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Original Research Article

Burden, maternal risk factors, and fetal outcomes in twin pregnancies: a retrospective observational study

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ABSTRACT

Background: Twin pregnancies present significant challenges for obstetricians worldwide. Although they account for a relatively small percentage of global births, their occurrence varies across different regions. The increasing utilization of assisted reproduction techniques and the advancing maternal age contribute to the growing incidence of twin pregnancies. As a result, it is essential to understand the implications and risks associated with multiple gestations. The objective was to determine the burden of twin pregnancies, identify maternal risk factors, assess fetal outcomes, and explore potential associations between these factors.

Methods: Data were collected from hospital records, including information on maternal age, parity, method of conception, gestational age, pregestational body mass index (BMI), and family history. Maternal and fetal complications, mode of delivery, and high-risk conditions in the fetuses were documented. Statistical analysis was performed using the Fisher-exact test.

Results: The study included 78 twin pregnancies. The majority of women (78.2%) fell within the age range of 21-30 years. The majority of women (70.5%) had a normal pregestational BMI. Preterm births occurred in 24.3% of twin pregnancies. Hypertensive disorders (24.0%) and foetal malpresentation (38.0%) were common indications for cesarean section. Fetal complications included intrauterine growth restriction (11.5%), birth weight discordance (25.0%), early neonatal deaths (14.7%), and low APGAR scores (16.0%).

Conclusions: Twin pregnancies present challenges due to the increased risks of maternal complications, preterm birth, and adverse fetal outcomes. The study emphasizes the need for careful management and monitoring of twin pregnancies to improve outcomes.

Keywords: Twin pregnancies, Maternal complications, Fetal outcomes, Mode of delivery, Risk factors

INTRODUCTION

Twin pregnancies present significant challenges for obstetricians worldwide. Although they account for a relatively small percentage of global births, their occurrence varies across different regions. The increasing utilization of assisted reproduction techniques and the advancing maternal age at the time of conception contribute to the growing incidence of twin pregnancies.

As a result, it is essential to understand the implications and risks associated with multiple gestations.¹

The higher incidence of twin pregnancies is accompanied by an elevated risk of maternal complications. Women carrying twins face increased rates of hypertensive disorders, including conditions such as preeclampsia. These disorders can have severe implications for both maternal and fetal health. Additionally, gestational diabetes, a metabolic disorder that develops during

pregnancy, is more prevalent in twin pregnancies. The risk of bleeding before and after childbirth, known as antepartum and postpartum hemorrhages, is also heightened in these cases. These maternal complications necessitate careful management and close monitoring throughout the pregnancy and delivery process.²

In addition to the maternal risks, twin pregnancies also carry a greater risk of adverse outcomes for the babies. Prematurity, defined as birth occurring before 37 weeks of gestation, is a common concern in twin pregnancies. The immaturity of the babies' organs and systems at birth can lead to complications and necessitate specialized care in the neonatal intensive care unit (NICU). Another risk associated with twin pregnancies is low birth weight (LBW). The division of resources and space within the uterus can result in restricted fetal growth, leading to LBW. Additionally, the risk of congenital anomalies, although relatively low, is slightly higher in twin pregnancies compared to singleton pregnancies.³

Given the increased risks and complexities associated with twin pregnancies, the mode of delivery often differs from that of singleton pregnancies. Cesarean sections are more frequently performed in twin pregnancies to mitigate potential complications during delivery. The unique challenges posed by multiple gestations, such as the potential for entangled umbilical cords, necessitate careful consideration of the delivery method.⁴

Despite extensive research on the complications associated with multiple gestations, efforts to normalize the risks and outcomes for twin pregnancies compared to singleton pregnancies have proven challenging. It is essential to continue investigating and understanding the burden of twin pregnancies, identify maternal risk factors, and assess fetal outcomes to develop more effective management strategies.⁵⁻⁷

Aims and objective

The objective of this study was to determine the burden of twin pregnancies, identify maternal risk factors, assess fetal outcomes, and explore potential associations between these factors.

METHODS

This retrospective observational study was conducted at Bundelkhand Government Medical College and Hospital over 1-year period from January 2023 to April 2023 following approval from the institutional ethics committee (IEC). A total of 5,115 deliveries took place during this time, out of which 78 were twin pregnancies.

The study included pregnant women who delivered twins at the institute, regardless of whether the conception occurred naturally or with the assistance of medical treatment. However, pregnancies with triplets or higher-order multiple fetuses were excluded from the analysis.

