# **Original Research Article**

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# Maternal risk factors and immediate outcome of late preterms

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### **ABSTRACT**

**Background:** This study was conducted to analyse the immediate outcome of late preterm babies and also to evaluate the various maternal risk factors in these babies so that close monitoring of these babies for the complications is done and immediate problems can be addressed.

**Methods:** Prospective observational study done in level 3 NICU setting for 6 months. All babies born between 34-36/7 weeks are included in the study and they constitute the cases. Term (above 36 weeks 6 days gestation) newborns babies born during the study period are controls. Maternal history is taken in detail. Risk factors during pregnancy including maternal age, gravida, mode of delivery, medical conditions and birth details. Baby details like gestational age, sex, birth weight, and neonatal morbidities are recorded. The babies are either shifted to NICU or to mother's side based depending on the baby's condition. All of them are followed up till discharge.

Results: 89 late preterm babies born in the hospital during the study period are included in the study. Out of 89 babies 45 are females constituting 50.6% and 44 are male babies constituting 49.4%. 20 (22.5%) babies had gestational age between 34-35 weeks.29 babies (32.5%) had gestational age between 35-36 weeks and 40 babies (45%) are between 36-37 weeks of gestation. 47 babies (52.9%) have birth weight between 1.5-2.49 kg.42 babies (47.1%) have birth weight between 2.5-3.5 kg. The number of babies born by LSCS were 48 (54%) and 41 babies 46% are born through vaginal route.42 babies constituting 48.3% are appropriate for gestational age and 43 babies (49.4%) are small for gestationalage.34 (39.1%) babies required NICU admission and 55 (60.9%) babies did not require NICU admission. Among the maternal risk factors PIH was the commonest risk factor in 22babies (24.7%), followed by PROM13 (14.6%), oligohydramnios 6 (6.7%), twin gestation 6 (6.7%), MSAF 3 (3.4%), IDM 3 (3.4%), Antepartum hemorrhage 3 (3.4%), eclampsia 1 (1.1%) and maternal cardiac disease 1.1%. Neonatal morbidities are 25 late preterm babies had jaundice (28.7%) followed by RDS in 15 (17.2%), sepsis in 9 (10.3%), NEC 2 (2.3%), Hypoglycemia 5 (5.6%) late preterm babies required ventilation/ CPAP constituting 5.7%. Surfactant was used in 2 late preterm babies (97.8%) got discharged and mortality is 2.2%.

Conclusions: Late prematurity is associated with significant neonatal morbidity.

Keywords: Late preterm, Maternal risk factors, Mortality, Neonatal morbidities, Outcome, Prematurity

## INTRODUCTION

Late preterm are those babies born between 34 to 36 6/7 weeks gestation. Late preterm deliveries are associated with adverse short term and long term outcomes and an increased health care burden.<sup>1</sup> There are an increasing

number of babies born at gestations of 34 to 37 weeks due to various obstetric and neonatal reasons. Babies born at this gestation are considered as late preterm babies and equivalent to term babies. It was believed that these babies will have lesser problems after birth and will do well.

Infants delivered at this gestational age are at greater risk for major neonatal complications as well as hospital readmissions.<sup>2-3</sup> Most of the readmissions are due to hyperbilirubinemia, sepsis. Moreover, after 34 weeks antenatal prophylactic steroids are not administered.<sup>4-5</sup> There has also been an increase in the proportion of babies born late preterm due to earlier termination of high risk pregnancies to prevent sudden and unexpected fetal loss, and the rising number of multiple gestations partly explained by increasing success of artificial reproductive techniques. 6 Most of the available data is from developed countries. The obstetric and newborn care in these countries is different from a developing country like India. There is very limited data available on the problems regarding late preterm babies in India. This is relevant because racial and demographic variations have been found to have impact on outcome.7 There is a definitive need to conduct this study, so that problems of late preterm can be dealt. This study aims to address the immediate morbidities in late preterm babies in this hospital.

#### **METHODS**

The study is done in NICU of medical college hospital. The study is approved by ethical committee of the institute. Before recruiting the subjects, informed consent is obtained from the parents. In this study babies born between 34-36/7 weeks are taken as cases. Maternal history is taken in detail including the presence of complicating illnesses during pregnancy, maternal age, gravida, mode of delivery and birth details.

