Original Research Article

AN AMBISPECTIVE COMPARATIVE STUDY OF NEAR-MISS MORBIDITIES AND MATERNAL DEATHS IN A TERTIARY CARE CENTER

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A B S T R A C T

Background: Despite medical progress, maternal mortality remains a pressing issue in low- and middle-income countries. While India has reduced its MMR, rural-urban disparities persist. Maternal near-miss cases—where women survive life-threatening obstetric complications provide valuable insights for improving emergency obstetric care. Unlike post-mortem audits, near-miss evaluations allow real-time identification of systemic gaps. **Aims:** To assess the magnitude, clinical profile, and contributing factors of maternal near-miss and mortality cases.

Methods and Materials: An ambispective observational study was conducted from January 2022 to December 2024 at a rural tertiary care centre in western India. Data were collected retrospectively and prospectively from patient records, ICU/HDU files, and labour room registers. For prospective cases, detailed histories were gathered from patients or attendants, supported by thorough clinical examinations. Statistical software STATA 15.1 was used for data analysis.

Results: A total of 531 maternal near-miss cases and 64 maternal deaths were recorded. The leading causes were postpartum hemorrhage, eclampsia, and sepsis, with anemia as a common contributing factor. Most near-miss cases and all maternal deaths occurred in unbooked patients, underscoring the critical role of routine antenatal care in early risk identification. The maternal near-miss to mortality ratio was 8.29, and the mortality index was 10.75%. Delays in seeking and reaching care (Delays I and II) were frequently observed in both groups.

Conclusion: Despite a declining MMR, significant gaps persist in antenatal outreach and emergency care. Integrating near-miss audits with maternal death reviews can guide targeted interventions and improve outcomes.

Keywords: Maternal deaths, Near-miss, Postpartum haemorrhage, Ecclampsia, Anemia, Critical care.

INTRODUCTION

Maternal mortality remains a pressing yet largely preventable global health challenge. As defined by the International Classification of Diseases (ICD-11), it refers to the death of a woman during pregnancy or within 42 days of its termination, regardless of gestational age or location.[1] According to the UN's Trends in Maternal Mortality report, an estimated 287,000 women died in 2020—just a modest drop from 309,000 in 2016, when the Sustainable Development Goals (SDGs) began.[2] While significant progress was made from 2000 to 2015, this momentum has since stalled, with some regions even seeing a reversal in gains.[2]

The six leading, major or direct causes of maternal mortality:[3]
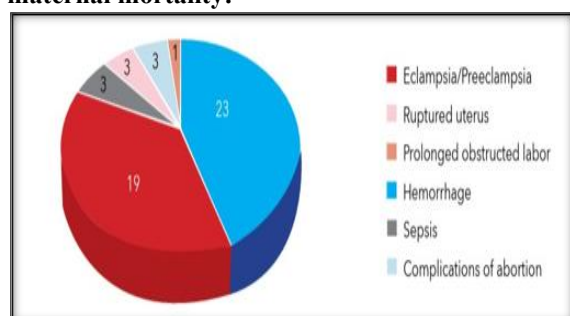
Maternal deaths are categorized as direct or indirect. Direct maternal deaths result from complications of pregnancy, childbirth, or the postpartum period, including those caused by medical interventions or omissions.[1] Indirect maternal deaths arise from pre-existing or newly developed conditions not directly related to obstetric causes but worsened by the physiological effects of pregnancy.[1]

A staggering 94% of maternal deaths occur in low- and middle-income countries, highlighting deep-rooted disparities in access to quality maternal care. [4] Contributing factors include limited skilled birth attendance, inadequate emergency obstetric services, poor nutrition, infectious diseases, and socioeconomic barriers. While preventable maternal deaths have declined by 34% since 2000, progress has plateaued since 2015, especially in sub-Saharan Africa and South Asia, where systemic challenges continue to drive avoidable losses.[5] Addressing this crisis demands urgent, sustained investment in healthcare infrastructure and targeted interventions to eliminate preventable maternal mortality.

