

Original Article

Evaluating the Quality of Obstetric care at the Federal Government Polyclinic, Islamabad Using the Lens of WHO's Maternal Near-Miss Approach

Bushra Ashraf¹, Naushin Farooq², Qurrat UI Ain³, Lubna Saleem⁴, Shazia Batool⁵, Sadia Kanwal⁶

¹Medical Officer, ²Consultant & Head Department of Obstetrics and Gynecology FGPC,

^{3,5,6}Associate Consultant, ⁴Senior Registrar

(Federal Government Polyclinic (FGPC), Islamabad)

Correspondence: *Dr. Bushra Ashraf*
Federal Government Polyclinic (FGPC), Islamabad,
Email bushraashraf205@gmail.com

Abstract

Objective: To determine the frequency of maternal near-miss (MNM) incidents and maternal deaths among hospitalized pregnant women, while also documenting the underlying causes and associated conditions.

Methodology: This descriptive observational study was carried out at the Department of Obstetrics and Gynecology, Federal Government Polyclinic (FGPC), Islamabad, over a period of six months. A non-probability consecutive sampling approach was utilized. The study included all pregnant women who were admitted for obstetric care and experienced severe maternal outcomes (comprising of maternal near-miss and maternal mortality). Participants were monitored for six weeks following their discharge, childbirth, pregnancy termination, or until their decease. Individuals who did not provide consent were excluded.

Results: The obstetric facility witnessed 1213 deliveries during the research period, with the ages of participants ranging from 18 to 42 years with a mean age of 27.94 ± 5.37 years. Among the 1213 live births, there were 31 cases of near-miss and an additional 3 cases of maternal mortality. Consequently, the frequency of near-miss incidents was calculated as 25.55 per 1000 live births. The near-miss to maternal mortality ratio stood at 10.33:1, with a mortality index of 0.088. The primary causes of severe maternal outcomes were obstetric hemorrhage (n=16) 47.05% and hypertensive disorders (n=7) 20.58%.

Conclusion: The study reveals that, for every ten women who survived critical obstetric complications, one unfortunately experienced mortality. Hemorrhagic events and hypertensive disorders constituted the commonest causes of near-miss cases and deaths. The utilization of the World Health Organization's Maternal Near-Miss (MNM) approach facilitates the identification of causes and circumstances linked to severe maternal outcomes. Consequently, this methodology enables the identification of areas for enhancement in obstetric care and the subsequent implementation of corrective measures.

Keywords: Maternal near-miss, Maternal deaths, Maternal mortality ratio, Severe maternal outcomes.

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Introduction

A maternal near-miss occurs when a woman nearly dies but survives a severe obstetric problem that occurs during pregnancy, childbirth, or within 42 days of the pregnancy's termination. Given that, it has many of the same determinants as maternal death; it is acknowledged as a useful indication for evaluating the quality of obstetric care.¹ The maternal near-miss continues to be a significant public health issue, particularly in the low and middle income countries. The

global estimated prevalence is 1.4%.²

Within the framework of Sustainable Development Goals, enhancing maternal health has been prioritized, aiming to reduce the global maternal mortality ratio to below 70 per 100,000 live births by 2030.³ However, this index continues to remain very high, particularly in the low-income countries, where 99% of these mortalities occur. Maternal mortality is one in 41 and one in 3300 live births in underdeveloped versus

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developed countries, respectively.^{3,4}

The MNM surveillance is helpful for identifying high-risk subgroups that require added health care and more robust resource allocation. Women who survive life-threatening complications during pregnancy, childbirth, or puerperium share many common pathological and circumstantial factors with those who die of these complications. Consequently, investigating the experiences of women who survive life-threatening conditions provides a comprehensive assessment of care quality within a given obstetric facility.⁵

Following publication of the famous WHO's MNM criteria in 2011, a plethora of high quality studies based on this new approach have been published. Majority of these studies have employed the WHO's criteria.^{1, 6-9}

Concerns over adverse maternal outcomes are becoming more well-known on a global scale. But in our nation, there is a severe lack of high-quality study into these problems. As a result, it was intended for the current study to quantify the incidence of maternal death and near-miss as well as their underlying causes. Our investigation is poised to provide a valuable evidence base in this context, thereby laying the groundwork for forthcoming remedial measures aimed at further enhancing obstetric care standards at our institution.

Methodology

This descriptive observational study centered on the accumulation of quantitative data concerning severe maternal outcomes and their corresponding contributing factors. The research was conducted at the Department of Obstetrics and Gynecology, Federal Government Polyclinic (FGPC), Islamabad, over a period of six months. The study protocol secured formal approval from the hospital's ethics committee. Informed consent was obtained from patients' attendants and subsequently from the patients themselves, once they attained stability post-treatment.

