International Journal of Contemporary Pediatrics
Haridas K et al. Int J Contemp Pediatr. 2019 Mar;6(2):593-597
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20190693

Original Research Article

A comparative study of morbidity pattern among term and late preterm infants in a tertiary care hospital

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Received: 12 February 2019
Accepted: 16 February 2019

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ABSTRACT

Background: The incidence of preterm birth, defined as delivery before the end of the 37th week of pregnancy from the first day of the last menstrual period, is increasing. India accounts for the 40% of the global burden of low birth weight babies with 7.5million babies born with a birth weight of <2500g. The objective of the study is to compare the morbidity suffered by the late preterm infants with that of term infants.
Methods: This was a retrospective study and the data for this study came from the medical records of maternal and neonatal case sheets and discharge summaries. The data was collected for the period between January 2014 and December 2014. All the late preterm infants born and admitted during early neonatal period were compared with term infants who were born and admitted during early neonatal period to the Aditya Hospital on the basis of maternal, infant and clinical characteristics.
Results: A total 292 infants including LPTI and term infant records were obtained. LPTI group had significant problems compared to term infants. The predominant clinical problems at birth and during the early neonatal period are neonatal jaundice, transient tachypnea of newborn, feeding difficulty and probable sepsis.
Conclusions: LPTI are at increased risk of morbidity compared to term infants and hence require special attention and care for possible complication during their early neonatal period.

Keywords: Late preterm, Morbidity, Preterm, Term

INTRODUCTION

The incidence of preterm birth, defined as delivery before the end of the 37th week of pregnancy from the first day of the last menstrual period, is increasing. India accounts for the 40% of the global burden of low birth weight babies with 7.5million babies born with a birth weight of <2500g.

Infants born between the gestational ages of 34 weeks and 0/7 days through 36 weeks and 6/7 days (239th 259th day) are called near term or late preterm.[1] Late preterm infants account for about 74% of all preterm births and about 8% of all births. They are recognized as the fastest increasing and largest proportion of singleton preterm births.[2] The increase in the late preterm births is due to the perception that the baby which is delivered early due to some reason has better survival chance and lesser complications than delivered late.[3]

Several recent studies of late preterm infants have documented increased short-term medical risks during

their birth hospitalizations and increased adverse long-term outcomes in the form of medical, social, behavior, and school performance compared to full-term infants.[4] Nevertheless, short-term and long-term outcomes of late preterm infants are not as frequently described as the outcomes of extremely preterm newborns and infants born late preterm are usually not entered in long-term developmental follow-up programmes.[5,6] And also late preterm infants were less frequently studied compared with extreme preterm infants until recent years. In this article authors estimate the magnitude of medical morbidity due to late preterm birth. Furthermore, late preterm infants are at increased risk for long-term morbidity such as cerebral palsy and mental retardation.[7] They have also a higher risk for problems during their school career. The aim of the current study is to understand the morbidities which are seen more commonly in late preterm infants compared to term infants during their early neonatal period. And also, to know the maternal conditions which leads to the earlier delivery of these babies.

METHODS

A retrospective study of 496 cases of late preterm infants and full term infants who were born in Aditya hospital and admitted to the Aditya Hospital, Hyderabad in early neonatal period, during the period between January 2014 and December 2014 were included in the study. Out of the 496 infants admitted in the hospital during the study period only 292 cases of late preterm infants and full term who met the inclusion criteria were analyzed. In all the newborns, relevant information was collected in a predesigned preform. Maternal, delivery and neonatal characteristics were recorded.

Inclusion criteria

- All the infants who were late preterm infants and term infant delivered and admitted to Aditya hospital in early neonatal period including outborns.

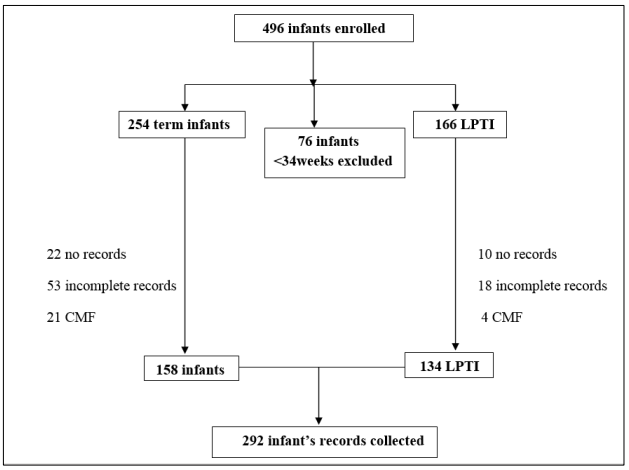
Exclusion criteria

- Gestational age less than 34 weeks
- Newborns with major congenital malformations
- Newborn with known chromosomal abnormality.