India has made significant strides in reducing its Maternal Mortality Ratio (MMR), dropping from 130 (2014–16) to 80 (2023) per 100,000 live births. [6] However, stark regional disparities persist. Kerala reports the lowest MMR at 20, while Assam records the highest at 167, with Gujarat at 53.[6] These gaps reflect underlying inequities in rural healthcare, socioeconomic conditions, and the implementation of programs such as Janani Shishu Suraksha Karyakram (JSSK).

A 'maternal near-miss' refers to a woman who nearly dies but survives a severe complication during pregnancy, childbirth, or within 42 days of its termination.[7] Since most maternal deaths occur in unbooked emergencies, isolated death audits provide an incomplete picture. Near-miss audits (NMAs) offer deeper insights into the quality of emergency obstetric care, revealing gaps in timely access, resource availability, clinical protocols, and system responsiveness. By incorporating data from communities, clinics, and hospitals, NMAs help identify barriers such as poverty, distance, and poor emergency services and guide targeted improvements to make maternal care more accessible and effective.[8]

For every maternal death, an estimated 20 women suffer severe complications or illness.[9] This has led to a global shift in focus from mortality to maternal morbidity and near-miss (MNM) events. MNM cases provide larger datasets, offering greater statistical power and deeper insights into obstetric care challenges. Studying these cases helps identify subtle patterns and systemic issues, enabling more targeted and effective interventions.

This study audits maternal near-miss cases at our institute in Anand, identifying local predictors like referral delays and anaemia prevalence. By comparing outcomes with national benchmarks, it aims to inform policy improvements for rural tertiary centres in India.

Aims and objectives

- To compare clinical profiles, risk factors, and outcomes in MNM and maternal death cases.
- To estimate maternal mortality and near-miss ratios.
- To analyse contributing factors using the Three Delays Model.

MATERIALS AND METHODS

Study Design & Setting:
An ambispective observational study was conducted at a rural tertiary referral centre in western India from January 2022 to December 2024, using retrospective data (2022) and prospective data (2023–2024).

Inclusion Criteria:
All antenatal and postnatal patients presenting to or admitted to the tertiary centre who met WHO/MoHFW criteria for maternal near miss or died from direct or indirect obstetric causes within 42 days of pregnancy termination.

Exclusion Criteria:
Cases of accidental/incidental causes and patients brought in dead.

Sampling Technique: All the eligible participants were acquired purposively in the present study.

Data Collection:
- **Retrospective data** were obtained from ICU and HDU registers, hospital obstetric case sheets, and the Maternal Death Surveillance and Response (MDSR) records maintained by SKH.

- **Prospective data** were collected through structured interviews with patients or their relatives and by reviewing admission and delivery event documentation.
  Variables Collected
- *Sociodemographic:* Age, parity, booking status, residence type, and education level.
- *Clinical Details:* Primary cause (e.g., PPH, eclampsia, sepsis), co-morbidities (especially anaemia), gestational age, interventions, ICU stay, ventilator use, transfusions, surgeries, and outcomes.
- *Delay Analysis:* Assessed using the Three Delays Model—Delay I (decision), Delay II (transport), and Delay III (facility-level).

Data Analysis:

Data were analysed using STATA version 15.1. Descriptive statistics were presented as mean ± standard deviation for continuous variables and as percentages for categorical data. Comparative analyses employed Chi-square or Fisher's exact tests for categorical variables and independent t-tests for continuous variables. Associations between delay factors and outcomes were evaluated using adjusted odds ratios (ORs) with 95% confidence intervals. A p-value of <0.05 was considered statistically significant.

