

MATERNAL HEALTH CARE IN TERTIARY HOSPITAL IN TERMS OF MATERNAL NEAR MISSES (MNM) INDICATORS

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ABSTRACT

Objective: To assess maternal health care in terms of maternal near-miss indicators i.e., maternal near-miss rate, Maternal Near Miss to mortality ratio, and Maternal Mortality Index in tertiary care, Lady Reading, hospital.

Materials and Methods : It was a cross-sectional descriptive case study conducted in Obstetrics A unit of Lady Reading Hospital from January 2019 to December 2019. The WHO near-miss “severe maternal complication” based inclusion criteria was used for case identification. The study population consisted of all women who were admitted during pregnancy, labor, or within the first 42 days of postpartum to our unit. The outcome was measured using the three indicators i.e. the mortality indices of near misses, maternal mortality ratio, mortality to near-miss ratio, near-miss cases/1000 deliveries

Results: The total number of admissions in the department in the year 2019 was were 10439. The total Maternal Near Miss cases were 1776 (1.84%). Maternal Near Miss Rate was calculated as 170 per 1000 live births. There were 44 total maternal deaths, and the maternal mortality rate was calculated as 421 per 100,000 live births. The Maternal Near Miss to Mortality ratio was 41:1. The mortality Index was 2.5%.

Conclusion: Our hospital has a higher maternal near-miss to mortality ratio of 41:1 showing good maternal care management.

Keywords: Maternal near-miss, Near-miss indicators mortality index, Maternal mortality.

This article may be cited as: Zahoor F, Fahim F. Maternal health care in Tertiary Hospital in terms of Maternal near Misses (MNM) indicators. *J Med Sci* 2021 October;29(4):239-242

INTRODUCTION

Maternal near-miss is defined as “a woman who nearly died”, in other words, she survived a complication that occurred during pregnancy, childbirth, or within 42 days (6 weeks) of termination of pregnancy.¹ The risk of maternal death is 1 in 41 live births in developing countries to 1 in 3300 live births in developed countries respectively. For every woman who dies, 20 more women experience acute and chronic complications.^{2,3} Between 1990 and 2015, the global maternal mortality ratio has decreased by 44%, although the decrease differed substantially among regions, with the highest decrease in eastern Asia 72% still 99% of the contribution to world maternal death is from developing region.⁴

Although maternal mortality has been used to assess the quality of obstetric care, there is a lack of standard definitions and criteria for identifying severe maternal morbidity and near-miss. Near miss cases share many characteristics with maternal deaths and can directly inform about various

obstacles to care, which can help in understanding the current health care system.^{5,6} In addition, auditing near miss cases can be seen as the success of healthcare workers, as great saves.^{7,8}

World Health Organization (WHO) has developed a new definition of maternal near-miss (MNM) and formulated identification criteria for maternal near-miss cases in 2009 using 3 categories: clinical, laboratory-based, and management-based criteria.⁹ The development of the near-miss criteria resulted in the development of the “2011-WHO near-miss approach”.¹⁰ This approach is a guideline for evaluating the quality of care for severe pregnancy complications, based on the concept of criterion-based clinical audit.¹¹

According to WHO, the prevalence of severe maternal outcomes (maternal death and maternal near-miss) is expected to be 7.5 per 1000 live births.¹³ It ranges from 0.6 to 14.98 % by disease-specific criteria and 0.04 to 4.54 % by the management-based criteria. The magnitude of a maternal near-miss is high among African and Asian middle and low-income countries.¹² A systematic review by WHO also showed that the prevalence of severe maternal morbidity (near-miss) varies between 0.80–8.23 % among studies that used disease-specific criteria and 0.01–2.99% among studies that used management-based criteria.¹³ This study reports WHO near-miss cases criteria from a tertiary care hospital from Pakistan (a lower-middle-income country), where the burden of maternal mortality and morbidity is

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Date received: 03-03-2021

Date revised: 24-12-2021

Date accepted: 25-12-2021

high.

