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Sandeep Thute., Chhaya Valvi and Sandhya Khadse

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RESEARCH ARTICLE

EARLY MORBIDITIES AND MORTALITY IN LATE PRETERM AND ASSOCIATED MATERNAL RISK FACTORS: A TERTIARY CARE CENTRE EXPERIENCE

Sandeep Thute[1]., Chhaya Valvi[2] and Sandhya Khadse[3]

[1,2,3]Department of Pediatrics, BJ Government Medical College, Pune

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ABSTRACT

Objective: To assess the risk of early neonatal morbidities and mortality and maternal risk factors associated with late preterm birth.
Method: Prospective observational study
Study period: 18 months
Result: 300 late preterm babies were studied. 84.33% of the total late preterm newborns were low birth weight babies. 28% were associated with maternal complications. Incidence of pregnancy induced hypertension was 14% in this study. 11.33% of the late preterm newborns needed resuscitation. Out of all the morbidities associated with late preterms, incidence of respiratory distress was highest with 31 %. According to this study, incidence of hyperbilirubinemia, hypothermia and respiratory distress syndrome was more towards the 34 weeks of gestation. This study shows that as the gestational age decreases, the late preterms are more prone for RDS, hypothermia and hyperbilirubinemia.
Conclusion:
Late preterm babies are vulnerable to many complications of prematurity and there is a need of greater awareness of increased risk of late preterm morbidity in medical fraternity.

INTRODUCTION

The number of pre term babies born in south Asia and sub-Saharan Africa were more than 60%, where 52% of the global live births occur. India ranks first in the total number of pre term births with 24% of the total pre term births taking place here. (1) Late preterm infants are defined as premature infants born between 34 0/1 to 36 6/7 weeks of gestation.

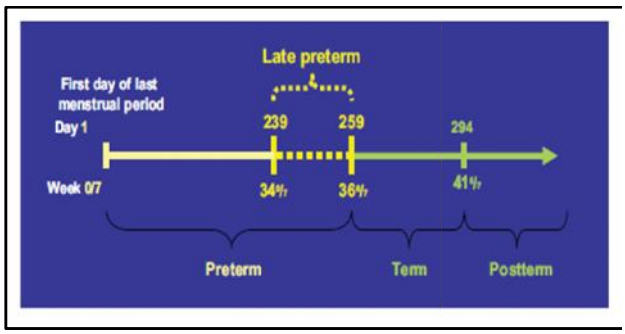

Figure 1 Representative Diagram of Late Pre-Terms. (2)

Late pre term infants account for 70% of all the pre term births in US. Currently there is no data available measuring the incidence of late pre terms in India. (3,4) There are an increasing number of babies born at gestations of 34 0/7 to 36 6/7 weeks due to various obstetric and neonatal reasons. 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. It was believed that these babies will have fewer problems postnatally and will do well with routine newborn care meant for a normal baby and therefore they never received the attention they deserved. It is now realized that babies born at 34 0/7 to 36 6/7 weeks should not be considered as term babies as the magnitude of morbidities in these subset of babies is much higher. These babies should therefore be considered as 'late preterms'. As the late preterm subgroup accounts for nearly 10% of all births, (4) 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. Very few studies have been conducted to assess the neonatal morbidity and mortality in late preterm infants . Much has been spoken and written about problems of the preterm (less than 34 weeks) but little is available on babies above this gestation. The available literature is mainly from the western nations. The obstetric and newborn care in these countries is different from a developing country like India.

Corresponding author:* **Sandeep Thute
Department of Pediatrics, BJ Government Medical College, Pune

There is very limited data available on the problems regarding late preterm babies in India. There is an immense need to study the problems of the late preterm. Understanding morbidity risk among late preterm infants is not only important for helping newborn care providers to anticipate and manage potential morbidity during the birth hospitalization stay and early follow-up after hospital discharge, but importantly also may possibly assist in guiding non-emergency obstetric intervention decisions.

Aims and Objectives

In late pre term newborns,

- To estimate risk of early morbidities & mortality.
- To study their clinical and laboratory profile.
- To study maternal risk factors associated in them.

