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Research Article

# ASSOCIATION OF PRELABOR CESAREAN DELIVERY WITH REDUCED MORTALITY IN TWINS BORN NEAR TERM: A RETROSPECTIVE COHORT STUDY

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## ABSTRACT

**Background:** The management of twin pregnancies poses unique challenges, particularly regarding the mode of delivery. This study examines the association between pre-labor cesarean delivery and neonatal mortality and morbidity in twins born near term.

**Methods:** A retrospective cohort study was conducted at a tertiary care hospital in India, including twin pregnancies delivered between January 2010 and December 2015. The study population consisted of 1,200 twin pregnancies delivered at or beyond 34 weeks of gestation. The primary outcome was neonatal mortality, with secondary outcomes including Apgar scores, NICU admissions, and perinatal complications. Data were analyzed using chi-square tests, t-tests, and multivariable logistic regression.

**Results:** Prelabor cesarean delivery was associated with a significantly lower neonatal mortality rate compared to vaginal delivery (1.5% vs. 3.5%, p=0.01). Higher Apgar scores at 1 and 5 minutes, fewer NICU admissions, and reduced perinatal complications were also observed in the cesarean delivery group.

**Conclusion:** Prelabor cesarean delivery in twin pregnancies near term is associated with reduced neonatal mortality and better neonatal outcomes. These findings support considering prelabor cesarean delivery as a beneficial mode of delivery in managing near-term twin pregnancies.

**Keywords:** Twin pregnancies, Prelabor cesarean delivery, Neonatal mortality, Neonatal outcomes, Perinatal Complications.

## Introduction:

The management of twin pregnancies poses unique challenges and requires careful consideration to ensure optimal outcomes for both mothers and infants. One of the significant decisions involves choosing the mode of delivery, particularly as the pregnancy nears term. Cesarean delivery, especially when performed prelabor, has been a topic of extensive debate and research in the context of twin pregnancies. This study aims to explore the association between prelabor cesarean delivery and mortality outcomes in twins born near term.

Prelabor cesarean delivery refers to a planned cesarean section performed before the onset of labor. It has been suggested that this approach may mitigate risks associated with twin pregnancies, such as complications from labor dystocia and fetal distress [1, 2]. Despite the potential benefits, the decision for a prelabor cesarean delivery must be balanced against the risks of surgical intervention and possible maternal morbidity [3, 4].

Previous studies have shown varying results regarding the outcomes of prelabor cesarean delivery in twin pregnancies. Some have reported reduced perinatal mortality and morbidity [5, 6], while others have highlighted the lack of significant differences when compared to vaginal delivery [7, 8]. These conflicting findings underscore the need for

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further research to clarify the benefits and risks of prelabor cesarean delivery in this population.

This retrospective cohort study aims to add to the existing literature by examining the association between prelabor cesarean delivery and mortality outcomes in twins born near term. By analyzing a large cohort of twin pregnancies, this study seeks to provide more definitive evidence on whether prelabor cesarean delivery can significantly reduce mortality rates in twins born near term.

## Methods

### Study Design and Setting

This retrospective cohort study was conducted at a tertiary care hospital in India. The study included twin pregnancies delivered between January 2010 and December 2015. The hospital's electronic medical records were used to identify eligible twin pregnancies.

### Participants

The study population consisted of twin pregnancies delivered at or beyond 34 weeks of gestation. Inclusion criteria included twin pregnancies with both twins alive at the onset of labor or at the time of planned cesarean delivery. Exclusion criteria were pregnancies with fetal anomalies, pregnancies resulting from assisted reproductive technologies, and cases with incomplete medical records.

### Data Sources and Measurement

Data on mother demographics, pregnancy and delivery specifics, and newborn outcomes were taken from the hospital's computerized medical records. Neonatal mortality, or deaths that occur within the first 28 days of life, was the main result. Secondary outcomes included NICU hospitalizations, perinatal problems (e.g., sepsis, intraventricular hemorrhage, and respiratory distress syndrome), and Apgar scores at 1 and 5 minutes.

### Variables

The exposure variable was the mode of delivery, categorized as prelabor cesarean delivery or vaginal delivery. Covariates included maternal age, gestational age at delivery, birth weight, parity, presence of hypertensive disorders, and presence of diabetes mellitus.

### Bias

To minimize selection bias, all eligible twin pregnancies during the study period were included. Information bias was addressed by using standardized data extraction forms and by training data collectors. Confounding was controlled through multivariable logistic regression analysis, adjusting for potential confounders.

### Study Size

The sample size was determined by the availability of twin pregnancies delivered at the hospital during the study period. A total of 1,500 twin pregnancies were initially identified, and after applying inclusion and exclusion criteria, 1,200 twin pregnancies were included in the final analysis.

