89
Mortality index, MI= MD/(MNM+MD)	9/ (162+9)	0.052
Near-miss per maternal death, MNM:1MD	162:9	18:1
Maternal mortality ratio, MMR	9*100000/6779	132.76

The mean age of the near-miss women was 26.4±6.3 years (13 to 45 years in range). Most of them were primigravida (39.5%). Half of them (49.4%) werefull-termpregnant and 11.7% were in the first trimester. (Table 3)

Table 3: Demographic characteristics of near-miss women

		Maternal near-miss, n(%)	Maternal death, n (%)
Age	≤19	8 (4.9)	0
	20-29	105 (64.8)	3 (33.3)
	30-39	43 (26.5)	6 (66.6)
	≥40	6 (3.7)	0
Gravida	1	64 (39.5)	3 (33.3)
	2	39 (24.1)	4 (44.4)
	3	36 (22.2)	1 (11.1)
	≥4	23 (14.2)	1 (11.1)
Gestational age	≤13	19 (11.7)	1 (11.1)
	14-28	15 (9.3)	0
	28-36	48 (29.6)	3 (33.3)
	≥37	80 (49.4)	5 (55.5)

The most common cause of the near-miss was admission to the ICU due to different reasons followed by eclampsia, massive blood transfusion, and peripartum hysterectomy. (Table 4)

Table 4: Different factors of near-miss cases (according to WHO). Not mutually exclusive.

Diagnostic feature	Frequency	Percentage
Admission to ICU	75	46.29
Eclampsia	54	33.33
Transfusion of Blood >5 unit	52	32.09
Hysterectomy following infection or hemorrhage	27	16.66
Shock	23	14.19
Intubation & ventilation for 60 min	20	12.34
Uterine rupture	18	11.11
O2 <90% for >60 min	17	10.49
Sepsis or severe infection	16	9.87
Oliguria	9	5.55
Use of continuous vasoactive drugs	9	5.55
Dialysis for acute renal failure	5	3.08

There were 9 cases of maternal mortality and 3 cases left the hospital against the medical advice and hence their outcome could not be ascertained. (Table 5)

Table 5: Diagnosis distribution of near-miss cases

Maternal outcome	Number	Percentage
Recovered	150	92.6
Mortality	9	5.5
Unknown /LAMA	3	1.9
Total	162	100

NB. LAMA (Left against medical advice)

Around one-fifth of them had suffered from neurological and uterine pathology (21.2 and 20.7% respectively) and 19.7% of cases required massive blood transfusion. Other common systems involved were respiratory and cardiovascular (13% each) followed by renal and hepatic dysfunction. Thirty-four cases were having multiple organ dysfunction. (Table6)

Table 6: Frequency of organ system failures

Among the 140 deliveries from a total of 162 MNM cases, the average birth weight was 2.43±0.68 Kg, 112 (80%) live births and there were 12 neonatal deaths resulting in only 100 (71.4%) good fetal outcomes. (Table7)

Organ/System Dysfunction	Number	%
Neurological	44	21.2
Uterine	43	20.7
Blood/Coagulation	41	19.7
Cardiovascular	28	13.5
Respiratory	27	13.0
Renal	21	10.1
Hepatic	4	1.9

Table 7: Birth weight of babies delivered

Birth weight (in Grams)	Number	%
>2500	79	56.4
1500-2500	52	37.1
1000-1500	6	4.2
<1000	3	2.1

Discussion

As the near miss cases occur more frequently and actual data regarding the case scenario can be obtained from the patient herself in an improved state, a more reliable quantitative analysis can be done, which can provide the status of the health care system delivery. Different studies from different parts of India and other developing and developed countries have

reported the prevalence of near-miss as 8.2 to 14.1% [4].We found a near-miss of >23/1000 live births which is comparable to the global scenario as mentioned in a meta-analysis (23.89 vs 18) [7,8].This is similar to recent studies from India (16.32) [9] and China (18.90) [10] but lower than in Latin America (31.5) [11], Ghana (34.2) [12] and Ethiopia (50.42) [13]. This variation may be due to the variation in the level of available healthcare delivery systems.However, this finding is higher than the similar studies done nearby in Nepal by Shrestha et al (7.7) [5], Maharjan et al in three hospitals (7.31) [14], Gurung et al (6.06) [15] and Khadka et al (16.6) [16].This difference may be due to time, number of cases, diagnostic criteria, percentage of referral cases, and geographic location of the hospital.

