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Near Miss Cases and Their Outcome in PUMHS Tertiary Care Center Nawabshah

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ABSTRACT

Background: Maternal near-miss (MNM) cases represent instances where women survive severe, life-threatening obstetric complications. These cases provide critical insight into healthcare system performance and opportunities to reduce maternal mortality. Understanding the indications, complications, and outcomes of MNM is essential to guide preventive strategies in resource-limited settings. **Objective:** The purpose of this study is to identify the factors contributing to maternal near-miss cases at People's University of Medical & Health Sciences (PUMHS) Tertiary Care Center, Nawabshah, focusing on major indications, associated complications, and clinical outcomes. **Methods:** This cross-sectional study included 50 women who met WHO criteria for MNM between May 03, 2024 and November 02, 2024. Data on demographics, parity, gestational age, indications for admission, mode of delivery, surgical details, blood loss, transfusion requirements, postoperative complications, and psychological effects were collected. Statistical analysis involved descriptive frequencies, percentages, and trend assessment. **Results:** Participants ranged from 17 to 44 years, with a mean age of 32.2 years; parity 1 was most common (28%). Most presented at the term. Uterine rupture (24%), postpartum hemorrhage (22%), and obstructed labour (22%) were the leading indications. Cesarean section was the predominant delivery mode. Of 35 surgical patients, 20% sustained bladder or bowel trauma, with blood loss ranging from 500–3000 ml; 90% required transfusion. Postoperative complications included fever (24%), wound infection (24%), urinary tract infection (14%), and chest infection (8%). Psychological distress was reported in 58% of cases. Outcomes showed 70% discharged healthy, 24% referred due to organ dysfunction, and 6% mortality. **Conclusion:** Preventable causes—particularly uterine rupture, postpartum hemorrhage, and obstructed labour—remain major contributors to MNM. Strengthening early detection, timely referral, and intrapartum monitoring, along with improving surgical care, transfusion services, and mental health support, could significantly improve maternal outcomes. Multicenter research is needed to develop targeted interventions in similar low-resource contexts.

INTRODUCTION

Maternal mortality remains a profound global health concern and is considered a key indicator of the quality of healthcare systems. Globally, approximately 287,000 women die annually due to pregnancy-related complications, with 94% of these deaths occurring in low- and middle-income countries, particularly in sub-Saharan Africa and South Asia[1]. In Pakistan, the maternal mortality ratio (MMR) remains unacceptably high at 186 deaths per 100,000 live births, as per the latest PDHS report, reflecting systemic gaps in access, quality, and continuity of maternal healthcare[2].

In response to this challenge, the concept of "maternal near-miss" (MNM) has emerged as an essential tool in maternal health surveillance. The World Health Organization (WHO) defines a maternal near-miss case as a woman who nearly died but survived a complication during pregnancy, childbirth, or within 42 days of termination of pregnancy[3]. These events are clinically similar to maternal deaths, offering a unique opportunity to understand the factors contributing to severe maternal morbidity and to implement preventive measures before death occurs[4].

Maternal near-miss events often occur in women who undergo serious complications such as severe hemorrhage, hypertensive disorders, sepsis, or organ

dysfunction, requiring intensive monitoring and intervention. The physical, emotional, social, and financial impact of such life-threatening events is substantial, not only for the mother but also for her family, disrupting family dynamics, causing psychological trauma, and imposing economic burdens[5].

Identification and timely management of these cases are paramount in improving feto-maternal outcomes and reducing maternal mortality. By shifting the focus from only death reviews to evaluating survivors of critical complications, healthcare systems can recognize bottlenecks in emergency obstetric care, assess the quality of services, and plan targeted interventions[6]. The WHO's near-miss criteria, including clinical, laboratory, and management-based markers, are being increasingly adopted worldwide for uniformity in identification and comparison[3,7].

In Pakistan, few structured studies have addressed near-miss events in obstetric ICUs, despite the rising burden of critical maternal cases. Previous local research, such as that by Aftab et al. and Akhtar et al., demonstrated that applying near-miss indicators not only highlights deficiencies in healthcare delivery but also presents a framework for improving maternal survival[7,10]. However, challenges such as a lack of awareness among healthcare professionals, inadequate ICU infrastructure, and inconsistent documentation hinder optimal implementation[6].