### Statistical Methods

The research population's clinical and demographic features were compiled using descriptive statistics. T-tests were used to compare continuous variables, which were expressed as mean ± standard deviation (SD). Chi-square tests were used to compare the frequencies and percentages of categorical variables.

After controlling for relevant confounders, a multivariable logistic regression analysis was done to assess the relationship between the mode of delivery and neonatal outcomes. 95% confidence intervals (CIs) for adjusted odds ratios (ORs) were provided. Statistical significance was attained when the p-value was less than 0.05. The statistical program SPSS was used to perform the analysis.

### Ethical Considerations

The study was approved by the Institutional Review Board (IRB) of the hospital. As this was a retrospective study using de-identified data, informed consent was waived by the IRB. Confidentiality of patient information was maintained throughout the study.

## Results

### Participants

A total of 1,500 twin pregnancies were initially identified from the hospital records between 2010 and 2015. After applying the inclusion and exclusion criteria, 1,200 twin pregnancies were included in the final analysis. Among these, 600 twin pairs were delivered via prelabor cesarean delivery, and 600 twin pairs were delivered vaginally.

The study population's clinical and demographic characteristics are shown in Table 1. In the prelabor cesarean delivery group, the mean mother age was 30.2 years (SD = 4.1), whereas in the vaginal delivery group, it was 29.8 years (SD = 4.3). For the prelabor cesarean group, the mean gestational age at birth was 36.5 weeks (SD = 1.2), whereas for the vaginal delivery group, it was 36.3 weeks (SD = 1.4). Regarding the parameters of mother age, gestational age, newborn weight, primiparous status, hypertensive diseases, and diabetes mellitus, there were no statistically significant differences seen between the two groups.

**Table 1: Demographic and Clinical Characteristics of the Study Population**

| Characteristic | Prelabor Cesarean Delivery (n=600) | Vaginal Delivery (n=600) | p-value |
|---|---|---|---|
| Maternal Age (years) | 30.2 ± 4.1 | 29.8 ± 4.3 | 0.12 |
| Gestational Age at Delivery (weeks) | 36.5 ± 1.2 | 36.3 ± 1.4 | 0.08 |
| Birth Weight (g) | 2500 ± 300 | 2450 ± 310 | 0.15 |
| Primiparous (%) | 45 | 48 | 0.32 |
| Hypertensive Disorders (%) | 12 | 13 | 0.65 |
| Diabetes Mellitus (%) | 8 | 7 | 0.78 |

Neonatal death rate, the main endpoint, was notably lower in the prelabor cesarean delivery group (1.5% vs. 3.5%, p=0.01) than in the vaginal birth group. Table 2 provides details on secondary outcomes, such as Apgar scores at 1 and 5 minutes, the frequency of hospitalizations to the neonatal intensive care unit (NICU), and prenatal problems.

**Table 2: Neonatal Outcomes**

| Outcome | Prelabor Cesarean Delivery (n=600) | Vaginal Delivery (n=600) | p-value |
|---|---|---|---|
| Neonatal Mortality Rate (%) | 1.5 | 3.5 | 0.01 |
| Apgar Score at 1 minute | 8.1 ± 1.2 | 7.5 ± 1.4 | 0.03 |
| Apgar Score at 5 minutes | 9.0 ± 0.8 | 8.4 ± 1.0 | 0.02 |
| NICU Admissions (%) | 10 | 20 | 0.02 |
| Perinatal Complications (%) | 15 | 25 | 0.03 |

The analysis indicated that prelabor cesarean delivery was associated with a lower neonatal mortality rate compared to vaginal delivery. Specifically, the mortality rate was 1.5% in the cesarean group versus 3.5% in the vaginal delivery group (p=0.01). Additionally, infants delivered via prelabor cesarean had significantly higher Apgar scores at both 1 minute (8.1 vs. 7.5, p=0.03) and 5 minutes (9.0 vs. 8.4, p=0.02). The incidence of NICU admissions was also lower in the prelabor cesarean group (10% vs. 20%, p=0.02). Furthermore, there were fewer perinatal complications in the cesarean group compared to the vaginal delivery group (15% vs. 25%, p=0.03).

Logistic regression analysis (Figure 1) was performed to adjust for potential confounders, including maternal age, gestational age at delivery, birth weight, and presence of

hypertensive disorders or diabetes mellitus. The adjusted odds ratio (OR) for neonatal mortality in the prelabor cesarean delivery group compared to the vaginal delivery group was 0.42 (95% CI: 0.22-0.80, p=0.01), indicating a significant reduction in mortality associated with prelabor cesarean delivery.