Operational Definitions:

- **Near Miss Ratio:** The number of maternal near-miss cases per 1,000 live births.
- **Maternal Near Miss Mortality Ratio (MNMR):** The ratio of maternal near-miss cases to maternal deaths, reflecting the number of women who survived life-threatening conditions compared to those who did not.
- **Mortality Index (MI):** Calculated as Maternal Deaths / (Maternal Near Miss + Maternal Deaths) × 100, this index represents the proportion of women with life-threatening conditions who died, expressed as a percentage.

WHO Near Miss Criteria,[10]

RESULTS

Over the 3-year study period, 64 maternal deaths and 2,881 live births were recorded, resulting in an MMR of 2,276 per 1 lakh live births—elevated due to fewer deliveries and a high rate of postpartum referrals. Among 3,024 deliveries, the near-miss ratio was 161.7 per 1,000 (489 cases, excluding 42 referrals). With 531 near-miss cases and 64 deaths, the near-miss to mortality ratio was 8.29, and the mortality index stood at 10.75% notably lower than the national average of 29.7%, indicating effective critical care management.

Table 1 compares the demographic profile. Among 531 near-miss and 64 maternal death cases, the mean age was comparable (26.7 vs. 26.2 years). Near-miss events mostly occurred antepartum (92.1%), while deaths were more common postpartum (59.4%, P<0.001). Near misses peaked in the third trimester (84.2%), whereas deaths were highest postpartum (60.9%, P=0.001). Near misses were more frequent in primigravida and first-parous women; deaths were higher among those with 1–2 prior deliveries. Singleton pregnancies predominated (>96%). Unbooked status was seen in 88% of near-miss and all death cases (P=0.003). Deaths were more often referred from government/private facilities (P=0.004). Severe anemia was more prevalent in deaths (25% vs. 15.4%). Previous cesarean was noted in 22.4% of near-miss and 11% of death cases; thrombocytopenia in 9.8% and 4.7%, respectively.

Table 2 compares delays and referrals between near-miss and death cases. Delays in admission were more common in near-miss cases (37.3%) than deaths (12.5%, P<0.001), while transfer delays were higher in deaths (76.6% vs. 48.4%). Multiple referral centers were involved in 14.3% of near-miss and 10.9% of death cases.

According to Table 3, hypertensive disorders—severe pre-eclampsia (25.1%) and antepartum eclampsia (25.8%)—were the leading causes of maternal near-miss (MNM), highlighting their potential for timely management. In contrast, postpartum haemorrhage (PPH) was the leading cause of maternal deaths (46.9%) but accounted for only 6% of MNM cases, with atonic PPH being most common. Sepsis contributed to 39.1% of deaths but just 1.3% of MNM cases, reflecting its rapid and severe course. Among indirect causes, DIC (54.7%), renal failure (43.8%), cardiac issues (34.4%), respiratory complications (26.6%), and liver dysfunction (9.4%) were significantly more prevalent in deaths than in MNM cases.

Table 4 depicts the obstetric and clinical outcomes in both groups. Obstetric outcomes significantly differed between maternal near-miss and death cases (P<0.001). Cesarean delivery was more common in near misses (73.3%), while vaginal births predominated in deaths (53.1% vs. 22.8%). Death cases also showed higher rates of instrumental deliveries, abortions, ectopic pregnancies, and undelivered outcomes.

Near-miss patients had longer hospital stays (7.65 vs. 5.84 days) but lower ICU admissions (42.8% vs. 79.7%) and shorter ICU stays. Ventilator support was required in 92.2% of deaths compared to 29.8% of near misses, with a longer mean duration (4.89 days vs. 3.1 days). Dialysis and massive transfusions were

significantly higher in deaths (10.9% and 40.6%, respectively).

Live births were more frequent in near misses (77.4% vs. 53.1%), while stillbirths were higher in deaths (35.9% vs. 19.4%). Preterm deliveries dominated near-miss cases (60.3%), whereas full-term births were more common in deaths (53.1%). DAMA (Discharged against Medical Advice) was significantly more frequent in deaths (26.6% vs. 11.3%, P<0.001).

