Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/6vf9h666

COMPARATIVE ANALYSIS OF EARLY NEONATAL MORBIDITY IN LATE PRETERM VERSUS FULL-TERM BABIES BORN IN A RURAL AREA OF JHARKHAND

Dr Sanjay Kumar[1]*, Dr Nutan[2]

[1*,2]Assistant Professor, Department of Pediatrics, Laxmi Chandravansi Medical College and Hospital, Palamu, India

***Corresponding Author:** Dr Sanjay Kumar
*Assistant Professor, Department of Pediatrics, Laxmi Chandravansi Medical College and Hospital, Palamu, India

Abstract-
Introduction- Neonatal health complications are a major concern, particularly among late preterm infants who are physiologically less developed than full-term newborns. This study focuses on early neonatal morbidity in a rural area of Jharkhand, highlighting the importance of timely medical care and improved healthcare infrastructure to reduce complications in resource-constrained settings.
Material and method- This observational study was carried out in Laxmi Chandravansi Medical College and Hospital, Jharkhand. It included 32 late preterm (34–36 weeks) and 32 full-term (≥37 weeks) neonates. Data on neonatal complications were gathered through clinical evaluations and medical records. Statistical methods were used to analyze and compare morbidity patterns between the two groups.
Result- Morbidity was significantly higher in late preterm neonates. Late preterm neonates had significantly higher rates of hypoglycemia, hypothermia, jaundice, feeding difficulties, and respiratory morbidities compared to full-term neonates. While hypocalcemia and sepsis were more frequent in late preterm neonates, the differences were not statistically significant. Additionally late preterm neonates had significantly lower birth weight, higher weight loss, lower APGAR scores, and require longer hospital stays compared to full-term neonates.
Conclusion- The increased morbidity risk among late preterm neonates was observed, emphasizing the need for improved perinatal and postnatal care strategies in rural healthcare settings. These findings highlight the need for improved neonatal care, early detection of complications, and better healthcare strategies tailored to rural settings.

Keywords- Neonates, late preterm, full term, newborns, infants, morbidity etc.

Introduction

Neonatal morbidity is a significant concern in perinatal healthcare, with notable variations between late preterm and full-term infants. Late preterm neonates, born between 34 and 36+6 weeks of gestation, are at a heightened risk for complications such as respiratory distress, feeding difficulties, hypoglycemia, jaundice, and sepsis compared to full-term infants.[1] These health issues stem from physiological immaturity, making late preterm neonates more vulnerable to both immediate and long-term complications.[2] In rural areas such as Jharkhand, healthcare disparities, maternal nutrition deficiencies, and inadequate antenatal care further exacerbate neonatal health challenges. Research

suggests that rural populations experience higher neonatal morbidity due to limited medical resources, low socioeconomic status, and a lack of awareness regarding neonatal care.[3] Additional contributing factors include maternal health conditions, a high incidence of home births, and delays in accessing healthcare facilities. Understanding the differences in neonatal morbidity between late preterm and full-term infants in these settings is crucial for developing effective healthcare interventions and policies. Studies indicate that late preterm infants are more likely to require admission to neonatal intensive care units (NICUs), experience prolonged hospital stays, and face higher risks of respiratory and metabolic complications.[4] A significant concern is respiratory distress syndrome (RDS), which frequently occurs in late preterm infants due to immature lung development, often necessitating oxygen therapy or mechanical ventilation.[5] Furthermore, neonatal hypoglycemia in this population, if left untreated, may lead to severe neurological damage.[6] Other common health concerns include neonatal jaundice, infections, and feeding difficulties, all of which add to the overall burden on families and healthcare systems.

On the other hand, full-term infants, born between 37 and 42 weeks of gestation, typically have more developed organ systems, enabling better adaptation to life outside the womb. However, in resource-limited settings, even full-term neonates may encounter challenges such as low birth weight, perinatal asphyxia, and neonatal infections.[7] Rural healthcare settings, like those in Jharkhand, face additional barriers such as insufficient neonatal resuscitation facilities, a shortage of trained medical professionals, and financial limitations that hinder optimal neonatal care.[8] This study aims to address the research gap by analyzing and comparing early neonatal morbidities in late preterm and full-term infants born in a rural area in Jharkhand. By identifying the most common morbidities and associated risk factors, the study aims to enhance neonatal care strategies, improve early intervention programs, and reduce neonatal mortality and morbidity rates. The findings can provide valuable insights for healthcare professionals, policymakers, and maternal health programs, ultimately contributing to improved neonatal outcomes in rural communities.