For every baby that requires admission to neonatal unit from birth or during birth hospitalization, all morbidities suffered by the baby will be recorded from the maternal case sheet and discharge summaries of both mother and baby. Those babies who did not require admission the data was collected from maternal case sheets and her discharge summary.

Statistical analysis

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean±SD (min-max) and results on categorical measurements are presented in number (%). Significance is assessed at 5 % level of significance.



CMF-congenital malformations

Figure 1: Study flow chart.

RESULTS

Out of the 292 infants who were enrolled for the study 158 of them had term delivery and 134 of the infants were classified as late preterm delivery.

Table 1: Maternal baseline variables of the study group.

Maternal variable	Late preterm n=134	Term n=158	P value
Antenatal registration	127 (94.8%)	157 (99.4%)	<0.05*
Primi	76 (56.7%)	87 (55.1%)	0.77
Multigravida	58 (43.3%)	71 (44.9%)	
LSCS	123(91.8%)	138(87.3%)	0.756
NVD	11(8.2%)	20(12.7%)	

The observations indicate that the registered population is more than the unregistered but there was no significant difference in delivery of LPTI and term infants among registered and unregistered pregnancies. There is no significant difference between the parity index between the LPTI and term births. The above results indicate that the parity is not a risk factor for the late preterm births. The study population in term infants had 46.8% of female and 53.2% were male. Among the late preterm infants 42.5 % were female and 57.5% were male babies. There was no significant difference in the sex between the LPTI and term infants studied. The study shows that 99.4% of the term infants were born to registered pregnancies whereas 94.8% of LPTI were born in registered group. Observations indicate that the registered population is more than the unregistered but there was no significant difference in delivery of LPTI and term infants among

registered and unregistered pregnancies. There were 55.1% of term babies were born to primi mothers and 44.9% were born to multiparous women. Among the LPTI group 56.7% infants were born to primi and 43.3% to multiparous women. On analysis there is no significant difference between the obstetric index between the LPTI and term births. The above results indicate that the parity is not risk factor for the late preterm births (Table 1 and 2).

Table 2: Neonatal baseline characteristics.

Variable		Term	Late preterm	P value
Gender	Male	84 (53.2%)	77 (57.5%)	0.46
	Female	74 (46.8%)	57 (42.5%)	
Apgar score	2*6	0 (0%)	1 (0.7%)	0.549
	3*6	1 (0.6%)	1 (0.7%)	
	8*9	157 (99.4%)	132 (98.5%)	
Gestational age maturity	AGA	152 (96.2%)	120 (89.6%)	0.025
	SGA	6 (3.8%)	14 (10.4%)	
Feeding difficult	No	151 (95.6%)	91 (67.9%)	0.0001*
	Yes	7 (4.4%)	43 (32.1%)	
TTRF (days)	1-2	137 (86.7%)	88 (65.7%)	0.0001*
	3-5	16 (10.1%)	27 (20.1%)	
	6-10	5 (3.2%)	19 (14.2%)	
Duration of stay in hospital	0	93 (58.9%)	0 (0%)	0.0001*
	1-5	54 (34.2%)	82 (61.2%)	
	6-10	11 (7%)	42 (31.3%)	
	11-15	0 (0%)	10 (7.5%)	
Percentage of weight loss	<1%	16 (10.1%)	6 (4.5%)	0.0001*
	1-2%	40 (25.3%)	10 (7.5%)	
	2-5%	52 (32.9%)	34 (25.4%)	
	5-10%	34 (21.5%)	52 (38.8%)	
	>10%	16 (10.1%)	32 (23.9%)	

In the present study there is significant difference in the antenatal complications between the LPTI and term infants. The term infants are having lesser antenatal complications than LPTI. The antenatal complications which are more commonly found in the LPTI group are oligohydramnios (19.4%), pregnancy induced hypertension (17.9%), abruption placenta (11.2%) maternal hypothyroidism (11.2%) and fetal distress (9%).

Table 3: Indication delivery among groups.