MATERIAL AND METHODS

This was a cross-sectional study which was conducted from January 2019 to December 2019 in Obstetrics and Gynecology (OBGYN) department at Lady Reading Hospital (LRH), which is a large tertiary care hospital in Peshawar Pakistan. We included all maternal deaths and maternal-near-misses that were admitted to the OBGYN unit during the above-mentioned period. In this study, a maternal death (MD) is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, from any cause. For the identification of maternal near misses, we used the WHO near-miss criteria, which include the obstetric diagnoses of hypertensive disorders (severe preeclampsia, eclampsia), severe hemorrhage, dystocia (defined in the current study as uterine rupture, impending uterine rupture like prolonged labor with previous cesarean section, and emergency C/S delivery), severe anemia (Hb < 6 g/dl), and sepsis (puerperal sepsis, chorioamnionitis, and septic abortion).

The study protocol was approved by Ethical Review Board of the hospital. Due to the majority of the participants being uneducated, verbal informed consent was directly obtained from study participants after explaining the study. The following near-miss indices /indicators were calculated.

(1) MNM incidence ratio refers to the number of maternal near-miss cases per 1,000 live births (LB). (MNM IR = MNM/LB).

(2) Maternal near miss: mortality ratio: Proportion between maternal near-miss cases and maternal deaths. A higher ratio indicates better care. (MNM: 1MD.)

(3) Mortality Index: Number of maternal deaths divided by the number of women with life-threatening conditions, expressed as a percentage. The higher the index, is more women with life-threatening conditions die (low quality of care), while the low index suggests better quality of health care. (MI = MD/(MNM + MD) × 100. Data were entered using SPSS version 21 for analysis. Descriptive statistics like frequencies, proportions, median, and mean were used to explain important variables to the outcome variable

RESULTS

The total number of admissions in the department in the year 2019 was were 10439, 15.83% were booked and 84.16 % were un-booked/referred patients from local private and government hospitals in Khyber Pakhtunkhwa. The total number of MNM seen was 1776 who fulfilled the inclusion criteria. Maternal deaths were 44 in the year 2019. Below is a table-1 of the different maternal near-miss and their frequency. The MNM was 1776 (1.84%). The ratio of near-miss events to maternal deaths was 41 to 1. The mortality Index for near-miss cases was 2.5% (table 2).

Table 1: Total maternal admissions and maternal mortality indicators

Total Admission	Frequency N= 10439
Total Maternal Near Miss(Mnm)	1776 (1.84%)
Maternal Near Miss Rate	x 1000= 170 per 1000 live births
Maternal Deaths	44
Maternal Mortality Rate	x 100,000 = 421 per 100,000 live births
Maternal Near Miss To Mortality Ratio	1776:44 (41:1)
Mortality Index	x 100= 2.5%

Table 2: Causes of Maternal Near Miss displayed as percentage

Causes of Maternal Near Misses(MNM= 1776)	Percentage%
Hypertensive disorders	27.08%
anemia	48.76%
Dystocia	20%
Severe hemorrhage	4%
Maternal septicemia	1%

DISCUSSION

Our results showed that the MNM from Peshawar was 17.67% or 170 per 1000 live births. Comparing MNM rates can be challenging due to a variation in the criteria used for identifying MNM. Our percentage is higher than that provided by Tunclap et al in their systematic review of 2012. Based on their results when disease-specific based criteria were used, the prevalence of MNM was between 0.60% to 14.98%, which is the criteria we used.¹⁴

A similar cross-section study was done in India by Adisasmita et al where they reviewed public and private hospital records between 2003-2004 and reported the prevalence of MNM. They noted a higher MNM prevalence in public hospitals 17.3% compared to private 4.2%. Our findings are consistent with their study because we depict MNM from a public hospital, our MNM prevalence was higher 17.6%.¹⁵

Morse et al. have reported MNM from a regional hospital in Brazil. They found 89 MNM out of the total 1544 cases. Their results were between 81 to 9.4 per 1000 live births based on the criteria used. Our MNM is based on disease-specific criteria and is consistent with the prevalence range provided by Morse et al. Morse et al used three different criteria to report the range of findings. Our MMR of 41 per 1000 was substantially higher than their MMR of 3.2 %. While comparing causes of MNM we noted a stark difference in the causes. The major cause of maternal morbidity in Brazil was Preeclampsia, while in our study from Pakistan the top cause of MNM was anaemia.¹⁶