Figure 2 shows that critical interventions varied significantly between the groups. Internal iliac ligation was performed in 8.11% of near-miss cases but only 4.76% of deaths. Deaths had higher rates of obstetric hysterectomy (18.8% vs. 6.4%) and cervico-vaginal exploration (10.9% vs. 2.6%). Notably, 50% of deaths received no critical surgical intervention, compared to 23.4% of near-miss cases (P<0.001).

Figure 3 highlights chronic sequelae in both groups. Chronic sequelae were markedly higher in maternal deaths. AKI occurred in 64.1% of deaths vs. 6.4% of near misses; DIC in 60.9% vs. 3%; and pulmonary edema in 26.6% vs. 0.9%. Pleural effusion and PRES (Posterior Reversible Encephalopathy) also showed higher rates in deaths. HELLP syndrome was slightly more common in near misses (2.8% vs. 1.6%). Notably, 86.4% of near misses had no chronic complications, compared to only 6.3% of deaths, highlighting the strong link between organ dysfunction and mortality.

Table 1: Comparison of Demographic and Clinical Characteristics Between Maternal Near Miss and Maternal Death Cases

Parameter	Near Miss(n=531)	Death(n=64)	Total(N=595)	P Value
Age (years) Mean (SD)	26.73 (5.55)	26.19 (4.80)	–	0.458
Period of Event				<0.001
Antepartum	489 (92.09%)	26 (40.63%)	515 (86.55%)	
Postpartum	42 (7.91%)	38 (59.37%)	80 (13.45%)	
Trimester				0.001
First	8 (1.51%)	0 (0%)	8 (1.34%)	
Second	37 (6.97%)	6 (9.38%)	43 (7.23%)	
Third	447 (84.18%)	19 (29.69%)	466 (78.32%)	
Postpartum	39 (7.34%)	39 (60.93%)	78 (13.11%)	
Parity				0.001
Primi gravida	164 (30.89%)	13 (20.31%)	177 (29.75%)	
Para 1	191 (35.96%)	18 (28.13%)	209 (35.13%)	
Para 2	103 (19.40%)	20 (31.25%)	123 (20.66%)	
Para 3	37 (6.96%)	12 (18.75%)	49 (8.24%)	
Para ≥4	36 (6.78%)	1 (1.56%)	37 (6.22%)	
No. of Pregnancy				0.974
Singleton pregnancy	514 (96.80%)	62 (96.87%)	576 (96.81%)	
Multifetal pregnancy	17 (3.20%)	2 (3.13%)	19 (3.19%)	
Booking Status				0.003
Booked	64 (12.05%)	0 (0%)	64 (10.76%)	
Unbooked	467 (87.95%)	64 (100%)	531 (89.24%)	
Type of Admission				0.004
Government	232 (43.69%)	32 (50%)	264 (44.37%)	
Private	205 (38.61%)	31 (48.44%)	236 (39.66%)	
Direct from Home	94 (17.70%)	1 (1.56%)	95 (15.97%)	
High-Risk Antenatal Factors				
Severe anemia	82 (15.44%)	16 (25%)	98 (16.47%)	0.012
Previous cesarean section	119 (22.41%)	7 (11%)	126 (21.18%)	
Thrombocytopenia	52 (9.80%)	3 (4.70%)	55 (9.24%)	

Table 2: Onset of problems in study participants

Onset of problems	Near Miss (n=531)		Death (n=64)		Total		OR Odds Ratio	P Value
	N	%	N	%	N	%		
Delay in admission	198	37.29	8	12.5	206	34.62	0.24 [CI:1.11-0.51]	**<0.001**
Delay in transfer	257	48.4	49	76.56	306	51.43	3.48 [CI:1.91-6.36]	
Multiple referral centres	76	14.31	7	10.94	83	13.95	0.73 [CI:0.30-1.75]	