Inclusion criteria

All newborn babies between the gestational age of 34 0/7 to 36 6/7 weeks of gestation (late preterm) admitted to

1. Neonatal Intensive Care Unit or Transitional care or Post natal care ward of a tertiary care centre in Western Maharashtra.
2. born outside and referred to Neonatal Intensive Care Unit of a tertiary care centre in Western Maharashtra.

Exclusion criteria

All newborn babies

1. whose mother were not aware of Last Menstrual Period and did not have ante natal Ultrasonography.
2. whose Parents/Guardian did not give consent

MATERIAL AND METHODS

This was a prospective observational study. Consent for participation, counselling and confidentiality was maintained. 300 Late preterms were studied during one year study period and assessment of Gestational Age was done by

1. Last Menstrual Period and/or 1st trimester Antenatal Ultrasonography in combination with
2. New Ballard Score.

In the newborns enrolled, morbidities such as hypothermia, hypoglycemia, hypocalcemia, feeding difficulties, respiratory distress, hyperbilirubinemia, sepsis and polycythemia were evaluated during the hospital stay along with relevant haematological and radiological investigation and outcome noted. Predesigned Proforma was used to document all relevant Clinical and Laboratory data. Appropriate statistical test were applied for the outcome.

RESULTS

Total number of late preterm in this study were 300.
83% of them were admitted in transition unit and 17% in NICU. Out of 300 late pre term babies, 163 were male and 137 were females. Thus 54% of the study group were males and 46 % were females. Male to female ratio in this study was 1.19: 1. Late pre term newborns were classified into small for gestational age (SGA), appropriate for gestational age (AGA) and large for gestational age (LGA)

Out of 300 late pre term babies, 80% were AGA group and 19% constituted SGA group.

Classification of late pre term on the basis of weight:
Table 1

	Total	Percentage
ELBW	01	0.3%
VLBW	19	6.3%
LBW	253	84.33%
>2.5kg	27	9%

Late pre term newborns were classified on the basis of weight into
ELBW: extremely low birth weight
VLBW: very low birth weight
LBW: low birth weight
Normal: birth weight > 2.5 kg
84.33% of the total late preterm newborns were low birth weight babies. 6.3% constituted VLBW babies.

Table 2 Maternal High risk factors associated with late pre term delivery.

Maternal history	Number	Percentage (%)
No high risk factors	217	72%
Pre eclampsia	41	14%
Twin gestation	21	07%
Anemia	07	02%
Eclampsia	03	01%
Fever	03	01%
PROM	03	01%
Heart disease	02	0.66%
GDM	02	0.66%
Kochs	01	0.33%
Scabies	01	0.33%
Neurocystecercosis	01	0.33%
Unmarried	01	0.33%

Out of 300 late pre term deliveries, 28% were associated with maternal complications. Incidence of pregnancy induced hypertension was 14% in this study.7% of the mothers had twin gestation and 2% had anemia as the complication affecting the outcome of late preterm infants. Incidence of eclampsia, fever and premature rupture of membranes (PROM) was 1% each in this study. Other complications were found in less than 1% of the mothers as shown in the above table.

Table 3 Mode of delivery

Mode of delivery	Number	Percentage
Normal Vaginal	186	62%
Caesarean	107	36%
Venthouse	04	01%
Forceps	03	01%

In our study, 62% of the late preterms were vaginally delivered and almost half of it were delivered by caesarean section.

Need of resuscitation

11.33% of the late preterm newborns needed resuscitation in the form of bag and mask or intermittent positive pressure ventilation (IPPV).

Table 4

Need of resuscitation	Numbers	Percentage
No resuscitation	266	88.66%
Bag and mask	25	08.33%
IPPV	09	03%

Early morbidities in late preterm newborns

Incidence of different morbidities associated with late pre terms in this study is shown in the following table. Some of the late pre terms had more than one morbidities present at a time.