Materials and Methods

This study employed a comparative observational approach and was done on late preterm and full-term babies born in a rural area of Jharkhand for around 6 months from October 2024 to April 2025 to compare early neonatal morbidities among them. Data collection was conducted at Laxmi Chandravansi Medical College and Hospital, Palamu, that provide maternal and neonatal care services. The study included late preterm neonates (34 to 36+6 weeks of gestation) and full-term neonates (37 to 42 weeks of gestation) born in the centre. Ethical clearance was obtained from the institutional ethics committee before commencing the study. A total of 64 participants comprising 32 late preterm and 32 full-term babies of both the genders were included in the study after securing informed consent from mothers before data collection. Eligibility for participation was determined based on specific inclusion and exclusion criteria. The study included singleton live births, neonates classified as late preterm or full-term at birth and infants whose mothers consented to participate in the study. Neonates diagnosed with major congenital abnormalities, infants born to mothers with severe medical conditions that could influence neonatal health outcomes (e.g., uncontrolled diabetes, severe infections) and neonates transferred to other medical facilities before full evaluation were excluded from the study.

Information was obtained from medical records, neonatal health assessments, and interviews with mothers. Gestational age was established using the last menstrual period (LMP) and confirmed with early obstetric ultrasound findings. The study documented common neonatal morbidities such as respiratory distress syndrome, jaundice, sepsis, feeding challenges, and hypoglycemia. The primary outcomes assessed were the frequency and severity of early neonatal morbidities in both groups. Secondary outcomes included duration of hospitalization, need for NICU admission, and required interventions for managing neonatal complications. All neonatal assessments and medical interventions adhered to standard clinical protocols to ensure the safety and well-being of participants. Data analysis was conducted using SPSS software. Descriptive statistics were utilized to summarize

demographic and clinical characteristics. The Chi-square test and t-test were employed to compare categorical and continuous variables, respectively. A p-value of less than 0.05 was considered statistically significant.

Result-

A total of 64 neonates were included in the study, comprising 32 late preterm and 32 full-term neonates of both the genders**.** The gender distribution was comparable between the two groups as seen in figure 1. Among late preterm neonates, 19 (59.4%) were male and 13 (40.6%) were female. Similarly, in the full-term group, 20 (62.5%) were male and 12 (37.5%) were female.