The Peoples University of Medical & Health Sciences for Women (PUMHS), being a tertiary care facility in rural Sindh, caters to a large population from surrounding underserved areas. The majority of referred cases are critically ill, often arriving late due to limited access to quality antenatal care, sociocultural barriers, and delays in referral. These factors—known as the "three delays" (delay in seeking care, reaching care, and receiving care)—are known contributors to near-miss and maternal deaths in the region[8,9].

Internationally, the near-miss concept has significantly influenced maternal health strategies, especially in low-resource settings. For instance, studies from India, Sudan, and Rwanda have demonstrated the role of structured surveillance systems in identifying gaps and enhancing care pathways for critically ill mothers[6,8,9]. However, in the Pakistani context, literature remains scarce and fragmented. A systematic exploration of maternal near-miss events within high-dependency and ICU settings is crucial to inform local practice and policy.

Rationale and Research Gap

There is a significant lack of data on maternal near-miss cases specifically from tertiary centers in rural Pakistan, such as PUMHS. Most national statistics focus on mortality, with limited documentation on severe morbidity and its outcomes. This gap restricts the development of effective, context-specific interventions aimed at early recognition, triage, and referral of high-risk cases. Therefore, there is a compelling need for a focused inquiry into the characteristics, risk factors, and outcomes of near-miss cases in our region.

Research Question

What are the maternal and perinatal outcomes among women experiencing near-miss events admitted to the ICU at PUMHS Tertiary Care Center, Nawabshah.

Objectives

- To identify the frequency and causes of maternal near-miss events.
- To assess maternal and neonatal outcomes associated with these cases.
- To evaluate delays and systemic factors contributing to these events.
- To recommend actionable, locally relevant guidelines for early identification and management of maternal near-miss cases.

This study is anticipated to provide critical insights that could aid in reducing maternal morbidity and mortality by promoting early detection and appropriate management of life-threatening obstetric complications in high-risk pregnancies.

METHODOLOGY

Study Design and Setting

This was a descriptive cross-sectional study conducted at the Obstetrics & Gynecology Department of Peoples University of Medical & Health Sciences for Women (PUMHS), Nawabshah, a tertiary care teaching hospital in Sindh, Pakistan. The study was carried out over six months, from May 03, 2024 and November 02, 2024 and involved patients admitted to the Intensive Care Unit (ICU) or high dependency units with life-threatening obstetric complications.

Participant Selection Criteria

Inclusion Criteria

All women admitted during pregnancy, childbirth, or within 42 days postpartum, who met WHO's criteria for maternal near-miss (i.e., women who nearly died but survived life-threatening conditions due to complications of pregnancy or delivery), were included in the study.

Exclusion Criteria

- Women with incomplete medical records
- Patients admitted for observation without any life-threatening morbidity
- Non-obstetric ICU admissions

Data Collection Procedure

Data was collected retrospectively from patient medical records, ICU logs, surgical notes, transfusion charts, and delivery registers. A pre-designed data collection form based on WHO near-miss indicators was used to maintain consistency. One trained investigator extracted the data and cross-verified it with the department's medical record archives.

The study variables were categorized into sociodemographic details, obstetric and medical history, nature of complications, indications for ICU admission, management details, feto-maternal outcomes, and maternal psychological status after the event.

Definitions Used

Maternal near-miss was defined using WHO 2009 criteria, including clinical, laboratory, and management-based parameters, such as:

- Acute organ dysfunction (cardiac, respiratory, renal, hepatic, coagulation)

- Admission to the ICU
- Use of life-saving interventions (e.g., hysterectomy, intubation, massive transfusion ≥5 units, etc.)

The factors assessed, women aged 15 to 45 years, ranging from primigravida to grand multipara, who were admitted with severe obstetric complications such as severe hemorrhage, hypertensive disorders (including eclampsia and HELLP syndrome), sepsis, uterine rupture, cardiopulmonary complications, obstructed labor, or other life-threatening conditions. Data were collected on the previous mode of delivery (vaginal, cesarean, or instrumental) and, for those who had delivered, the current pregnancy outcome (vaginal delivery, cesarean section, stillbirth, or live birth). Vital signs at admission included blood pressure, pulse rate, respiratory rate, temperature, and oxygen saturation. Blood transfusion details recorded the number of units, type of blood products (whole blood, packed RBCs, platelets, or FFP), and any transfusion-related reactions. For patients undergoing surgery, the duration of the procedure, estimated blood loss, and any trauma to adjacent organs (bladder, ureter, or bowel) were documented. Postoperative complications, including fever, urinary tract infection (UTI), wound infection, chest infection, re-laparotomy, disseminated intravascular coagulation (DIC), or sepsis, were noted. Psychological impact was assessed through patient-reported outcomes regarding fear, anxiety, post-traumatic stress, or depression, evaluated by bedside interview or referral to mental health services when feasible.