Table 5

Diagnosis	Number	Percentage
No medical problems	148	49.33%
Sepsis	39	13%
Hyperbilirubinemia	36	12%
TTN	27	09%
IUGR	23	08%
Birth asphyxia	21	07%
RDS	20	07%
MAS	18	06%
Hypothermia	18	06%
Hypoglycemia	18	06%
Feeding difficulties	06	02%
Pneumonia	06	02%

Out of all the morbidities associated with late preterms, incidence of respiratory distress was highest with 31 %. Respiratory distress was further classified into transient tachypnea of newborn (TTN), respiratory distress syndrome (RDS), meconium aspiration syndrome (MAS), birth asphyxia and pneumonia. Incidence of these co morbidities is shown in the above table. Sepsis, Hyperbilirubinemia, Hypothermia, hypoglycaemia and feeding difficulties were other common problems encountered in the late preterm newborns.

Early morbidities in the late preterms was further classified on the basis of gestational age. Above table shows incidence of different morbidities at 34,35 and 36 weeks of gestation. The Fisher exact test was applied to this data to test its significance. According to this study, incidence of hyperbilirubinemia, hypothermia and respiratory distress syndrome is more towards the 34 weeks of gestation. This study shows that as the gestational age decreases, the late preterms are more prone for RDS, hypothermia and hyperbilirubinemia. After applying Fisher test, this difference was found to be statistically significant. Around 69% of the late preterms in this study were exclusively breast fed on day 1. 16% of the patients required orogastric feeds initially.15 % late preterm babies needed intravenous fluid therapy.

DISCUSSION

This was a prospective observational study in which total 300 late pre term were studied. In a study conducted by Jain *et al* (10) to study early morbidities in late preterms, 114 late pre term babies were included. Male to female ratio was almost similar in this study.

Table 6

Diagnosis		Gestational age			P-value
		34 wk	35 wk	36 wk	
Sepsis	Present	12	10	17	0.952
	Absent	77	74	110	
Lab Sepsis	Present	3	4	4	0.86
	Absent	86	80	123	
Clinical Sepsis	Present	8	6	13	0.764
	Absent	81	78	114	
Confirm sepsis	Present	1	0	0	0.577
	Absent	88	84	127	
Hyperbilirubinemia	Present	17	10	9	0.028
	Absent	72	74	118	
TTN	Present	3	8	16	0.053
	Absent	86	76	111	
IUGR	Present	11	4	8	0.141
	Absent	78	80	119	
Birth asphyxia	Present	6	4	11	0.602
	Absent	83	80	116	
RDS	Present	11	6	3	0.013
	Absent	78	78	124	
MAS	Present	3	5	10	0.433
	Absent	86	79	117	
Hypoglycemia	Present	6	6	6	0.71
	Absent	83	78	121	
Hypothermia	Present	11	4	3	0.013
	Absent	78	80	124	
Feeding difficulties	Present	2	1	3	0.999
	Absent	87	83	124	
Cong. Pneumonia	Present	2	1	3	0.999
	Absent	87	83	124	

P value < 0.05 is significant.

Wang *et al* (8) studied early morbidities in 90 late preterm babies. Lubow *et al* (13) did retrospective analysis of 149 late preterms to study their short term outcomes. Leone *et al* (14) studied neonatal morbidities in 530 late preterm infants.The sample size studied by them was the largest. Jaiswal *et al* (12) studied 363 late preterm babies for early morbidities .In their study 54.5 % were males and 45.5 % of the study group were female. Thus male to female ratio was 1.2: 1 in their study. In our study, out of 300 late pre term babies, 163 were male and 137 were females. Thus 54% of the study group were males and 46 % were females. Male to female ratio in our study was 1.19: 1. Melamed *et al* (15) found that 55.9 % of the study group were males and 44.1 % were females. In our study, male to female ratio was almost similar as found in most of the other studies.

Out of 300 late preterm babies, 30% babies were born at 34 weeks, 28% were born at 35 weeks and 42 % were born at 36 weeks of gestation. In a study by Jain *et al* (10) incidence of late preterm births was 29.8% at 34 weeks, 23.6% at 35 weeks and 46.9% at 36 weeks. In another similar study , Lubow *et al* (13) found that gestational age wise distribution of late preterms was 32.88% for 34 weeks , 33.55% for 35 weeks and 33.55% for 36 weeks. Study by Lubow *et al* (13) showed similar distribution of late pre terms in different gestational age group. In our study, late preterm babies in gestational age group of 36 were more compared to babies in 34 and 35 weeks of gestation.