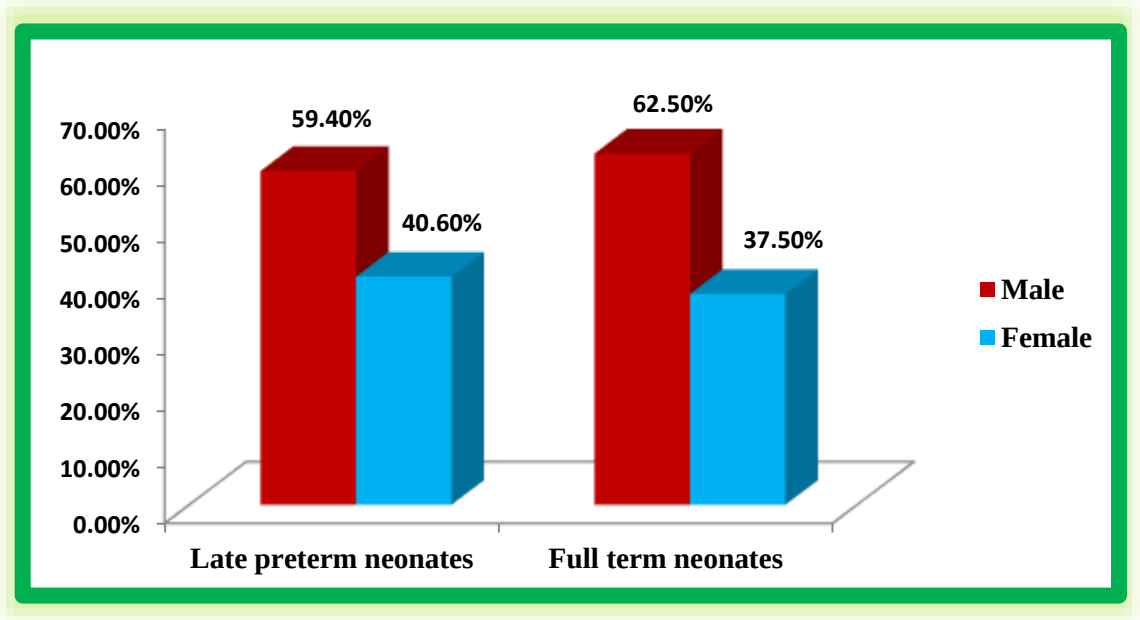

Figure 1-Sex distribution of late preterm and full term newborns

As shown in table 1, the proportion of neonates delivered via lower segment cesarean section (LSCS) was higher among late preterm neonates (62.5%) compared to full-term neonates (37.5%). Conversely, full-term neonates had a higher rate of normal vaginal delivery (62.5%) compared to late preterm neonates (37.5%). However, this difference was not statistically significant (p = 0.12). Study indicates that the late preterm neonates are at a significantly higher risk of developing early complications compared to their full-term counterparts as a significantly higher proportion of late preterm neonates experienced early neonatal morbidity (68.8%), compared to 31.3% in full-term neonates (p = 0.004). Mortality was observed in 2 late preterm neonates (6.3%), while no deaths were recorded among full-term neonates. However, the difference was not statistically significant (p = 0.15). As far as readmission rate is concerned, it was higher among late preterm neonates (15.6%) compared to full-term neonates (3.1%), and this difference was also not statistically significant (p=0.10).

Table 1- Comparison of different variables between late preterm and full term newborns.

Variable		**Late preterm neonates n(%)**	**Full-term neonates n(%)**	**p-value**
Type of delivery	NVD	12 (37.5%)	20 (62.5%)	0.12
	LSCS	20 (62.5%)	12 (37.5%)	
Any morbidity		22 (68.8%)	10 (31.3%)	**0.004**
Mortality rate		2(6.3%)	0(0.0%)	0.15
Readmission		5 (15.6%)	1 (3.1%)	0.10

Table 2 depicts the comparison of anthropometric and other clinical data between late preterm and full term neonates. Late preterm neonates were readmitted at a significantly later age (1.8 ± 0.6 weeks) compared to full-term neonates (1.2±0.4weeks, p=0.03). Late preterm neonates had a significantly longer hospital stay (6.2±1.5 days) than full-term neonates (3.1±1.2days, p<0.001). As far as weight is concerned, late preterm neonates had a lower weight at 72hours (1.98±0.4kg) compared to full-term neonates (2.7±0.3kg, p<0.001). Weight loss experienced by late preterm newborns was significantly greater (6.5±1.2%) than full-term neonates (4.2±1.0%, p=0.002). APGAR scores were significantly lower in late preterm neonates than full-term neonates at 1min (p=0.001) and 5 min p<0.001. At 1 minute, APGAR score of late preterm neonates was 6.5 ± 1.1 and of full-term neonates was 7.8 ± 0.9. At 5 minutes, late preterm neonates scored 8.1 ± 0.8 and full-term neonates scored 9.2 ± 0.5. Anthropometric measurements i.e. mean length (p<0.001) and mean head circumference (p<0.001) were significantly less in late preterm neonates than full-term neonates. Late preterm neonates had 45.2±2.5cm length and full-term neonates had 48.8±2.8cm. Mean head circumference was 32.1±1.6cm in late preterm neonates and among full-term neonates it was 34.2±1.4cm.

Table 2-Comparison of Anthropometric and clinical data of late preterm and full term newborns.