Data were collected from hospital records, including information on maternal age, parity (number of previous pregnancies), method of conception (spontaneous or assisted), gestational age, pregestational body mass index (BMI), and family history. Details of maternal and fetal complications that occurred during the antenatal period, labor, and delivery, as well as the mode of delivery, were collected and analyzed. The researchers also attempted to identify any clinical associations between relevant maternal factors and the likelihood of cesarean section delivery and preterm labor.

The study also documented the presence of high-risk conditions in the fetuses, such as intrauterine growth restriction (IUGR), twin growth discordance, fetal anomalies, cord prolapse, and fetal distress.

Statistical analysis

The data collected for this study were entered into Microsoft excel 2010 software. Qualitative data, such as rates and proportions, were used to represent categorical information, while quantitative data, such as means and standard deviations, were used to represent numerical information. To analyze the data, the Fisher-exact test was employed to examine the association between complications and the mode of delivery. Additionally, the test was used to identify factors that influenced preterm delivery. A *p* value of less than 0.05 was considered statistically significant.

RESULTS

The study included a total of 78 women with twin pregnancies. In terms of maternal age, 7 women (8.9%) were below the age of 20, while the majority of women, 61 (78.2%), fell within the age range of 21-30 years. There were 9 women (11.5%) between the ages of 31-40, and only 1 woman (1.4%) was above the age of 40. Regarding parity, 38 women (48.7%) were primiparous, meaning they were experiencing their first pregnancy, while the remaining 40 women (51.3%) were multiparous, indicating they had previous pregnancies. In terms of pregestational BMI, 5 women (6.4%) had a BMI below 18.5 kg/m², indicating underweight status. The majority of women, 55 (70.5%), had a BMI between 18.5-24.9 kg/m², falling within the normal weight range. There were 18 women (23.1%) with a BMI between 25-29.9 kg/m², indicating overweight status. When considering the period of gestation, 19 twin pregnancies (24.3%) were delivered before 34 weeks, which is considered preterm. 32 pregnancies (41.0%) lasted between 34-37 weeks, categorized as late preterm. Furthermore, 27 pregnancies (34.7%) lasted beyond 37 weeks, indicating full-term gestation. Among the participants, 20 women (25.6%) had a history of ovulation induction, which involves medical assistance to stimulate ovulation. The majority, 58 women (74.4%), did not undergo ovulation induction. Regarding family history of twin pregnancies, 17 participants (21.7%) had a positive family history, indicating a

previous occurrence of twins in their family. The majority of participants, 61 (78.3%), did not have a family history of twin pregnancies.

Table 1: Maternal demography.

| Characteristic | Number | % |
|--|--------|------|
| Maternal age (years) | | |
| <20 | 7 | 8.9 |
| 21-30 | 61 | 78.2 |
| 31-40 | 9 | 11.5 |
| >40 | 1 | 1.4 |
| Parity | | |
| Primipara | 38 | 48.7 |
| Multipara | 40 | 51.3 |
| Pregestational BMI (kg/m²) | | |
| <18.5 | 5 | 6.4 |
| 18.5-24.9 | 55 | 70.5 |
| 25-29.9 | 18 | 23.1 |
| Period of gestation (in weeks) | | |
| <34 | 19 | 24.3 |
| 34-37 | 32 | 41.0 |
| >37 | 27 | 34.7 |
| History of ovulation induction | | |
| Yes | 20 | 25.6 |
| No | 58 | 74.4 |
| Family history of twin pregnancy | | |
| Yes | 17 | 21.7 |
| No | 61 | 78.3 |

Among the indications for caesarean section (n=50) in the twin pregnancies included in the study, 2 cases (4.0%) were due to abnormalities of labour. One case (2.0%) was attributed to antepartum haemorrhage. The most common indication was foetal malpresentation, accounting for 19 cases (38.0%). Foetal distress was identified as the reason for caesarean section in 9 cases (18.0%). Hypertensive disorders, such as preeclampsia, were responsible for 12

cases (24.0%) requiring caesarean section. Additionally, 7 cases (14.0%) involved previous caesarean sections as an indication. These findings highlight the various indications that led to the decision for caesarean delivery in the twin pregnancies analyzed in the study.

Table 2: LSCS indication (n=50).

| Indications | Number | % |
|--------------------------------|--------|------|
| Abnormalities of labour | 2 | 4.0 |
| Antepartum haemorrhage | 1 | 2.0 |
| Foetal malpresentation | 19 | 38.0 |
| Foetal distress | 9 | 18.0 |
| Hypertensive disorder | 12 | 24.0 |
| Previous caesarean | 7 | 14.0 |

The analysis of the data revealed the following results. Among the participants, 13 (26.0%) in the lower segment cesarean section (LSCS) group had anaemia, while 6 (21.4%) in the vaginal delivery group had anaemia. The p value for this comparison was not statistically significant (p = 0.647), with an odds ratio (OR) of 1.517 (95% CI: 0.497-4.633).

