

## Clinical Profile of Late Preterm Neonates at Tertiary Care Hospital

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### Abstract

*Introduction:* During the past few decades, preventive and therapeutic interventions focused primarily on low birth weight infants and deliveries occurring at less than 34 weeks. Many clinicians have become increasingly comfortable with births in late preterm gestations and many seemingly choose elective delivery well before 39 to 40 weeks of gestation, mistakenly believing that these neonates may be as physiologically and metabolically mature as term new borns. *Methodology:* Data were collected from infants and mothers medical records and supplemented with additional information collected at discharge using a structured form covering the variables of interest. Variables relating to the mothers and their infants were analyzed. *Results:* Regarding gestational age, 18 neonates were admitted between the gestational age of 34<sup>0/7</sup> to 34<sup>6/7</sup> weeks who constitute about 18%. 16 neonates were admitted between the gestational age of 35<sup>0/7</sup> to 35<sup>6/7</sup> weeks who constitute about 16% and 66 neonates were admitted between the gestational age of 36<sup>1/7</sup> to 36<sup>6/7</sup> weeks who constitute 67%. *Conclusion:* Majority of babies were admitted within first three days of life.

**Keywords:** Preterm Neonates; Gestation; Low Birth Weight.

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### Introduction

With 4 million births annually in the United States, a 12.5% preterm birth rate computes into a staggering figure of one preterm infant born each minute. It is also note worthy that in all preterm gestations, there has been an increase in cesarean births and induced deliveries [1]. This is concerning because there is a large proportion of induced births in late preterm gestations with documented etiology. Some explanations for the increasing preterm birth are increasing proportion of pregnant women older than 35 years of age, medically indicated deliveries secondary to better surveillance of the mother and the fetus, attempts to reduce stillbirths and stress from a variety of sources. However nationwide epidemiologic studies are needed to inform the etiology of increasing preterm births, especially in the late preterm gestations [2].

During the past few decades, preventive and therapeutic interventions focused primarily on low birth weight infants and deliveries occurring at less than 34 weeks. Many clinicians have become increasingly comfortable with births in latepreterm gestations and many seemingly choose elective delivery well before 39 to 40 weeks of gestation, mistakenly believing that these neonates may be as physiologically and metabolically mature as term new borns. There is now a growing awareness with regard to late preterm birth due to the un anticipated rate of complications this group has demonstrated. Neonates born between 34 and 36 weeks of gestation (latepreterm or near term births) comprise 71% of all preterm births in the United States. Latepreterm neonates have significantly higher rates of morbidity and mortality relative to those born at term (37-42 weeks). In addition to higher risks for serious health complications, the mortality rate for late preterm infants is 3-fold higher than that for term

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infants (7.7 vs 2.5 per 1000 live births) [3].

The mechanisms initiating normal labour are not clearly understood and much less are known about the triggers that initiate labour before term. There may be spontaneous onset of premature labour or it may be induced by the Obstetrician to safeguard the interests of the mother or baby [4].

The cause of premature onset of labour is uncertain in most instances. The known causes include poor socio-economic status, low maternal weight, chronic and acute systemic maternal disease, antepartum hemorrhage, cervical incompetence, maternal genital colonization and infections, threatened abortion, acute emotional stress, physical exertion, sexual activity, trauma, bicornuate uterus, multiple pregnancy and congenital malformations.

Premature births are relatively common among very young and unmarried mothers. Past history of preterm birth is associated with 3 to 4 times increased risk of prematurity in the subsequent pregnancies [4].

The labour is often induced before term when there is impending danger to mother or fetal life in utero e.g. maternal diabetes mellitus, placental dysfunction as indicated by unsatisfactory fetal growth, eclampsia, fetal hypoxia, antepartum hemorrhage and severe rhesus-sensitization [4].

The Obstetrician faces many challenges while managing women in labour in any preterm gestation. These include balancing the benefits of immediate delivery against the risks of prematurity and assessing the benefits of expectant management versus the potential risk of compromising maternal and fetal health. Furthermore, there are well known, medically indicated causes of preterm births, such as placental abruption, placenta previa, bleeding, infection, hypertension, multiple pregnancy, preeclampsia, idiopathic preterm labor, premature rupture of membranes, and intrauterine growth restriction [2].

However, with the exception of multiple pregnancies, there is no indication that the prevalence of other conditions are on the increase. Thus, some experts contend a sizable number of late preterm births can be prevented; however more studies are needed to substantiate this claim [2].

The reason for the increase in late preterm births during the last decade is not well understood. One hypothesis is that it may be attributable, in part, to increased use of reproductive technologies and as a result, an increase in multifetal pregnancies. Another hypothesis is that advances in Obstetric practice have led to an increase in surveillance and medical

interventions during pregnancy. As a result, fetuses considered to be at risk of still birth, including those with intrauterine growth restriction, fetal anomalies and intrapartum asphyxia, may be identified earlier, which results in more deliveries at 34 to 36 weeks' gestation. For example, between 1989 and 2003, the use of electronic fetal monitoring and prenatal ultrasonography increased substantially from 68.1% to 85.4% and 47.6% to 67%, respectively. Rates of labour induction and cesarean delivery also increased during the last decade. It is important to note, however, that the increased intensity of care provided to pregnant women has been accompanied by significant reductions in still births, perinatal mortality and births beyond 40 weeks' gestation [5].