Variable	**Late preterm neonates (Mean±SD)**	**Full-term neonates (Mean±SD)**	**p-value**
Age at readmission (weeks)	1.8 ± 0.6	1.2 ± 0.4	**0.03**
Birth weight (Kgs)	2.1 ± 0.3	2.8 ± 0.4	**<0.001**
Gestation age (weeks)	35.5 ± 0.8	39.1 ± 1.2	**<0.001**
Duration of hospital stay (days)	6.2 ± 1.5	3.1 ± 1.2	**<0.001**
Weight at 72hrs (kgs)	1.98 ± 0.4	2.7 ± 0.3	**<0.001**
Weight loss (%)	6.5 ± 1.2	4.2 ± 1.0	**0.002**
APGAR score (1min)	6.5 ± 1.1	7.8 ± 0.9	**0.001**
APGAR score (5min)	8.1 ± 0.8	9.2 ± 0.5	**<0.001**
Length (cm)	45.2 ± 2.5	48.8 ± 2.8	**<0.001**
Head circumference (cm)	32.1 ± 1.6	34.2 ± 1.4	**<0.001**

Table 3 shows the comparison of different morbidities like hypoglycemia, hypothermia, jaundice, sepsis, feeding difficulty and respiratory morbidities between late preterm and full term newborns. Hypoglycemia was more common in late preterm neonates (21.9%) compared to full-term neonates (6.3%), with a statistically significant difference (p=0.045). Hypothermia had higher incidence in late preterm neonates (28.1%) than full-term neonates (9.4%), with a significant difference (p=0.04). Hypocalcemia was observed in 18.8% of late preterm neonates and 6.3% of full-term neonates, though the difference was not statistically significant (p=0.08). Jaundice was more frequent in late preterm neonates (43.8%) compared to full-term neonates (18.8%), and this difference was statistically significant (p=0.02). Sepsis was present in 18.8% of late preterm neonates and 6.3% of full-term neonates. However the difference was not statistically significant (p=0.08). Feeding difficulty was seen to be significantly higher in late preterm neonates (46.9%) compared to full-term neonates (15.6%) (p=0.005). As far as respiratory morbidities are concerned, it was more common in late preterm neonates (43.8%) than in full-term neonates (15.6%), with a statistically significant difference (p=0.01).

Table 3-Comparison of morbidities between late preterm and full term newborns.

Variable	Late preterm neonates n(%)	Full-term neonates n(%)	p-value
Hypoglycemia	7 (21.9%)	2 (6.3%)	**0.045**
Hypothermia	9 (28.1%)	3 (9.4%)	**0.04**
Hypocalcaemia	6 (18.8%)	2 (6.3%)	0.08
Jaundice	14 (43.8%)	6 (18.8%)	**0.02**
Sepsis	6 (18.8%	2 (6.3%)	0.08
Feeding difficulty	15 (46.9%)	5 (15.6%)	**0.005**
Respiratory morbidities	14 (43.8%)	5 (15.6%)	**0.01**

Discussion-

The findings of this study indicated that late preterm neonates experience significantly higher early neonatal morbidity compared to full-term neonates. The increased risk of hypoglycemia, hypothermia, jaundice, feeding difficulties, and respiratory morbidities among late preterm neonates highlights their vulnerability and the need for enhanced neonatal care strategies in rural healthcare settings. One of the most significant findings of this study was the increased incidence of hypoglycemia among late preterm neonates (21.9%) compared to full-term neonates (6.3%) (p=0.045). This is in agreement with the study by Manocha et al.[9] and Jaiswal, et al.[10] Although Sunil kumar et al.[11] found non-significant association. Hypoglycemia in late preterm neonates is commonly attributed to post-birth immature glycogen stores and metabolic adaptation challenges.[1] Studies have shown that hypoglycemia in neonates is associated with long-term neurodevelopmental impairments if not managed promptly.[12] Therefore, early screening and glucose monitoring in late preterm neonates is crucial. Similarly, hypothermia was significantly more prevalent in late preterm neonates than in full-term neonates. This can be explained by the inadequate thermoregulation capacity in late preterm neonates due to lower brown fat stores and immature skin barrier functions.[13] Our finding is in harmony with the study by Manocha et al.[9] and Mehta YP et al.[14] Hypothermia is known to increase the risk of metabolic derangements, respiratory distress, and infections.[15] The findings highlight the necessity of maintaining optimal thermal regulation strategies, particularly in resource-limited rural settings. Neonatal jaundice was also significantly higher among late preterm neonates compared to full-term neonates. The higher incidence is likely due to immature liver enzyme function and decreased hepatic clearance of bilirubin.[16] Our result is supported by many previous studies.[9-11,14] Late preterm neonates have a higher risk of severe hyperbilirubinemia, which can result in kernicterus if left untreated.[17] These findings stress the importance of routine bilirubin screening and early intervention strategies, such as phototherapy. Feeding difficulties were notably more frequent in late preterm neonates (46.9%) than in full-term neonates (15.6%) (p=0.005). This is in concordance with few previous studies. [9,11,14] Immature sucking and swallowing reflexes, along with delayed gut maturation, contribute to poor feeding in late preterm neonates.[18] Feeding difficulties can result in inadequate weight gain and increased risk of hospital readmissions.[19] Respiratory morbidities were significantly higher in late preterm neonates compared to full-term neonates. This finding is also in agreement with many prior studies. [9-11,14] Immature lung development, lower surfactant production, and delayed fetal lung fluid clearance contribute to increased respiratory distress in late preterm neonates.[20] Late preterm neonates are at a higher risk of conditions such as transient tachypnea of the newborn and respiratory distress syndrome.[21] These findings underscore the need for vigilant respiratory monitoring and early intervention, especially in rural settings with limited access to advanced neonatal care. Although not statistically significant, sepsis and hypocalcemia were observed more frequently in late preterm neonates. These findings are consistent with the study by Manocha et al. [9] suggesting an increased risk of infections and metabolic disturbances in late preterm infants due to immune system immaturity and calcium homeostasis imbalance.[4,22]