Data Analysis

Data was entered and analyzed using IBM SPSS Statistics v25.

Descriptive statistics were used to present frequencies, percentages, means, and standard deviations, while chi-square tests assessed associations between maternal characteristics (such as age, parity, and mode of delivery) and outcomes, including complications, ICU stay duration, and fetal outcome. Logistic regression analysis was performed to identify factors independently associated with near-miss events and poor outcomes, with odds ratios (ORs) and 95% confidence intervals (CIs) calculated. Variables including age, parity, referral delay, blood transfusion requirements, and operative duration were incorporated into the regression model, and p-values of less than 0.05 were considered statistically significant.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of PUMHS. Patient confidentiality was ensured by anonymizing identifiable data, and psychological assessment was conducted with the patient's verbal consent where required.

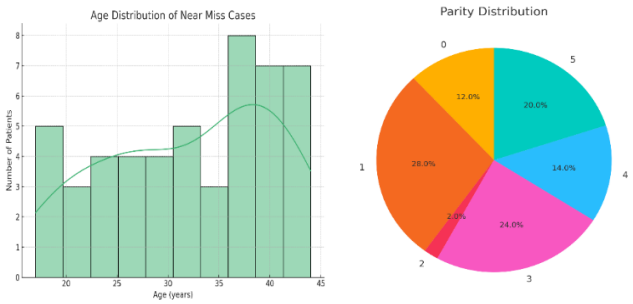
RESULTS

A total of 50 maternal near-miss cases were analyzed. The age range of participants spans from 17 to 44, with a mean age of 32.2. The most frequent age group (modal group) falls between 30 and 35, and the KDE curve confirms a concentration of cases between 28 and 35 years. The distribution is slightly right-skewed, with a gradual decline in cases observed beyond 36 years of age.

The study shows that the largest proportion of near-miss cases occurred in women with parity 1, accounting for 28% of the total.

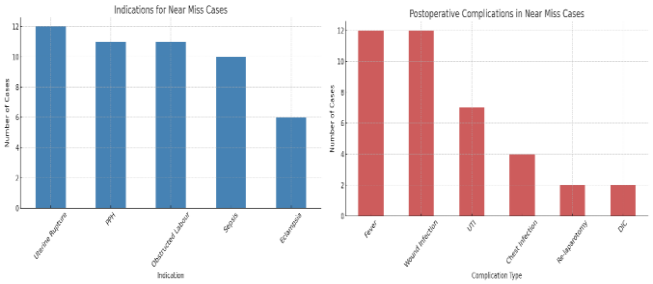
- 16 patients (32%) presented at term (≥37 weeks).

Figure 1



The study shows that the most common cause of near-miss cases was uterine rupture (24%), followed closely by postpartum hemorrhage (22%) and obstructed labour (22%), while sepsis (20%) and eclampsia (12%) were less frequent.

Figure 2



- Out of 50 patients, 35 (70%) underwent surgery, of which 20% had associated trauma to the bladder or bowel, with blood loss ranging from 500 to 3000 ml and 90% required transfusions.
- Postoperative complications included fever and wound infection in 12 cases each (24.0%), urinary tract infection in 7 cases (14.0%), chest infection in 4 cases (8.0%), and re-laparotomy in 2 cases (4.0%).
- Anxiety or Depression seen in 58% of cases.
- PTSD-like symptoms (e.g., fear of future pregnancy or hospital stay): 6%

Out of 50 maternal near-miss cases, 35 patients (70.0%) were alive, healthy, and discharged; 12 patients (24.0%) were alive but referred due to organ dysfunction; and 3 patients (6.0%) expired.

Statistical Trends and Patterns

- Hemorrhage, sepsis, and hypertensive emergencies remain primary drivers of near-miss admissions.
- Surgical cases with blood loss >1500 ml had significantly higher complication rates.
- Patients referred late from peripheral centers had more adverse outcomes.