The study employed a non-probability consecutive sampling technique, with the sample size determined according to WHO guidelines. Although a formally established sample size adequate for generating near-miss and process indicators is currently lacking; the calculation was approximated based on the incidence of severe maternal outcomes (comprising maternal deaths and near-miss cases divided by the number of women giving birth within a specific time frame). WHO's estimation indicated an incidence of approximately 7.5

cases per 1000 deliveries for severe maternal outcomes. Thus, a desirable sample size of at least 20 cases with severe maternal outcomes was deemed appropriate.¹ Over the six-month study period, data from 34 patients experiencing severe maternal outcomes were collected.

All pregnant women who were admitted to the hospital for obstetric care and presented with severe maternal outcomes (classified as maternal near-miss as per WHO criteria or maternal deaths) were included in the study. They were monitored for six weeks post-discharge, childbirth, pregnancy termination, or until decease. Patients who did not provide consent were excluded. The recorded data encompassed live births occurring at the facility during the study phase.

The WHO criteria were employed for diagnosing the near-miss events. The major three categories of these criteria included the following: 1) severe complications or potentially life threatening conditions; 2) critical interventions; and 3) end-organ dysfunction.¹

All the patients were evaluated with standard history, examination, and relevant investigations. All patients were hospitalized for indoor management. Standard obstetric management was provided as was dictated by their condition.

The data were entered on a pre-designed proforma. Statistical analyses were performed to measure the objectives. The data collected included the patient's demographic features and relevant clinical entry parameters. Three delays were found: 1) the decision to seek appropriate obstetric care; 2) the timely arrival at the proper facility to receive the required obstetric care; and 3) the third delay associated with circumstances where prompt treatment could not be started at the facility level. A complete blood count, coagulation profile, liver function tests, renal function tests, and arterial blood gases were all performed in the lab.

Multiple descriptive statistics were used to generate frequencies, percentages, means, and standard deviations after the data were processed using SPSS version 21. The numerical data were presented as Mean \pm Standard deviation, including the age of the patients. The categorical information, like the factors that contributed to adverse maternal outcomes, were presented as frequency and percentages. The primary outcome measure was to determine the frequency of maternal near-miss and maternal deaths among pregnant women admitted to the hospital and to

document the underlying causes thereof. The secondary outcome measures were to determine the other relevant indices such as the mortality index and the various demographic and clinical factors that were associated with severe maternal outcomes. The mortality index represented the number of maternal deaths divided by the total number of women with severe maternal outcomes expressed as a percentage. It was calculated by using the formula: $MI = MD / (MNM + MD)$.

Results

During the study period, the obstetric facility witnessed the delivery of 1213 pregnant women. Their ages spanned from 18 to 42 years, with a mean age of 27.94 ± 5.37 years. Among the 1213 live births, 31 instances of near-miss were recorded. Furthermore, three cases of maternal mortality were documented within the same study timeframe.

Table I: Demographic and baseline clinical characteristics of the patients with severe maternal outcomes. (n=34)

Clinical and Demographical Characteristics of the patients	Number / Percentage
Age of the woman in years:	
Age range	18-41 Years
≤20 years	2(5.88%)
21-30 years	22(64.70%)
31-40 years	9(26.47%)
>40 years	1(2.94%)
Gestational age in weeks:	
≤20 weeks	9(26.47%)
>20 weeks	25(73.52%)
Parity/Gravida status of the woman:	
Primigravida	7(20.58%)
Multigravida	22(64.70%)
Grand Multigravida	5(14.70%)
Booking status:	
Yes	11(32.35%)
No	23(67.64%)
Delays in initiation of treatment:	
First (i.e., timely decision to seek appropriate obstetric care)	13(38.23%)
Second (i.e., timely access to appropriate obstetric care)	5(14.70%)
Third (i.e., timely receipt of adequate and appropriate treatment at the obstetric facility)	2(5.88%)
Socioeconomic status:	
Poor	25(73.52%)
Middle	9(26.47%)
Upper	0
Educational status of the woman:	
None/ Illiterate	23(67.64%)
Primary	5(14.70%)
Secondary	3(8.82%)
Tertiary	3(8.82%)

The frequency of near-miss occurrences was calculated as 25.55 per 1000 live births. The ratio between near-miss cases and maternal mortality stood at 10.33:1. The mortality index was quantified as 0.088. Notably, obstetric hemorrhage (n=16) 47.05% and hypertensive disorders (n=7) 20.58% were the leading causes that underlied the severe maternal outcomes.