The significantly longer hospital stay for late preterm neonates compared to full-term neonates aligns with previous studies indicating a higher burden of complications requiring extended neonatal care.[23] The increased readmission rate also supports evidence that late preterm neonates face a higher likelihood of post-discharge complications.[24] Mortality rate of late preterm neonates was non-significantly higher than full term neonates. This finding is in agreement with the study by Sunil kumar et al. [11] Incidence of any morbidity was significantly higher in late preterm neonates than full term neonates. This result is in concordance with the study by Jaiswal, et al. [10] and Sunil kumar et al. [11] Type of delivery showed non-significant association in our study and is in contrast with the findings by Jaiswal, et al. [10] and Manocha et al. [9] Weight loss was significantly higher in late preterm infants than full term infants. This outcome is consistent with the study by Mehta YP et al.[14] Birth weight and length were significantly lower in late preterm infants than full term infants. This result is in harmony with the study by Mehta YP et al.[14] and Sunil kumar et al. [11] Weight at 72hrs was also found to be significantly lower in late preterm infants. This is consistent with the study by Mehta YP et al.[14] Late preterm newborns had significantly lower head circumference than full term newborns. Study by Sunil kumar et al. [11] reported similar findings. However this is in contrast to the findings by Mehta YP et al.[14] as they observed non-significant association. APGAR score at 1min and 5min was significantly lower in late preterm neonates than full term neonates. Study by Jaiswal, et al. [10] documented comparable results. However this is in disparity with the result revealed by Sunil kumar et al. [11] as they observed non-significant association.

Conclusion-

The present study compared early neonatal morbidity between late preterm and full-term infants in a rural region of Jharkhand and revealed notable differences in health outcomes. The increased morbidity risk among late preterm neonates was observed, emphasizing the need for improved perinatal and postnatal care strategies in rural healthcare settings. Late preterm newborns faced higher risks of respiratory distress, feeding challenges, hypoglycemia, and infections compared to their full-term counterparts. Early screening for hypoglycemia, hypothermia, and jaundice, along with enhanced breastfeeding support and respiratory monitoring, can significantly improve neonatal outcomes. These findings highlight the need for improved neonatal care, early detection of complications, and better healthcare strategies tailored to rural settings. Strengthening maternal and infant healthcare services, enhancing awareness, and ensuring timely medical support can significantly reduce neonatal morbidity and improve overall health outcomes in the region. Further research with a larger sample size and long-term follow-up is recommended to better understand the developmental outcomes of late preterm neonates.

