

ORIGINAL RESEARCH

Early morbidities of the late preterm and early term infants compared to full term infants: A prospective cohort study from a tertiary care centre

¹Sumit Kumar Singhi, ²Apurva Kawadiya, ³Pragya Mehta, ⁴Swati Mulye, ⁵Gaurav Mogra

¹⁻⁵Department of Paediatrics, Sri Aurobindo Medical College and PGI, Indore, MP, India

Corresponding author

Apurva Kawadiya

Department of Paediatrics, Sri Aurobindo Medical College and PGI, Indore, MP, India

Received: 21 November, 2023

Accepted: 23 December, 2023

ABSTRACT

Introduction– Prematurity accounts for about 10.6% of neonates worldwide. It is also the main cause of an estimated one million neonatal deaths globally every year. Studies have shown increased risk for poor neonatal and developmental outcomes associated with late preterm birth. Another vulnerable group that has been identified is that of the infants born between 37 to 38 completed weeks i.e. the early term infants. This study aims to compare these two groups with the full term infants. **Aims and objectives** - To identify and compare the early morbidities in late preterm, early term and full-term neonates including hypoglycemia, hypothermia, oxygen requirement, need for resuscitation, hyperbilirubinaemia, sepsis, feeding difficulties and duration of hospital stay. **Method**– This was a prospective cohort study conducted in Paediatric department at tertiary care centre from central India. Study was undertaken for a period of 18 months after approval from the ethical committee i.e.; from 1st April 2021 to September 2022. All inborn late preterm, early term and full term neonates were included. Neonates with major congenital anomalies and parents not giving consent were excluded. **Results** - A total of 271 neonates with 119 late preterm, 90 were early term and 62 were full term. Morbidities like hypoglycemia, hypothermia, hyperbilirubinemia, sepsis, requirement for NICU admission, oxygen requirement, need for resuscitation, prolonged duration of hospital stay, feeding difficulties were significantly associated with the late preterms than term infants. Hypothermia and hypoglycemia were reported with early term compared to full term infants. **Conclusion** - Late preterm and even early term births should be avoided whenever possible. These at-risk babies should be closely monitored for comorbidities, to ensure timely intervention and prevention of complications.

Keywords: Late preterm, Early term, Full term, Early morbidities

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INTRODUCTION

Prematurity accounts for about 10.6% of neonates worldwide and 13% in India. It is also the main cause of an estimated one million neonatal deaths globally every year. Studies have shown increased risk for poor neonatal and developmental outcomes associated with late preterm birth. Another vulnerable group that has been identified is that of the infants born between 37 to 38 completed weeks i.e. the early term infants. The difference between late preterm infants and infants born at term is that term infants have fewer severe neonatal complications and less long-term neurological outcomes.^{1,2} Therefore, late preterm birth has increased risk of morbidities such as respiratory distress syndrome (RDS), hyperbilirubinemia, hypoglycemia, feeding difficulties, hypothermia, high risk for sepsis,

seizures, anemia, intraventricular hemorrhage (IVH), and necrotizing enterocolitis. Various long-term complications are also identified including poor growth, learning and developmental disorder, cognitive delay etc.^{1,2}

On long term follow up studies, late preterm infants had increased rates of hospital readmission in the first year of their life and longer hospital stay compared to infants born at term. Presence of morbidities in late preterm infants can affect their feeding pattern and feeding strategies. Feeding difficulties in late preterm infants can be due to maternal and neonates causes for example ineffective breastfeeding behaviors and delayed onset of lactation. Immature sucking and swallowing reflex in late preterm infants can lead to feeding difficulties and this will later affect their weight gain pattern.³ This study aims to compare

these two groups with the full term infants.

OBJECTIVE

To identify and compare the early morbidities in late preterm and early term with full-term neonates including hypoglycemia, hypothermia, oxygen requirement, need for resuscitation, hyperbilirubinaemia, sepsis, feeding difficulties and duration of hospital stay.

MATERIAL AND METHODS

The present prospective cohort study was undertaken at Pediatric Department at a tertiary care teaching hospital of Sri Aurobindo Medical College & Postgraduate Institute, Indore (M.P.). It included 271 neonates (late preterm, early term and full term) born over a period of 18 months from April 2021 to September 2022. Neonate with major congenital anomalies and parents not giving consent were excluded from the study. Written informed consent from the parent/guardian of the patients and clearance from the institutional ethical committee was obtained. After enrolment, neonates were classified into three groups based on gestational age.

