

Study of Clinical Profile of Late Preterms at Tertiary Care Hospital, Bangalore

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Abstract:-

Background: Prematurity is the leading cause of neonatal morbidity and mortality ^[1,2]. Births at 34 to 36.9 weeks gestation, often referred to as late preterm ^[3,4] account for up to 75% of all preterm births. In spite of concerted efforts to decrease prematurity, the total and late preterm birth rates have been increasing during the past decade, raising concerns about the reasons for such trends. Higher rates of induced deliveries and cesarean births have also caused concern about their collective impact on morbidity and health care cost. Most of the studies on late preterms were done in the United States. Hence this study was done to present the characteristics of late preterm neonates born in our hospital settings and to identify the major issues of these neonates we are facing.

Objectives: The purpose of this study is to present the characteristics of late preterm infants in our settings To identify the major problem issues in late preterm infants in our hospital settings.

Design: Prospective observational study.

Setting: In a tertiary health care centre at Manipal Hospital, Bangalore at Neonatal division in the Department of Paediatrics.

Study population: 100 late preterm neonates born during the study period at Manipal hospital.

Methodology: The clinical profile of each late preterm neonate in the study was recorded and data was prepared.

Observation and Results: In our study clinical profile of 100 late preterm neonates were studied. 54% of the neonates had hyperbilirubinemia requiring phototherapy. 26% of the neonates had feeding problems. 14% of the neonates had respiratory problems. 57% of the neonates required NICU admission. In our study we observed that these neonates required long duration of hospital stay (mean duration of hospital stay was 6.02 ± 2.68 days) and had high rate of readmission (16%) to the hospital after initial discharge.

Summary: In our study it was noticed that late preterm neonates had high rates of morbidity, common problems noticed are hyperbilirubinemia, feeding problems, respiratory distress and hypoglycemia.

Most late preterm neonates required admission to NICU. Late preterm neonates required prolonged duration of hospital stay and had high rate of readmission to the hospital.

ACRONYMS:

NICU - Neonatal Intensive Care Unit
AGA-Appropriate for Gestational Age
SGA - Small for Gestational Age
LGA - Large for Gestational Age
IUGR-Intra Uterine Growth Retardation
NVD- Normal Vaginal Delivery
LSCS - Lower Segment Caesarean Section
TTN-Transient Tachypnea of Newborn
RDS - Respiratory Distress Syndrome
PPHN - Primary Pulmonary Hypertension
PPROM - Preterm Premature Rupture of Membranes
PIH - Pregnancy Induced Hypertension
NG feeds - Naso-Gastric feeds

I. INTRODUCTION

Prematurity is the leading cause of neonatal morbidity and mortality ^[1, 2]. Births at 34 to 36.9 weeks gestation, often referred to as late preterm ^[3, 4] account for up to 75% of all preterm births. In spite of concerted efforts to decrease prematurity, the total and late preterm birth rates have been increasing during the past decade, raising concerns about the reasons for such trends. Higher rates of induced deliveries and cesarean births have also caused concern about their collective impact on morbidity and health care cost.

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 having been labeled “near-term,” such infants were being looked upon as “almost mature,” and hence there was no need to be concerned. However, recent research has revealed a contrary trend. 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. Because the late preterm subgroup accounts for 9% 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 infants being admitted to NICUs have been

increasing worldwide. The issue gets even more complex: because more than 80% of all deliveries occur in community hospitals, the health care teams may not always be equipped to assess and manage sick, late preterm infants. Moreover, since such infants may initially appear mature and healthy, they may be admitted to term nurseries, or allowed to “room in” with their mothers until the clinical status deteriorates^[3].

II. OBJECTIVES OF THE STUDY

- The purpose of this study is to present the characteristics of late preterm infants in our settings
- To identify the major problem issues in late preterm infants in our hospital settings.

III. MATERIALS AND METHODS

This is a hospital based study carried in a tertiary health care centre at Manipal Hospital, Bangalore at Neonatal division in the Department of Paediatrics during the period of December 2011 to April 2013.

A. Study Population:

Infants those bom between 34 and 36 6/7 completed

weeks gestation in Manipal hospital during the period of December 2011 to April 2013.

B. Study Design:

Prospective Observational study.

C. Inclusion Criteria:

Late preterms bom in the hospital during the study period.

D. Exclusion Criteria:

Latepreterms bom with congenital anomolies.

IV. STUDY PROCEDURE

All late preterms under previously mentioned selection criteria delivered at Manipal hospital were selected for study.