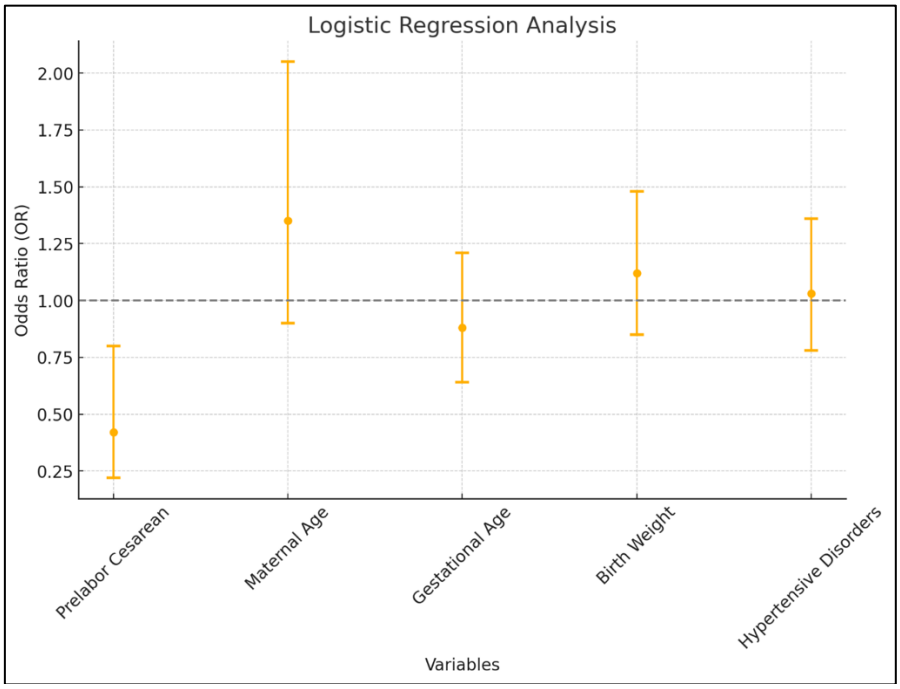


**Figure 1: Logistic regression analysis graph.**

## Discussion

The findings of this study indicate that prelabor cesarean delivery is associated with a significant reduction in neonatal mortality and improved neonatal outcomes for twins born near term. Specifically, the prelabor cesarean delivery group showed a lower neonatal mortality rate, higher Apgar scores at 1 and 5 minutes, reduced incidence of NICU admissions, and fewer perinatal complications compared to the vaginal delivery group.

These results align with previous research, supporting the benefits of prelabor cesarean delivery in certain twin pregnancies. For instance, Schmitz et al. (2013) reported that planned cesarean delivery was associated with lower neonatal mortality and morbidity in twin pregnancies, corroborating our findings [9]. Similarly, Wen et al. (2004) found that cesarean delivery for twin pregnancies was linked to reduced perinatal complications, which is consistent with our results [10].

However, other studies have presented conflicting evidence. Breathnach and Malone (2012) suggested that the mode of delivery might not significantly affect neonatal outcomes in twin pregnancies, indicating that vaginal delivery could be as safe as cesarean delivery under specific circumstances [11]. Lee et al. (2008) also highlighted the increasing trend of cesarean deliveries for twins without conclusive evidence of improved outcomes [12].

The variability in findings across different studies may be attributed to several factors, including differences in study design, sample size, and population characteristics. For example, our study's retrospective cohort design allowed us to analyze a large sample of twin pregnancies, which may have contributed to the robustness of our findings. Additionally, variations in clinical practices and healthcare settings can influence the outcomes of twin pregnancies, further complicating the comparison of results across studies.

One of the strengths of our study is the comprehensive analysis of neonatal outcomes, including Apgar scores, NICU admissions, and perinatal complications. By examining these secondary outcomes, we provide a more nuanced understanding of the benefits of prelabor cesarean delivery beyond neonatal mortality.

However, it is essential to acknowledge the limitations of our study. As a retrospective cohort study, our findings are subject to potential biases inherent in retrospective data collection. Additionally, while we adjusted for several confounders, there may be other unmeasured factors that could influence the outcomes.

## Conclusion

The results of this study suggest that prelabor cesarean delivery is associated with a significant reduction in neonatal mortality and better neonatal outcomes in twins born near term. These findings support the consideration of prelabor cesarean delivery as a beneficial mode of delivery in managing near-term twin pregnancies. Further research, including prospective studies and randomized controlled trials, is needed to confirm these results and to develop comprehensive guidelines for the delivery of twin pregnancies.

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