# Near-miss Obstetric Events in a Tertiary Care Teaching Hospital in Nepal: An Audit

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**Aims:** This study aims to determine the frequency of near-miss obstetric events and analyze its nature such as reasons for near-miss, organ dysfunction associated and critical management required among pregnant women managed over a 3-year period in a Tertiary Care Teaching Hospital in Nepal.

**Methods:** This hospital based prospective, descriptive study was done from August 2011 to February 2015. Case eligibility was defined by WHO Near-Miss Guidelines. Medical records of the patients and the interview with the patient, accompanying family members and health workers from referral centres were used to generate the data which were filled in the pre-designed questionnaire. The data generated and analyzed included age and gestation weeks, parity, mode of intervention, associated organ dysfunctions, reasons for near-miss and critical intervention accompanied to manage the near-miss cases. Results were presented in mean ± SD and percentages, wherever applicable.

**Results:** There were 4617 deliveries with 28 near-miss cases. The major factors contributing near-miss events were obstetric haemorrhage followed by hypertensive disorder. Three fourth (n=21) of cases required blood transfusion and almost all cases (n=26) required ICU management. Coagulation disorder was observed in majority of cases (n=23) followed by cardiovascular, respiratory and uterine atony.

**Conclusions:** In this study, maternal near-miss event was mainly attributable to obstetric haemorrhage followed by hypertension and sepsis. Major organ-system disorders observed were coagulation disorder, cardiovascular, respiratory and uterine disorders. Almost all the cases were managed in ICU and majority of them required blood transfusion.

**Keywords:** maternal mortality; obstetric haemorrhage; obstetric near miss.

## INTRODUCTION

Maternal near-miss case 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".[1] Until few years ago, there were no set criteria for identification of these cases for routine implementation, and application of this concept was limited.[2] But in 2009, WHO has come up with clinical, laboratory, and management criteria for the identification of these cases.[1]

A review of near-miss cases highlighted the shortcomings and positive elements of the quality of maternal and newborn healthcare, and these cases of near-misses demonstrated similar characteristics to those of maternal death.[3,4] Clinical audit of these cases can help to identify preventable factors that, if addressed, would improve the quality of services offered.[5] A clinical audit also identifies the determinants of near misses and contributes to improving the management of a mother's severe life-threatening complications.[6-8]

In this medical audit, we analyze and present the various determinants and complications associated with the near-miss events encountered at KIST Medical College Teaching Hospital.

## METHODS

This hospital based prospective descriptive study was done from August 2011 to February 2015. Case eligibility was defined by WHO Near-Miss Guideline.[1] A questionnaire was designed to collect the information of the cases. In-patient medical records of the patients verified with the treating physicians were used as the primary source of information. However, in order to complete the information gaps in the patient's files as well as to facilitate the institutional

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audit in near-miss cases, an interview was conducted with the patient and accompanying family members, health workers from referral centre relevant person involved in her care.

Near-miss cases were identified by trained nurses or attending gynaecologist according to the WHO 2009 criteria[1] and approved by the principal investigator or the second gynaecologist and the intensive care specialist.

Data generated and analyzed primarily included age and gestation weeks, parity, mode of intervention, associated organ dysfunction, reasons for near miss and critical intervention accompanied to manage the near-miss cases. Results were presented in mean ± SD and percentages, wherever applicable.

## RESULTS

There were 4617 deliveries with 28 near-miss cases (i.e., 6.06 per 1000 births).

**Table 1. Age and Gestation Week of Near-miss Cases (n = 28).**

| **Age** | **Mean ± SD: 24.29 ± 5.36 years** | **Range: 17-36 years** |
|---|---|---|
| | **Gestation Week** | |
| Live Birth(n = 25) | Mean ± SD: 37.68 ± 1.44 weeks | Range: 35-40 weeks |
| Abortion (n=1) | 16 weeks | |
| Still Birth (n=1) | 36 Weeks | |
| Ectopic Pregnancy (n=1) | 6 weeks | |

Table 1 depicts the age and gestation week distribution of the near-miss cases along with the frequency of live birth, abortion, still birth and ectopic pregnancy. Figure 1 illustrates that 46.43% of near-miss cases were multigravida whereas 53.57% cases were primigravida. Similarly, table 2 enlists the identified reasons for near-miss cases – obstetric haemorrhage comprising the maximum cases (50%) followed by hypertension (32.14%).

