

## A Hospital Based Descriptive Epidemiological Study of Early Neonatal Morbidity in Late Preterm

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Conflict of interest: Nil

### Abstract

**Aim:** The aim of the present study was to assess variables such as respiratory distress, hypoglycaemia, probable and proven sepsis and hyperbilirubinemia, in the first week of life, and the risk of these morbidities as the gestational age regresses compared to the full-term newborns.

**Methods:** The present study was conducted in the Upgraded Department of Pediatrics, Patna Medical College and Hospital, Patna, Bihar, India from January 2012 to December 2012

**Results:** Out of 1470 newborns included, there were 1341 term infants (91.22%) and 129 late preterm (8.77%). Most of the term infants are adequate for gestational age, most of the late preterm are small for gestational age. Majority of the risk factors were preterm labour followed by PROM and hypertensive disorders. 16.2% of late preterms have respiratory distress compared to 1.26% of term infants which is statistically significant and they are 15 times more likely to develop respiratory distress compared to the term infants. 9.3% of late preterms have hypoglycemia compared to 1.26% in term infants which is statistically significant and they are 8 times more likely to develop hypoglycaemia compared to the term infants 14.7% of late preterms have probable sepsis compared to 1.71% in term infants which is statistically significant they are 10 times more likely to develop probable sepsis compared to the term infants 5.4% of late preterm had proven sepsis compared to 0.82% of term infants which is statistically significant, and they are 7 times more likely to develop sepsis compared to the term infants. 39.5% of late preterms have hyperbilirubinemia compared to the 12.3% in term infants which is statistically significant, and late preterm have 4 times more risk of developing hyperbilirubinemia than term infants.

**Conclusion:** Late preterm infants are more likely to develop proven sepsis compared to the term infants. The risk increases with decreasing gestational age, with those born at 34 weeks having an eleven times greater risk than a term newborn. Considering significant morbidity in late preterm compared to the term infants they must be considered as preterm infants and need to be monitored carefully. Appropriate discharge criteria and discharge advice, follow up plan are required for late preterm infants.

**Keywords:** early neonatal morbidity, late preterm

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### Introduction

Late preterm infants (34 0/7 through 36 6/7 weeks of gestation) are physiologically less mature and have limited compensatory responses to the extra-uterine environment, compared with term infants. Although late preterm infants are the largest subgroup of preterm infants, there has been little research on this group until recently. This is mainly because of labeling them as “near-term”, thus being looked upon as “almost mature,” with little need to be concerned. However, recent research has revealed a contrary trend. [1-4]

While serious morbidities are rare, the late preterm group has 2 to 3 fold increased rates for mild to moderate morbidities, such as hypothermia,

hypoglycemia, delayed lung fluid clearance and respiratory distress, poor feeding, jaundice, infection, and readmission rates after initial hospital discharge. [1] As the late preterm subgroup accounts for nearly 10% of all births, even a modest increase in any morbidity will have a huge impact on the overall health care resources. Thus, it is not surprising that the absolute number of late preterm infant being admitted to NICUs has been increasing worldwide. Only few studies have been conducted to assess the neonatal morbidity and mortality in late preterm infants. [1-4]

The American Academy of Pediatrics and The American College of Obstetrics and Gynaecology

also consider the same definition. [5] In 2005, NICHD, proposed the definition of late Preterm infants as those born between 340/7 to 366/7 weeks of gestation. [5] These babies were previously termed as “near term” as they are apparently mature and with comparable birth weight to that of term babies. This is however deceitful as they are triaged and managed as term babies though they are less mature both physiologically and metabolically, and have higher risk of complication than term infants. In United States there was an increase in preterm birth rate from 9.1% (1981) to 12.3% (2003) an increase of 3.1%. Mostly it was due to an increase in the proportion of late preterm births. The primary reason is early deliveries of high risk pregnancy so as to prevent sudden and unexpected foetal complication. [6] Recently, many studies have been conducted in western hemisphere, which prove the vulnerability of late preterm infants to short term morbidities as well as high rate of readmission to hospital. [7-9]

The aim of the present study was to assess variables such as respiratory distress, hypoglycaemia, probable and proven sepsis and hyperbilirubinemia, in the first week of life, and the risk of these morbidities as the gestational age regresses compared to the full term newborns.