Detailed insights into the demographic and baseline clinical characteristics of patients experiencing severe maternal outcomes are presented in Table I. Furthermore, Figure 1 visually represents the primary causes of observed near-miss cases and deaths throughout the study period. Table II provides a comprehensive summary of the causes and associated conditions observed among the patients of maternal near-miss and maternal deaths.

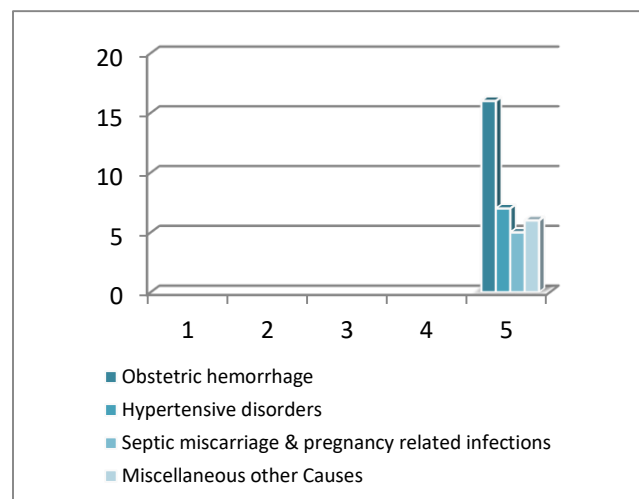


Figure 1. Graphic presentation of the major or leading causes of near miss cases and deaths. (n=34)

Discussion

Robust obstetric care with good fetomaternal outcomes is an important cornerstone of any good healthcare system. In the past, only the maternal mortality rate was used to evaluate the quality of obstetric care; however, this single parameter missed many aspects of obstetric care. In 2011, the WHO published its more diversified MNM's criteria. ¹

These criteria were quickly adopted by obstetric care providers across the globe. These criteria encompass the continuum of health events, spanning from good health to any potential or actual death occurring in a pregnant lady. Through the utilization of the WHO's MNM approach, the process of pregnancy and its potential outcomes are taken as a continuum, spanning from normal pregnancy and concluding with maternal

death or otherwise. In this way, not only the actual deaths but also those outcomes that are closest to mortality are taken into consideration.¹⁰ Consequently, this approach diversifies surrogate indices suitable for evaluating the quality of obstetric care provided by healthcare facilities. Facilities demonstrating robust care exhibit lower mortality rates and improved outcomes for near-miss incidents.

Table II: Causes and associated conditions found among the patients of near-miss and deaths. (n=34)

Leading Causes and Associated conditions	Numbers	%
A) Near-miss cases		
Obstetric Hemorrhage:		
Placental abruption	3	8.82%
Severe postpartum hemorrhage (PPH)	12	35.29%
Morbidly adherent placenta	3	
Retained placental products	2	5.88%
Hypertensive disorders:		
Severe Preeclampsia	2	5.88%
Eclampsia	2	5.88%
Untreated chronic hypertension	1	2.94%
Septic Induced/Miscarriage:	3	8.82%
Pregnancy related infection:	2	5.88%
Organ/ System dysfunction:		
Cardiomyopathy	1	2.94%
Renal dysfunction	2	5.88%
Uterine dysfunction	2	5.88%
Previous Cesarean Sections:	4	11.76%
Anemia:	13	38.23%
Pregnancy with Abortive Outcome:	7	20.58%
Still births:	2	5.88%
Admission to Intensive Care Unit	7	20.58%
Transfusion of blood products	20	58.82%
B) Maternal mortality cases:		
Hemorrhage	1	2.94%
Severe hypertensive disorder	1	2.94%
Septic induced miscarriage	1	2.94%

In our study, the frequency of near miss (i.e., the maternal near-miss ratio) was 25.55 per 1000 live births. In a systematic assessment, Heitkamp A et al.¹¹ noted that the global median maternal near-miss ratio in middle-income countries was 9.6 per 1000 live births. When further stratified, this ratio was 15.9 per 1000 live births for the lower-middle-income countries,^{12, 13} whereas for the upper-middle-income countries, this ratio was 7.8 per 1000 live births.^{14, 15}

Local studies from Pakistan have reported variable figures of near miss cases from different centers and hospitals of the country. For instance, Wasim T⁹ from Lahore reported it to be 28.1/1000 live births whereas Rafiq S¹⁶ from Peshawar reported a higher frequency

of 158.59/1000 live births. The remarkable variations in these reported figures can be due to a variety of reasons. Some of these include the standard of care at the hospital; the obstetrical awareness level of the served population; rural versus urban setting and various socioeconomic factors.