Gestational age was recorded as per obstetrical estimates based on first date of last menstrual period.

The clinical profile of each infant was recorded and data was prepared.

V. OBSERVATION AND RESULTS

➤ *TOTAL STUDY GROUP -> 100 Late preterms*

Table 1: Gender distribution of patients studied

Gender	Number of Babies	%
Male	46	46.0
Female	54	54.0
Total	100	100.0

➤ *LATE PRETERMS AND LOW BIRTH WEIGHT:*

Out of 100 Late preterms studied 65 babies (65%) were bom low birth weight (<2500 grams). Mean birth weight of studied group was 2343.50(±380.51) grams.

Table 2: Birth weight (grams)

Birth weight (grams)	Number of babies	%
<2500	65	65.0
2500-3500	34	34.0
>3500	1	1.0
Total	100	100.0

Mean ± SD: 2343.50±380.51

➤ *LATE PRETERMS AND SMALL FOR GESTATIONAL AGE:*

Out of 100 late preterms 8 babies (8%) were bom small for gestation and 90 babies (90%) were bom appropriate for gestational age.

Table 3: SGA/AGA/LGA

SGA/AGA/LGA	Number of babies	%
LGA	2	2.0
AGA	90	90.0
SGA	8	8.0
Total	100	100.0

➤ **APGAR SCORES:**

Apgar scores of the late preterm neonates observed in this study were as below. 97 % of the neonates had good Apgar score of > 7 at 1 min after birth and all the neonates of the study had Apgar score of > 7 at 5 min after birth.

Table 4: Apgar score

Apgar score	Number of babies (n=100)	%
Apgar score at 1min		
• <7	3	3.0
• >7	97	97.0
Apgar score at 5 min		
• <7	0	0.0
• >7	100	100.0

➤ **MODE OF DELIVERY:**

Out of 100 late preterms studied 87 babies (87%) were delivered by LSCS and 13 babies (13%) were delivered by NVD.

Table 5: Mode of delivery

Mode of delivery	Number of babies	%
NVD	13	13.0
LSCS	87	87.0
Total	100	100.0

➤ **INDICATIONS OF LSCS:**

Most common causes of preterm delivery and LSCS included PROM, previous LSCS, Multiple gestation, Preeclampsia, Fetal distress as shown below.

Table 6: Indication of LSCS

Indication of LSCS	Number of Mothers	%
1.PROM	21	24.7
2.Previous LSCS	16	18.8
3.Twin gestation	15	17.6
4.PIH/Preeclampsia	9	10.6
5.Fetal distress	9	10.6
6.Bleeding P/V	6	7

➤ **LATE PRETERMS AND NEONATAL PROBLEMS:**

The neonatal problems of the late preterm neonates observed in this study were as follows [table 7]

Table 7: Neonatal problems

Neonatal problems	Number of babies (n=100)	%
1.Hypoglycemia	4	4.0
2.Respiratory distress/TTNB	14	14.0
3. Oxy gen/ventilation	12	12.0
4.Initial NG feeds	57	57
5.IV fluids requirement	15	15
6.Feeding problems	26	26.0
7 .Hyperbilirubinemia	54	54.0
8. Miscellaneous	6	6.0

➤ **DURATION OF HOSPITAL STAY:**

The duration of hospital stay of the late preterm neonates of this study was as shown below.

Table 8: Duration of Hospital stay (days)

Duration of stay Hospital (days)	Number of babies	%
1-5	29	29.0
5-10	66	66.0
>10	5	5.0
Total	100	100.0

Mean duration of hospital stay(days):6.02±2.68

VI. DURATION OF HOSPITAL STAY (DAYS)

➤ **LATE PRETERMS AND REQUIREMENT OF NICU ADMISSION:**

Out of 100 babies studied 57 babies(57%) required admission in NICU and 43 babies(43%) didn't required admission in NICU and were admitted in neonatal nursery ward.

Table 9: NICU admission

NICU admission	Number of babies	%
No	43	43.0
Yes	57	57.0
Total	100	100.0

➤ **DURATION OF NICU STAY:**

57% of the late preterm neonates of this study required NICU admission. The duration of NICU stay of these neonates is as shown below.

Table 10: Duration of NICU stay

Duration of NICU stay(days)	Number of babies	%
1-3	22	38.6
3-7	33	57.9
>7	3	5.3
Total	57	100.0

➤ **READMISSION TO THE HOSPITAL AFTER DISCHARGE:**

16 neonates (16%) out of 100 late preterm neonates observed in this study required readmission to the hospital after initial discharge from the hospital.

