Neonatal Outcome of Late Preterm Infants Delivered in a Tertiary Care Hospital

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Abstract

Introduction: Infant born before 37 weeks of gestation known as Preterm. Previously called Near term I.e infant born in gestation week 34 to 37 week known as Late Preterm. Preterm are more prone for increased morbidity and mortality as compared to Term. It is also associated with hospital readmission in 1st year of life. The available literature in late preterm is limited and need to conduct study to know the outcome of late preterm in tertiary care hospital with respect to morbidity and mortality in late preterm.

Methodology: It is a single centric, observational, prospective, descriptive study conducted at tertiary care hospital on Late Preterm admitted in NICU. Duration of study is 18 month with 195 patient were included.

Inclusion Criteria: 1.Late Preterm(34 to 37 week)
2.Large for Gestational age and Appropriate for Gestational age

Exclusion Criteria: 1.Late Preterm with Small for Gestational age
2.Outborn delivery
3.Congenital Anomalies

Patient who were willing to participate and sign the informed consent were enrolled in study. Gestational age was assessed by Modified New Ballard Score.

Result: In total study population 69.7% kept with mother and 30.3% need NICU admission. Higher percentage of neonates with NBS score 34 week require NICU admission as compared to 36 weeks. (P<0.007). Most common indication of admission is Hyperbilirubinemia followed by HIE followed by TTN. Preterm with morbidity noted in only 2.6% most probably with Neonatal seizure. Mortality is 1%.

Conclusion: In studied population of gestational age 34 to 37 weeks have higher magnitude of morbidities and mortality as compared to term neonates with increase in magnitude of severity as gestational age decreased.

Keywords: Late Preterm, Modified New Ballard Score, Near Term.
Introduction
Preterm or premature babies are significant public health problem across the world. WHO defines preterm as Infants born before 37 week of gestation. The percentage of death in children < 5 years of age is more in the neonatal period of which many deaths are attributable to Preterm Births. According to National institute of child health and human development workshop in 2005, late preterm infants are infants born in gestational weeks 34th/7 and 36th/7. Late preterm infants were known as near term infants earlier(1,2). The last 25 years have showed that the birth rate of late preterm infants have raised by33%, and this is because of its well defined gestational age (3). In India, the incidence of late preterm birth was highlighted in study conducted in south India, where out of 13.5%preterm births 55% were late preterm (4). According to another hypothesis, advancement in the obstetric practice had led to early detection of infants with intrauterine growth retardation, fetal abnormalities and hence can be delivered earlier (5-9). These late preterm newborns are considered to be physiologically and metabolically “functionally mature” due their same size and weight at birth as newborns born at term. Therefore, late preterm birth has increased risk of neonatal mortality and morbidity such as Respiratory distress syndrome(RDS), apnea, jaundice and hyperbilirubinemia, hypoglycemia, feeding difficulties, hypothermia and temperature instability, high risk for infection and sepsis, seizures, anemia, intraventricular hemorrhage (IVH), and necrotizing enterocolitis (1,5). Late preterm birth has defined as an infant born between 34 0/7 weeks and 36 6/7 weeks of gestation(10-12). It was seen that PIH was the most commonly associated maternal illness which led to preterm delivery.

Material and Methods
In the present study entitled, Neonatal outcome of late preterm infants delivered in a tertiary care hospital, we applied following methodology.

Study Design: This was a single centric, observational, prospective, descriptive study.
Study Site: The study was conducted in department of pediatrics of a tertiary care, teaching hospital.

Study duration: The study was conducted for a period of 18 month from January 2018 to June 2019.
Study population: Late preterm born neonates who fulfill d the inclusion and exclusion criteria
Sample size: 195 late preterm neonates admitted in our tertiary care hospital were be enrolled in the study.

The sample size was calculated as follow:
Population size (for finite population correction factor or fpc) (N):
Hypothesized % frequency of outcome factor In the population (p)
8%±4 Confidence limits as % of 100 (absolute±%)
(d):
Design effect (for cluster surveys-DEFF):
With confidence level of 95%, the sample size calculated was 177

With 95% CI, it comes to 177, considering 10% non-response rate, It becomes (177+18= 195)
Sample size n = \[DEFF*p(1-p)/[(d2/Z21- α/2*(N-1)+p*(1-p)]\]

Inclusion Criteria
1. Late preterms (born between 340/7 to 366/7 weeks of gestational age)
2. Appropriate for gestational age (AGA) & Large for gestational age (LGA) neonates. Hospital delivery only.
3. Mothers willing to participate in the study.

Exclusion Criteria
1. Late preterm with small for gestational age (SGA).
2. Out born delivery
3. Congenital anomalies
4. Mothers unwilling to participate in the study.
Statistical Analysis
Data was recorded in a predesigned proforma and compiled in Microsoft excel version 2015 and analysed. Descriptive statistics for quantitative variables was represented as mean +/- SD. Qualitative variables was represented as frequency & percentages. Fisher test or Chi-square test was used to test the association of columns and rows in tabular data, in case of qualitative, categorical data. Unpaired t test or Mann Whitney test was used to compare differences between two independent groups depending on the normality of distribution. Graphical representations were done wherever applicable. Level of significance was considered as P ≤ 0.05. Software used for analysis was Graph pad prism.