Table 3: Primary and Indirect Causes Among Maternal Near Miss and Maternal Death Cases

Cause	Near Miss(n=531)	Death(n=64)	Total(N=595)	P Value
Primary Causes				**<0.001**
Ectopic pregnancy	8 (1.51%)	0 (0%)	8 (1.34%)	
Perforation/rupture of uterus	12 (2.26%)	0 (0%)	12 (2.02%)	
APH - Placenta previa	66 (12.43%)	2 (3.13%)	68 (11.43%)	
APH - Abruption	85 (16.01%)	4 (6.25%)	89 (14.96%)	
PPH - Atonic	20 (3.77%)	20 (31.25%)	40 (6.72%)	
PPH - Traumatic	9 (1.69%)	8 (12.50%)	17 (2.86%)	
PPH - Retained products	3 (0.56%)	2 (3.13%)	5 (0.84%)	
PPH - Coagulopathies	0 (0%)	0 (0%)	0 (0%)	

Uterine inversion	1 (0.19%)	2 (3.13%)	3 (0.50%)	
Dystocia	0 (0%)	0 (0%)	0 (0%)	
Sepsis/Infection	7 (1.32%)	25 (39.06%)	32 (5.38%)	
Severe pre-eclampsia	133 (25.05%)	6 (9.38%)	139 (23.36%)	
Antepartum eclampsia	137 (25.80%)	5 (7.81%)	142 (23.87%)	
Postpartum eclampsia	8 (1.51%)	3 (4.69%)	11 (1.85%)	
PAS (Placenta accreta spectrum)	16 (3.01%)	3 (4.69%)	19 (3.19%)	
Obstructed labour	15 (2.82%)	1 (1.56%)	16 (2.69%)	
HELLP syndrome	21 (3.95%)	0 (0%)	21 (3.53%)	
Indirect Causes				<0.001
Cardiac	41 (7.72%)	22 (34.38%)	63 (10.59%)	
Liver	8 (1.51%)	6 (9.38%)	14 (2.35%)	
Respiratory	4 (0.75%)	17 (26.56%)	21 (3.53%)	
Renal	23 (4.33%)	28 (43.75%)	51 (8.57%)	
DIC (Disseminated intravascular coagulation)	18 (3.39%)	35 (54.69%)	53 (8.91%)	

Table 4: Comparison of Obstetric and Clinical Outcomes Between Maternal Near Miss and Maternal Death Cases