Gestational age was calculated on the basis of

mother's 1st day of last menstrual period or confirmatory ultrasonography of 1st trimester. If neither was available, new ballard score was used to estimate gestational age. Especially designed pre-structured proforma were used for collecting the data. Statistical software, SPSS version 20.0 was used for statistical analysis. Student T test were used to compare quantitative data if data found to be normal. The association between qualitative data was shown by Chi square test value less than 0.05 was considered significant.

RESULTS

A total of 271 neonates with 119 late preterm, 90 were early term and 62 were full term analysed. Baseline characteristics were comparable in the respective groups (table 1). Morbidities including hypoglycemia, hypothermia, hyperbilirubinemia, sepsis, requirement for NICU admission, oxygen requirement, need for resuscitation, prolonged duration of hospital stay and feeding difficulties were significantly associated with late preterms than term infants (Table 2) Hypothermia and hypoglycemia were reported with early term compared to full term infants (Table 3)

Table 1. Baseline Characteristics

Group	Late Preterm	Early Term	Full Term	
Total No.	119	90	62	
Mean Birth Weight	2.146	2.596	2.899	
Gender	Male	64(53.8%)	42(46.6%)	34(54.8%)
	Female	55(46.2%)	48(53.4%)	28(45.2%)

Table 2. Early comorbidities compared between late preterm and full term

Comorbidities	Late Pre term (n=119)	Full term (n=62)	P -value	Result
Hypoglycemia	20(16.8%)	0(0%)	0.000	Sign
Hypothermia	14(11.84%)	0(0%)	0.000	Sign
Hyperbilirubenemia	32(26.9%)	8(12.9%)	0.017	Sign
Sepsis	24(20.2%)	3(4.8%)	0.001	Sign
NICU Admission	37(31.3%)	7(12.5%)	0.002	Sign
O2 Requirement	32(26.9%)	6(9.7%)	0.001	Sign
Need of resuscitation	21(19.4%)	4(7%)	0.017	Sign
Prolonged hospital stay	16(14.8%)	2(3.6%)	0.008	Sign
Feeding difficulties	40(32%)	2(3.6%)	0.000	Sign

Table 3. Early comorbidities compared between Early term and full term

Comorbidities	Early term (90)	Full term (62)	P -value	Result
Hypoglycemia	4(4.4%)	0(0.0)	0.041	Sign
Hypothermia	5(5.6%)	0(0.0)	0.021	Sign
Hyperbilirubinemia	12(13.3%)	8(2.9%)	0.938	Non sign.
Sepsis	7(2.8%)	3(4.81%)	0.454	Non sign.
NICU Admission	10(11.1%)	7(12.5%)	0.775	Non sign.
O2 Requirement	7(8.4%)	6(9.7%)	0.449	Non sign.
Need of resuscitation	6(7.2%)	4(7.1%)	0.985	Non sign.
Prolonged hospitalization	2(2.4%)	2(3.6%)	0.698	Non sign.
Feeding difficulties	7(8.4%)	2(3.6%)	0.216	Non sign.

DISCUSSION

There is a steady increase in the late preterm birth rate in last decade. Of late, preterm infants born between 34-37 weeks have been identified as at risk infants for various common short term and long term morbidities. Indian data for this group is limited. An understanding of these morbidities will help us anticipate and manage complications in late preterms. Another set of vulnerable infants ie early term infants have been identified. This group comprises babies born between 37 to 38+6 weeks. Although these babies are born at term, their outcome may not be as good as a full term baby. There is limited literature available for this group of babies. Identification of their morbidities may help in judicious planning of elective deliveries both caesareans as well as induced vaginal deliveries.

One of the most common morbidity identified in our study was that of hypoglycaemia. This could be secondary to various mechanisms and risk factors like low glycogen stores, immaturity of enzymes involved in glucose release, poor feeding, cold stress and infection. The physiologic postnatal decrease in blood glucose concentration is also higher in preterm infants. In our study, we found that proportion of hypoglycemia was significantly higher in late preterm group (16.8%) when compared with full term($p=0.000$). Similar result was found when we compared early term and full-term groups($p=0.041$). The results of our study were concurrent with studies done by Wang et al. and Bolut et al⁴. Wang et al⁵, reported that hypoglycemia occurred in 16% of late preterm compared with 5.3% in term infants. Bolut et al⁴ in their study concluded that hypoglycemia was twice as common in late preterm infant.

