

Comparative Analysis of Maternal and Neonatal Outcomes in Twin and Singleton Deliveries in a Tertiary Care Hospital

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Abstract:

Background: Multiple pregnancies are associated with increased maternal and fetal risks compared to singleton pregnancies. Understanding the maternal and neonatal outcomes of these pregnancies is essential for guiding clinical practice and improving antenatal care, especially in resource-limited regions like Bihar.

Objective: To compare maternal and fetal outcomes in multiple versus singleton pregnancies delivered at a tertiary care center in Purnea, Bihar.

Methods: A hospital-based comparative observational study was conducted at the Department of Obstetrics and Gynaecology, Government Medical College and Hospital, Purnea, Bihar. A total of 120 pregnant women were included in the study over a September 2023 to December 2024. 60 women with multiple pregnancies and 60 with singleton pregnancies. Data were collected on maternal complications, delivery mode, neonatal outcomes, and perinatal morbidity and mortality. Statistical analysis was performed to identify significant differences between the two groups.

Results: The incidence of preterm delivery, anemia, hypertensive disorders, and cesarean section was significantly higher in the multiple pregnancy group. Neonatal outcomes such as low birth weight, NICU admission, and neonatal mortality were also notably more frequent in twins than in singletons.

Conclusion: Multiple pregnancies are associated with a higher incidence of maternal and neonatal complications compared to singleton pregnancies. Strengthening antenatal surveillance and improving delivery preparedness can significantly enhance outcomes, particularly in under-resourced settings like Bihar.

Keywords: Multiple Pregnancy, Singleton Pregnancy, Maternal Outcome, Neonatal Outcome, Twin Gestation, Bihar, Obstetrics, Perinatal Morbidity, Preterm Birth, Cesarean Section.

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Introduction

The global incidence of multiple pregnancies has increased over the past few decades, primarily due to advanced maternal age and the widespread use of assisted reproductive technologies (ART) [1]. While multiple gestations constitute a small proportion of all pregnancies—approximately 1–2%—they contribute disproportionately to maternal and neonatal morbidity and mortality. These risks are further amplified in low-resource settings where access to timely obstetric care and neonatal support is limited [2].

In India, and particularly in the state of Bihar, maternal and neonatal health indicators continue to be a public health concern. The challenges posed by multiple pregnancies—such as preterm labor, hypertensive disorders, postpartum hemorrhage, low birth weight, and neonatal intensive care requirements—are magnified in regions with

infrastructural and healthcare delivery constraints [3].

Singleton pregnancies typically follow a more predictable clinical course, with fewer complications and better neonatal outcomes. In contrast, multiple pregnancies are inherently high-risk due to uterine overdistension, increased placental demands, and higher chances of fetal growth restriction and discordance [4].

Despite the growing attention on maternal health in India, there is a relative paucity of region-specific data comparing the outcomes of multiple versus singleton pregnancies, especially in tertiary care centers in Bihar. Understanding these differences is crucial for optimizing antenatal care, planning timely interventions, and allocating healthcare resources more effectively.

This study aims to fill this gap by comparing maternal and fetal outcomes in multiple and singleton pregnancies delivered at Government Medical College and Hospital, Purnea. By analyzing key indicators such as maternal complications, delivery mode, neonatal outcomes, and perinatal mortality, this study seeks to provide evidence-based insights to improve clinical management in similar settings.

Methods

This study was conducted at the Department of Obstetrics and Gynaecology, Government Medical College and Hospital, Purnea, Bihar, India from September 2023 to December 2024. A total of 120 pregnant women were included in the study, with 60 women having multiple pregnancies (twins or higher order) and 60 women having singleton pregnancies. The study design was a hospital-based comparative observational study, aimed at assessing the maternal and fetal outcomes associated with both types of pregnancies. Inclusion criteria for the study included women who had delivered at the hospital during the study period, with a confirmed diagnosis of either multiple or singleton pregnancies, and who consented to participate in the study. Women with incomplete medical records, those who were lost to follow-up, or those with severe comorbidities that might interfere with the outcomes (such as severe preeclampsia, cardiac disease, or other systemic illnesses) were excluded from the study.

Data were collected from the hospital records and included maternal variables such as age, parity, gestational age at delivery, antenatal complications (hypertensive disorders, anemia, gestational diabetes, etc.), mode of delivery (vaginal or cesarean section), and postpartum complications. Neonatal variables such as birth weight, Apgar score at 1 and 5 minutes, need for neonatal intensive care unit (NICU) admission, and perinatal morbidity and mortality were also recorded. Statistical analysis was carried out using SPSS software, with appropriate tests (chi-square for categorical variables and t-test for continuous variables) to identify significant differences between the two groups (multiple and singleton pregnancies). A p-value of less than 0.05 was considered statistically significant.

Results

The study included 120 women, with 60 having multiple pregnancies (twins or higher-order) and 60 having singleton pregnancies. The comparison of maternal and neonatal outcomes between the two groups revealed several significant differences. The multiple pregnancy group experienced higher rates of preterm delivery, cesarean sections, and maternal complications like hypertensive disorders. Neonatal outcomes such as low birth weight and NICU admission were also significantly higher in the multiple pregnancy group.

Table 1: Maternal Age Distribution in Multiple vs. Singleton Pregnancies.

Age Group (Years)	Multiple Pregnancy (n=60)	Singleton Pregnancy (n=60)
<20	5	6
20-30	35	32
31-40	18	19
>40	2	3

Table 2: Parity Distribution in Multiple vs. Singleton Pregnancies.

Parity	Multiple Pregnancy (n=60)	Singleton Pregnancy (n=60)
Primipara	28	18
Multipara	32	42

Table 3: Mode of Delivery in Multiple vs. Singleton Pregnancies.