Parameter	Near Miss(n=531)	Death(n=64)	Total(N=595)	P Value
Age of Termination				0.001
Full term	207 (38.99%)	34 (53.14%)	241 (40.50%)	
Preterm	320 (60.26%)	27 (42.19%)	347 (58.32%)	
Undelivered	4 (0.75%)	3 (4.69%)	7 (1.18%)	
Obstetric Outcome				<0.001
Normal vaginal delivery	121 (22.79%)	34 (53.12%)	155 (26.05%)	
Instrumental delivery	5 (0.94%)	3 (4.69%)	8 (1.34%)	
LSCS	389 (73.26%)	21 (32.81%)	410 (68.91%)	
Other (Abortion/Ectopic)	12 (2.26%)	3 (4.69%)	15 (2.52%)	
Undelivered	4 (0.75%)	3 (4.69%)	7 (1.18%)	
Total Hospital Stay Duration				0.169
Mean (SD), in days	7.65 (4.61)	5.84 (10.20)	–	
ICU Admission				<0.001
Yes	227 (42.75%)	51 (79.69%)	278 (46.72%)	
No	304 (57.25%)	13 (20.31%)	317 (53.28%)	
Total ICU Stay Duration				0.023
Mean (SD), in days	3.93 (3.30)	6.24 (7.84)	–	
Mechanical Ventilation				<0.001
Yes	158 (29.76%)	59 (92.19%)	217 (36.47%)	
No	373 (70.24%)	5 (7.81%)	378 (63.53%)	
Mean (SD), duration in days	3.10 (3.24)	4.89 (5.69)	–	0.016
Requirement of Dialysis				<0.001
Yes	5 (0.94%)	7 (10.94%)	12 (2.02%)	
No	526 (99.06%)	57 (89.06%)	583 (97.98%)	
Blood Transfusion				<0.001
No	237 (44.63%)	17 (26.56%)	254 (42.69%)	
Yes	272 (51.23%)	21 (32.81%)	293 (49.24%)	
Massive transfusion	22 (4.14%)	26 (40.63%)	48 (8.07%)	
Type of Discharge				<0.001
DAMA	60 (11.30%)	17 (26.56%)	77 (12.94%)	
Perinatal Outcome				<0.001
Live birth	411 (77.40%)	34 (53.13%)	445 (74.78%)	
Fresh stillbirth/IUFD	101 (19.02%)	23 (35.94%)	124 (20.84%)	
Macerated stillbirth	2 (0.38%)	0 (0%)	2 (0.34%)	
Abortion/Ectopic	13 (2.45%)	4 (6.25%)	17 (2.86%)	
Undelivered	4 (0.75%)	3 (4.69%)	7 (1.18%)	
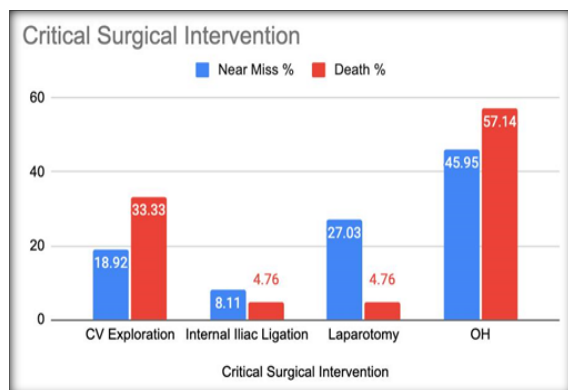
Figure 2: Critical Surgical Interventions among patients in both groups
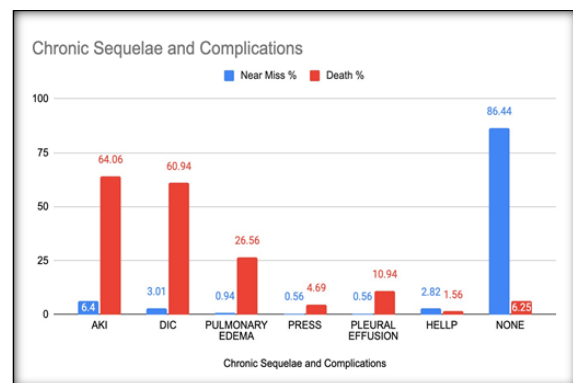
Figure 3: Chronic sequelae/complications seen among study participants

P-value: <0.001

DISCUSSION

During the study, 3,418 patients were observed, with an MMR of 2,227.6 per 1 lakh live births; much higher than the national average due to high-risk postpartum referrals and delays. The near-miss ratio was 170, higher than most national data. The probable reason could be the strategic location of our institute, which serves as a tertiary care referral center for the entire Anand district, covering 500 square kilometers of rural and semi-urban population. The load of critically ill obstetric patients reaching our facility is substantial.

An MNMR of 8.29 was observed, which indicates that for every maternal death, 8 women with life-threatening complications were saved, highlighting effective care. The mortality index (10.75%) was lower than that of comparable studies,[11,12] suggesting that timely interventions, multidisciplinary management, ICU/NICU support, and indicated preterm deliveries for maternal indications contributed to improved outcomes.

The maternal mortality rate is an important indicator of maternal health. Globally, nations are grappling to achieve the target of 70/100000 live births. At the same time, there is another group of women who have suffered life-threatening complications due to pregnancy and labor, but managed to survive. These near-miss cases are potentially a stronger health indicator that can provide information on relevant factors contributing to terminal events.