To date, limited studies have addressed the etiology of late preterm births. Reddy et al categorized the etiology of late preterm deliveries into five groups: maternal medical conditions, Obstetric complications, major congenital anomalies, isolated spontaneous deliveries and no recorded indications, which accounted for 14%, 16%, 1%, 49% and 23.2% of all deliveries respectively [6].

Laughon et al reported that spontaneous labor, preterm premature rupture of membranes and indicated deliveries each accounted for about 30% of late preterm births. These two studies revealed three aspects. Firstly, medically indicated elective cesarean sections (CSs) were responsible for the majority of all late preterm deliveries; secondly, varied neonatal morbidities and mortalities depended upon the indications for delivery; and thirdly, a certain proportion of deliveries with unknown indications were likely patient scheduled CS and thus potentially avoidable [7].

No consensus has yet been reached on the contributing factors of the increase in late preterm births. Available data have suggested medically indicated deliveries and patient driven factors were responsible for the increase of late preterm newborns. Because the actual indication for delivery is recognized as a determinant of neonatal outcome, more attention should be devoted to examine the etiology of late preterm births [6,7].

## Methodology

Details regarding maternal risk factors were collected by detailed history taking and the medical records with them. The infants in the sample were followed throughout their stay in the SNCU and postnatal wards, up until hospital discharge. Data were collected from infants and mothers' medical

records and supplemented with additional information collected at discharge using a structured form covering the variables of interest. Variables relating to the mothers and their infants were analyzed.

The maternal and gestational variables studied were: Age (years), number of pregnancies, prior history of miscarriages, still births and premature deliveries; type of delivery (normal or caesarean); previous caesarean section, intercurrent clinical conditions observed during gestation - diabetes, hypertension, anemia, urinary infections at any point during pregnancy, syphilis, human immunodeficiency virus (HIV), toxoplasmosis, heart disease, hepatitis B, premature rupture of membranes (PROM) for longer than 18 hours, placental abruption.

The neonatal variables studied were: Age at admission, days in hospital, sex, birth weight; gestational age (Calculated from modified Ballard's scoring); hypothermia/ hyperthermia (hypothermia: body temperature below 36°C, hyperthermia: temperature above 37.5 °C); hypoglycemia (glucose below 40 mg/dL); hyperbilirubinemia requiring phototherapy/exchange transfusion; feed intolerance; respiratory pathologies - transient tachypnea of the newborn (TTN), hyaline membrane disease (HMD), pneumonia, sepsis, interventions done, deaths, rehospitalizations.

#### Inclusion Criteria

All late preterm babies (34<sup>0/7</sup> weeks to 36<sup>6/7</sup> weeks) admitted to SNCU and postnatal wards for a period of Five months (September 2015 -February 2016).

#### Exclusion Criteria

1. Late preterm babies of parents who have not given consent.
2. Late preterm babies who had surgical conditions, congenital malformations, genetic disorders, metabolic disorders other than hypoglycaemia (suspected IEM), babies of multiple gestation.

#### Results

351 late preterm neonates were admitted during the study period, out of which 100 babies met the inclusion criteria.

Age of admission varies from day 1 of life to 30 days of life. Majority of babies were admitted within first three days of life. 88 babies were admitted within first three days of life which constitute 88%. 4 babies were admitted between day 4 and day 6 of life which constitutes about 4%. 4 babies were admitted between 7 to 10 days of life which constitute about 4%. 2 children were admitted between 11 to 15 days of life which constitute about 2%. 1 child was admitted at day 16 of life which constitute about 1%.

Out Of the 100 neonates, 48 were male who constitute about 48% and 52 neonates were female who constitute 52%. Sex distribution showed female predominance.

Regarding gestational age, 18 neonates were admitted between the gestational age of 34<sup>0/7</sup> to 34<sup>6/7</sup> weeks who constitute about 18%. 16 neonates were admitted between the gestational age of 35<sup>0/7</sup> to 35<sup>6/7</sup> weeks who constitute about 16% and 66 neonates were admitted between the gestational age of 36<sup>1/7</sup> to 36<sup>6/7</sup> weeks who constitute 67%

**Table 1:** Age distribution of neonates studied

Age at admission (days)	No. of patients	%
1-3	88	88
4-6	4	4
7-10	4	4
11-15	2	2
15-20	1	1
Total	100	100

**Table 2:** Gender distribution of neonates studied

Gender	No. of patients	%
Female	52	52
Male	48	48
Total	100	100

**Table 3:** Gestational age in weeks

Gestational age	No. of patients	%
34 <sup>0/7</sup> to 34 <sup>6/7</sup>	18	18
35 <sup>0/7</sup> to 35 <sup>6/7</sup>	16	16
36 <sup>0/7</sup> to 36 <sup>6/7</sup>	66	66
Total	100	100

## Discussion

Late preterm infants are at high risk for neonatal morbidities especially neonatal hyperbilirubinemia requiring phototherapy, respiratory morbidity, need of mechanical ventilation, sepsis, hypoglycemia. Length of stay, mortality rate and rate of rehospitalizations were high. This implies that extreme caution should be taken while discharging these babies. It is of utmost importance to counsel parents regarding the morbidities that their babies can have and to stress to them the importance of monitoring feeding, weight gain, jaundice and apnea.