Table 11: Readmission

Readmission	Number of babies	%
No	84	84.0
Yes	16	16.0
Total	100	100.0

➤ **CAUSES OF READMISSION OF LATE PRETERM NEONATES:**

For 16 late preterm neonates readmitted to hospital, hyperbilirubinemia was cause for admission for 15 neonates (93.8%). 11 neonates (68.8%) admitted with hyperbilirubinemia alone and 4 neonates (25%) admitted with both hyperbilirubinemia and dehydration.

Table 12: Cause of Readmission

Cause of Readmission	Number of babies	%
1 .Hyperbilirubinemia alone	11	68.8
2.Hyperbilirubinemia with dehydration	A	25
3.Inguinal hernia	1	6.2
Total	16	100.0

➤ *COMPARISON WITH OTHER STUDIES:*

Table 13: Common problems noted in the late preterms in our study

Neonatal problems	number of babies (n= 100)	(%)
Hypoglycemia	4	4
Respiratory problems	14	14
TTNB	6	6
Respiratory distress	6	6
RDS ^a	1	1
Apnoea	1	1
Oxy gen/Ventilatory requirement	12	12
IV fluids requirement	15	15
Feeding problems	26	26
Hyperbilirubinemia	54	54

a Respiratory distress syndrome

Table: 16: Common problems noted in the late preterms in other studies

Neonatal problems	number of babies	(%)
Hypoglycemia		
Wang et al ⁸⁹ (35-366/ 7 wk)	14	15.6
Respiratory distress		
Escobar et al ⁹⁰ (34—366^ 7 wk)	345	10.7
Gilbert et al ⁹¹ (34-366/ 7 wk)	1167	3.6
Wang et al ⁸⁹ (35-36(7 7 wk)	26	28.9
Received mechanical ventilation		
Gilbert et al ⁹¹ (34-366^ 7 wk)	1103	3.4
IV fluids requirement		
Wang et al ⁸⁹ (35-366/ 7 wk)	24	26.7
Feeding problems		
Wang et al ⁸⁹ (35-366/ 7 wk)	29	32.2
Hyperbilirubinemia		
Wang et al ⁸⁹ (35-366/ 7 wk)	49	54.4

VII. DISCUSSION

The study of clinical profile of late preterms in our hospital demonstrated that late-preterm infants are likely to have more neonatal problems than term neonates. Post-delivery, late-preterm infants in our study were noticed to have problems like jaundice, feeding difficulties, respiratory problems and hypoglycemia.

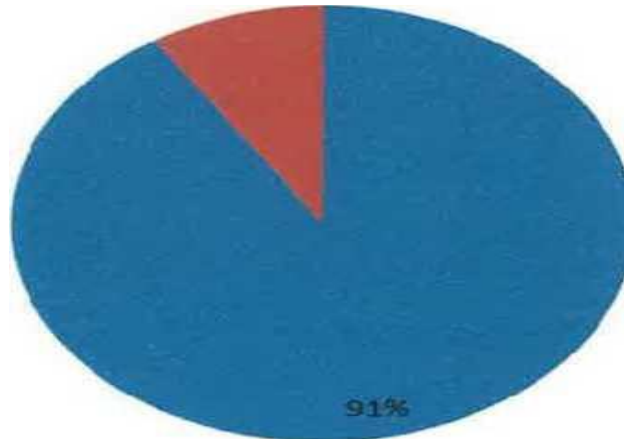
57% of the late preterms studied were admitted in NICU post-delivery, the common cause were low birth weight, respiratory problems, feeding problems.

Late preterm neonates required prolonged duration of hospital stay after birth (Mean duration of hospital stay was 6.02±2.68 days Within 28 days of birth most of the late-preterm infants (16%) were rehospitalized. Among these neonates 93.8% of them had jaundice, 25% of these neonates had feeding difficulties and dehydration.

The magnitude of neonatal problems like hyperbilirubinemia, respiratory distress and feeding difficulties observed in our study were similar to other studies - Wang et al⁸⁹, Escobar et al⁹⁰ [table- 13].;

VIII. BURDEN OF LATE PRETERMS

In our hospital during the study period (2012-2013), out of 1000 live births 90 births were of late preterms i.e. late preterms deliveries constituted at 9% of the total deliveries.



Graph 12: Percentage of late preterms out of total live births Late preterms 9%

The observed late preterm birth in our hospital was similar to the late preterm birth rate observed in United States in 2003 which is 8.8% ⁴³. This may suggest that late preterm burden is similar all over although the data available was insufficient and comparison done with different time periods and also this study was done in a single hospital, corporate hospital and population group being very small.