In terms of hypertension, 15 (30.0%) participants in the LSCS group had hypertension, whereas only 1 (3.6%) participant in the vaginal delivery group had hypertension. This difference was found to be statistically significant (p=0.006), with an odds ratio of 13.929 (95% CI: 1.717-113.004).

Regarding preterm labour, 7 (14.0%) participants in the LSCS group experienced preterm labour, while 11 (39.3%) participants in the Vaginal delivery group had preterm labour. The comparison between the two groups showed a statistically significant difference (p=0.046), with an odds ratio of 0.283 (95% CI: 0.093-0.863), indicating a lower likelihood of preterm labour in the LSCS group.

Table 3: Comparison of characteristics between LSCS and vaginal delivery groups.

| Characteristic | LSCS (n=50) | Vaginal (n=28) | P value | OR (95% CI) |
|-------------------------------|-------------|----------------|---------|------------------------|
| Anaemia | Yes 13 | Yes 6 | 0.647 | 1.517 (0.497-4.633) |
| | No 37 | No 22 | | |
| Hypertension | Yes 15 | Yes 1 | 0.006 | 13.929 (1.717-113.004) |
| | No 35 | No 27 | | |
| Preterm labour | Yes 7 | Yes 11 | 0.046 | 0.283 (0.093-0.863) |
| | No 43 | No 17 | | |
| PROM | Yes 5 | Yes 8 | 0.117 | 0.312 (0.090-1.086) |
| | No 45 | No 20 | | |
| Diabetes | Yes 3 | Yes 1 | 0.748 | 0.148 (0.026-0.766) |
| | No 47 | No 27 | | |
| Antepartum haemorrhage | Yes 1 | Yes 0 | 1.653 | 0.478 (0.108-0.924) |
| | No 49 | No 28 | | |

For premature rupture of membranes (PROM), 5 (10.0%) participants in the LSCS group had PROM, compared to 8 (28.6%) participants in the Vaginal delivery group. Although the p-value did not reach statistical significance ($p=0.117$), the odds ratio was 0.312 (95% CI: 0.090-1.086), suggesting a lower likelihood of PROM in the LSCS group.

In terms of diabetes, 3 (6.0%) participants in the LSCS group had diabetes, while 1 (3.6%) participant in the vaginal delivery group had diabetes. The p value for this comparison was not statistically significant ($p=0.748$), with an odds ratio of 0.148 (95% CI: 0.026-0.766).

Lastly, regarding antepartum haemorrhage, only 1 (2.0%) participant in the LSCS group had antepartum haemorrhage, while no participants in the vaginal delivery group experienced this complication. However, the p value for this comparison was not statistically significant ($p=1.653$), with an odds ratio of 0.478 (95% CI: 0.108-0.924).

These findings suggest that hypertension and preterm labour were significantly associated with the mode of delivery (LSCS versus vaginal), with a higher prevalence observed in the LSCS group for hypertension and a lower prevalence for preterm labour. Other complications such as anaemia, PROM, diabetes, and antepartum haemorrhage did not show significant associations with the mode of delivery.

Table 4: Fetal complications.

| Fetal complications | Number (N=156) | Percent |
|--|----------------|---------|
| Nil | 51 | 32.7 |
| Intrauterine growth restriction (IUGR) | 18 | 11.5 |
| Birth weight discordance | 39 | 25.0 |
| Early neonatal deaths | 23 | 14.7 |
| Low APGAR score | 25 | 16.0 |

The study examined foetal complications in a total of 156 cases. Among these cases, 51 (32.7%) had no foetal complications. Intrauterine growth restriction (IUGR) was observed in 18 cases (11.5%). Birth weight discordance was reported in 39 cases (25.0%). There were 23 cases (14.7%) of early neonatal deaths, and 25 cases (16.0%) had a low APGAR score. These findings highlight the presence of various foetal complications in the study population, including IUGR, birth weight discordance, early neonatal deaths, and low APGAR scores.

DISCUSSION

The present study included a total of 70 participants and aimed to investigate various aspects of twin deliveries. The findings of this study were compared with those of several other studies, including Vogel et al, Mathew et al, Su et al,

Rezavand et al, and Konar et al, which had larger sample sizes and focused on similar topics.⁸⁻¹²

Regarding the incidence of twin delivery, the present study reported an incidence of 1.65%, which was comparable to the findings of Vogel et al (1.2%) and Rezavand et al (1.66%), but lower than that reported by Mathew et al (2%) and Konar et al (0.48%). The mean maternal age in the present study was 27.6 years with a standard deviation of 3.4, which was considerably lower than the mean maternal age reported by Vogel et al (36.8 years), Mathew et al (28.11 years), and Su et al (29.6 years). However, the study by Konar et al had a similar mean maternal age of 27 years.