Indication delivery	Diagnosis		Total (n=292)
	Term (n=158)	LPTI (n=134)	
Normal	21 (13.3%)	3 (2.2%)	24 (8.2%)
Abnormal	137 (86.7%)	115 (85.8%)	268 (91.8%)
PCS	47 (29.7%)	11 (8.2%)	58 (19.9%)
Oligohydramnios	10 (6.3%)	30 (22.4%)	40 (13.7%)
PIH	10 (6.3%)	24 (17.9%)	34 (11.6%)
Prom	12 (7.6%)	0 (0%)	28 (9.6%)
Breech	25 (15.8%)	2 (1.5%)	27 (9.2%)
Failed induction	13 (8.2%)	5 (3.7%)	18 (6.2%)
Abruptio placenta	2 (1.3%)	15 (11.2%)	17 (5.8%)
F. distress	5 (3.2%)	12 (9%)	17 (5.8%)
PP	4 (2.5%)	6 (4.5%)	10 (3.4%)
CPD	5 (3.2%)	3 (2.2%)	8 (2.7%)
Cord around neck	1 (0.6%)	5 (3.7%)	6 (2.1%)
Twins	0 (0%)	2 (1.5%)	2 (0.7%)
Polyhydramnios	1 (0.6%)	0 (0%)	1 (0.3%)

There was higher proportion of caesarian section in the present study both in term (87.3%) and late preterm infants (91.8%). The proportion of normal vaginal delivery in term infants were 12.7% and in LPTI were 8.2%. The most common indication for CS in term infants is previous CS (29.7%) whereas in LPTI it is oligohydramnios (22.4%), followed by pregnancy induced hypertension (17.9%) and fetal distress (9%).The reason for the more number of CS in present study population is that being a referral hospital most cases which are getting admitted and are referred to present hospital will be complicated by one or the other factors. Hence more number of CS in the study group. The CS between the LPTI and term infants is not significantly different. But LPTI group had more number of CS than term infants (32% vs 4. 4%). The rate of birth asphyxia in

term infant was 0.6% and 1.4% among LPTI. There is significant difference in the rate of birth asphyxia among the LPTI and term infants. There are more number of SGA in the LPTI (10.4%) group than term infants (3.8%).

Table 4: Comparison of morbidity among late preterm and term babies.

Variable	Diagnosis		Total (n=292)
	Term (n=158)	LPTI (n=134)	
Normal	93 (58.9%)	7 (5.2%)	100 (34.2%)
Abnormal	65 (41.1%)	126 (94%)	192 (65.8%)
NNJ	39 (24.7%)	62 (46.3%)	101 (34.6%)
TTNB	5 (3.2%)	18 (13.4%)	23 (7.9%)
Hypocalcemia	5 (3.2%)	15 (11.2%)	20 (6.8%)
Sepsis	4 (2.5%)	9 (6.7%)	13 (4.5%)
RD	0 (0%)	8 (6%)	8 (2.7%)
HIE	1 (0.6%)	4 (3%)	5 (1.7%)
IDM	2 (1.3%)	1 (0.7%)	3 (1%)
Dehydration	2 (1.3%)	0 (0%)	2 (0.7%)
Hypernatremia	0 (0%)	2 (1.5%)	2 (0.7%)
Feed intolerance	3 (1.9%)	1 (0.7%)	4 (1.4%)
MSAF	2 (1.3%)	0 (0%)	2 (0.7%)
Cleft palate	0 (0%)	1 (0.7%)	1 (0.3%)
Dehydration fever	1 (0.6%)	0 (0%)	1 (0.3%)
HDN	0 (0%)	1 (0.7%)	1 (0.3%)
Horse shoe kidney	1 (0.6%)	0 (0%)	1 (0.3%)
Meningocele	0 (0%)	1 (0.7%)	1 (0.3%)
NAIT	0 (0%)	1 (0.7%)	1 (0.3%)
Polycythemia	0 (0%)	1 (0.7%)	1 (0.3%)
Seizures	0 (0%)	1 (0.7%)	1 (0.3%)
UTI	0 (0%)	1 (0.7%)	1 (0.3%)

The AGA among term infants were 96.2% and among LPTI were 89.6%. This was not found to be statistically significant. Feeding difficulty is found to be more commonly associated with LPTI (32.1%) than term infants (4.4%). Feeding difficulty may be in the form of difficulty in initiation or establishment of feeding. In present study the TTRF is significantly higher in LPTI than term infants. The mean duration of stay in the hospital for the LPTI group of infants is higher when compared to the term infants. The percentage of weight loss in the LPTI group is higher than term infants. Among the LPTI group 23.9% of babies and among term infants 10.1% had weight loss of >10% (Table 2 and 4).