WHO criteria of MNM ratio (MNMR) mentions the

number of maternal near-miss cases per 1000 live births (LB). This criterion is being reviewed to improve the quality of care because a large number of MNM cases will experience long-term physical and psychological effects.¹⁷ The maternal near-miss ratio (MNMR) in our study was 170 /1000 live births in our study. This finding is consistent with results from other lower-income countries which show a range between 2.2 to 287.7 /1000 Live birth.¹⁸

The maternal mortality rate MMR calculated based on our results was 421/100,000 live births. The average maternal mortality rate in Asia-Pacific is reported to be 127 per 100,000 live births, compared to the developed-country average of just 12 per 100,000.¹⁹ The lower middle income countries including Pakistan, Afghanistan, and Bangladesh, have particularly high maternal mortality rates, reaching up to 423/100000 live births.

When the causes of Maternal Mortality were evaluated, Eclampsia was the leading cause of death in our study. Secondary causes were pulmonary embolism, postpartum hemorrhage, and septicemia. Literature shows that hemorrhage is the leading cause of maternal deaths in Africa (33.9%) while in Asia (30.8%) Latin America and the Caribbean, hypertensive disorders were the primary etiology of maternal mortality.²⁰

The near-miss to mortality ratio was 41:1, which means for every 41 mothers who experiences life-threatening conditions, there was one mother who died. In other words, for every 41 mothers who got sick, 40 mothers were saved while 1 mother died. This indicates better obstetric care. The MMNMR based on a study from Syria shows a ratio of 60: 1, while a study done in Nepal showed a ratio of 72: 1.^{11,12} This ratio is similar to those of African countries where the range is 15–12.¹⁸ This is a far cry from those reported in Western Europe. Their studies have reported a ratio of 117–223: 116. If this ratio increases over some time, it reflects on the improvement achieved in obstetric care. So instead of a single estimation, the yearly estimation may help us in improving the care provided. The major contributor to maternal near misses and direct maternal death in our unit was hypertensive disorders (27.04% near misses) with the majority presenting with eclampsia (201 patients) with complications like HELLP syndrome, pulmonary edema requiring assisted ventilation, and intracranial hemorrhage. Of the indirect causes of severe maternal outcomes, anemia was the most common 48.78% in this study with 75% of patients having nutritional iron deficiency anemia. These poor reserves of iron made them prone to severe anemia in pregnancy and presented to us as late booker which required multiple blood transfusions. Beta thalassemia is at its highest incidence in KPK with 2-8% incidence. Patients are diagnosed for the first time in pregnancy when they presented with severe anemia in the antenatal visit. Anemia in pregnancy was also noted in the WHO MCS study as well as in other studies in developed countries to be the indirect leading cause of maternal near miss.^{21,22}

The third category of the near-miss was dystocia which was 20%. The majority included c/section of patients who were referred from the periphery with obstructed labor or prolonged 2nd stage of labor (303 patients), contributing to an increased rate of c section in this unit of 25.76%. Sub-total hysterectomy was done for the atonic uterus leading to PPH in 29 cases and ruptured uterus in 19 patients. A morbidly adherent placenta was seen in 9 patients for which total abdominal hysterectomy was done. These cases are now on the verge of the increase due to the increasing number of c/section being done leading to a high number of blood product transfusions and ICU admissions. This point is of importance to note, of exploring the negative impact of high C-section rates on maternal health. Internationally, studies have documented the association between the increased incidence of placenta previa and accreta with the increase in cesarean delivery rates and the number of previous ones.^{23,24}

It was noted that the majority of women in this study were unable to seek medical care in time leading to an exaggeration of risk factors and an increase in morbidity that can be easily addressed had it been managed timely. Of the many reasons for delay from the periphery is the long-distance travel to reach health facility and delayed referral to most appropriate health facility. So, it is important to Improve the timely healthcare-seeking behavior of women.

CONCLUSION

Our hospital has a higher maternal near-miss to mortality ratio of 41:1 showing good maternal care management. Timely healthcare-seeking behavior of women is uncommon in the study area, therefore, a considerable number of women are developing severe acute maternal morbidities that can be easily addressed had it been managed in a timely manner.

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CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE: NIL

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Zahoor F: Concept/ Idea, Literature, review, Drafting & Final Review

Fahim F: Concept/idea, Literature review, Drafting & Final Review

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.