Research Article

CLINICAL PROFILE AND OUTCOME OF MULTIPLE BIRTHS IN A TERTIARY CARE CENTRE

Dr.C.Chandrasekaran[1], Dr.M.Manoj Kumar[2], Dr.Ramya[3], DrJ.Ganesh[4], Dr.Senthilprabhu[5]

[1]Associate Professor, Department of Pediatrics, Government Kilpauk Medical College, Chennai, Tamil Nadu, India
[2]Assistant Professor, Department of Pediatrics, Government RSRM Hospital, Stanley Medical College, Chennai, Tamil Nadu, India
[3]Senior Resident, Nandhivarman Medical College and Hospital, Walajabad – Sunguvar Chattiram Road, Kanchipuram. Tamilnadu, India
[4]Director and Professor, Institute of Social Paediatrics, Govt Stanley Medical College and Hospital,Chennai, Tamil Nadu, India
[5]Professor of Paediatrics, Institute of Social Paediatrics, Stanley Medical College and Hospital, Chennai, Tamil Nadu, India

OPEN ACCESS

Corresponding Author:

Dr. C. Chandrasekaran
Associate Professor, Department of Pediatrics, Government Kilpauk Medical College, Chennai, Tamil Nadu, India.

ABSTRACT

Background: Multiple births represent a high-risk obstetric and neonatal group, contributing disproportionately to preterm delivery, low birth weight, and neonatal morbidity. In the Indian setting, rising use of assisted reproductive technologies and referral of high-risk pregnancies to tertiary centres have increased the clinical burden of twin gestations admitted to neonatal intensive care units. Evidence describing outcome patterns stratified by chorionicity in such real-world settings remains limited.

Objectives: To describe the clinical profile and early neonatal outcomes of multiple births admitted to a tertiary care neonatal intensive care unit and to assess the influence of chorionicity on neonatal morbidity and mortality.

Methods: This prospective observational study was conducted over one year in the neonatal intensive care unit of a tertiary government teaching hospital in Chennai in the year 2023,Sixty twin pregnancies resulting in 120 neonates were enrolled. Maternal demographics, antenatal factors, chorionicity, delivery characteristics, and neonatal outcomes were documented systematically. Neonates were followed until discharge or death, and outcomes were analysed using descriptive and comparative statistical methods.

Results: Most mothers were aged 20–35 years and were primigravidae. Assisted reproductive techniques accounted for nearly one-third of twin pregnancies. Dichorionic diamniotic twins predominated, followed by monochorionic diamniotic gestations. Preterm birth was frequent, with the majority delivered before 37 weeks of gestation. A substantial proportion of neonates were small for gestational age. Respiratory distress syndrome, neonatal jaundice, apnea of prematurity, and sepsis were the most common morbidities. Adverse neonatal outcomes were more frequent among monochorionic twins. Overall, neonatal mortality was low and largely associated with extreme prematurity and growth restriction.

Conclusions: Twin pregnancies continue to pose significant neonatal risks, primarily driven by prematurity. Chorionicity remains an important predictor of early neonatal outcome, underscoring the need for chorionicity-based antenatal surveillance and optimized neonatal care.

Keywords: Multiple births, Twin pregnancy, Chorionicity, Neonatal outcomes, Prematurity, Tertiary care.

INTRODUCTION

Twin gestations are often discussed as a "high-risk group", but that label can feel too generic unless we name what actually drives the risk. The most consistent thread is prematurity. More than half of twin pregnancies deliver before 37 weeks in many settings, and this early delivery then pulls a chain of neonatal consequences behind it: respiratory morbidity, feeding intolerance, jaundice, sepsis risk, longer hospitalization, and repeated follow-up visits that families

may struggle to sustain [1,2]. In government tertiary hospitals in India, this matters in a very practical way because the same unit often receives both booked cases and late referrals, and the NICU becomes the point where antenatal complexity finally translates into neonatal workload.

Even so, gestational age alone does not explain everything. Clinicians often notice that two sets of twins born at similar weeks can behave very differently in the first few days of life. Chorionicity is one of the clearest biological reasons for this variation. Monochorionic twins share a placenta, and that shared circulation is not just an anatomical detail. It creates the possibility of unbalanced placental sharing and intertwin vascular connections, mechanisms that can shape growth patterns, haemodynamic stability, and vulnerability to complications—sometimes before labour even begins [3,4]. So, when chorionicity is missed or recorded late, risk stratification becomes blunt, and counselling tends to fall back on generalities.