A. Late preterms and Cesarean deliveries:

In our study we observed very high cesarean rate in late preterm deliveries, showing a rate of 87% of total late preterm deliveries [table 7].

Common causes for indications of cesarean were premature rupture of membranes (PROM), pre eclampsia, twin gestation, previous cesarean delivery, fetal distress, preterm labour, bleeding etc. [table 8]. Most of these causes were combined instead single cause being an indication of cesarean. Gestational diabetes mellitus (GDM) and Pregnancy induced hypertension (PIH) were most common antenatal problems observed in the mothers. Other less common causes observed were Polyhydramnios, Oligohydramnios, Placenta previa etc. Multiple gestations (Twin gestation) was comprised for 17.6% of the mothers of late preterms studied.

90 so 70 bO

30

20

10

50

40

Singleton Vs Twin Gestation

IX. NEONATAL ISSUES

In this study 100 late preterms were taken, for all the babies gestational age was estimated as per the obstetrical records based on first date of last menstrual period (LMP), Maternal data, mode of delivery, indications of cesarean, Apgar scores, anthropometry, clinical profile of each baby, duration of hospital stay was recorded and data prepared. No intervention was done in this study. All the babies were managed as per routine hospital Neonatal division management protocols of the newborn, only the clinical characteristics of the late preterms in this hospital was observed and data prepared. Almost all the babies had good Apgar scores after birth [table 6].

A. Late preterms and low birth weight (<2500 grams):

Out of 100 late preterms studied, 65 babies (65%) were bom with birth weight less than 2500 grams [table 4]. But 90% of the babies were bom with weight appropriate to their gestational age [table 5]. This suggests that most of the late preterms are low birth weight that needs special care as compared to normal birth weight babies in terms of feeding, thermoregulation, and clinical problems.

B. Late preterms and requirement of NICU admission:

In 100 late preterms studied in our hospital 57 babies (57%) required admission in NICU [table 11, graph 8]. All the babies bom were initially observed in transitional NICU nursery care unit for 6 hours exceptions being babies who develop complications immediately after birth who are directly admitted in NICU. Late preterms with gestation less than 35 weeks and birth weight less than 2000 grams who are likely to be observed closely for more time to access the establishment of feeding were also directly admitted in NICU. After observing in transitional care in few hours, if the babies were hemodynamically stable and after establishment of breast feeding babies were shifted to wards to the mother side.

The late preterms who were admitted in NICU were shifted to wards after establishment of breast feeding and hemodynamically stable.

Table 12 shows duration of NICU stay of late preterm babies. 38.6% of the late preterms required 1-3 days of NICU stay, 57.9 % of the late preterms required 3-7 days of NICU stay and 5.3% required NICU stay more than 1 week. This indicates that late preterms have high rate of morbidity, increased cost of hospitalization and they are separated from mothers for long time which in turn will result in delay in bonding and establishment of breast feeding.

C. Hyperbilirubinemia in late preterms:

It is well known that late preterm neonates demonstrate a slower postnatal maturation of hepatic bilirubin uptake and bilirubin conjugation as compared with their term counterparts. This exaggerated hepatic immaturity contributes to the greater prevalence, severity and duration of neonatal jaundice in late preterm infants.

In this study we observed hyperbilirubinemia as commonest problem in the late preterms. 54% of the late preterms studied had hyperbilirubinemia and required management with phototherapy [table 9, graph 6], Phototherapy was started using American academy of Paediatrics chart. Hyperbilirubinemia contributed to major cause in delaying the discharge of the baby from the hospital. Peak in rise of bilirubin is often noticed in 2 week of life. Hyperbilirubinemia also was the most common cause of readmission which will discussed later. Hence this study signifies the importance of hyperbilirubinemia as most common problem in late preterm neonates and hence late preterm neonate needs to be closely observed for increase in jaundice for long time.

D. Late preterms and Feeding problems:

Late preterms presented a great challenge to the health care providers in feeding them [table 9, graph 6]. 26% of the late preterms in this study had feeding problems in the form of delay in initiation or establishment of breast feeding and difficulty in continuation of breast feeding. 15% of the late preterms were started initially on IV fluids the most common reasons being respiratory distress, suspected sepsis which caused delay in starting the feeds.