In terms of cesarean delivery rates, the present study reported a percentage of 64.3%, which was higher than that reported by Vogel et al (42.9%) but lower than the rates reported by Mathew et al (78%) and Su et al (85.8%). Konar et al reported a lower cesarean delivery rate of 35.71%.

In terms of maternal complications, the present study reported a 5.6% incidence of diabetes, 26.8% incidence of anaemia, 22.5% incidence of hypertension, and 25.4% incidence of preterm labor. These rates varied across the different studies, indicating differences in population characteristics and healthcare practices.

Regarding fetal complications, the present study reported an 11.4% incidence of IUGR and a 21.4% incidence of birth weight discordance. These findings were comparable to those reported by Vogel et al, Mathew et al, and Konar et al, but differed from the rates reported by Su et al and Rezavand et al.

It is important to note that the findings from these studies provide valuable insights into the characteristics and outcomes of twin deliveries. However, differences in sample sizes, study designs, and populations may contribute to variations in the reported results.

Further research and larger-scale studies are warranted to obtain more comprehensive and generalizable findings in this field.

Limitations

One limitation of this study is its retrospective design, which relies on data collected from medical records. This introduces the possibility of incomplete or inaccurate documentation, leading to potential bias in the results. Additionally, the study was conducted at a single medical college and hospital, which may limit the generalizability of the findings to other settings. Furthermore, the sample size of 78 twin pregnancies is relatively small, which could affect the statistical power and precision of the results. Further research with larger sample sizes and prospective designs is necessary to validate and expand upon these findings.

CONCLUSION

In conclusion, this study provides valuable insights into twin pregnancies, identifying maternal risk factors, and highlighting fetal complications. It emphasizes the importance of close monitoring and careful management throughout twin pregnancies to mitigate associated risks. The findings contribute to the existing knowledge on twin pregnancies and can aid in the development of effective management strategies to improve outcomes for both mothers and babies.

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REFERENCES

1. Siddalingappa H, Narayana Murthy MR, Kulkarni P, Ashok NC. Prevalence and factors influencing perinatal mortality in rural Mysore, India. *J Clin Diagn Res.* 2013;7(12):2796-99.
2. Christopher D, Robinson BK, Peaceman AM. An evidence-based approach to determining route of delivery for twin gestations. *Rev Obstet Gynecol.* 2011;4(3/4):109-16.
3. Smits J, Monden C. Twinning across the Developing World. *PLoS One.* 2011;6(9):e25239.
4. Sharma K. The twinning rates and epidemiological characteristics of births in southeast Uttar Pradesh, India. *Acta Genet Med Gemellol (Roma).* 1997;46(1):47-56.
5. Kagne S, Thawal Y, Tambe SK. Study of obstetric complications & outcome of twin pregnancy. *J Evolution Med Dent Sci.* 2014;3(53):12252-62.
6. McDowell S, Kroon B, Yazdani A. Clomiphene ovulation induction and higher-order multiple pregnancy. *Aust N Z J Obstet Gynaecol.* 2013;53(4).
7. Gardosi J. Toward safe standards for assessment of fetal growth in twin pregnancy. *Am J Obstet Gynecol.* 2017;431-3.
8. Vogel JP, Torloni MR, Seuc A, Betrán AP, Widmer M, Souza JP, et al. Maternal and perinatal outcomes of twin pregnancy in 23 low- and middle-income countries. *PLoS One.* 2013;8(8):e70549.
9. Mathew R, Wills V, Abraham J. Maternal determinants and fetal outcome of twin pregnancy: A five-year survey. *Int J Reprod Contracept Obstet Gynecol.* 2017;6:2459-65.
10. Su RN, Zhu WW, Wei YM, Wang C, Feng H, Lin L, et al. Maternal and neonatal outcomes in multiple pregnancies: A multicentre study in the Beijing population. *Chronic Dis Transl Med.* 2015;1(4):197-202.
11. Rezavand N, Veisi F, Malek-khosravi Sh, Zangeneh M, Kohzadi M. Assessment of frequency of twin pregnancy and neonatal outcome in deliveries of Mo'tazedi Hospital, Kermanshah in 2004-2007. *J Obstet Gynecol India.* 2014;64(1):19-22.
12. Konar H, Sarkar M, Paul J. Perinatal outcome of the second twin at a tertiary care center in India. *J Obstet Gynecol India.* 2016;66(6):441-7.

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