Baby details are recorded like gestational age, sex, birth weight, complications like respiratory distress hypoglycaemia, sepsis, hyperbilirubinemia, length of hospital stay etc., The gestationalage at birth is assessed based on maternal last menstrual period, first trimester ultrasound scan if available and New Ballards score. The babies are either shifted to NICU or to mother's side based on the baby's condition. They are followed up till discharge. The data is recorded on proforma and analysed using descriptive statistics. Deliveries are attended by trained residents. Mortality and morbidity of late preterm is noted. Neonatal morbidities like respiratory distress requiring oxygen, CPAP/ventilation are also noted. Hypoglycaemia-Blood sugar less than 45 mg/dl.

Sugars are monitored by glucometer. Bilirubin estimation is done as per clinical need. The decision of phototherapy was taken on the basis hour specific serum bilirubin nomograms. Sepsis is suspected on the basis of signs and symptoms and positive sepsis screen. Length of hospital stay is noted. ROP screening is done in this setup for all late preterm.

#### **RESULTS**

There were 89 late preterm babies who are born during the study period are included in the study. There were 1023 (89.7%) term babies born during the study period are considered as controls. 30 preterm babies less than 34 weeks born during the study period are excluded from the study. Out of 89 late preterm babies, 45are female sconstituting 50.6% and 44 are male babies constituting 49.4%. The male to female ratio is 0.98% (Table 1).

Table 1: Gender wise distribution of late preterms studied.

Gender	No. of late preterms	%
Female	45	50.6
Male	44	49.4
Total	89	100.0

Among 89 late preterm babies, 20 (22.5%) babies have gestational age between 34-35 weeks, 29 babies (32,5%) have gestational age between 35-36 weeks and 40 babies (45%) are between 36-37 weeks of gestation (Table 2).

Table 2: Gestational age.

Gestational age	No. of late preterms	%
34-35	20	22.5
35-36	29	32.5
36-37	40	45
Total	89	100.0

There were 43 babies (48.3%) were born to prim mothers, 26 babies (29.2%) are born to gravida 2 mothers and the remaining 20 babies (22.47%) are born to gravida 3 and above mothers. In Table 3, 47 babies (52.9%) have birth weight between 1.5-2.49 kg. 42 babies (47.1%) have birth weight between 2.5-3.5 kg. The number of babies born by LSCS are 48 (54%) and 41 babies 46% are born through vaginal route (Table 4).

Table 3: Birth weight of neonates studied.

Birthweight (kg)	No. of late preterms	%
1.5-2.49	47	52.9
2.5-3.5	42	47.1
Total	89	100.0

Table 4: Mode of delivery.

Mode of delivery	No. of late preterms	%
LSCS	48	54.0
Vaginal	41	46.0
Total	89	100.0

There were 42 babies constituting 47.1% are appropriate for gestational age and 44 babies (49.4%) are small for gestational age and 3.4% babies are LGA babies (Table 5). 34 (39.1%) babies required NICU admission and 55 (60.9%) babies did not require NICU admission (Table 8)

Among the maternal risk factors (Table 6) PIH (pregnancy induced hypertension) was the commonest risk factor in 22 babies (24.7%), followed by PROM (Premature rupture of membranes) 13 (14.6%), oligohydramnios 6 (6.9%), twin gestation 6 (6.9%), MSAF (Meconium stained amniotic fluid) 3 (3.4%), IDM (Infant of diabetic mothers) 3 (3.4%), Antepartum haemorrhage 3 (3.4%), eclampsia 1 (1.1%), maternal cardiac disease 1 (1.1%).

Table 5: gestational age.

SGA/AGA/LGA	No. of late preterms	%
AGA	42	47.2
SGA	44	49.4
LGA	3	3.4
Total	89	100.0

From Table 7, 25 late preterm babies had jaundice 28.7%, followed by RDS in 15 (17.2%), sepsis in 9 (10.3%),

NEC 2 (2.3%), Hypoglycemia 5 (5.6%). ROP stage 2 in 2 babies. Five babies required ventilation/ CPAP constituting 5.7% Surfactant is used in two late preterm babies (2.3%). 87 babies (96.6%) got discharged and mortality rate is 2.2% (Table 9).

Table 6: Maternal risk factors.

Maternal risk factors	No. of patients (n=89)	%
PIH	22	24.7
PROM	13	14.6
Oligohydramnios	6	6.7
Twin gestation	6	6.7
MSAF	3	3.4
IDM	3	3.4
Antepartum haemorrhage	3	3.4
Eclampsia	1	1.1
Maternal cardiac disease	1	1.1

Table 7: Neonatal morbidity and mortality.

