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Original Research Article

Is maternal mortality ratio an outdated indicator of obstetric care in a tertiary care hospital?

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Abstract

Background: High-risk pregnancies are associated with increased maternal morbidity and mortality, particularly when complications that threaten the life of the mother arise. This study analysed the maternal outcomes of pregnancies with potentially life-threatening complications (PLTCs), near misses, and mortality with the aim of identifying key risk factors and trends.

Materials and Methods: This prospective cross-sectional study was conducted at KAHER's Dr. Prabhakar Kore Hospital, Belagavi, over a one-year period from February 2023 to January 2024. The study included 239 pregnant women with potentially life-threatening conditions (PLTC) during pregnancy, labour, or the postpartum period, based on the WHO Health Organization criteria, and was approved by the institutional ethical committee. Data on maternal demographics, obstetric history, complications, interventions, and outcomes were collected using structured forms and interviews, ensuring confidentiality. Statistical analysis was performed using SPSS software, with chi-square tests and logistic regression models to identify associations between maternal outcomes and delays, and indices were presented as rates, ratios, and percentages.

Results: The study period encompassed a total of 4083 deliveries in one year, resulting in 4183 live births. During this period, severe maternal outcomes (PLTC and MNM) were recorded, including 4 maternal deaths and 34 maternal near-miss cases, with 239 potentially life threatening conditions. The incidence of near miss events was calculated to be 8.32 per 1000 deliveries and 8.12 per 1000 live births. The NMMR was observed to be 8.5, indicating that for every maternal death, there were 8.5 instances of near-miss events. The MMR was 95.62 per 100,000 live births per year and MMI was noted to be 10.5%. The maternal near misses to mortality ratios as well as the morbidity mortality index offer insights into the quality of healthcare provided at a centre. The higher ratio of maternal near-miss to mortality suggests good obstetric care and hospital facilities.

Conclusion: Timely intervention and appropriate management of potentially life-threatening conditions play critical roles in improving maternal outcomes. Despite variations in demographic and clinical factors, early detection and targeted care remain the key to reducing mortality and severe complications in maternal health. MNM, MNMMR, MMI give valuable insights into the obstetric care of a tertiary care hospital.

Keywords: Maternal mortality (MM), Near miss (MNM), Potentially life threatening complications in pregnancy (PLTC), Maternal mortality ratio (MMR), Maternal mortality index (MMI), Maternal near miss to mortality ratio (MNMMR), Obstetric haemorrhage.

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1. Introduction

High-risk pregnancies are a significant concern in obstetric care because they pose substantial risks to both maternal and foetal health. These pregnancies are characterized by various factors, such as pre-existing medical conditions, multiple gestations, advanced maternal age, and previous obstetric complications, which can increase the likelihood of potentially life-threatening complications (PLTC), maternal near misses(MNM), and Maternal mortality(MM). Maternal near-miss and potentially life-threatening conditions are important indicators of maternal health and quality of obstetric care. The management of high-risk pregnancies requires meticulous attention, timely intervention, and a multidisciplinary approach to mitigate adverse outcomes. Maternal mortality remains a pressing global public health issue. According to the World Health Organization (WHO),

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approximately 810 women die every day due to pregnancy and childbirth-related complications, with the majority of these deaths occurring in low- and middle-income countries.[1] However, even in high-income settings, maternal mortality rates have shown concerning trends. For instance, a recent study highlighted that maternal mortality rates in the United States have been increasing over the past few decades, emphasizing the need for improved maternal healthcare services.[2]