In our study, an observed ratio of 10.33:1 existed between instances of near-miss cases and maternal mortality. This ratio defines the relationship between maternal near-miss cases and occurrences of maternal deaths. Higher ratios reflect better care. Our figures conform to several local studies. For instance, Wasim T⁹ and Shahid A et al.¹⁷ from Lahore reported it to be 10.5:1 and 17.7:1 respectively. Rafiq S¹⁶ from Peshawar reported it to be 30.87:1 whereas Qadir M et al.¹⁸ from Mardan reported it to be 3.7:1. Mustafa R et al.¹⁹ reported the near-miss and maternal mortality ratio among their patients to be 7:1. As compared to the reported figures in our local studies from Pakistan, much higher ratios have been reported from the developed countries. This shows their much higher standards of obstetric care and better awareness on the part of their public regarding timely reporting to the hospital for pregnancy related complications.²⁰

In our study, the majority of the patients with severe maternal outcomes were non-booked. Several published studies have variably reported on the incidence of near miss cases among booked versus non-booked patients. Shahid A et al.¹⁷ reported a higher proportion (88%) of their patients with near miss as being non-booked. Mustafa R et al.¹⁹ observed that 90.4% of their near miss cases and all maternal deaths were among the non-booked cases. In glaring contrast to the above studies, Subuktageen B et al.²¹ in their study from Karachi included only booked patients and recorded an overall 15.2% frequency of near miss among them. They observed that the phenomenon of near-miss was frequent among booked patients, particularly if the patients had some pre-existing comorbid conditions and also in the second or third trimesters. Similarly, Shrestha et al.²² recorded 7.5% frequency of near-miss cases among their booked patients, whereas Ansari et al.²³ found this frequency to be 14% among their booked patients. In our study, we found that the non-booked patients did not receive any proper antenatal care in any other hospital too. They were brought to our hospital in serious, life threatening conditions. Our efficient team rescued most of them; however, some precious lives were lost too. Public awareness regarding seeking regular antenatal care is

imperative. This will help to greatly reduce the menace of the near miss as well as ensure prevention of the loss of precious maternal lives.

In our study, the commonest underlying causes included obstetric hemorrhage and hypertensive disorders. Heitkamp A et al¹¹ in their elegant systematic review observed that in the lower-middle-income countries, the most frequent cause of near miss was obstetric hemorrhage (accounting for 45% of the cases) whereas hypertensive disorders of pregnancy constituted the second commonest (accounting for another 38% cases). According to the interesting findings of their systematic review, the causes were reversed in frequency for the upper-middle-income countries. In these countries, hypertensive disorders accounted for 52% cases, followed by hemorrhagic events accounting for 29% of the near-miss cases. Regarding other underlying causes, there was equal share of both hematological derangements and cardiovascular dysfunction in both the lower-middle and upper-middle-income countries.

Conclusion

The study reveals that, for every ten women who survived critical obstetric complications, one unfortunately experienced mortality. Hemorrhagic events and hypertensive disorders constituted the commonest causes of near-miss cases and deaths. The utilization of the World Health Organization's Maternal Near-Miss (MNM) approach facilitates the identification of causes and circumstances linked to severe maternal outcomes. Consequently, this methodology enables the identification of areas for enhancement in obstetric care and the subsequent implementation of corrective measures.

Recommendations: To improve maternal outcomes, our study suggests the following recommendations:

Numerous socioeconomic factors were identified in our study as contributors to adverse fetomaternal outcomes. These included low socioeconomic level, maternal illiteracy, delays in obtaining obstetric care, family restrictions on seeking medical attention, ignorance of antenatal care, pregnancy difficulties, and insufficient transportation to get to the hospital in a timely way.

Timely Access to Care: All pregnant women should be able to access prenatal, birth, and postpartum care because access to healthcare should be seen as a

fundamental human right. It is necessary to make prompt decisions and plan for the right kind of care.

Health Education and Awareness: To increase understanding of the importance of prenatal care, institutional delivery, and postpartum care, community-level health education should be offered. Education and literacy levels for women should be improved. It is essential to raise the general public's knowledge of the significance of getting obstetric care. To achieve prompt detection of high risk pregnancies, prenatal care needs to be enhanced.

Facility Preparedness: The hospital's infrastructure has to be improved in order to better meet the severely ill obstetric patients' intensive care needs. Additionally, guidelines should be created to allow medical practitioners to prevent post-partum haemorrhage as well as actively treat the affected women.

Establishment of Uniform Protocols: Formulating and executing standardized protocols aimed at preventing and managing postpartum hemorrhage holds the potential to enhance maternal outcomes.

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