Conflict of interest: None

Source of funding: Nil

References-

1. Engle WA, Tomashek KM, Wallman C. "Late-preterm infants: a population at risk." Pediatrics. 2007;120(6):1390-1401.
2. McKinlay CJD, Cutfield WS, Hofman PL. "Consequences of being born small for gestational age." J Intern Med. 2017;282(6):628-640.
3. Singh A, Pathak PK, Chauhan RK, Pan W. "Infant and child mortality in India in the last two decades: a geospatial analysis." PLoS One. 2011;6(11):e26856.
4. Wang ML, Dorer DJ, Fleming MP, Catlin EA. "Clinical outcomes of near-term infants." Pediatrics. 2004;114(2):372-376.
5. Jain L. "Respiratory morbidity in late-preterm infants: prevention is better than cure." Am J Perinatol. 2008;25(2):75-78.

6. Rozance PJ, Hay WW Jr. "Neonatal hypoglycemia—answers, but more questions." J Pediatr. 2012;161(5):775-776.
7. Lawn JE, Blencowe H, Oza S, et al. "Every newborn: progress, priorities, and potential beyond survival." Lancet. 2014;384(9938):189-205.
8. Kumar V, Shearer JC, Kumar A, Darmstadt GL. "Neonatal hypothermia in low-resource settings: a review." J Perinatol. 2009;29(6):401-412.
9. Manocha et al., Comparative study of early neonatal morbidities of late preterm and term neonates, IJSR, Volume 10, Issue 3, March,2021, Page 23-25, DOI : 10.36106/ijsr
10. Jaiswal, et al. Early neonatal morbidities in late preterm infants, Indian pediatrics, Volume 48, August, 2011, page 607-611.
11. Sunil kumar et al., Comparison of Early Neonatal Morbidity and Mortality in Late Preterm Vs Term Neonates Indian Journal of Trauma and Emergency Pediatrics Vol 7, April - June 2015
12. Adamkin, D. H. (2016). Postnatal glucose homeostasis in late-preterm and term infants. Pediatrics, 138(6), e20163149.
13. Laptook, A. R., Salhab, W., & Bhaskar, B. (2013). Admission temperature of low birth weight infants: Predictors and associated morbidities. Pediatrics, 131(3), e643-e651.
14. Mehta YP, Naik MB, Putrevu K. Early neonatal morbidities in late preterm compared to term neonates born in a tertiary care private hospital. Int J Contemp Pediatr 2020;7:565-70.
15. WHO. (2017). Thermal protection of the newborn: A practical guide. WHO Press.
16. Bhutani, V. K., Johnson, L. H., & Keren, R. (2013). Diagnosis and management of hyperbilirubinemia in the term neonate. Clinics in Perinatology, 40(2), 217-231.
17. Maisels, M. J., & Watchko, J. F. (2016). Jaundice in healthy late preterm and term infants: Guidelines for detection and management. Pediatrics in Review, 37(11), 451-463.
18. Meier, P. P., Patel, A. L., Wright, K., & Engstrom, J. L. (2013). Management of breastfeeding in very low birth weight infants. Clinics in Perinatology, 40(1), 227-245.
19. Pineda, R., Dewey, K., Jacobsen, A., & Smith, J. (2019). Predictors of exclusive breastfeeding in late preterm infants. Journal of Human Lactation, 35(4), 693-701.
20. McIntire, D. D., & Leveno, K. J. (2008). Neonatal mortality and morbidity rates in late preterm births compared with births at term. Obstetrics & Gynecology, 111(1), 35-41.
21. Shapiro-Mendoza, C. K., & Lackritz, E. M. (2012). Epidemiology of late and moderate preterm births. Seminars in Fetal and Neonatal Medicine, 17(3), 120-125.
22. Jain, L., & Cheng, T. (2006). Birth-related lung injury: Epidemiology and pathophysiology. Seminars in Neonatology, 11(4), 236-245.
23. Raju, T. N. K., Higgins, R. D., Stark, A. R., & Leveno, K. J. (2006). Optimizing care and outcome for late-preterm (near-term) infants: A summary of the workshop sponsored by the National Institute of Child Health and Human Development. Pediatrics, 118(3), 1207-1214.
24. Escobar, G. J., Clark, R. H., & Greene, J. D. (2006). Short-term outcomes of infants born at 35 and 36 weeks gestation: We need to ask more questions. Seminars in Perinatology, 30(1), 28-33.