Women who experience severe maternal morbidity or near-miss events face increased risks in subsequent pregnancies and may have reduced future reproductive potential. Multiple pregnancies, especially twin pregnancies, are associated with higher rates of maternal complications and adverse perinatal outcomes than singleton pregnancies. Studies have found that potentially life-threatening conditions, maternal near miss, severe maternal outcomes, and maternal deaths are significantly more common in twin pregnancies.[3,4] The prevalence of PLTC varies across settings, with one study in India finding 4.5% of women developed PLTC, of which 21% progressed to life-threatening conditions.[5] Multiple pregnancies are generally considered higher risk, one study found no significant difference in the prevalence of PLTC, maternal near-miss, or maternal death between multiple and singleton pregnancies.[4] However, perinatal outcomes are poorer in multiple pregnancies. Several studies have highlighted the importance of the early identification of high-risk pregnancies and timely intervention. Women with high-risk pregnancies were found to be 4.2 times more likely to develop severe maternal morbidity during childbirth.[6]

The analysis of near-miss cases provides valuable insights into maternal health, particularly in life-threatening situations. Factors such as chronic hypertension, delays in care, emergency caesarean section, and assisted vaginal delivery have been identified as significant risk factors for near-miss events. Conversely, antenatal care at tertiary facilities and knowledge of pregnancy-related complications appear to be protective factors. Understanding the risk factors associated with high-risk pregnancies and implementing appropriate interventions are crucial for improving both maternal and perinatal outcomes. This one-year observational study aimed to contribute to the existing body of knowledge by examining maternal outcomes in high-risk pregnancies in a tertiary centre, with a focus on identifying and addressing these critical risk factors.

2. Materials and Methods

This prospective cross-sectional study was conducted at KAHER's Dr. Prabhakar Kore Hospital, Belagavi, over a one-year period, from February 2023 to January 2024. This study identified 239 pregnant women with potentially life-threatening complications (PLTC) during pregnancy, labour, or the postpartum period based on the WHO criteria. Patients were evaluated for various factors such as the period of gestation, parity, mode of delivery, complications, and maternal outcomes such as sepsis, hemorrhage, shock, and mortality. Data were collected from the medical records and interviews using structured forms to ensure patient confidentiality. Inclusion criteria required patients to meet the WHO definitions of PLTC and maternal near-miss, while those with pre-existing chronic diseases or accidental causes were excluded. The sample size was determined using statistical formulas, with universal sampling applied to calculate incidence. Descriptive statistics, chi-square tests, and logistic regression models were used for data analysis, with significant associations identified at $p < 0.05$. Maternal mortality and near-miss ratios as well as mortality indices were calculated to assess outcomes.

1. Maternal mortality ratio MMR (MM per 100,000 live births)
2. Maternal near-miss: mortality ratio (MNM: MD)[7]
3. Mortality index [MI = MD/ (MNM + MD)][7]

3. Results

The analysis of 239 patients revealed that all 4 mortalities occurred in the 26–30-year age group, which had a all mortality cases and 50% of all near miss cases. The 21–25-year age group accounted for 17.6% of near-misses. The ≤20- and >35-year age groups had fewer near misses, with 2 near misses (5.9%) in ≤20 years and 1 near miss (2.9%) in >35 years. Statistical analysis showed no significant difference across age groups, with a chi-square value of 12.16 and a p-value of 0.144.

The socioeconomic status (SES) based on the Kuppuswami scale showed that the upper middle class had no mortalities, but 11 patients (32.4%) had near misses and 34 (16.9%) survived without further complications, accounting for 18.8% of the total sample. The lower middle class accounted for all 4 mortalities (100%), 23 near-misses (67.6%). Statistical analysis (chi-square = 6.54, p = 0.365) showed no significant differences in outcomes across SES groups.

Regarding obstetric score distribution (n=239), mortality was the highest among G3 patients, accounting for 75% of total deaths, with 3 out of 4 total mortality cases. Near-miss outcomes were primarily observed in G1 (32.4%, n=11), followed by G3 (35.3%, n=12). Chi-square analysis yielded a value of 29.77, with a significant p-value of 0.003, indicating meaningful differences in outcomes across obstetric scores.

In Antenatal Care (ANC) registration among 239 participants, it was observed that among those who were not registered, 23.5% in near-miss events. Among those PLTC registered within the facility, there were no mortalities; 35.3% experienced near-miss. The Chi-square analysis yielded a value of 12.16 with a p-value of 0.144, indicating

no statistically significant difference in outcomes based on ANC registration location.