This is why early determination of chorionicity is emphasised in modern obstetric imaging. First-trimester ultrasound markers (including the lambda/"twin-peak" sign and the T-sign) have been shown to identify chorionicity with good reliability when performed in the appropriate gestational window [5,6]. The clinical value is straightforward: once chorionicity is known, surveillance intensity, timing of follow-up scans, and anticipatory neonatal planning can be better matched to expected risk.

What remains less clear in many Indian public-sector settings is how strongly chorionicity maps onto early neonatal outcomes among babies who actually require NICU care. Much of the published evidence arises from environments with highly protocolised antenatal follow-up, which may not reflect on-ground realities where referral timing varies, and workload is heavy. Against this background, the present study was undertaken to describe the clinical profile and early neonatal outcomes of twin births admitted to a tertiary care NICU, and to examine how chorionicity relates to neonatal morbidity and mortality within this real-world care pathway.

MATERIALS AND METHODS
Study design and setting
This prospective observational study was conducted in the neonatal intensive care unit of a tertiary government teaching hospital in Chennai, Tamil Nadu. The hospital functions as a major referral centre for high-risk obstetric and neonatal cases from urban and peri-urban regions, ensuring a consistent inflow of complicated multiple gestations requiring specialised neonatal care.

Study period and population
Data were collected over 12 months, from January 2024 to December 2024. All twin neonates delivered during the study period and admitted to the neonatal intensive care unit were eligible for inclusion. Only live-born twins were considered for neonatal outcome analysis.

Eligibility criteria
All neonates born from twin pregnancies and admitted for neonatal intensive care during the study period were included, provided complete maternal, antenatal, delivery, and neonatal records were available. Pregnancies complicated by vanishing twin syndrome, cases with major congenital anomalies incompatible with life, neonates with incomplete records, and instances where parental consent was declined were excluded.

Data collection
Maternal and neonatal data were collected using a structured proforma specifically designed for the study. Maternal variables included age, gravidity, mode of conception, antenatal complications, and documented chorionicity based on antenatal ultrasound and placental findings. Delivery-related details such as gestational age at birth, fetal presentation, mode of delivery, liquor characteristics, fetal distress, and inter-twin delivery interval were recorded from obstetric case sheets.

Neonatal variables included sex, birth order, birth weight, gestational age category, Apgar scores, need for resuscitation, and growth status at birth. Neonates were monitored throughout their NICU stay for complications related to prematurity and early neonatal adaptation, including respiratory, metabolic, infectious, neurological, and gastrointestinal morbidities. Outcomes were documented until discharge or death.

Chorionicity classification
Twin pregnancies were categorised as dichorionic diamniotic, monochorionic diamniotic, or monochorionic monoamniotic based on antenatal ultrasound findings corroborated with delivery and placental examination records where available.

Outcome measures
The primary outcomes assessed were early neonatal morbidity and mortality. Secondary outcomes included duration of NICU stay and the distribution of neonatal complications across chorionicity groups.

Statistical analysis

Data were entered into Microsoft Excel and analysed using SPSS version 26. Categorical variables were expressed as frequencies and percentages. Associations between clinical variables and neonatal outcomes were evaluated using appropriate statistical tests, with significance assessed at standard confidence levels.

Ethical considerations

Approval for the study was obtained from the Institutional Ethics Committee prior to commencement. Written informed consent was obtained from parents or legal guardians before enrolment. Confidentiality of patient information was maintained throughout data collection and analysis.

RESULTS

Maternal profile and pregnancy characteristics

Most mothers were between 20 and 35 years of age, and primigravidae formed the largest subgroup. Assisted reproductive techniques accounted for nearly one-third of twin pregnancies. Anaemia was the most frequent maternal comorbidity, followed by gestational diabetes mellitus and gestational hypertension.