**Materials and Methods**

The present study was conducted in the Upgraded Department of Pediatrics, Patna Medical College and Hospital, Patna, Bihar, India January 2012 to December 2012

**Inclusion Criteria:** All late preterm (34 0/7-36 6/7 weeks) and Term infants born in the hospital

**Exclusion Criteria**

- Newborns with major congenital anomalies.
- Newborns with clinically identified chromosomal syndromes.
- All out born newborns admitted in our hospital.
- All term and late preterm born satisfying the inclusion criteria were included in the study.

Informed consent was obtained from the parents. Data was collected from the parents and case sheets. Maternal details included last menstrual period, risk factors like hypertension, antepartum haemorrhage, and premature rupture of membranes. Newborn details included birth weight, gestational age, morbidity variables discussed below.

All these details collected were entered into the proforma sheet followed by entry into the excel sheet. All these infants were observed for the morbidities explained below during the hospital stay. New born is considered as late preterm if it is born at 34 0/7 through 36 6/7 weeks according to the AAP guidelines. Gestational age for the late preterm is assessed by

- LMP
- First trimester ultrasound abdomen or
- New Ballard’s scoring

Both the term and late preterm are classified as AGA/SGA/LGA by Fenton’s chart.

Statistical Analysis: Data was entered into Microsoft excel data sheet and was analysed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions.

**Results**

**Table 1: Distribution based on Term and late preterm**

Variables	Frequency	Percentage
Term	1341	91.22%
Late preterm	129	8.77%

Out of 1470 newborns included, there were 1341 term infants (91.22%) and 129 late preterm (8.77%).

**Table 2: Distribution based on Gestational age**

Gestational age	Frequency	%
34 0/7-34 6/7 weeks	24	1.6
35 0/7-35 6/7 weeks	31	2.1
36 0/7-36 6/7 weeks	74	5.03
37 0/7-37 6/7 weeks	394	26.8
38 0/7-38 6/7 weeks	372	25.3
39 0/7-39 6/7 weeks	339	23.06
40 0/7-41 6/7 weeks	235	15.9

**Table 3: Distribution of A/L/S across gestational status**

A/L/S	LPT	%	Term	%
AGA	86	66.67	1190	88.75
LGA	3	2.33	10	0.74
SGA	40	31	141	10.51
Total	129		1341	

Most of the term infants are adequate for gestational age, most of the late preterm are small for gestational age.

**Table 4: Maternal risk factors associated with preterm**

Maternal risk factors	Frequency	Percentage
PROM	30	24.1
Preterm labour	39	31.4
Hypertensive disorders	31	24.1
Bad obstetric History	12	9.6
Abruption	3	2.4
APH	3	2.4
Oligohydramnios	3	2.4
Polyhydramnios	3	2.4

Majority of the risk factors were preterm labour followed by PROM and hypertensive disorders.

**Table 5: Distribution of morbidity across LPT and Term**

RDS	Yes	No	Frequency	P Value	OR
LPT	21	121	16.2%	0.0001	15.1
Term	17	1324	1.26%		
<b>Hypoglycaemia</b>					
LPT	12	117	9.3%	0.0001	7.98
Term	17	1324	1.26%		
<b>Probable sepsis</b>					
LPT	19	110	14.7%	0.0001	9.89
Term	23	1318	1.7%		
<b>Proven Sepsis</b>					
LPT	7	122	5.4%	0.0001	6.93
Term	11	1330	0.82%		
<b>Hyperbilirubinemia</b>					
LPT	51	78	39.5%	0.0001	4.6
Term	166	1175	12.3%		

16.2% of late preterms have respiratory distress compared to 1.26% of term infants which is statistically significant and they are 15 times more likely to develop respiratory distress compared to the term infants. 9.3% of late preterms have hypoglycemia compared to 1.26% in term infants which is statistically significant and they are 8 times more likely to develop hypoglycaemia compared to the term infants. 14.7% of late preterms have probable sepsis compared to 1.71% in term infants which is statistically significant they are 10 times more likely to develop probable sepsis compared to the term infants. 5.4% of late preterm had proven sepsis compared to 0.82% of term infants which is statistically significant, and they are 7 times more likely to develop sepsis compared to the term infants. 39.5% of late preterms have hyperbilirubinemia compared to the 12.3% in term infants which is statistically significant, and late preterm have 4 times more risk of developing hyperbilirubinemia than term infants.