Prolonging pregnancy to the maximum safest gestation will result in decrease in such morbidities.

The study comprised of 100 late preterm neonates. The frequency of preterm births is increasing in many countries and this increase is mainly due to rise in late pre term births. There is only limited published data from India related to morbidities of late preterm neonates. Many reasons were proposed to explain this increasing trend including increased surveillance of the mother and fetus, increasing maternal age and reproductive technologies which are associated with multiple pregnancies. It is suggested that as a result of increased surveillance, fetuses considered to be at risk of stillbirth, including those with intrauterine growth restriction, fetal anomalies, and intra partum asphyxia may be identified earlier, which results in more deliveries at 34 to 36 weeks gestation [8].

This study demonstrates the importance and magnitude of the risks of inter current conditions to which infants born at 34<sup>0/7</sup> to 36<sup>6/7</sup> weeks gestation are subjected.

In this study Female predominance was observed, with 52% comprising male babies and female babies constitute about 48% which is comparable with the study conducted by Ashish Jaiswal et al [9]. In their study female sex constitute about 45.5%. Male predominance is seen in another study conducted by Jean-Bernard Gouyon et al [10], where male babies constituted about 55.4%.

Majority of the neonates were admitted within 3 days of life. About 88 neonate were admitted which accounts for about 88%.

Treating latepreterm infant as almost term and almost normal infants should be avoided. The concept of late preterm babies as almost full term infants means that they are discharged prematurely, following the routine protocols set out for full term babies. Discharging these infants before 48 hours precludes the opportunity of identifying morbidities early

enough to allow timely intervention. It is not there for surprising that these infants have a much higher rate of hospital read mission. It is important to explain to parents the vulnerabilities to which their children are subject to and to stress to them the importance of monitoring feeding, weight gain, jaundice and apnea. These inter current conditions are frequently responsible for a hospital visit within 48 hours of discharge It is therefore important that further studies be conducted to:

- a. Establish and evaluate strategies, routines and protocols for premature interruption of pregnancy that are more rigorous and are based on scientific evidence, there by reducing the number of premature births and
- b. Develop Obstetric protocols that increase the precision of methods for estimating gestational age, such as, for example, routine ultrasound in the first trimester, which is important to decision-making when considering interrupting a pregnancy before full term.

Another intervention that merits greater study is the possibility of using antenatal corticosteroid after 34 weeks to reduce respiratory pathologies and prevent a significant number of deaths in this group of neonates [2].

## Conclusion

It is of utmost importance to counsel parents regarding the morbidities that their babies can have and to stress to them the importance of monitoring feeding, weight gain, jaundice and apnea.

Prolonging pregnancy to the maximum safest gestation will result in decrease in such morbidities.

## References

1. Osama Abu-Salah "Unfavourable outcomes associated with late preterm birth: observations from Jordan" JPMA 2011;61:769.
2. Raju TN, Higgins RD, Stark AR, Leveno KJ. Optimizing care and outcome for late-preterm (near-term) gestations and for late-preterm infants: a summary of the workshop sponsored by the National Institutes of Health and Human Development. Pediatrics. 2006;118:1207-1214.
3. Kramer MS, Demissie K, Yang H, Platt RW, Sauve´ R, Liston R. The contribution of mild and moderate preterm birth to infant mortality. Fetal and Infant Health Study Group of the Canadian Perinatal Surveillance System. JAMA. 2000;284:843-849.

4. MeharbanSingh, "Care of the Newborn" 7th edition. Sagar publications. 2010.p.234-235.
  5. Shapiro-Mendoza CK, Tomashek KM, Kotelchuck M, Barfield W, Weiss J, Evans S. Risk factors for neonatal morbidity and mortality among "healthy" late preterm newborns. *SeminPerinatol.* 2006;30:54-60.
  6. Reddy UM, Ko CW, Raju TN, Willinger M. Delivery indications at late-preterm gestations and infant mortality rates in the United States. *Pediatrics* 2009;124:234-240.
  7. Laughon SK, Reddy UM, Sun L, Zhang J "Precursors for late preterm birth in singleton gestations" *Obstet Gynecol.* 2010 Nov;116(5):1047-55.
  8. Inder TE, Warfield SK, Wang H, Hüppi PS, Volpe JJ. Abnormalcerebralstructure is present at term in premature infants. *Pediatrics* 2005;115:286-294.
  9. Ashishjaiswal, srinivasmurki, pramodgaddam and anupamareddy, "EarlyNeonatal Morbidities in Late Preterm Infants" *Indian Pediatr* 2011;48:607-611.
  10. Cloherty, JohnP.; Eichenwald, EricC.; Stark, AnnR, Title: *ManualofNeonatalCare*, 6th Edition. Lippincott; 2012;518:528.
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