Classification of the babies on the basis of weight for gestation showed that 19% of the babies were SGA, 80% of the babies were AGA and 1% of the babies were LGA in our study. In the study by Jain *et al* (10) 11 % babies were SGA. 81 % were AGA and 8 % were LGA. In the study by Jaiswal *et al* (12) 83.7 late preterm babies were in AGA group. 10.2% of the babies were SGA and 6.1 % were LGA.

In our study, out of 300 late pre term deliveries, 72 % were not associated with any maternal complications. 28% of the deliveries were associated with some maternal complications. 82.33% of the mothers were in the age group of 21- 25 years. Incidence of pregnancy induced hypertension was 14% in our study.7% of the mothers had twin gestation and 2% had anemia as the complication affecting the outcome of late preterm infants. Incidence of eclampsia, fever and premature rupture of membranes (PROM) was 1% each in this study. Medical complications like heart disease, gestational diabetes mellitus, scabies and neurocystecercosis was found in one patient each. Social issues like unmarried pregnancy affecting the outcome of the pregnancy was found to be less than 1% . In the study by Lubow *et al* (13) spontaneous labour and premature rupture of membranes was the most common indication for the late preterm delivery. In the study by Masoura *et al* (16), pre eclampsia was responsible for 8% of the late pre term deliveries. Shapiro – Mendoza *et al* (5) found that pregnancy induced hypertension and gestational diabetes mellitus were most frequent maternal complications in late preterms followed by ante partum hemorrhage. In their study, among late-preterm infants with newborn morbidity, 17.9% had no maternal conditions reported, 28.7% had at least 1 maternal condition reported, and 36.6% had 2 or more than 2 maternal conditions reported. In the study by Jain *et al* (10), preterm labor and PROM accounted for 46.9% cases while maternal /fetal factors such as – PIH, GDM, antepartum hemorrhage, multiple gestation, fetal distress, abnormal doppler and meconium stained amniotic fluid accounted for 53.5% cases.

Incidence of normal vaginal deliveries was higher with 62% of the late pre terms delivered by this route, in our study. 36% of the late preterms were delivered by lower segment caesarean section. 50.46% of the LSCS were performed for maternal indications and fetal distress was responsible for 49.53% of the LSCS. Incidence of venthouse and forceps delivery was 1% each. In the study by Jain *et al* (10) 86.8% late preterm babies were delivered by caesarean section while only 10.5% were delivered by vaginal route and 2.6% by assisted vaginal deliveries. The caesarean rates in their study were higher because a sizeable proportion of mothers were referred for antenatal problem. Incidence of deliveries conducted by caesarean section was 67.8% in the study by Jaiswal *et al* (12). In their study 32.2 % late preterms were delivered by normal vaginal delivery. In the study by Masoura *et al* (16), rates of caesarean section was higher in the study group with pre eclampsia. In the study by Melamed *et al* (15), incidence of caesarean section in late preterm group was 27.7%. Thus, compared to other Indian studies, incidence of caesarean deliveries was lower in our study group.

In our study, out of 300 total late preterms delivered 11.3% late preterms required some resuscitation. 8.33 % of the babies required bag and mask ventilation and 3% late pre terms required intermittent positive pressure ventilation. In the study by Jain *et al* (10) 14% late preterm babies required some resuscitation. They found that the initial steps of resuscitation was required in 4.3 % late preterms, Positive pressure ventilation at birth in 9.7 % and Intubation in 0.8% of the study group.

Incidence of early morbidities in the late preterms was 51.66% in our study. In the study by Jaiswal *et al* (12) 70.8% of late preterm had atleast one of the neonatal morbidities requiring inpatient hospital observation or admission. In a retrospective study by Wang *et al* (8), 77.8% late preterm term babies had at least one clinical problem. Melamed (15), *et al* found that compared with full-term infants, spontaneous late preterm delivery was independently associated with an increased risk of neonatal morbidity, including respiratory distress syndrome, sepsis, intraventricular hemorrhage, hypoglycemia, and jaundice requiring phototherapy. Another study by Tomashek, *et al* (7) found that late preterm infants were 1.5 times more likely to require hospital-related care and 1.8 times more likely to be readmitted than term infants. Shapiro - Mendoza, *et al* (11) found that the newborn morbidity rate doubled in infants for each gestational week earlier than 38 weeks.