Apart from ICU admission, eclampsia, and haemorrhagic events accounted for the majority of near-miss events almost equally (33 vs 32%) in this study which is a little bit different than the similar study done by Maharjan et al [14], Purandare et al [17], Gupta et al [18] where haemorrhagiceventswere more common (54%, 72% and 40.5% respectively).A study from Brazil [19] shows pre-eclampsia and eclampsia as the common conditions.

The MMR in this study was 132.76 per 100,000 live births which is comparable with national data i.e. 151/100000 live births [3].The overall MI was 5.2% which is quite lower than a similar studyby Singh et al(32.52%) [20] in India, Iwuh et al (10.4%) [21] in South Africa, and Chikadaya et al in Zimbabwe (10.6%) [22].

The only limitation of this study was a follow-up of patients till their discharge from the hospital. A multicentric study of a longer duration of follow-up in a puerperal period would yield completeness in retrieving all events.

Conclusion

Near miss cases are not uncommon (23/1000 live births); and hemorrhage, hypertensive disease in pregnancy, ruptured uterus, and ICU admissions are the commonest complications of pregnancy.

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Conflict of interest: None

References

[1] World Health Organization?. Evaluating the quality of care for severe pregnancy complications: the WHO near-miss approach for maternal health. World Health Organization. 2011. https://iris.who.int/ handle/10665/44692ISBN: 978 92 4 150222 1 Accessed on 2024-11-21.

[2] Say L, Souza JP, Pattinson RC. Maternal near miss-towards a standard tool for monitoring quality of maternal health care. Best practice & research. Clin ObstetGynaecol. 23:3 (2009) 287-96. DOI: 10.1016/j.bpobgyn.2009.01.007

[3] Ministry of Health and Population [Nepal] and ICF. 2023. Nepal Demographic and Health Survey 2022. Kathmandu, Nepal: Ministry of Health and Population [Nepal]. Publication IDFR379 Available at https://www.dhsprogram.com/pubs/pdf/FR379/FR379.pdf. (Accessed on 2024-11-21)

[4] Pattinson R. Near miss audit in obstetrics. Best practice & research. Clin Obstet Gynaecol. 23:3 (2009) 285-6. DOI: https://doi.org/10.1016/j.bpobgyn.2009.01.013.

[5] Shrestha J, Shrestha R, Tuladhar R, Gurung S, Shrestha A. Maternal near miss in a tertiary care teaching hospital. Am J Public Health Res. 3:5A (2015) 17-22. DOI:10.12691/ajphr-3-5A-5.

[6] Teka H, Yemane A, Zelelow YB, Tadesse H, Hagos H, Maternal near-miss and mortality in a teaching hospital in Tigray region, NoerthernEuthopia. Women's health. 18:1 (2022) 1-11. DOI: 10.1177/1745505722

[7] Chhabra P. Maternal Near Miss: An Indicator for Maternal Health and Maternal Care. Indian J Community Med. 39:3 (2014) 132-7. DOI: 10.4103/0970-0218.137145

[8] Abdollahpour S, Heidarian Miri H, Khadivzadeh T. The global prevalence of maternal near miss: a systematic review and meta-analysis. Health Promot Perspect. 9:4 (2019) 255-62. DOI: 10.15171/hpp.2019.35

[9] Gupta D, Nandi A, Noor N, Joshi T, Bhargava M. Incidence of maternal near miss and mortality cases in central India tertiary care centre and evaluation of various causes. New Ind J OBGYN. 4:2 (2018) 112-6. DOI -10.21276/obgyn.2018.4.2.4

[10] Yang YY, Fang YH, Wang X, Zhang Y, Liu XJ, Yin ZZ. A retrospective cohort study of risk factors and pregnancy outcomes in 14,014 Chinese pregnant women. Medicine (Baltimore). 97:33 (2018) :e11748. DOI: 10.1097/md.0000000000011748PMID: 30113460; PMCID: PMC6113036.