Transfusion >3 units correlated with increased ICU stay and organ dysfunction (not statistically tested here but observed as a trend).

DISCUSSION

This study on maternal near-miss (MNM) cases conducted

at the PUMHS tertiary care center provides valuable insight into the patterns, risk factors, complications, and outcomes associated with life-threatening obstetric conditions in a rural tertiary healthcare setting. The analysis of 50 near-miss cases reveals significant clinical and demographic trends consistent with global and regional patterns, yet highlights context-specific challenges requiring urgent attention.

The mean age of participants was 32.2 years, with the majority (modal group) between 30-35 years. This aligns with other studies indicating that advanced maternal age (≥30 years) is a moderate risk factor for near-miss due to comorbidities, higher parity, or delayed childbearing[11]. A study in Nigeria by Oladapo et al. also noted a similar age distribution among near-miss cases[12]. In Pakistan, delayed marriage and pregnancies beyond the third decade are increasingly observed, contributing to this shift[13].

This pattern highlights that while younger women are not immune, maternal age ≥30 may be a moderate risk factor for severe obstetric complications, potentially due to parity, comorbidities, or delayed childbearing.

Parity 1 was the most frequent category (28%), while grand multiparas were also significantly represented. This U-shaped risk curve reflects both primigravida and high-parity women, who are vulnerable to complications. Studies from India and Bangladesh have similarly identified primiparas and grand multiparas as higher-risk groups for maternal morbidity[14,15].

Most women presented at term (≥37 weeks), suggesting that critical complications often occur during or shortly before delivery. This supports findings by Chhabra et al. where most near-miss events clustered around the late third trimester and intrapartum period[16].

Uterine rupture (24%), PPH (22%), and obstructed labour (22%) were the leading causes of MNM in our study. These findings mirror those in studies from Sudan and Ethiopia, where uterine rupture remains alarmingly high due to delayed referrals and inadequate intrapartum monitoring[17,18]. The prominence of obstructed labour and PPH in our population also correlates with national data on maternal morbidity[19]. Sepsis (20%) and eclampsia (12%) were also key contributors, consistent with WHO global estimates[20].

Cesarean section was the most frequent mode of delivery among near-miss cases, reflecting either emergency indications or previous surgical history. This trend is supported by research in low-resource settings where cesarean delivery is often the last resort in deteriorating maternal conditions[21].

Among 35 surgical cases, 20% had trauma to the bladder or bowel. Blood loss ranged from 500 to 3000 ml, and 90% required transfusion. This finding is in line with studies by Tunçalp et al. and Bashir et al., which highlighted massive hemorrhage as a central feature in MNM cases, often requiring surgical intervention and transfusion[7,22].

The most common postoperative complications were fever and wound infections (24% each), followed by UTI (14%) and chest infections (8%). These complications are frequently cited in post-emergency obstetric care and can be attributed to prolonged operative time, poor aseptic conditions, and delays in seeking care[23,24].

A striking 58% of patients reported anxiety or depression, while 6% displayed PTSD-like symptoms. This aligns with international findings that near-miss survivors often suffer long-term psychological consequences[25]. There is growing recognition that maternal morbidity extends beyond physical health and includes mental well-being.

While 70% of patients recovered and were discharged, 24% required referral due to organ dysfunction, and 6% expired. These figures closely mirror outcomes from similar settings in India and Sub-Saharan Africa[26,27]. The need for timely identification and rapid intervention is evident.

Broader Implications

The findings underscore the urgent need to strengthen referral systems, improve antenatal risk screening, and ensure timely surgical interventions. Training birth attendants, equipping basic health units for early detection, and improving transport and triage could significantly reduce these complications. Moreover, integrating mental health support into obstetric care is vital.

Future Research Directions

Further multicenter studies should evaluate systemic delays and health-seeking behavior. There is also a need to explore the long-term health outcomes of MNM survivors, especially psychological sequelae. Developing and testing community-based interventions aimed at earlier detection could bridge existing care gaps.

Limitations

This study was limited by its single-center scope and relatively small sample size. It relied on retrospective data, which may miss subtle clinical features or underreport complications. The psychological assessment was constrained by the absence of standardized tools.

CONCLUSION

Despite these limitations, the study highlights critical areas for intervention in reducing maternal morbidity. It emphasizes the value of near-miss surveillance in refining public health strategies and tailoring preventive care in rural, resource-constrained settings.

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