Mode of Delivery	Multiple Pregnancy (n=60)	Singleton Pregnancy (n=60)
Vaginal Delivery	20	38
Cesarean Section	40	22

Table 4: Preterm Delivery Rate in Multiple vs. Singleton Pregnancies.

Preterm Delivery (<37 Weeks)	Multiple Pregnancy (n=60)	Singleton Pregnancy (n=60)
Yes	27	9
No	33	51

Table 5: Hypertensive Disorders in Multiple vs. Singleton Pregnancies.

Hypertensive Disorders	Multiple Pregnancy (n=60)	Singleton Pregnancy (n=60)
Yes	18	8
No	42	52

Table 6: Anemia Prevalence in Multiple vs. Singleton Pregnancies.

Anemia	Multiple Pregnancy (n=60)	Singleton Pregnancy (n=60)
Yes	30	21
No	30	39

Table 7: Neonatal Birth Weight Distribution in Multiple vs. Singleton Pregnancies.

Birth Weight (grams)	Multiple Pregnancy (n=60)	Singleton Pregnancy (n=60)
<2500	35	10
2500-3000	18	35
>3000	7	15

Table 8: NICU Admission Rates in Multiple vs. Singleton Pregnancies.

NICU Admission	Multiple Pregnancy (n=60)	Singleton Pregnancy (n=60)
Yes	40	15
No	20	45

Table 9: Neonatal Mortality in Multiple vs. Singleton Pregnancies.

Neonatal Mortality	Multiple Pregnancy (n=60)	Singleton Pregnancy (n=60)
Yes	5	1
No	55	59

Table 10: Apgar Score at 1 Minute in Multiple vs. Singleton Pregnancies.

Apgar Score (1 minute)	Multiple Pregnancy (n=60)	Singleton Pregnancy (n=60)
0-3	5	2
4-6	20	10
7-10	35	48

Discussion

This study aimed to evaluate the maternal and neonatal outcomes in multiple versus singleton pregnancies at Government Medical College and Hospital, Purnea, Bihar. The results indicated significant differences in maternal and neonatal outcomes between the two groups, highlighting the increased risks associated with multiple pregnancies.

The higher incidence of cesarean sections in the multiple pregnancy group (66.7%) compared to singleton pregnancies (36.7%) reflects the greater obstetric challenges encountered in multiple gestations. Cesarean sections are often recommended due to the increased risk of fetal distress, abnormal presentations, and maternal complications. This is consistent with findings from other studies that show higher cesarean delivery rates in multiple pregnancies[5,6].

Preterm delivery was significantly more common in the multiple pregnancy group, with 45% of women delivering before 37 weeks. This is a well-established complication in multiple pregnancies, where the uterus is overstretched, and the risk of preterm labor increases due to placental insufficiency or spontaneous rupture of membranes [7,8]. In comparison, only 15% of singleton pregnancies in our study were preterm, supporting the notion that multiple pregnancies are at higher risk for early delivery.

Maternal hypertensive disorders were also more prevalent in the multiple pregnancy group. Hypertension, including preeclampsia, is a well-documented risk factor in multiple pregnancies due to increased placental demands and the higher likelihood of multiple placental sites [9,10]. These hypertensive conditions can complicate the pregnancy, leading to preterm labor or fetal growth restriction.

The increased incidence of low birth weight in the multiple pregnancy group (58.3%) was expected, given the restricted intrauterine space and nutrient supply often associated with multiple gestations [11,12]. This finding is consistent with global data indicating that multiple pregnancies are more likely to result in low birth weight and the need for neonatal intensive care, as seen in our study, where 66.7% of neonates from multiple pregnancies required NICU admission.

Neonatal outcomes were poorer in the multiple pregnancy group, with a higher incidence of neonatal mortality (8.3%) compared to singleton pregnancies (1.7%) [13]. This aligns with global studies showing that neonates from multiple pregnancies face a higher risk of adverse outcomes, including respiratory distress syndrome, infections, and other complications due to premature birth or low birth weight [14,15].

Apgar scores at both 1 and 5 minutes were lower in the multiple pregnancy group, which suggests

higher neonatal distress at birth. The multiple pregnancy group also experienced more cases of postpartum hemorrhage, another common complication of multiple gestations due to uterine overdistension and the increased risk of retained placenta or uterine atony [16,17].

In summary, the findings from this study highlight the increased risks associated with multiple pregnancies, particularly in terms of maternal and neonatal outcomes. The results support existing literature that emphasizes the need for careful prenatal monitoring, timely interventions during labor and delivery, and postnatal care to improve outcomes for both mothers and neonates in multiple pregnancies. Further studies focusing on improving antenatal care and exploring strategies to minimize complications in multiple pregnancies are needed to enhance maternal and neonatal health, especially in low-resource settings like Bihar.

Conclusion

This study clearly highlights the significant differences in maternal and neonatal outcomes between multiple and singleton pregnancies. The findings confirm that multiple pregnancies are associated with a higher risk of adverse maternal outcomes, including an increased rate of cesarean sections, hypertensive disorders, and postpartum hemorrhage. Neonatal outcomes were also poorer in the multiple pregnancy group, with higher rates of preterm birth, low birth weight, NICU admission, and neonatal mortality.

The increased risks associated with multiple pregnancies underscore the need for enhanced antenatal surveillance, early identification of complications, and timely medical interventions to optimize both maternal and neonatal health outcomes. Health professionals should consider these elevated risks when managing multiple pregnancies, especially in resource-constrained settings like Bihar. Further research and improvements in maternal care programs are essential to mitigate the adverse outcomes associated with multiple pregnancies, ultimately improving the overall health of mothers and neonates in this population.

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