Table 1. Maternal and pregnancy characteristics among twin gestations (n = 60)

Variable	Category	n	%
Maternal age (years)	<20	5	8.0
	20–35	38	64.0
	>35	17	28.0
Gravidity	Primigravida	39	65.0
	Multigravida (G2–G4)	20	33.0
	Grand multigravida (≥G5)	1	2.0
Mode of conception	Spontaneous	42	70.0
	Assisted reproductive techniques	18	30.0
Maternal comorbidities	Anaemia	21	35.0
	Gestational diabetes mellitus	17	28.0
	Gestational hypertension	14	23.0

Figure 1. Distribution of maternal age among twin pregnancies
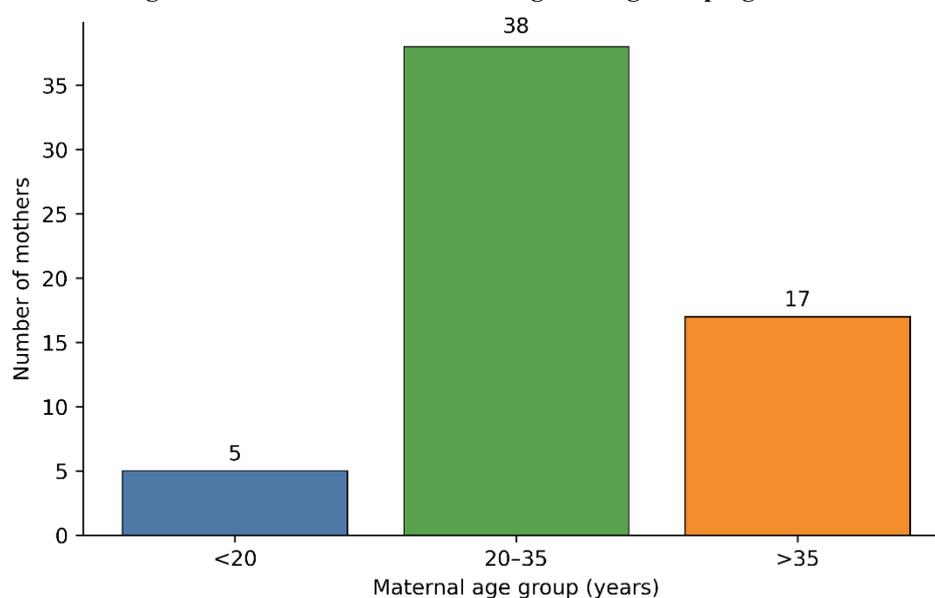
*Twin pregnancies were most common among mothers aged 20–35 years.*

Gestational age at delivery

Preterm birth was common in the study cohort. More than half of the twins were delivered between 34 and 37 weeks of gestation, while only a small proportion reached term.

Table 2. Gestational age distribution at birth among twin neonates (n = 60 pregnancies)

Gestational age	Number of twin pregnancies	%
<28 weeks	2	3.3
28–32 weeks	6	10.0
32–34 weeks	11	18.3
34–37 weeks	33	55.0
≥37 weeks	8	13.3

Figure 2. Gestational age at delivery among twin pregnancies
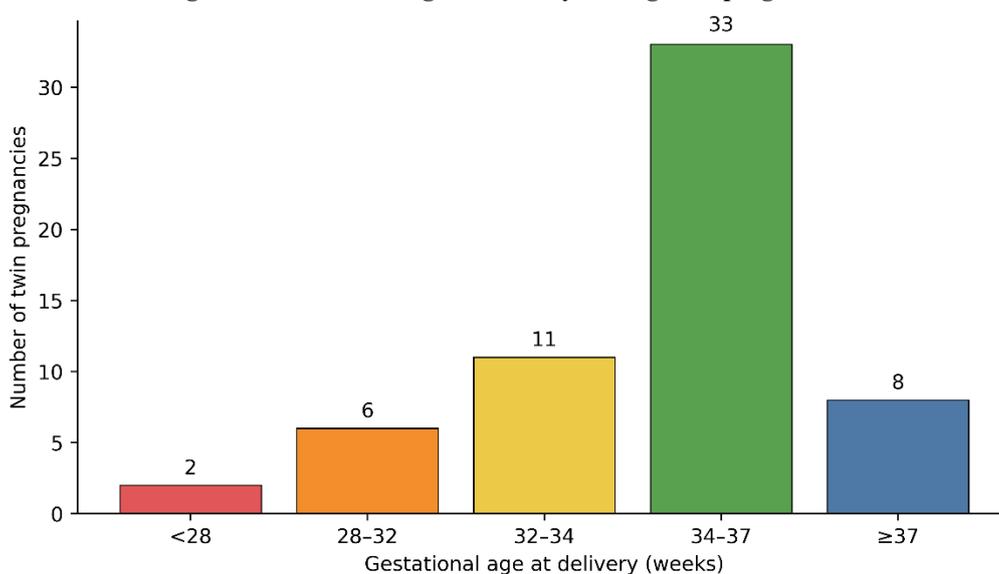
Late-preterm delivery (34–37 weeks) accounted for the majority of twin births.