In our study, the majority of women were aged 21–30 years, aligning with Singh et al.'s observation that 64% of maternal near-miss (MNM) cases occurred within the 20–29 years age group, highlighting the heightened vulnerability of this reproductive demographic.13 A majority of MNM events (92.1%) occurred antepartum, while 59.4% of maternal deaths occurred postpartum. Similar patterns were reported by Singh et al., indicating higher survival rates with antepartum referrals and a greater risk associated with postpartum complications.[13] Near-miss cases were more frequent in primigravida and first-parous women, largely due to severe pre-eclampsia and eclampsia, which accounted for 50% of cases. In contrast, mortality was higher among women with one or two prior deliveries. This trend aligns with Aruna Verma's findings, suggesting a shift in risk patterns due to reduced multiparity through improved contraceptive counselling.[14] Most near-miss events occurred in the third trimester (84.2%), while postpartum deaths predominated (60.9%), emphasizing the need for intensive antenatal care in late pregnancy and vigilant postpartum monitoring—findings supported by Vandana Verma's work.[15]

Unbooked status was a key risk factor, seen in 88% of MNM cases and all maternal deaths. This is consistent with studies by Shilpa Mishra and Ragini Kulkarni, which also highlight the high referral rate from lower-level facilities.[16,17] In our data, 43.7% of unbooked near-miss cases were referred from government facilities, 38.6% from private facilities, and 17.7% came directly from home. For maternal deaths, 98.4% were referrals, with only 1.6% arriving directly. These findings underscore the urgent need for early and consistent antenatal care, robust referral systems, and strengthened postpartum support to improve maternal outcomes.

The effectiveness of a referral system depends on accessible expertise, diagnostics, specialized care, transportation, communication, financial feasibility, and quality counselling. Cultural beliefs, perceived care quality, and clear referral guidelines also shape compliance.[18] Strengthening partnerships with peripheral providers fosters trust and encourages early referrals. Our study demonstrated that transfer delays significantly increased the odds of maternal deaths (OR: 3.48; CI: 1.96-6.36), whereas admission delays were less associated (OR: 0.24; CI: 0.11-0.51). Multiple referrals showed no significant associations (OR: O.73; CI: O.30-1.75). Ragini Kulkarni (2023) reported similar findings, with delays in 91.2% of cases—most commonly in care-seeking (Level I). Non-utilization of resources and shortages of blood products contributed to Level III delays.[17]

Severe anemia, a major risk factor, was present in 15.4% of near-miss cases and 25% of maternal deaths in our study, aligning with Kulkarni et al from Maharashtra reporting a rate of 32.4%.[17] These findings underscore the critical need for routine anemia screening and timely intervention during antenatal care. In our study, hypertensive disorders were the leading causes of near misses, while PPH accounted for most of the maternal deaths. Sepsis claimed a significant number of maternal lives, highlighting its rapid progression and the need for early detection. Indirect causes like DIC, renal failure, and respiratory failure were strongly linked to deaths but rare in MNM. Studies from Maharashtra, Jharkhand, and Chhattisgarh echo these findings, emphasizing the importance of early identification, improved critical care, and robust referral systems to reduce preventable maternal mortality.[17,19,20]

In our study, 73.26% of MNM cases underwent LSCS versus 32.81% of maternal deaths, indicating that timely surgical intervention improves survival, aligning with Kulkarni et al. and Eastern India studies.[17,13] Instrumental deliveries, though rare, were more common in deaths (4.69% vs. 0.94%), often associated with emergency interventions and traumatic PPH in low-resource settings. Deaths occurred in 4.69% of undelivered women, highlighting the urgency of rapid stabilization and decision-making in antepartum cases. Notably, 50% of deaths had no surgical intervention, indicating late presentation or rapid deterioration. Live births were higher in MNM (77.4%) vs. deaths (53.13%), while stillbirths were more frequent in deaths (35.94% vs. 19.4%). Preterm deliveries were more common in

MNM (60.26%), reflecting proactive management; full-term births were higher in deaths (53.14%). DAMA rates were greater in deaths (26.56% vs. 11.3%), highlighting socioeconomic barriers and the need for strengthened counselling, financial support, and inclusion of DAMA in death audits. Chronic complications, especially AKI linked to hypertensive disorders, were more prevalent in maternal deaths, reinforcing the need for early detection and multidisciplinary care.