Results and Observation
In this study 195 late per term neonates were evaluated for clinical outcome Total number live births in the hospital during the study period was 4165, the incidence of late preterm in the tertiary care centre was found to be 13.6% (total number of late preterms delivered in the study period were 567 of which 177 required NICU admission) and incidence of late preterm who required NICU admission in tertiary care centre was 31.2% and in our study group incidence of late preterm requiring NICU care was 30.3%(59). The result of our study is as follows.
The average hospital day stay was 10.30±8.87 days among all neonates. Significant difference was in the hospital stay of neonates with NBS score 34(13.47±8.40 days) and those with NBS score 36 (8.60±8.74 days). Our study showed 195 late preterm neonates were enrolled of which males were found to be 106 (54.36%) and females were 89 (45.64%) with male to female ratio as 1.19:1.

(a) Weight wise distribution

<table>
<thead>
<tr>
<th>Weight wise distribution</th>
<th>No of neonates (n=195)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500 to 4000</td>
<td>61</td>
<td>31.28</td>
</tr>
<tr>
<td>2000 to 2499</td>
<td>132</td>
<td>67.7</td>
</tr>
<tr>
<td>1499 to 2000</td>
<td>2</td>
<td>1.02</td>
</tr>
<tr>
<td>&lt;1500</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Average weight (grams)</td>
<td>2282±491.2</td>
<td></td>
</tr>
</tbody>
</table>

(b) Gestational age and birth weight

<table>
<thead>
<tr>
<th>Gestational age and Birth weight</th>
<th>No of neonates (n=195)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGA</td>
<td>182</td>
<td>93.33</td>
</tr>
<tr>
<td>LGA</td>
<td>13</td>
<td>6.67</td>
</tr>
</tbody>
</table>

(c) Gestational age on NBS score

<table>
<thead>
<tr>
<th>NBS score</th>
<th>No of neonates</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>42</td>
<td>21.54</td>
</tr>
<tr>
<td>36</td>
<td>153</td>
<td>78.46</td>
</tr>
<tr>
<td>Total</td>
<td>195</td>
<td>100</td>
</tr>
</tbody>
</table>
(d) APGAR score among enrolled late preterm

<table>
<thead>
<tr>
<th>Gestational age (NBS)</th>
<th>APGAR score</th>
<th>0min</th>
<th>1min</th>
<th>5min</th>
</tr>
</thead>
<tbody>
<tr>
<td>34wk</td>
<td></td>
<td>7.23±0.43</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>36wk</td>
<td></td>
<td>6.86±1.14</td>
<td>8.70±1.06</td>
<td>9.86±0.6</td>
</tr>
<tr>
<td>P-value</td>
<td></td>
<td>0.18</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

(e) Status at birth

<table>
<thead>
<tr>
<th>Status</th>
<th>NBS score34</th>
<th>NBS score36</th>
<th>No. of neonate</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Mother</td>
<td>22(52.4%)</td>
<td>114(74.5%)</td>
<td>136</td>
<td>69.7</td>
</tr>
<tr>
<td>NICU</td>
<td>20(47.6%)</td>
<td>39(25.5%)</td>
<td>59</td>
<td>30.6</td>
</tr>
</tbody>
</table>

(f) Discharge or outcome of late preterm

<table>
<thead>
<tr>
<th>Discharge</th>
<th>No. of late preterms (n=195)</th>
<th>Total</th>
<th>Percentage</th>
<th>P value (Fisher test)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>34wk</td>
<td>36wk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without morbidity</td>
<td>40</td>
<td>148</td>
<td>188</td>
<td>96.4</td>
</tr>
<tr>
<td>With Morbidity</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>2.6</td>
</tr>
<tr>
<td>Death</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Discussion

WHO defines Preterm as Infants born before 37 weeks of gestation. In several others study it is found that babies born at 34 to 36 weeks the magnitude of morbidities and mortality in these subset of babies is much higher compared to term neonates. It is similar in our study as well. These were attributable to prematurity and associated morbidities. Significantly higher percentage of neonate with NBS score of 34wk required NICU admission (p<0.007). This shows that late preterm are at risk compared to term babies. Hence may require early intervention and NICU admission and neonatal care.

Conclusion and Recommendation

We can conclude that the late preterm have higher morbidities and mortality than term neonates and in postnatal period may require NICU admission. Late preterms form a special group of neonates who require more care and attention after delivery as compared to term neonates. Late preterms have more tendency to develop medical complications as compared to term neonates which lead to increase in morbidity and mortality. Late preterms discharged with morbidity were few (2.6%) i.e. amongst which, most common morbidity was neonatal seizure Hyperbilirubinemia was the most common indication for NICU admission. Hence in an era of technological advancement, in order to decrease infant mortality rate which is regarded as significant parameter for development of country, we need to decrease preterm mortality which also includes late preterm death. The goals will include screening and scrutinizing from the antenatal period to the postnatal period. Educating mothers regarding regular ANC visits, timely screening and close monitoring of high risk pregnancy, close monitoring of late preterm babies, equipped NICU facilities with experienced staff and doctors, delay in early discharge from hospital, educating mothers regarding special care and feeding practices for late preterm babies and frequent follow up after discharge are important steps required for decreasing perinatal mortality rate in India.
References