Neonatal morbidity and mortality	No. of late preterms (n=89)	Term babies (n=1023)
Jaundice	25	(28.7%)
RDS	15	(17.2%)
Sepsis	9	(10.3%)
CPAP/ventilation	5	(5.7%)
NEC	2	(2.3%)
Hypoglycemia	5	(5.6%)
Surfactant use	2	(2.3%)
ROP stage 2	2	2.2%

Table 8: Neonates requiring the NICU admission.

NICU admission	No. of patients (n=89)	%
No	55	60.9
Yes	34	39.1

Table 9: Final outcome.

Final outcome	No. of patients (n=89)	%
Discharged	87	96.6%
Death	2	2.2%

## **DISCUSSION**

Late preterm are at greater risk for neonatal morbidities although they are born close to term. Immediate neonatal morbidities of late preterms (n=89) are noted. This is a prospective case control study. During the study period 8% of the babies are born late preterm and rest 92% babies are delivered at term gestation. In the United States the proportion of late preterm babies has increased from 6.2% in 1995 to 7.5% in 2008. These changes are

more due to obstetric interventions. Among the preterm, 69% in this hospital are late preterm and 31% are below 34 weeks. In USA in 2005 late preterm babies constituted 70 % of premature births and only 30% were born before 34 weeks 10 which is comparable to study. 22.5% babies were born at 34 -35weeks, 32.5% at this 35 -36weeks and 45% at 36-37 weeks gestation. There was nearly equal sex distribution (0.98 M: F). Among the maternal risk factors, pregnancy induced hypertension, preterm. Premature rupture of membranes and multiple gestations have been long recognized as the common associations and causes for spontaneous and iatrogenic early delivery. 10 Shapiro Mendoza et al, conducted a large population based study and found that maternal medical conditions are self-determining risk factors for newborn morbidity in the late preterm group. 11 A study from Greece reported an independent risk for neonatal morbidity when the mothers suffered antepartum hemorrhage and these mothers are taken up for emergency caesarian deliveries.12 Khashu et al, established that there was increased prevalence of chorioamnionitis, hypertension and PROM in the study group.<sup>13</sup> In the present study pregnancy induced

hypertension, premature rupture of oligohydramnios and twin gestation are the common risk factors in the decreasing order. The late preterm babies are at increased risk of neonatal morbidities or need for NICU care. Neonatal hyperbilirubinemia requiring treatment in the form of Phototherapy is much higher in late preterm babies, some of them required readmission for jaundice because of developmental immaturity in the liver and feeding issues in the immediate newborn period. Wang et al, found need for phototherapy to be similar in late preterm (54.4 %). Respiratory morbidity is common in late preterms. RDS was 40 fold higher at 34 weeks. The rate of respiratory compromise in 19 US hospitals was 10.5% in late preterms compared with 1.13% term infants.<sup>14</sup> In the present study RDS was seen in 17.2% late preterms and 4.6% term infants. Respiratory issues are related to delayed transition, delayed fluid clearance and surfactant deficiency. Hypoglycaemia (Symptomatic or Asymptomatic) defined as blood sugar below 45mg/dl was seen in 5.6% babies in the late preterm group. The blood sugar estimation was mostly by Dextrostix and lab confirmation was not available in all cases. The percentage of hypoglycaemia is less in this study both in term and late preterm babies because of initiation of breast feeding soon after delivery and screening for hypoglycaemia during first 24 hours. Preterm infants have a higher rate of sepsis and health care associated infections. 15 The incidence of neonatal sepsis in the late preterm vs. term babies was 10.3% vs. 1.37% in the present study. A recent Indian study has reported that late preterm infants are at significantly higher risk of sepsis when compared with term infants. <sup>16</sup> Many retrospective cohort studies have reported increased morbidity. These problems and their clinical implications have been extensively reviewed recently. 17,18 The present study supports the above findings that late preterm newborns are a significantly vulnerable population. The hospital in which the study was conducted is a free hospital; cost of care analysis is not done. Reports from USA staten early 3 times the cost in treatment of late preterm neonates.<sup>19</sup>

The limitations of this study are small sample size, so a large population based study is required from the developing country like this. The etiology of preterm births needs to be determined; especially with respect to percentage of iatrogenic late prematurity. In conclusion late prematurity is associated with significant neonatal morbidity. Late preterm babies have higher risk of neonatal morbidities when compared with term babies.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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