Respiratory morbidities

Out of all the morbidities associated with late preterms, incidence of respiratory distress was highest with 31. Incidence of respiratory distress in caesarean delivery was 27.1 % and 55

late preterm babies out of 186 delivered by normal vaginal delivery were found to have respiratory distress. Incidence of respiratory distress in vaginal delivery was 29.6%. Thus incidence of respiratory distress was not significantly affected by the mode of delivery in our study. Respiratory support was needed in 33% of the newborns in our study group. 19.33% of the late preterm study group needed B'CPAP, 11.66% needed oxygen by hood and 2% of the late preterms needed ventilator support. Incidence of respiratory distress syndrome was more towards the 34 weeks of gestation and was found to be statistically significant. Jaiswal *et al* (12) reported 10.5% incidence of respiratory morbidities in late preterm study group. In the study by Leone *et al*, incidence of respiratory distress was 34.7%. Celik *et al* (17) found that incidence of respiratory distress was 46.5%. In the study by Lubow *et al* (13) 20% late preterms had respiratory complications. In the study by Jain *et al* (10), respiratory support in the form of oxygen by hood, ventilation, and surfactant administration was required in 29.8% late preterm babies. In the study by Wang *et al* (8) need of respiratory support was 28.9%. Escobar *et al* (18) found that 10.7% of the late preterms needed respiratory support while in the study by Rubaltelli *et al* (19) 9.6% of late preterm newborns needed respiratory support. Severe respiratory distress syndrome caused by surfactant deficiency is not only common in pre terms but it is also seen in late pre-term babies after caesarean section (CS), especially when carried out before the onset of labour occurs . The most frequent underlying diagnosis of Respiratory distress during the first 48 hours are transient tachypnoea of the newborn, infections such as early onset sepsis and congenital pneumonia, meconium aspiration syndrome, hyaline membrane disease (HMD) and perinatal asphyxia. As the gestational age decreases the incidence of RDS increases.

Hypoglycemia

6% of the late preterms had hypoglycaemia in our study. The incidence was equal in 34, 35 and 36 weeks of gestation. Jain *et al* (10) reported 30% incidence of hypoglycaemia whereas study by Wang *et al* showed that 15.6 % of the late pre terms had hypoglycaemia. The incidence of hypoglycaemia was 8.8% in the study by Jaiswal *et al* (12). Melamed *et al* (15) found that 6.8% of the late preterms had hypoglycaemia with higher incidence in the late preterms towards 34 weeks of gestation. In the study by Leone *et al* (14) 14.3 % of the late preterms were hypoglycaemic. In the study by Celik *et al* (17) 4% incidence of hypoglycaemia was noted. Late Preterm infants are at increased risk of developing hypoglycemia after birth, because they have immature hepatic glycogenolysis and adipose tissue lipolysis, hormonal dysregulation, and deficient hepatic gluconeogenesis and ketogenesis.

Hypothermia

In our study, incidence of hypothermia was 6% with higher incidence towards 34 weeks of gestation. This difference was found to be statistically significant. Incidence of hypothermia was 0.7% in the study by Melamed *et al* (15). In their study, higher incidence of hypothermia was found towards the 34 weeks of gestation. 2.5% of the late preterms had hypothermia in the study by Leone *et al* (14). Late-preterm infants have less white adipose tissue for insulation, and they cannot generate heat from brown adipose tissue as effectively as infants born at term, thus making them prone for hypothermia. In addition, late-preterm infants are likely to lose heat more readily than term infants, because they have a larger ratio of surface area to weight and are smaller in size.