Chorionicity distribution

Dichorionic diamniotic twins constituted the predominant placental type, while monochorionic twins represented nearly one-quarter of pregnancies.

Table 3. Chorionicity distribution in twin pregnancies (n = 60)

Chorionicity	n	%
Dichorionic diamniotic (DCDA)	45	75.0
Monochorionic diamniotic (MCDA)	14	23.0
Monochorionic monoamniotic (MCMA)	1	2.0

Figure 3. Chorionicity pattern among twin pregnancies
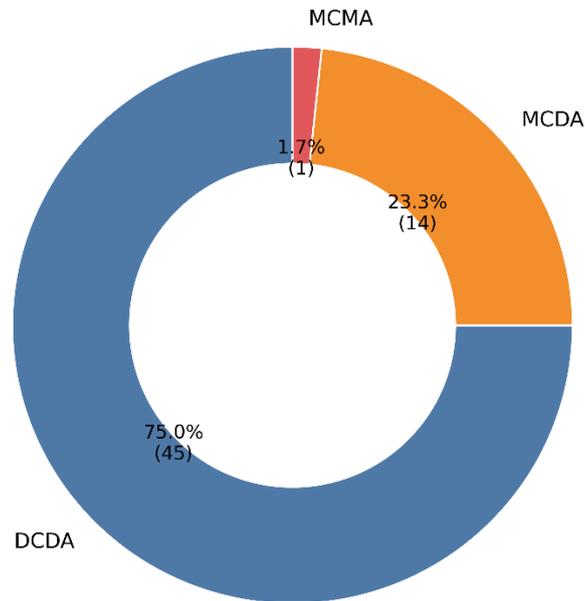
*DCDA twins predominated, with MCDA forming nearly one-quarter of cases.*

Birth weight and growth status

Low birth weight was common, and a substantial proportion of neonates were classified as small for gestational age at birth.

Table 4. Birth weight and growth status of twin neonates (n = 120 neonates)

Variable	Category	n	%
Birth weight	<2.5 kg	87	72.5
	≥2.5 kg	33	27.5
Growth status	Small for gestational age (SGA)	51	42.5
	Appropriate for gestational age (AGA)	63	52.5
	Large for gestational age (LGA)	6	5.0

Figure 4. Birth-weight distribution among twin neonates
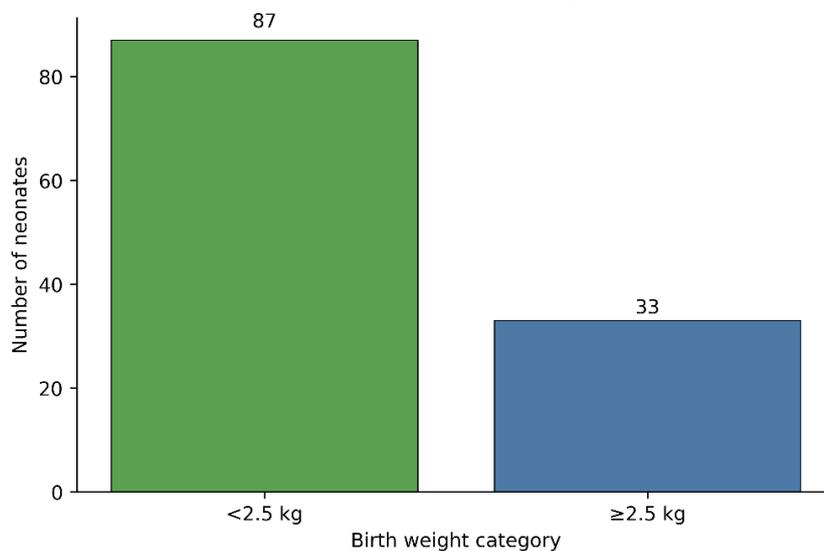
*Low birth weight (<2.5 kg) was frequent among twin neonates.*

Neonatal morbidity and early outcomes

Respiratory distress syndrome, neonatal jaundice, apnea of prematurity, and sepsis were the most frequent morbidities encountered during NICU stay. Overall, neonatal mortality was low and occurred mainly among extremely preterm and growth-restricted neonates.