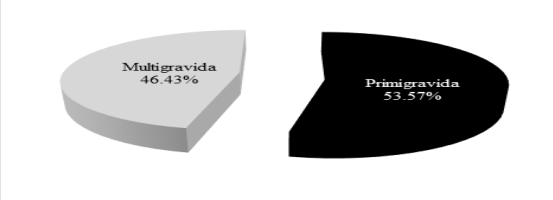


**Figure 1. Parity of Near-miss Cases.**

Likewise, figure 2 demonstrates the percentage of associated organ dysfunction encountered in near-miss events.

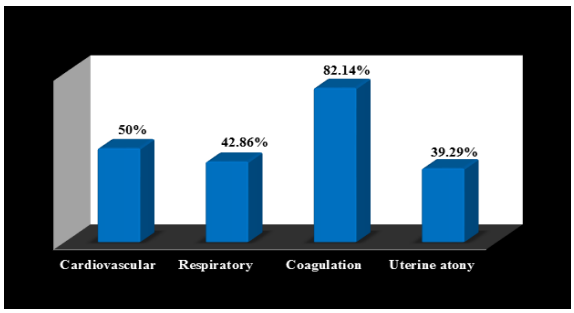


**Figure 2. Associated Organ Dysfunction in Near-miss Cases.**

Coagulation disorder was observed in maximum cases followed by cardiovascular disorder, respiratory disorder and uterine atony. Renal and hepatic dysfunctions were the least observed each contributing only one case (3.57%).

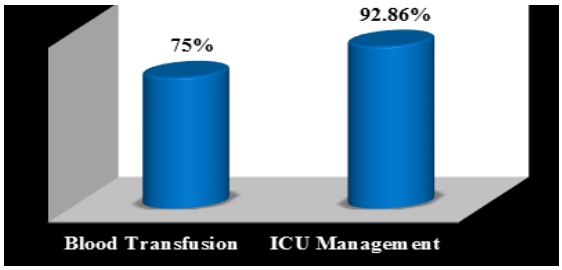


**Figure 3. Critical Intervention.**

As depicted in figure 3, 75% (n=21) cases required blood transfusion, 92.86% (n=26) cases were managed in ICU, 3.57% cases needed haemodialysis support and 3.57% cases were managed with condom tamponade.

**Table 2. Reasons for Near-miss (n = 28).**

| **Reasons for Near-miss** | **Percentage** |
|---|---|
| Obstetric haemorrhage | 50% |
| Hypertension | 32.14% |
| Sepsis | 10.71% |
| Cardiac cause | 3.57% |
| Spinal shock | 3.57% |

## DISCUSSION

We observed a near-miss event rate of 6.06 per 1000 birth compared to 3.8 per 1000 births in a national multicentre surveillance led by Rana et al[9] and between 3.8 – 12 per 1000 births in high income countries.[10] Our study shows that obstetric haemorrhage was the most common cause of obstetric near-miss event being the commonest followed by hypertensive disorders

during pregnancy. Similar results were observed in a study done at Kathmandu Medical College Teaching Hospital (KMCTH) where haemorrhage (41.66%) was the commonest cause for obstetric near-miss event followed by hypertensive disorder of pregnancy (27.77%).[11] Likewise, in 2012, a big multicentric study done in Nepal by Rana et al also highlighted PPH (40%) as the commonest cause for maternal near-miss event followed by hypertensive disorders of pregnancy (17%).[9] Similarly, the study also depicts that major organ-system dysfunction associated with obstetric near-miss event includes coagulation, cardiovascular, respiratory and uterine atony with almost all patients requiring ICU management and three fourth of cases demanding blood transfusion. Complications observed in near-miss cases were as per the expectation and included PPH, pre-eclampsia and sepsis in common.

Obstetric deaths represent the quality of maternal care. But for the present scenario it may not reflect the global situation with regard to obstetric care. Hence, new "near miss" criteria take over maternal mortality ratio. Although near-miss criteria were in vogue for some years, lack of uniformity was the hindrance. WHO criteria, 2009[1] are unique in considering not only clinical but also laboratory and management-based criteria. Hence, it incorporates both Mantel's[12] and Waterston's criteria.[13] So, if one of the criteria fails to pick the case, the other makes it up, thus minimizing the chance of missing the case.

## CONCLUSIONS

This study highlights obstetric haemorrhage as the most common serious obstetric complication leading to near-miss event followed by hypertension during pregnancy. Almost all the patients were managed in ICU and majority of them required blood transfusion. There were various other reasons noted for near-miss events with lesser frequencies and several different complications observed which were managed accordingly. Therefore, reduction of maternal mortality may best be achieved by developing evidence-based protocols and improving the resources for managing severe morbidities.

## DISCLOSURE

The authors report no conflicts of interest in this work.

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