Hyperbilirubinemia

The incidence of hyperbilirubinemia was 12%, in our study. It was found that incidence of hyperbilirubinemia was more towards 34 weeks of gestation and the difference was found to be statistically significant. Out of the total 36 late preterms with hyperbilirubinemia, 34 responded to double surface phototherapy, 1 patient needed single surface phototherapy and 1 patient underwent exchange transfusion. Jain *et al* (10) found that neonatal hyperbilirubinemia requiring treatment in the form of phototherapy was much higher in late preterm babies as compared to term babies (50.8 vs. 10.4%). Their study also revealed that more babies - 67.3% at 34 weeks of gestation required treatment for jaundice as compared to 44 % at 35 and 36 weeks gestation. In the study by Jaiswal *et al* (12), hyperbilirubinemia was the most common early morbidity in the late preterm group with incidence of 55%.Wang *et al* (8) found the incidence of neonatal jaundice to be 54.4% in the late pre term age group. In the study on late preterms by Melamed *et al* (15), incidence of neonatal hyperbilirubinemia was 18 % with higher incidence towards 34 weeks of gestation. Incidence of neonatal hyperbilirubinemia was 47.4 % in the study conducted by Leone *et al*. In a prospective study by Celik *et al* (17) 13.7 % of the late preterms had hyperbilirubinemia. Max *et al* (20) found the incidence of neonatal hyperbilirubinemia to be 17.6%. Lavanya *et al* (9) found the incidence of hyperbilirubinemia to be 57% in the late pre term population. They also found that incidence of hyperbilirubinemia was more towards lower gestational age. The high incidence of significant jaundice in late preterm infants may be attributed to their inability to handle bilirubin load, decreased hepatic UDP glucuronyl transferase enzyme activity, and a slower post natal maturity of hepatic bilirubin uptake. In our study incidence of hyperbilirubinemia was lower as compared to most other studies. Our study showed increased incidence of hyperbilirubinemia towards 34 weeks of gestation like most of the other studies. As compared to the term infants, bilirubin binding to albumin is less in late pre term infants. Late pre term infants have sub optimal milk intake and delayed follow up visits. Also signs of kernicterus may be more subtle in them. Therefore, Jaundice in late preterm infants is more prevalent, more pronounced, and more protracted in nature than in their term counterparts.

Feeding difficulties

In our study, 69% of the late preterms were exclusively breast fed on day 1. 16% of the patients required orogastric feeds initially.15 % late preterm babies needed intravenous fluid therapy. In the study by Jain *et al* (10), 53.5% of the babies were exclusively breast fed and 57.8 % of the late preterms needed intravenous fluid treatment. In the study by Wang *et al* (8) twenty-seven percent of all late pre-term infants studied had a clinical condition whereby intravenous fluid was given

compared with only 5% of all term infants. A variety of clinical problems, including hypoglycaemia and poor feeding, precipitated this treatment. Celik *et al* (17) found incidence of feeding difficulties to be 13.7%.Feeding difficulties in late preterm can be attributed to relatively low oromotor tone, function and neuronal maturation in them. Also, Late pre term infants have less stamina, less co ordinated suck/swallow/breathe, less effective suckling and less alert awake period. This leads to insufficient breast stimulation, incomplete emptying and insufficient milk supply. In mothers of late pre term delayed lactogenesis is a common problem.

Sepsis

Incidence of sepsis was 13% in our study. It was further classified into clinical, lab and culture proven sepsis. No significant difference was found in the incidence of sepsis with gestational age. Incidence of probable sepsis was 12.66% and that of confirm sepsis was 0.4 % in our study. In the study conducted by Jain *et al* (10), incidence of sepsis was 9.6%. In the study by Wang *et al* (8), 36% late preterm babies had sepsis. In the study by Jaiswal *et al* (12) incidence of probable sepsis was 4.1% and that of confirm sepsis was 1.1%. In the study by Melamed *et al* (15) incidence of probable sepsis was 19 % and that of confirm sepsis was 0.4%. Max *et al* (20) found 5.9% incidence of sepsis in late preterm group. Late preterm infants demonstrate specific infection rates, pathogen distribution, and mortality associated with early and late onset sepsis. Recent evidence suggests, however, that late preterm infants (relative to full-term infants) are diagnosed with culture-proven sepsis more frequently, have increased sepsis-related mortality, and have a substantial increased risk for morbidity and mortality.