Table 5. Major neonatal morbidities and outcomes among twins (n = 120 neonates)

Outcome	n	%
Respiratory distress syndrome	34	28.3
Neonatal jaundice	46	38.3
Apnea of prematurity	29	24.2
Sepsis	21	17.5
NEC	4	3.3
Neonatal death	7	5.9

Figure 5. Pattern of neonatal morbidities among twin neonates
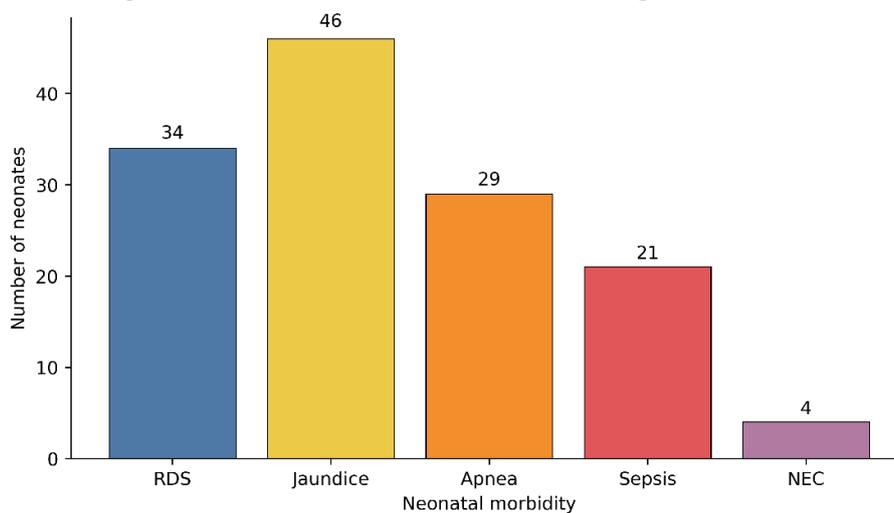
Prematurity-related complications formed the bulk of neonatal morbidity.

DISCUSSION

Twin pregnancies are usually identified as high risk early, but what that risk actually looks like is less clear when cases are followed day by day. In this cohort, outcomes did not separate cleanly at birth. Many neonates appeared stable initially. Complications accumulated later. This was seen repeatedly during the NICU stay rather than at delivery.

Prematurity shaped most of what followed. A large proportion of twins were delivered before 37 weeks, many in the late-preterm range. These infants often did not require immediate intensive intervention. Apgar scores were frequently acceptable. Respiratory support, feeding difficulty, jaundice, or apnea appeared later. This delayed expression of morbidity has been described before in twins and late-preterm neonates, where physiological immaturity becomes evident only with time [7,8].

Low birth weight and growth restriction were common, but their effects were inconsistent. Some small-for-gestational-age neonates progressed without major events. Others required prolonged support. Birth weight alone did not define outcome. What seemed different was tolerance. Smaller neonates crossed intervention thresholds earlier. Similar variability has been reported in studies where growth modifies vulnerability rather than acting as a direct predictor [9].

Chorionicity did not declare itself at birth. Monochorionic twins were not uniformly sicker in the delivery room. Differences became clearer later. Complications persisted longer. NICU stay extended. This pattern fits with the idea that shared placentation affects reserve rather than causing abrupt instability. Other studies have noted that monochorionicity alters the *course* of illness more than its onset [10,11].

At the same time, chorionicity did not operate independently. When gestational age and birth weight were considered, boundaries blurred. Large datasets have shown that mortality differences narrow after adjustment for prematurity [12]. The present findings suggest something similar. Chorionicity appears to add strain to an already vulnerable system rather than acting alone.