Hypothermia is another short-term clinical consequence prevalent in late preterm neonates. Large surface area when compared to body weight, immature insulation, low amount of both brown and white fat, immaturity in thermogenesis and inefficient compensatory mechanisms make late preterm infants more prone for hypothermia. It was observed in the present study that proportion of hypothermia was significantly higher in late preterm neonates(11.8%). Also, a statistically significant correlation was observed between prevalence of hypothermia in early term neonates when compared with full term($p=0.021$). The results of study were comparable to studies done by Wang et al⁵ and Mehta YP et al⁶ showing late 20 %preterm and 1 % full term ($p < 0.01$) suffer from hypothermia.

Risk of infection is more in preterm infants due to immature immunological system and more number of interventions. In our study the rate of sepsis was nearly five times in late preterm than full term infants (20.2% vs 4.8%). No significant difference was found when early term infants were compared with full term. Results were concurrent with studies done by Bolut et al⁴ and Mehta YP et al⁶. Also, Teune MJ et al⁷ in their study found that late preterm were reported to have a

fourfold increased risk of undergoing sepsis evaluations and a fivefold higher risk of culture positive infections, compared with their term counterparts. Haroon et al⁸ also in their study found that 4.9% of late preterms had confirmed sepsis in comparison to 0.3% of term infants.

In our study, 26.9% of late preterm developed hyperbilirubinemia which is significantly higher as compared to full-term group (12.9%). Inadequate conjugation by immature liver and feeding difficulties leading to increase in enterohepatic circulation further increase the risk of jaundice in this group. The results of our study were comparable to study done by Wang et al⁵ who reported very high rates of jaundice in their cohort of late preterm (54% late preterm vs 38% term). Also, Bhutani et al⁹ observed that significant number of late preterm developed kernicterus and experienced higher rates of sequelae from hyperbilirubinemia. Early term infants had higher incidence of hyperbilirubinemia compared to term infants although it was not statistically significant, due to the low sample size.

Feeding problems are quite common in late preterm as compared to term infants and it is one of the leading cause for rehospitalization secondary to poor weight gain and dehydration. In our study 32% of late preterm, 8.4% of early term and 3.6% of full term reported feeding difficulties. On comparison results were statistically significant between late preterm and full term ($p=0.000$). The results of our study were comparable to studies done by Mehta YP et al⁶, in their study 32% late preterm had feeding difficulties which were significantly higher than term neonates. In the similar study 16% of late preterms required parenteral nutrition compared to 4% of term babies. This can be explained by poor suck-swallow coordination, suboptimal oral motor skills and immature gut motility.

Need for NICU admission increases as gestational age decreases. In our study NICU admission rates were 31.3% in late preterm and 12.5% in full term group. The results were higher compared to study done by Bolut et al⁴, where 17.5% of late preterm infants and 6.5% of term infants were hospitalized. Engle et al¹⁰ reported NICU admission rates of 88%, 54% and 25% for babies born at 34, 35, 36 weeks respectively.

Respiratory morbidities leading to need for oxygen support was found to be higher in late preterm (26.7%) infants compared to term infants (9.7%) in present study. Likewise, Selvan et al¹¹ showed that respiratory distress was seen in 17.5% of late preterm compared to 1.3% of term babies. Respiratory morbidities are because of delayed fluid clearance, surfactant deficiency and more risk of infections. Risk of RDS increases with decrease in gestational age is well established in various studies Gupta et al¹².

Prolonged duration of hospital stay (>7 days) was found in 14.8% of late preterms, 2.4% of early term and 3.6% of full term. Results were significant when late preterm was compared with full-term group

($p=0.008$). Bulut et al⁴, in his studies found that median hospitalization duration of late preterm infants was 7 days (4-11 days) whereas it was 4 (2-8) days for term infants. This is mainly due to more risk of respiratory morbidities, sepsis and feeding difficulties. Modi et al¹³, also observed in their study that while 42% of late preterm infants required admission for 3-7 days, only 28% of term infants needed the same duration of hospitalization.

CONCLUSION

The study highlights late preterm and early term infants as a vulnerable group associated with significant morbidities. They need close monitoring for these conditions to ensure timely intervention and prevention of complications. Furthermore, planning of elective deliveries should be done at full term only.

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