The late preterms who were admitted in NICU after birth were initially started on Nasogastric/Orogastric feeds and continued till complete establishment of breast feeding. Even without other complications most of the late preterms had difficulty in establishing breast feeding indicating their immaturity in latch, suck and swallow. Feeding problem was the major cause in delay in discharging the neonate from NICU to nursery wards and discharging the neonate from hospital.

E. Late preterms and Respiratory problems:

Transient tachypnea of newborn (TTN) and respiratory distress syndrome (RDS) in late preterm infants have been well studied [44,50]. In this study 14% of the late preterms had respiratory problems [table 9,15].

Out of 100 late preterm neonates studied 6 had TTN, 6 had Respiratory distress, 1 neonate had apnoea and 1 neonate had respiratory distress syndrome (RDS) who required surfactant therapy.

In the 14 neonates who had respiratory problems 12 neonates required ventilatory support. Except the one neonate who had RDS and treated with surfactant with invasive ventilation, all other neonates were managed with CPAP (Continuous Positive Airway Pressure) support. Late preterms and duration of hospital stay:

The duration of the hospital stay of late preterm neonates was definitely long when compared to term neonates although comparison was not done in this study.

29% of the late preterm neonates required hospital stay of 3-5 days, 66% of them required hospital stay of 6-10 days and 5% of them required hospital stay of more than 10 days [table 10, graph 7]. Mean duration of hospital stay of the late preterm neonates of this study group is 6.02 ± 2.68 days.

Most common causes in delaying the discharge of the neonate were feeding problems and neonatal hyperbilirubinemia.

This study implies that late preterm neonates require prolonged stay of hospitalisation due to their prematurity and early discharge of these neonates is not recommended. Readmissions after initial hospital discharge:

Although late preterms were not discharged early from the hospital, 16% of the late preterm neonates studied were readmitted to the hospital [table 13,].

Hyperbilirubinemia was the major cause for the readmission of the late preterm neonates born in our hospital. 93.8% of the late preterm neonates readmitted had hyperbilirubinemia [table 14], among them 68.8% had hyperbilirubinemia alone and 25% had dehydration along with hyperbilirubinemia.

Dehydration of these late preterm neonates readmitted signifies the feeding issues of the late preterm neonates even after initial discharge from the hospital.

This study signifies of risk of early discharge of late preterm neonate from the hospital and signifies the importance of follow up of these neonates after initial discharge from the hospital.

X. CONCLUSION

The study done on clinical profile of 100 late preterms in our hospital has shown the following results.

Late-preterm infants are likely to have more neonatal problems than term neonates. Post-delivery, late-preterm infants in our study were noticed to have problems like jaundice (54%), feeding difficulties (26%), respiratory problems (14%) and hypoglycemia (4%). Neonatal hyperbilirubinemia was the most common problem noticed in the late preterm neonates, which was also a major cause of readmission of these neonates to the hospital.

57% of the late preterms studied were admitted in NICU post-delivery, the common cause were low birth weight, respiratory problems, feeding problems.

Late preterm neonates required prolonged duration of hospital stay after birth (Mean duration of hospital stay was 6.02±2.68 days).

Within 28 days of birth most of the late-preterm infants (16%) were rehospitalized. Among these neonates 93.8% of them had jaundice, 25% of these neonates had feeding difficulties and dehydration.

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STUDY PROFORMA

NAME OF BABY
HOSPITAL NUMBER:
DATE & TIME OF BIRTH :
SEX :
GESTATIONAL AGE :
EXPECTED DATE OF DELIVERY:
MODE OF DELIVERY :
INDICATION :
ANTENATAL PROBLEMS:
ANTENATAL STEROIDS :
MOTHERS BLOOD GROUP:
BABY BLOOD GROUP :
BIRTH WEIGHT
SGA/AGA/LGA :
LENGTH :
HEAD CIRCUMFERENCE :
APGAR SCORE : at 1 min and at 5 min
DATE OF ADMISSION :
DATE OF DISCHARGE :
HYPOGLYCEMIA: Yes/No
Age of onset:
Lowest Glucose level:
Symptomatic / Asymptomatic:
TTNB/RESPIRATORY DISTRESS SYNDROME:
Requirement of Oxygen:
Requirement of ventilator support:
FEEDING DIFFICULTIES:
Difficulty in initiating and continuing breast feeding:
JAUNDICE:

Serum bilirubin:
mg/dl at
hours of life

Phototherapy given for _____ hours

Phototherapy given: Yes/No

MISCELLANEOUS:
REQUIREMENT OF NICU STAY:
Cause of NICU admission:
No of days in NICU:
READMISSION TO HOSPITAL:
Causes of readmission: