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Short term respiratory outcomes in late preterm newborns delivered at Trichy SRM Medical College

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Abstract

Introduction: The majority of the literature on late preterm newborns comes from western countries, whose obstetric and neonatal care differs from that of a developing nation like India. The majority of the time, late -preterm infants receives the same care as term newborns. Late –preterm children have not been researched, and our knowledge of the developmental biology and illness mechanisms that these infants suffer is essentially lacking. In this context, this study was conducted on late preterm infants.

Methodology: This is a prospective observational study conducted among 100 late preterm infants admitted in Trichy SRM medical college hospital and research institute. The demographic was collected as per the standard questionnaire and assessed for their gestational age primarily by using Modified Ballard's scoring system. In addition to NBS gestational assessment is also done by the antenatal records of USG (6-12weeks dating scan). In absence of antenatal records 1st day OF LMP is used for assessment of gestational age. Relevant maternal details during three trimesters of antenatal period were collected The data obtained were entered in Excel and analysed using SPSS 25.

Results: In our study,. 41 babies had respiratory morbidity 1 baby needed intubation and 28 needed O2. Neonatal jaundice was present in 53 babies and 1 baby needed exchange transfusion and 4 babies needed intensive PT. Incidence of polycythemia and hypoglycemia was 17and 1%. Sepsis was found to be probable in 5%. Suspected in 13% and culture positive in 1 baby. 41 babies had respiratory morbidity

Conclusion: The higher incidence of complications in late preterm birth suggests an effective management of high-risk mothers is needed for prevention of neonatal mortality and morbidity

Keywords: Late Preterm, Respiratory Morbidity, Intubation.

Introduction

Over the past few decades, preventive and therapeutic measures have mostly targeted low birth weight babies and deliveries that take place before 34 weeks. Despite a growing awareness of the rate of difficulties associated with late preterm deliveries, many clinicians today feel more at ease with births at late preterm gestations and many tend to opt for elective delivery well before 39 to 40 weeks' gestation.[1] There are higher risks of respiratory distress syndrome, sepsis, and patent ductus arteriosus in the 34 - to 35- week gestational groups. Neonatal intensive care unit admission rates were rather high at 34 weeks' gestation (16.3%), but by 36 weeks' gestation, the rate had dropped to 4.8%.[2] Medical issues may be more likely to occur in late preterm babies than in full- term ones. Recent research has revealed that infants born between 35 and 36 weeks were more susceptible to clinical jaundice, intravenous infusion needs, temperature instability, and respiratory distress. There is rising awareness that, in addition to the obvious physical challenges, this population may also be experiencing more subtle neurodevelopmental disorders, such as poor academic performance or behavioural issues.[2] The rise in preterm births has contributed to an increase in low birth weight as well. A significant contributor to infant mortality and morbidity is prematurity. While late-preterm infants are equally physiologically and metabolically immature, the majority of studies are concentrated on outcomes among preterm neonates less than 34 weeks gestation, who have the highest mortality and morbidity rates. The majority of the literature on late preterm newborns comes from western countries, whose obstetric and neonatal care differs from that of a developing nation like India. The majority of the time, late-preterm infants receives the same care as term newborns. Late -preterm children have not been researched,[3] and our knowledge of the developmental biology and illness mechanisms that these infants suffer is essentially lacking. [4, 5]. In this context, this study was conducted on late preterm infants.

Aim and Objectives

To study the short- term respiratory outcomes in late preterm infants delivered at Trichy SRM medical college hospital and research Centre.

Review of Literature

A precise characterization of the illness and its associated consequences is required to assess its incidence and impact. This leads to the reporting of a generic classification for a few gestational age categories. All births that occur before 37-0/7 weeks are considered preterm births, which also includes births that occur very preterm (before 32-0/7 weeks), moderately preterm (32 -0/7 to 33-6/7weeks), and late preterm births (34-0/7 to 36-6/7 weeks). Post-term births are any deliveries that take place after 42-0/7 weeks and are categorised as occurring between 37-0/7 and 42-0/7 weeks.[3]The preterm babies are more prone for many complications. some of the most common health conditions that affect premature babies are:

- Apnea of prematurity, or temporary pauses inbreathing during sleep.
- Bronchopulmonary dysplasia, or underdeveloped lungs.
- Intra ventricular hemorrhage, or bleeding in the brain.
- Necrotizing enter colitis, or inflammation of the intestines.
- Neonatal sepsis, or blood infection.

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- Patent ductus arteriosus (PDA), or abnormal blood flow in the heart.
- Retinopathy of prematurity, or underdeveloped blood vessels in the eye. Premature babies are also at a higher risk of developmental challenges. They may have health issues later in life, including:
- Cerebral palsy.
- Hearing and vision problems.
- Learning disabilities.
- Poor growth.[8] Bulut et al. conducted a study with the goal of analysing the rates of morbidity, such as respiratory system illnesses, infections, congenital malformations, hypoglycemia, and hematologic abnormalities, as well as mortality. In three years, 41752 births were examined. 16.1% of births were between 34 and 37 weeks of gestation, whereas 71.9% of all births occur ed between 37 and42 weeks (i.e. late preterm). Late preterm newborns showed higher incidence of short-term issues compared to term infants. As gestational age declined, the mortality rate rose. The late - preterm newborns spent much longer in the hospital. [6] Rahul et al conducted a study to assess the short-term morbidities and mortality in full-term, late-preterm, and early-term neonates. In a level 3newborn unit, this prospective observational study was carried out. The study comprised new borns admitted to the neonatal intensive care unit (NICU) within the first 24 hours of life and born at a gestational age between 34 and 41 weeks. Multifetal gestation and neonates with significant congenital abnormalities were prohibited. The incidence of neonatal death and other short-term morbidities were assessed as the study's main outcome measures. The incidence of respiratory morbidities was higher in late-preterm and early-term newborns than in full-term newborns, including respiratory distress syndrome, transient tachypnea of the newborn, culture -positive early-onset sepsis, hemodynamically significant patent ductus arteriosus, and neonatal hyperbilirubinemia.[7]

Material and Methods

This is a prospective observational study conducted among late preterm infants admitted in Trichy SRM medical college hospital and research institute.

Inclusion criteria: Babies delivered between 34 to 36(6/7) COMPLETED weeks of gestation Single / Multiple gestation.

Exclusion criteria: Babies with major congenital anomalies detected antenatally / postnatally out born babies.

Babies delivered during or equal to 37 weeks of gestations Still birth

Sample size: 100

Sampling method: Random sampling Study period: June 2021-December 2022.

Procedure: After obtaining the necessary permission, the study was conducted by the investigator. The demographic was collected as per the standard questionnaire. Babies born in the Trichy SRM medical college hospital during the study period were assessed for their gestational age primarily by using Modified Ballard's scoring system. In addition to NBS gestational assessment is also done by the antenatal records of USG (6-12weeks dating scan). In absence of antenatal records 1st day OF LMP is used for assessment of gestational age. Relevant maternal details during three trimesters of antenatal period were collected.

Data analysis: The data obtained were entered in Excel and analysed using SPSS 25.

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The categorical variables were given in proportion and continuous variables were given in mean with s.d.

Results (Including Observations)

In our study, the gestational age profile shows that 2 7% were of GA 34-34 6/7 weeks, 30% were of GA 35-35 6/7 weeks and 43% were of 36-36 6/7 weeks. 59 % were male and 41 % were female.

Majority of mothers were 26 to 30 years of age (41 %), followed by 21 – 25 years of age (36%) and

31 -35years of age (11%). Only 9 % of age below 20 years and 3 % of age above 35years. 41% had complete course of antenatal steroid and 32% had one dose of steroid. The indication of preterm in our study shows that spontaneous labour in preterm (21%) to be most common with followed by Twins(16%) , previous LSCS (15%) and oligohydromnios (12%).The least common are IUGR, MSAF and failed induction. 68% of babies were delivered by LSCS and 4% had assisted delivery.

In our study, 20 babies were SGA and 5 were LGA. In our study, 1 baby needed intubation and 28 needed O2. Neonatal jaundice was present in 53 babies and 1 baby needed exchange transfusion and 4 babies needed intensive PT. Incidence of polycythemia and hypoglycemia was 17 and 1%. Sepsis was found to be probable in 5%. Suspected in 13% and culture positive in 1 baby.

Discussion

In our study, the gestational age profile shows that 2 7% were of GA 34-34 6/7 weeks, 30% were of GA 35-35 6/7 weeks and 43% were of 36-36 6/7 weeks. 59 % were male and 41 % were female. In general males have higher prevalence of preterm and morbidity associated with it. Despite the introduction of antenatal corticosteroid medication and the use of postnatal surfactants, the clinical evidence from the previous three decades continues to show a sex discrepancy. At the most fundamental macroscopic level, male fetuses have more alveoli and surface area than female fetuses of the same gestational age due to their tendency to weigh more at any given gestational age. But research has showed that female's lungs develop their surfactant synthesis earlier than males. This earlier surfactant appearance appears to prevent the early closure of female alveoli and tiny airways, which may be a factor in the female respiratory system's higher airflow and lower resistance. [9,10] The 2:1 lecithin/sphingomyelin (L/S) ratio and the emergence of phosphatidyl glycerol, a component o f surfactant, occurred 74 one week earlier in females than in males, according to research by Fleisher et al.[11] Majority of mothers were 26 to 30 years of age(41 %), followed by 21 – 25 years of age (36%) and 31 -35years of age (11%). Only 9 % of age below20 years and 3 % of age above 35years. 41% had complete course of antenatal steroid and 32% had one dose of steroid. The indication of preterm in our study shows that spontaneous labour in preterm(21%) to be most common with followed by Twins(16%) , previous LSCS (15%) and oligohydromnios (12%).The least common are IUGR, MSAF and failed induction. 68% of babies were delivered by LSCS and 4% had assisted delivery. For births that take place at less than 37 weeks of gestation, the general distribution of preterm birth subtypes has been broadly divided into 2 groups. These comprise: (1) suggested or iatrogenic births brought on by a harmful maternal or foetal condition; and (2) spontaneous births, which include preterm lab ours that go undiagnosed and PPROM. According to Ananth et al., only about 25% of preterm births are medically necessary, with the other75% occurring naturally. 80 40% of spontaneous preterm births are caused by PPROM, while 60%are the result of preterm labour.[12] Meis et al have

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reported that Preeclampsia (40%)no reassuring foetal testing (25%), IUGR (10%), placenta abruption (7%), and foetal mortality (7%),are the most frequent etiologies of recommended preterm births. [13] The GA 34-36 6/7 weeks we reassessed using I trimester USG in 44% babies, by LMP in 37% and by USG in 19% in our study. Intervention and complications 20% were SGA and 5% were LGA..1 % needed intubation and 3%needed Positive pressure ventilation for resuscitation in our study. In our study, 28% had respiratory distress and O2 requirement. 53% of neonates had 76 neonatal jaundice, around 17 neonates hadhypoglycaemia and only one baby had polycythemia, in our study, 13% had suspected sepsis, 5% had probable sepsis and 1% had culture diagnosed sepsis. 25% of the neonates has requirement of i.v fluid. Mortality was around 1% among the study population. The mean duration of hospital stay is9.03+/-1.9 days and the mean duration of NICU stay is 5.2+/-2.06 day Similar to our study, Natlaie et al. study also showed the neonatal respiratory morbidity to be higher in late preterm. They conducted a retrospective study on 14,515 infants. There were 856 LPI and 12,948 TI (89.2%).Respiratory morbidity affected 105 Late pre terms (LPI) (12.4%) and 121 Term infants (0.9%), for a rate of 1.6% overall. 84 LPI (9.8%) were given respiratory support, with 13 LPI (1.5%) ventilated. The adjusted odds ratio (OR) for developing respiratory morbidity increased significantly from 3.3(95% CI 2.0-5.5) at 37 weeks to 40.8 (95% CI 19.7-84.9%) at 34 weeks. The adjusted OR for Mechanical ventilation requirement increased significantly from 3.4 (95% CI 1.2-10) at 37 weeks to34.4 (95% CI 6.7-180.6%) at 34 weeks. [14] Correia et al conducted a study among total of 498newborns and reported that 44 (8.83%) having RDS or TTN. Lower gestational age, male gender, caesarean section, per partum antibiotic exposure, overweight and nulliparous mothers all had a higher risk of respiratory morbidity. When compared to TTN newborns, RDS newborns required significantly more resuscitation, endotracheal intubation, oxygen therapy, early invasive ventilation, parenteral nutrition, and a longer NICU stay. 55% of the RDS patients were 35+0 to 36+6 weeks gestational age, had moderate or severe RDS, and needed mechanical ventilation; six required surfactant. The results were similar to ours.[15]

Summary and Conclusion

This is a prospective observational study conducted among 100 late preterm infants admitted in Trichy SRM medical college hospital and research institute. The demographic was collected as per the standard questionnaire and assessed for their gestational age primarily by using Modified Ballard's scoring system. In addition to NBS gestational assessment is also done by the antenatal records of USG (6-12weeks dating scan). In absence of antenatal records 1st day OF LMP is used for assessment of gestational age. Relevant maternal details during three trimesters of antenatal period were collected. The data obtained were entered in Excel and analysed using SPSS 25. Late preterm babies had mean duration of hospital stay of 9.03 days with higher respiratory morbidities and Nicu stay is 5.2 days. The higher duration of hospital and Nicu stay, higher need of iv fluids, intubation, PPV suggest a need of effective immediate neonate setup care for management of late preterm neonates. Also, higher incidence of complications in late preterm birth suggests an effective management of high-risk mothers is needed for prevention of neonatal mortality and morbidity.

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Legend Table and Figure

Variables	n	%
Gestational age at delivery		
34-34 6/7	27	27
35-35 6/7	30	30
36-36 6/7	43	43
Gender		
Male	41	41
Female	59	59
Age of mother in years		
<20	9	9
21-25	36	36
26-30	41	41
31-35	11	11
>35	3	3
Risk factors		
GDM	12	12
GHTN	18	18
Hypothyroidism	7	7
Anaemia corrected pregnancy	16	16
Use of steroids		
Complete course	41	41
Incomplete course	32	32
Nil	27	27
GA assessment 34-36 6/7 weeks		
I trimester USG	44	44
LMP	37	37
USG	19	19
Birth weight		
AGA	75	75
SGA	20	20
LGA	5	5

Table 1: Descriptive data of study variables

OUTCOMES	n	%
Need of resuscitation		
Initial steps	96	96
PPV	3	3
Intubation	1	1
Need of o2 and surfactant		
O2	28	28
Surfactant	0	0
Neonatal jaundice		
Yes	53	53
No	47	47
Need of interventions for jaundice		
Exchange transfusion	1	1
SSPT single surface	40	40
DSPT double surface	8	8
Intensive PT	4	4
Onset of jaundice		
Within 24 hours	2	2
24-72 hours	33	33
>72 hours	18	18
Incidence of hypoglycemia and polycythemia		
Hypoglycemia	17	17
Polycythemia	1	1
Sepsis distribution		
Nil	81	81
Culture positive	1	1
Probable	5	5
Suspected	13	13
IV Fluid indication		
Respiratory distress	15	15
Hypoglycemia	4	4
Sepsis	3	3
Apnoea	2	2
Feeding intolerance	1	1

Table 2: Short term outcomes of late preterm babies

	Duration of hospital stay in days	Duration of NICU stay in days
Mean	9.03	5.23
S.d	1.9	2.01
Range	7-14	4.9

Table 3: Duration of hospital and NICU Stay

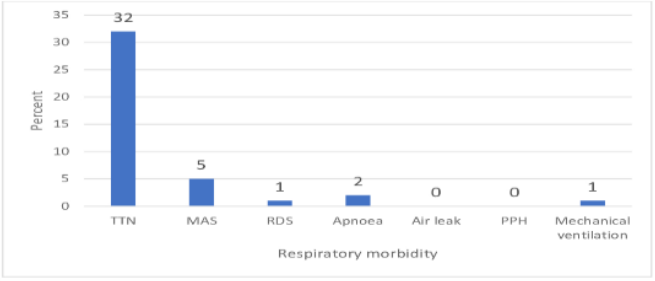

Figure 1: Respiratory morbidity

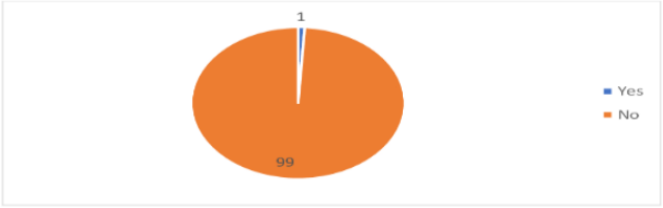

Figure 2: Mortality among late preterms

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