The outcomes of gestational age at presentation varied significantly among the 239 patients. For pregnancies under 20 weeks of age, there were no mortalities, while 23.5% had near-miss outcomes. The 37-to 42-week group had the highest survival rate (51.2%). Post-abortion cases had a mortality rate of 25%. Statistically, a Chi-square value of 218.15 with a p-value of 0.001 indicated significant findings. In terms of delivery methods, emergency LSCS was the most common (62.3%), showing no mortality, but included 35.3% near-miss cases. The results were statistically significant, with the same chi-square and p-values. (**Table 1**)

In a study of the causes of potentially life-threatening conditions (PLTC) among 239 cases, hypertensive disorders were the most common, accounting for 52.3% of PLTC cases. Obstetric haemorrhage also contributed significantly, with postpartum haemorrhage present in 26.8% of cases. Sepsis has a high mortality rate of 75%, although it is less common (5.43%). Other causes, such as ectopic pregnancy and morbidly adherent placenta, contributed to near-miss cases without mortality, except for isolated cases of acute renal failure and ARDS, both of which resulted in mortality.

In the analysis of admission conditions among 239 participants, 69.03% were admitted as PLTC (potentially life-threatening conditions), with no mortality, but comprise 70.5% of all near-miss cases. A total of 27.19% of patients were admitted with no initial complications but later became near-miss or PLTC, showing no mortality, comprised 14.7% of all near-miss cases. The remaining 3.7% of patients were admitted directly as near-miss cases. These findings were statistically significant.

Among 239 cases, hypertensive disorders and Obstetric haemorrhage were the most common. Antepartum haemorrhage, including placental abruption and placenta previa, was less frequent, with no associated mortality, and p-values indicating no significant impact on outcomes. Hypertensive disorders, particularly severe preeclampsia, accounted for 46% of cases, with no mortality. Eclampsia contributed to 6.3% of the cases.

Among the 239 subjects, 56.1% received transfusions, including 17.6% who experienced near-miss events. There was a significant chi-square value of 26.07 with a p-value of 0.001, indicating a statistically significant association between transfusion and outcomes. (**Table 3**)

Table 1: Gestational age at presentation distribution and mode of delivery/termination distribution

Gestation age	**Final outcome**			**Total/PLTC (n=239)**
	Mortality (n=4)	**Near miss (n=34)**	**Survived (n=201)**	
<20	0 (0.0%)	9 (23.5%)	1 (0.5%)	10 (3.8%)
20-27	1 (25%)	1 (2.9%)	0 (0%)	2 (0.8%)
27 to 34	1 (25%)	1 (2.9%)	58 (28.9%)	60 (25.1%)
34-37	0 (0%)	11 (32.4%)	38 (18.9%)	49 (20.5%)
37 to 42	0 (0%)	10 (29.4%)	103 (51.2%)	113 (47.3%)
Post-Abortion	1 (25%)	1 (2.9%)	1 (0.5%)	3 (1.2%)
Post partum	0 (0%)	2 (5.8%)	0 (0%)	2 (0.8%)
Chi-square value - 218.15				
p value - 0.001*				
Mode of delivery/termination	**Final outcome**			**Total (n=239)**
	Mortality (n=4)	**Near miss (n=34)**	**Survived (n=201)**	
Elective LSCS	0 (0%)	4 (11.8%)	24 (11.9%)	28 (11.7%)
Emergency LSCS	0 (0%)	12 (35.3%)	137 (68.2%)	149 (62.3%)
Laparotomy	1 (25%)	9 (26.5%)	0 (0%)	10 (4.2%)
Peripartum hysterectomy (5 classical caesarean sections for PAS▫ + 1 following LSCS▪)	0 (0%)	6 (17.6%)	0 (0%)	6 (2.5%)
Suction evacuation or medical method of abortion	1 (25%)	1 (2.9%)	1 (0.5%)	3 (1.2%)
Vaginal	1 (25%)	2 (5.9%)	39 (19.4%)	42 (17.6%)
Antenatal mortality	1 (25%)	0 (0%)	0 (0%)	1 (0.4%)
Chi-square value - 218.15				
p value - 0.001*				

*Significant;

▫PAS -Placenta accreta spectrum; ▪following LSCS, hysterectomy done in view of PPH

Table 2: Type of obstetric haemorrhage and hypertensive disorder distribution

Type of haemorrhage		Final outcome			Total / PLTC (n=239)	Chi-square value	p-value
		Mortality (n=4)	Near miss (n=34)	Survived (n=201)			
Post-partum haemorrhage		1 (25%)	7 (20.6%)	56 (27.9%)	64 (26.8%)	0.79	0.67
Antepartum haemorrhage	Abruption	0 (0%)	1 (2.9%)	18 (9%)	19 (7.9%)	1.78	0.409
	Placenta previa	0 (0.0%)	3 (8.8%)	15 (7.5%)	18 (7.5%)	0.409	0.815

Hypertensive disorder	Final outcome			Total / PLTC (n=239)
	Mortality (n=4)	Near miss (n=34)	Survived (n=201)	
Severe PE Count (%)	0 (0.0%)	7 (20.6%)	103 (51.2%)	110 (46.0%)
Eclampsia Count (%)	0 (0.0%)	3 (8.8%)	12 (6.0%)	15 (6.3%)
Total Count (%)	0 (0.0%)	10 (29.4%)	115 (57.2%)	125 (52.3%)

Table 3: Distribution of the subjects based on blood/blood products

Intra-op /Post op BT - component	Final outcome			Total N=239
	Mortality (n=4)	Near miss (n=34)	Survived (n=201)	
Received	1 (25.0%)	6 (17.6%)	127 (63.2%)	134 (56.1%)
Not received	3 (75.0%)	28 (82.4%)	74 (36.8%)	105 (43.9%)
Chi-square value- 26.07				
p value- 0.001*				

Several medical and surgical interventions have been associated with different outcomes. ICU admission, required in 5% of cases, showed a 75% mortality rate and was statistically significant (Chi-square = 74.12, p = 0.001). Similarly, mechanical ventilation, applied in 3.8% of cases, also showed a 75% mortality rate (chi-square = 66.27, p = 0.001). Cardiotonic support was used in 1.3% of cases, all of which resulted in mortality (chi-square = 178.49, p = 0.001). Central venous access was provided to 10.7% of the patients, with a 50% mortality rate (p = 0.001). Among the surgical interventions, peripartum hysterectomy, conducted in 2.5% of cases, was used exclusively for near-miss cases (p = 0.001). Bilateral internal artery ligation and laparotomy were used in 9.6% and 3.3% of cases, respectively, primarily for near-miss cases, both of which were statistically significant (p = 0.001). Hayman/B-Lynch sutures were applied in 4.2% of the cases and were also significant (p = 0.004). Other interventions such as uterine artery ligation and perineal tear repair were not significantly associated with adverse outcomes. (**Table 4**)

The distribution of subjects based on foetal outcomes revealed that out of 239 patients, there were no live births among those who experienced mortality, and 64.7% of near-miss cases and 91.1% of survivors had live births, totalling to 85.8% of the sample. Perinatal mortality accounted for 25% of the mortality cases, 5.9% of the near-miss cases, and 8.5% of the survivors. NICU admissions were observed in 20.6% of near-miss cases and 28.9% of survivors, totalling to 27.2% across all groups. Statistical analysis showed a significant association between foetal and final outcomes (chi-square = 82.12, p = 0.001).

The distribution of subjects based on the duration of hospital stay showed that the majority of near-miss cases (79.4%) and survivors (67.7%) stayed in the hospital for 7 to 14 days. Only a small percentage of near-miss cases (5.9%) and survivors (5.5%) stayed between 15 and 21 days, and a minimal number of survivors (2.5%) stayed for > 21 days. Statistical analysis showed a significant association between the duration of hospital stay and final outcomes (chi-square = 15.27, p = 0.018). The mean duration of hospital stay for 238 subjects ranged from 1 to 23 days, with an average stay of 8.55 days and a standard deviation of 3.83 days. Of the 239 subjects, 52.7% were referred, comprising 75% of mortalities, 67.6% of near-misses, and 33.9% of survivors coming from the referral group. The remaining 42.3% were not referred, comprised 25% of mortalities, 32.4% near-misses, and 43.2% survivors in this category.

Among the 239 subjects, delays were categorized into personal/family and referral centre delays. Personal or family delays were associated in all mortality cases, 67.6% near-misses, and 54.2% survivors, accounting for 56.9% of the total cases. Referral centre delays accounted for 75% of total mortalities, 50% of near-misses, and 20.4% of survivors, affecting 25.5% of the total cases. Statistically, referral centre delays showed a significant association with outcomes, whereas personal/family delays did not.

Table 4: Distribution of the subjects based on type of additional medical interventions and surgical interventions done

Medical Interventions	**Final outcome**			**Total / PLTC n=240**	**Chi-square value**	**p value**
	Mortality (n=4)	**Near miss (n=34)**	**Survived without complications (n=201)**			
ICU admission	3 (75.0%)	8 (23.5%)	1 (0.5%)	12 (5.0%)	74.12	0.001*
Mechanical ventilation	3 (75.0%)	4 (11.8%)	2 (1.0%)	9 (3.8%)	66.27	0.001*
Cardiotonic	3 (75.0%)	0 (0.0%)	0 (0.0%)	3 (1.3%)	178.49	0.001*
Central venous access	2 (50.0%)	14 (41.8%)	8 (3.98%)	24 (10.7%)	24.52	0.001*
Surgical interventions	**Final outcome**			**Total**	**Chi-square**	**p-value**
	Mortality	**Near miss**	**Survived without complications**			
Peri-partum hysterectomy	0 (0.0%)	6 (17.6%)	0 (0.0%)	6 (2.5%)	37.1	0.001*
Uterine artery ligation	0 (0.0%)	3 (8.8%)	25 (12.4%)	28 (11.7%)	0.907	0.635
B/L Internal artery ligation	0 (0.0%)	11 (32.4%)	12 (6.0%)	23 (9.6%)	23.7	0.001*
Laparotomy	0 (0.0%)	8 (23.5%)	0 (0.0%)	8 (3.3%)	49.9	0.001*
Manual removal of placenta	0 (0.0%)	0 (0.0%)	1 (0.5%)	1 (0.4%)	0.19	0.909
Genital injury/perineal tear	0 (0.0%)	1 (2.9%)	1 (0.5%)	2 (0.8%)	2.12	0.345
Hayman/B-lynch sutures	0 (0.0%)	5 (14.7%)	5 (2.5%)	10 (4.2%)	11.007	0.004*

Table 5: Maternal morbidity mortality indicators

Indicator	**Formula**	
Total Deliveries in Study Period	N/A	4083
Total Live Births in Study Period	N/A	4183
Severe maternal outcomes		
Maternal Mortality	N/A	4
Maternal Near Miss	N/A	34
PLTC	N/A	239
Incidence of Near Miss per 1000 Deliveries	Near Misses / Total Deliveries * 1000	8.32
Incidence of Near Miss per 1000 Live Births	Near Misses / Total Live Births * 1000	8.12
Near Miss by Mortality Ratio	Near Misses / Maternal Deaths	8.5:1.0
Maternal Mortality Ratio (per lakh live births per year)	(Maternal Deaths / Total Live Births) * 100,000	95.62
Maternal mortality index (MMI)	Maternal deaths/maternal death + near miss x 100	10.5%
Hospital access indicators		
PLTC at arrival	-	165
Proportion of PLTC at Arrival among PLTC	(Proportion of PLTC at Arrival among PLTC	69%
Proportion of PLTC that were Referred	(Number of Referred PLTCs / Total Number of PLTCs) * 100	47.2%
PLTC at Arrival Mortality Index	(PLTC Died within 24 Hours / PLTC at Arrival=3/165)	1.8%
Intra-hospital care indicators		
Intra-Hospital PLTC	Registered/Total = 116/239x100	48.53%
Intra-Hospital PLTC Rate per 1000 Live Births	(Intra-Hospital PLTC / Total Live Births) * 1000	27.49
Intra-Hospital Mortality Index	(mortality among PLTC registered in this hospital)	0%

During the study period, there were 4083 total deliveries and 4183 live births occurred. The incidence of near misses was 8.32 per 1000 deliveries and 8.12 per 1000 live births. The maternal mortality ratio (MMR) was 95.62 per lakh live births, with 4 maternal deaths and 34 near-miss cases. Among the patients with potentially life-threatening conditions (PLTC), 69% arrived at the hospital in this state, with 47.2% being referred, and the mortality index for PLTC at arrival was 1.8%. Intra-hospital PLTCs accounted for 48.53% of cases, with no mortality among those registered for intra-hospital care.

4. Discussion

Maternal outcomes in high-risk pregnancies are of critical concern in obstetric care. Several studies have identified the main causes of maternal near-miss and mortality. Hypertensive disorders and hemorrhage consistently emerge as leading causes across different settings.[5,7-9] Other significant contributors include severe anaemia, sepsis, and organ failure.[7,8,10] Among 239 patients, the 26–30-year age group had all 4 mortalities (100% mortality for non-survivors), 50% of near misses, and 37.3% of survivors without complications, while the 21–25-year group had 37.3% of survivors without complications and 17.6% of near misses was observed in the present study.

The Kuppuswami SES scale showed no mortality in the upper middle class (18.8% of the sample), whereas the lower middle class had 100% mortality, 67.6% near misses, and 79.6% survivors without complications. G3 patients had the highest mortality rate (75% of deaths), with G1 and G2 contributing the most survivors. The unregistered ANC cases had a 25% mortality and 23.5% near-miss rate, while registered facilities had 0% mortality and 51.7% survival, while external registrations had the highest mortality at 75%. This aligns with the existing literature that shows the impact of age and socioeconomic factors on maternal health outcomes. In a study by Vaghela et al., the 26–30 age group had 100% mortality among non-survivors and 50% near misses. The 21–25 years age group showed a lower near-miss rate of 17.6%, indicating a potential protective factor in younger mothers.[11] The Kuppuswami SES scale indicated no mortalities in the upper middle class, contrasting sharply with the lower middle class, which had 100% mortality and high near-miss rates as observed in the study of Yadav et al.[12] This reflects findings from other studies that highlight socioeconomic disparities in maternal health outcomes.[13]

In Ali et al., study the unregistered ANC cases had a 25% mortality rate, while facility-registered cases had 0% mortality, underscoring the importance of proper antenatal care.[14] This is consistent with literature suggesting that timely and adequate prenatal care significantly reduces maternal morbidity and mortality.[15] Other research indicates that improved healthcare access and education can mitigate these risks, suggesting a need for targeted interventions in high-risk populations.[13]

In the present study, pregnancies under 20 weeks had no mortality, but a 23.5% near-miss rate, the 37–42-week group had the highest survival (51.2%), and post-abortion cases had a mortality rate of 25%. Hypertensive disorders were the leading cause of potentially life-threatening conditions (52.3%) with no mortality. Obstetric haemorrhage had a mortality rate of 25%, and sepsis had the highest mortality rate (75%). Approximately 69.03% of cases were admitted as potentially life-threatening, with no mortality, 70.5% near misses, and 70.14% survival, while 3.7% admitted as near-miss cases had 100% mortality, showing statistical significance. Postpartum haemorrhage was the most common obstetric haemorrhage (26.8%) with a 25% mortality rate, severe preeclampsia (46%) had no mortalities and a 51.2% survival rate, while transfusion recipients had a 63.2% survival rate, and non-recipients had 75% mortality. ICU admission (5%) and mechanical ventilation (3.8%) both had a 75% mortality rate, cardiotonic support (1.3%) resulted in 100% mortality, and surgical interventions, such as peripartum hysterectomy and bilateral internal artery ligation, were primarily linked to near-miss outcomes. The present study reported a near-miss rate of 23.5% for pregnancies < 20 weeks, consistent with the literature indicating the critical nature of early pregnancy complications.[16]

Vaghela et al., sound that the 37–42-week group had a survival rate of 51.2%, reflecting findings from other studies that emphasize the risks associated with late-term pregnancies.[12] Hypertensive disorders accounted for 52.3% of potentially life-threatening conditions, corroborating findings from systematic reviews that identify hypertension as a significant risk factor in maternal morbidity in the study of Kaskun and Greene.[17] Obstetric hemorrhage had a 25% mortality rate, aligning with literature that underscores severe hemorrhage as a leading cause of maternal mortality was observed in the study results of Sultana et al.[18]

The present study on maternal outcomes in high-risk pregnancies revealed significant insights into potentially life-threatening complications, near-misses, and mortality rates. The findings indicate that pregnancies under 20 weeks had no mortality, but a notable near-miss rate of 23.5%. In contrast, the 37-to 42-week group exhibited the highest survival rate (51.2%). Hypertensive disorders have emerged as the leading cause of complications, whereas obstetric haemorrhage and sepsis present substantial mortality risks. This study reported a near-miss rate of 23.5% for pregnancies under 20 weeks, consistent with the literature highlighting the critical nature of early pregnancy complications.[16]

In the study of Vaghela et al. the 37–42-week group had a survival rate of 51.2%, reflecting findings from other studies that emphasize the risks associated with late-term pregnancies.[11] Hypertensive disorders accounted for 52.3% of potentially life-threatening conditions, corroborating findings from systematic reviews that identify hypertension

as a significant risk factor in maternal morbidity.[17] Obstetric hemorrhage had a 25% mortality rate, aligning with literature that is evident in the study of Sultana et al. that severe hemorrhage as a leading cause of maternal mortality.[18]

The present study's results suggest a need for improved prenatal care and timely interventions, as highlighted in existing literature, to mitigate risks associated with high-risk pregnancies.[15] Conversely, the study indicates the high near-miss rates and mortality associated with specific complications, it is essential to consider that advancements in maternal healthcare and early intervention strategies have led to improved outcomes in many high-risk populations, particularly in high-income countries.[17] Future research should focus on refining risk prediction models and developing targeted interventions to reduce the incidence of severe maternal morbidity and mortality in high-risk pregnancies.

5. Conclusion

This study highlights the complex relationship between demographic, clinical, and care-related factors in shaping maternal outcomes. We observed that maternal deaths were more common in specific age groups and among women from lower socioeconomic backgrounds. Obstetric conditions like hypertensive disorders and haemorrhage played a major role in the severity of these outcomes. While factors such as age, antenatal care, and gestational age at presentation varied among patients, the most crucial factor influencing survival was the timely and appropriate management of potentially life-threatening conditions (PLTCs). This underlines the importance of early detection, prompt intervention, and continuous monitoring to improve outcomes across different patient populations.

Although the maternal mortality ratio (MMR) was relatively high at 95.62 per 100,000 live births, a closer look at the near miss to mortality ratio of 8.5:1 revealed that the hospital manages a large number of critically ill patients who survive due to effective care. Most of the women who died were referred to the centre in extremely critical condition and passed away within 24 hours of admission. This suggests that MMR alone does not fully capture the quality of obstetric care, especially in referral hospitals that handle high-risk cases.

Our findings emphasize the need for stronger referral systems, better access to antenatal care, and timely management of complications. Evaluating maternal near misses and using MMI and MMR: MD ratio, alongside mortality, provides a more complete understanding of obstetric care quality and health system performance. Strengthening early detection, referral pathways, and provider training can significantly reduce maternal deaths and improve overall maternal health outcomes.

6. Source of Funding

None.

7. Conflict of Interest

None.

8. Ethical Approval

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