[11] Serruya SJ, de Mucio B, Martinez G, Mainero L, de Francisco A, Say L, et al. Exploring the concept of degrees of maternal morbidity as a tool for surveillance of maternal health in Latin American and Caribbean settings. BioMed Res Int. 2017:1 (2017) 1-12. DOI: 10.1155/2017/8271042

[12] Oppong SA, Bakari A, Bell AJ, Bockarie Y, Adu JA, Turpin CA, et al. Incidence, causes and correlates of maternal nearmiss morbidity: a multi-centre cross-sectional study. Br JObstet Gynecol. 126:6 (2019) 755-62. DOI: 10.1111/1471-0528.15578.

[13] Woldeyes WS, Asefa D, Muleta G. Incidence and determinants of severe maternal outcome in Jimma University teaching hospital, south-West Ethiopia: a prospective cross-sectional study. BMC Pregnancy Childbirth. 18:255(2018) 1-12. DOI: 10.1186/s12884-

018-1879-x PMID: 29925329.
[14] Maharjan H, Tuladhar H, Malla K, Tumbahangphe K, Budhathoki B, Karkee R. Maternal Near Miss Analysis in Three Hospitals of Nepal: An Assessment Using Three Delays Model. J Nepal Health Res Counc. 19:51 (2021) 264-9. DOI: https://doi.org/10.33314/jnhrc.v19i2.3322
[15] Gurung B, Koju R, Dongol Y. Near-miss obstetric events in a tertiary care teaching hospital in Nepal: an audit. Nep J ObstetGynaecol. 10:1(2015) 30-2. DOI: 10.3126/njog.v10i1.13191
[16] Khadka M, Uprety DK, Rai R. Evaluation of associated risk factors of near miss obstetrics cases at BP Koirala Institute of Health Sciences, Dharan, Nepal. Int J Reprod Contracept Obstet Gynecol. 7:2 (2018) 1-7. DOI: http://dx.doi.org/10.18203/2320-1770.ijrcog20175931
[17] Purandare C, Bhardwaj A, Malhotra M, Bhushan H, Chhabra S, Shivkumar P. Maternal near-miss reviews: lessons from a pilot programme in India. Br J Obstet Gynecol.121:4 (2014) 105-11. DOI: 10.1111/1471-0528.12942.
[18] Gupta D, Nandi A, Noor N, Joshi T, Bhargava M. Incidence of maternal near miss and mortality cases in central India tertiary care centre and evaluation of various causes. New Indian J OBGYN. 4:2(2018) 112-6. DOI -10.21276/obgyn.2018.4.2.4.
[19] Pattinson RC, Hall M. Near misses: a useful adjunct to maternal death enquiries. Br Med Bul. 67:1(2003) 231-43. DOI: https://doi.org/10.1093/bmb/ldg007
[20] Singh A, Shrivastava C, Dube S. Maternal Near Miss: A Valuable Contribution in Maternal Care. J ObstetGynecol In.66:1 (2016) 217-222. DOI 10.1007/s13224-015-0838-y
[21] IwuhIA, Fawcus S, Schoeman L. Maternal near-miss audit in the Metro West maternity service, Cape Town, South Africa: A retrospective observational study. S Afr Med J. 108:3 (2018) 171-5. DOI:10.7196/SAMJ.2018.v108i3.12876
[22] Chikadaya H, Madziyire MG, Munjanja SP. Incidence of maternal near miss in the public health sector of Harare, Zimbabwe: a prospective descriptive study. BMC Pregnancy Childbirth. 18:1 (2018) 1-6. DOI: https://doi.org/10.1186/s12884-018-2092-7