Discharge

Our study shows that 11.33% of the late preterm developed one or more complication leading to hospital stay of more than 7 days. In a study by Shapiro – Mendoza *et al* 22.8% of the late preterms experienced atleast one of the complication that could lead to prolonged hospital stay. Late preterm infants being of the same weight as of full term infants and in the initial period is able to maintain his or her temperature and breast feeding, they may be discharged early from the hospital. As per AAP and the committee on fetus and newborn 2010, early discharge is defined as less than 48 hours after vaginal birth or 96 hours after a caesarean section. The late preterm infants inability in adapting to extra uterine surroundings may not be discovered during the birth hospitalisation, if the infant is discharged early. Early discharge is not recommended due to the multiple morbidity risks associated with the late preterm infants.

Mortality

Death rate in our study was 1% with 1 death each occurring in 34, 35 and 36 weeks of gestational age. In a study by McIntire *et al* (6) late preterm mortality rates per 1,000 live births were 1.1, 1.5, and 0.5 at 34, 35, and 36 weeks, respectively, compared with 0.2 at 39 weeks. Kalyoncu *et al* (21) found the incidence of mortality was 2.3% in late preterm births. The morbidity is significantly higher in late preterm infants than in term ones, thus it is not surprising that the survival rate of late preterm infants is significantly reduced. The mortality in the early neonatal (age 0-6 days), late neonatal (age 7-27 days) and postneonatal (age 28-364 days) periods was 6, 3, and 2 times higher respectively in late preterm infants than in term infants in a study conducted by Shapiro – Mendoza *et al*.(11) The common causes of death are congenital malformations, immaturity, sepsis, atelectasis, maternal complications and sudden infant death syndrome (SIDS). SGA is suggested to substantially increase the mortality rate.

The present study is an attempt to obtain actual data on late preterm births and associated neonatal morbidities from India. As the present study was designed to asses early neonatal morbidities, rehospitalisation, length of follow up and long term risks to which this infants are exposed have not been studied . The sample which we have recruited is from the single hospital and region so the results may not be applicable to the entire population. The study population is derived from tertiary care referral centre where significant proportions of mothers are referred for antenatal problems. Therefore a higher incidence of morbidities may be observable in the late preterm population.

CONCLUSION

1. Late preterm babies are vulnerable to many complications of prematurity. They are at risk for early morbidities such as respiratory distress, hyperbilirubinemia, hypothermia, feeding difficulties, hypoglycaemia and sepsis.
2. In our study, the incidence of respiratory distress, hyperbilirubinemia and hypothermia was found to increase as the gestational age decreased.
3. Incidence of respiratory distress was as high as 33% in late preterm with respiratory distress syndrome, transient tachypnea of newborn, meconium aspiration syndrome and birth asphyxia being the common causes.
4. 4.19% of the late preterms were small for gestational age, thus making them vulnerable for early morbidities.
5. In our study, PIH was the most common maternal risk factor responsible for late preterm birth.
6. Incidence of respiratory distress was not significantly affected by the mode of delivery in our study. Earlier studies showed that higher incidence of caesarean section predisposes the late preterm group to respiratory morbidities.
7. As late preterm births constitute maximum of all preterm births, it is important to limit late preterm deliveries to those with clear maternal and fetal indication for delivery.

Future scope

Further multicentric prospective studies evaluating late preterm morbidities and risk factors associated with them should be conducted in India, as timely intervention can help to decrease

the late preterm birth and early morbidities associated with them. Guidelines need to be formulated for late preterm in developing countries. There is a clear need for discharge criteria to be developed specifically for late preterms where minimum duration of stay in the hospital, breast feeding assessment , hyperbilirubinemia risk assessment needs to be done as discharge criteria of full term babies cannot be applied to late preterm babies. It is important to explain to the parents, the vulnerabilities this fragile neonates are exposed and importance of monitoring later. Studies need to be conducted for better understanding of pathophysiology of the conditions leading to SGA in late preterms and their optimum time of delivery. Also, there is a need of greater awareness of increased risk of newborn morbidity in medical fraternity.

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