Maternal near-miss (MNM) cases, where women survive life-threatening obstetric complications, offer critical insights into healthcare system strengths and gaps, providing a more comprehensive picture than mortality data alone.[7] These women face heightened risks in future pregnancies, especially after events like ICU admission, massive transfusion, or organ failure. In India, social pressures and limited awareness often lead to unintended, closely spaced pregnancies post-MNM, particularly among women from lower socioeconomic backgrounds. This highlights the urgent need for targeted contraceptive counselling and proactive family planning support to prevent recurrent severe maternal morbidity and improve long-term maternal health. The "Three Delays" framework identifies critical barriers contributing to severe maternal complications and preventable deaths during obstetric emergencies. It highlights three key stages where timely intervention is essential.[21]

First Delay – Delay in deciding to seek care

Second Delay – Delay in reaching a healthcare facility

Third Delay – Delay in receiving adequate care at the facility

Understanding these delays enables the development of targeted strategies to improve maternal outcomes. Preventing maternal mortality and near-miss events begins with strengthening obstetric care, particularly in rural areas. This involves early antenatal registration, raising awareness about the importance of regular check-ups, and promoting iron-rich nutrition and iron supplementation throughout pregnancy to combat anemia—a major contributor to complications like postpartum hemorrhage.[22] Empowering women through accessible contraception and family planning services is vital to ensure birth spacing and reduce the risks associated with multiparity. In response, India has launched several national initiatives, including the Janani Suraksha Yojana (JSY), Janani Shishu Suraksha Karyakram (JSSK), Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA), Anemia Mukt Bharat, and LaQshya (Labour Room Quality Improvement Initiative).[23,24]

A recently introduced scheme mandates institutional deliveries for Very High-Risk (VHR) pregnancies at civil or tertiary hospitals, offering phased monetary support to encourage compliance.[25] These programs collectively aim to ensure timely, quality maternal care while removing financial barriers. The cornerstone of managing maternal near-miss cases lies in early detection, prompt referral to tertiary centers equipped with ICUs and blood banks, timely surgical intervention, and a multidisciplinary approach to prevent complications like AKI and MODS. Importantly, reviewing maternal near-miss cases, unlike death audits, fosters a less defensive, more collaborative environment for learning. These reviews help identify systemic gaps in emergency obstetric care, enabling targeted interventions that can significantly enhance the quality and safety of maternal healthcare, ultimately reducing both morbidity and mortality.[8]

Limitations

This single-centre study from SKH Anand may have limited generalizability due to regional and resource differences. Retrospective data collection posed challenges like incomplete records and reliance on variable case sheet quality. The absence of a control group and unmeasured socio-cultural factors further limit risk assessment. Additionally, community deaths and long-term outcomes in near-miss survivors were not captured, potentially underestimating maternal morbidity and mortality.

CONCLUSION

PPH, eclampsia, and sepsis were found to be the leading causes of severe maternal illness. Most near-miss cases were antenatal and primiparous, while most deaths occurred in postpartum multiparous women. Anemia was a consistent co-morbidity. First and second delays were significant in both cohorts. In conclusion, the three delays framework provides a comprehensive understanding of the barriers that impede access to adequate management of obstetric emergencies. A holistic and multi-sectoral approach, involving collaboration between healthcare providers, communities, policymakers, and other stakeholders, is crucial to ensure that all women have access to timely, affordable, and high-quality obstetric care when they need it most.

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