The number of complications found in the LPTI group is significantly higher than term infants. Among the LPTI 94% had some morbidity whereas among the term infants 41% had some morbidity. The most common complications in the LPTI were neonatal jaundice (46.3%), TTNB (13.4%), sepsis (6.7%) and feeding difficulty. The study population includes both inborn and outborns. The majority of LPTI in the study group are having complications as present hospital is a referral centre for surrounding smaller NICU´s, which are providing only level 2 care and therefore more number of LPTI as well as term infants are having some complications which required admission. In the study the outborns are more than the inborn (Table 3 and 4).

DISCUSSION

The proportion of late preterm birth is increasing and also the admission of these infants is at the rise. There was misleading terminology which was used for these infants as near term infants as they appear large enough to consider them as term infants. There are multiple studies which have shown that these preterm infants do suffer from many clinical problems similar to preterm infants, but definitely less problems when compared to more preterm infants. As late preterm infants comprise a major group of births in recent years and also, they suffer more compared to the term infants, this group of infants could cause a huge impact on the management of these infants. There is need to accurately estimate the morbidity and mortality suffered by these infants.

The respiratory morbidity in the form of TTNB is significantly higher in the present study. Around 13.4% of LPTI and only 3.2% of term infants had TTNB. Similar results were obtained in the study conducted by Jaiswal et al, Mac bird et al and Brenofauth et al.[8-10] In the study conducted by Jaiswal et al, they had concluded that around 10% of their LPTI group had TTNB. Mac bird et al around 5% of their study LPTI group had transient tachypnea.[8,9] Brenofauth et al showed that 25% of their cases had transient tachypnea when compared to the term which had only around 2%.[10]

The rate of neonatal jaundice among the LPTI is higher when compared with that of term infants. The difference in the rate of neonatal jaundice is significantly higher in LPTI than term infants. Similarly, the study conducted by Jaiswal et al had higher proportion of jaundice cases in

late preterm infants than term infants.[8] The study conducted by Mac Bird et al and Brenofauth et al also had the similar findings.[9,10] In the present study the LPTI group had a significant amount of difficulty in the initiation and establishing the feeds. Similar results were obtained by the study conducted by Mac bird et al and Brenofauth et al.[9,10]

In the present study the sepsis rate among the LPTI is found to be high compared to the term infants. Around 7% of infants in the study group had sepsis or are evaluated for the sepsis whereas around 2.5% of term infants had sepsis or sepsis evaluation done on them. The study conducted by Jaiswal et al, Mac bird et al, and Brenofauth et al also had similar findings.[8-10] In Jaiswal et al study around 4% of LPTI had sepsis and 1.1% of term had sepsis.[8] The present study is in accordance with the previous studies. The present study had multiple maternal risk factors in the LPTI group. Most important being pregnancy induced hypertension, which more commonly found among LPTI than term. In a study by Brenofauth et al found similar result as seen with the present study.[10] The other risk factors in the present study included oligohydramnios, maternal hypothyroidism and abruption placentae. The present study has similar results compared with Brenofauth et al study.[10] In the present study the percentage of weight loss in the LPTI group is higher than term infants. In the study conducted by Jaiswal et al found similar results.[8] Authors concluded that weight loss of >10% is more in LPTI than term group. The study conducted by Engle et al also found that the weight loss in late preterm group is more than term infants.[11] Hence present study has the same trend as with other studies.

Limitation: This study included both inborn and outborns, to find out the exact morbidity it is preferred to study with only inborn. Inclusion of out born may falsely increase the morbidity of term babies.

CONCLUSION

The present study has clearly shown that the LPTI are at increased risk of clinical problems than term infants hence needs special attention and care. The commonly found problems in the LPTI neonates were neonatal jaundice, probable sepsis and TTNB. Time to reach full feeds and difficulty in feeding are also commonly seen in LPTI than term infants.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Haridas K, Shinde R, Nagar P, Parakh H. A comparative study of morbidity pattern among term and late preterm infants in a tertiary care hospital. Int J Contemp Pediatr 2019;6:593-7.