Neonatal mortality was low in this cohort. Deaths occurred mainly among extremely preterm and very low birth weight infants. Compared with older Indian reports describing higher twin mortality, this reflects changing neonatal care practices [13]. Survival, however, did not imply low burden. Length of stay varied widely. Resource use remained substantial.

Context matters. In public sector hospitals, twin pregnancies often arrive late. Antenatal optimisation is uneven. Chorionicity may not be documented early. Neonatal teams manage consequences rather than causes. Within this setting, gradual risk emergence is more relevant than early prediction [14].

This study has limitations. It reflects experience from a single centre. Follow-up was limited to the neonatal period. Longer observation would be needed to assess later outcomes. Still, the findings resemble everyday practice.

Overall, outcomes in twin pregnancies did not unfold suddenly. They evolved. Prematurity dominated. Chorionicity modified vulnerability. Differences appeared over time rather than at birth. Recognising this slow separation may help clinicians anticipate needs more realistically.

CONCLUSION

Twin pregnancies in tertiary neonatal units remain dominated by prematurity-related morbidity. In this study, adverse outcomes evolved during hospital stay rather than being evident at birth. Prematurity was the primary driver of neonatal risk, while chorionicity appeared to influence the persistence and progression of morbidity, particularly in monochorionic twins. Early recognition of these patterns may support better counselling, surveillance, and neonatal resource planning in multiple gestations.

REFERENCES

1. Blondel B, Macfarlane A, Gissler M, et al. Preterm birth and multiple pregnancy in European countries participating in the PERISTAT project. *BJOG.* 2006;113(5):528–535.
2. Luke B, Brown MB. Contemporary risks of maternal morbidity and adverse outcomes with increasing maternal age and plurality. *Fertil Steril.* 2007;88(2):283–293.
3. Hack KE, Derks JB, Elias SG, et al. Increased perinatal mortality and morbidity in monochorionic versus dichorionic twin pregnancies: clinical implications of a large Dutch cohort study. *BJOG.* 2008;115(1):58–67.
4. Lewi L, Van Schoubroeck D, Gratacós E, et al. Monochorionic diamniotic twin pregnancies: natural history and risk stratification. *Fetal DiagnTher.* 2010;27(3):121–133.
5. Dias T, Arcangeli T, Bhide A, et al. First-trimester ultrasound determination of chorionicity in twin pregnancy. *Ultrasound Obstet Gynecol.* 2011;38(5):530–532.
6. Sepulveda W, Sebire NJ, Hughes K, et al. The lambda sign at 10–14 weeks of gestation as a predictor of chorionicity in twin pregnancies. *Ultrasound Obstet Gynecol.* 1996;7(6):421–423.
7. Raju TNK, Higgins RD, Stark AR, Leveno KJ. Optimizing care and outcome for late-preterm infants: a summary of the workshop sponsored by the National Institute of Child Health and Human Development. *Pediatrics.* 2006;118(3):1207–1214.
8. Shah PS, Shah J. Late preterm birth: a systematic review of neonatal outcomes. *ActaPaediatr.* 2009;98(7):1154–1160.
9. Bernstein IM, Horbar JD, Badger GJ, et al. Morbidity and mortality among very-low-birth-weight neonates with intrauterine growth restriction. *Am J Obstet Gynecol.* 2000;182(1):198–206.
10. McPherson JA, Odibo AO, Shanks AL, et al. Impact of chorionicity on obstetric and neonatal outcomes in twin pregnancies. *Am J Obstet Gynecol.* 2012;206(4): 334.e1–334.e6.
11. Dube J, Dodds L, Armson BA. Does chorionicity or zygosity predict adverse perinatal outcomes in twins? *Am J Obstet Gynecol.* 2002;186(3):579–583.
12. Liu YC, Blair EM. Predicted birthweight for twin pregnancies adjusted for chorionicity and gestational age. *BJOG.* 2002;109(8):919–926.
13. Kumar VS, Jaiswal A, Gupta P, et al. Perinatal outcome of twin pregnancies in a tertiary care hospital of India. *J Clin Neonatol.* 2016;5(3):156–160.
14. Government of India. India Newborn Action Plan (INAP): Ministry of Health and Family Welfare. New Delhi, 2014.