### Discussion

There has been a lot of interest in the late pre-term infants in the recent years. They have been called as the near term infants as they were closer to the term gestation. They have been seen as almost mature

infants requiring no attention as the term infants. [10] The Workshop panel intended to coin the infants born from 34 0/7 to 36 6/7 weeks of gestation as late preterm instead near term, owing to the immaturity of these infants. [11] Advances in neonatology have improved the focus on extreme preterm newborns diverting away from the late preterm who are prone to have 2 to 3 times [12] more morbidity compared to the term infants. Studies in the near past has found an increasing number of this subset of neonates due to raise in the pregnancy related complications such as increasing maternal age, and other maternal morbid conditions such as hypertension, abruption placenta, diabetes, oligohydramnios, infertility. [13]

Out of 1470 newborns included, there were 1341 term infants (91.22%) and 129 late preterm (8.77%). Most of the term infants are adequate for gestational age, most of the late preterm are small for gestational age. Majority of the risk factors were preterm labour followed by PROM and hypertensive disorders. 16.2% of late preterms have respiratory distress compared to 1.26% of term infants which is statistically significant and they are 15 times more likely to develop respiratory distress compared to the term infants. Late preterm births account for

about 9% of term and late preterm infants at our hospital. In a prospective cohort study by Jaiswal et al., 2010 had 11.2% of late preterm births. Similarly study by Donald D. et al., 2008 had 9% late preterm births. In study at United States by Cande V. Ananth et al., which is a population based study in 2008 found late preterm births to be around 7.5%. [14-16] So it is essential to look upon this group as this population was found to be prone to neonatal morbidity like a preterm infant than a term infant.

A Study by Melamed et al [17] found a 30 fold increase in infectious morbidity which was more than our study. Higher incidence of infection reported may be due to the difference in the population and the definition of morbidities. In a previous study it was found that maternal complications such as chorioamnionitis and premature rupture of membranes contribute to the infectious morbidity in late preterms. This study did not specifically look at maternal risk factors. [18] 9.3% of late preterms have hypoglycemia compared to 1.26% in term infants which is statistically significant and they are 8 times more likely to develop hypoglycaemia compared to the term infants 14.7% of late preterms have probable sepsis compared to 1.71% in term infants which is statistically significant they are 10 times more likely to develop probable sepsis compared to the term infants 5.4% of late preterm had proven sepsis compared to 0.82% of term infants which is statistically significant, and they are 7 times more likely to develop sepsis compared to the term infants. 39.5% of late preterms have hyperbilirubinemia compared to the 12.3% in term infants which is statistically significant, and late preterm have 4 times more risk of developing hyperbilirubinemia than term infants.

In a Study by Jamie et al [19] 40.6% of late preterm had hyperbilirubinemia compared to 9.7% term new-born. In a retrospective study by found 25.35% of late preterm infants had hyperbilirubinemia compared to 2.5% of the term infants. In a retrospective study done in a well infant population of 35-36 weeks, 36-37 weeks who needed readmission for hyperbilirubinemia was found to be 13.2, 7.7 times more respectively. [20] In a previous study found that late preterm infants experienced hyperbilirubinemia more at 24 to 48 hours, necessitating the importance of pre discharge assessment of bilirubin levels. [21]

### Conclusion

Late preterm infants are more likely to develop proven sepsis compared to the term infants. The risk increases with decreasing gestational age, with those born at 34 weeks having an eleven times greater risk than a term newborn. Considering significant morbidity in late preterm compared to the term infants they must be considered as preterm infants

and need to be monitored carefully. Appropriate discharge criteria and discharge advice, follow up plan are required for late preterm infants. There is a need to educate health care providers and parents about the vulnerability of the late preterm infants to various morbidities during the first week of life and seeking appropriate medical attention for these morbidities.

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