

Unfavourable outcomes associated with late preterm birth: observations from Jordan

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Abstract

Objectives: To determine the impact of late preterm birth on neonatal morbidity and neonatal unit admissions compared to full term babies in Amman, Jordan.

Methods: Data was extracted through retrospective file review from 2009 to 2010, on all singletons born at Queen Alia Hospital in Amman, Jordan. This cross sectional study noted gestational age at birth, weight, admission to the neonatal unit during birth hospitalization, respiratory distress, hypoglycaemia, evaluation for septicaemia, feeding difficulties and significant jaundice. Late preterm infants were compared to those born at term.

Results: There were 2904 (89.3%) term and 348 (10.7%) preterm live singletons. There were 253 (7.8%) late preterm making the rate of late preterm at 253 (72.7%) of all preterm singletons. Among them respiratory morbidities were diagnosed in 2.8% against 13.8% ($p < 0.001$). Hypoglycaemia was diagnosed in 1.1% against 10.3%. Feeding difficulties were 1.2% against 15.8% ($p < 0.001$). Evaluation for sepsis in 2.9% versus 30.8% ($p < 0.001$). Phototherapy for jaundice was required in 1.2% against 10.7% infants ($p < 0.001$).

Conclusion: Late preterm infants are at higher risk of morbidity and hospitalization than term infants. Treating late preterm infant as almost term and almost normal infants should be avoided.

Keywords: Late preterm, Neonatal morbidity, Respiratory Distress Hypoglycaemia Neonatal sepsis, Feeding difficulties, Jordan, Late preterm (JPMA 61:769; 2011).

Introduction

Many recent studies showed that, Late-preterm infants are more likely to have clinical problems than term infants and their neonatal mortality is higher.^{1,2}

Late preterm infants may have the external appearance, size and behaviour of term infants rather than the more premature infants.³ However, many studies have shown them to be immature both metabolically and physiologically and this predisposes to various neonatal morbidities related to transitioning to extra uterine life.⁴

It is only recently, that the designation "near-term" and "slightly premature" and "almost term" were dropped to the more appropriate "late preterm". This emphasizes the prematurity of these infants. During the National Institute of Child Health and Human Development (NICHD) Workshop in 2005, the designation "late preterm," identified infants born between 34 and 36 weeks.³

Late preterm babies are not only at increased risk in the neonatal period, but also at increased risk for complications later in life, including developmental delay and disability, cerebral palsy, mental disability, schizophrenia, and other psychiatric disorders.^{5,6}

It has also been noticed in many countries other than the USA, such as, China,⁷ Brazil,⁸ that late preterms

constitute a significant proportion of preterm births and a large proportion of neonatal units' admissions.

This study was conducted to determine the rate of late preterm birth in a Jordanian hospital and to determine the rate of the most common morbidities in late preterm infants against those born at term.

Methods

In this cross sectional study, a preterm infant is defined as per the World Health Organization (WHO) definition as an infant who is born before the end of the 37th week (259th day) of pregnancy, from the first day of the last menstrual period.⁹ Late-preterm birth is defined as birth between 34 weeks and 36 6/7 weeks of gestation from the first day of the last menstrual period.³

Over a 12 month period, from July 2009 to July 2010 all live born singletons were retrospectively studied. Data were collected and included the gestational age as provided by the obstetric team based on calculations from the first day or of the last menstrual period or early foetal ultrasound scan. The sex, weight, as well as the mode of delivery was also recorded.

For every baby that required admission to the neonatal unit from birth or during the birth hospitalization, records of the admission diagnosis and, any further morbidity while

being hospitalized were evaluated.

Babies with severe congenital abnormalities, post term and multiples, were excluded from the study.

The diagnosis of respiratory distress was made clinically as the presence of tachypnoea, flaring of the alai, grunting or retractions of the chest wall with or without oxygen requirement for more than two hours after birth.

Hypoglycaemia was defined as any glucose measurement below 40 mg/dl. Jaundice was very commonly seen but we studied babies with high enough serum bilirubin level to necessitate treatment with phototherapy based on nomograms used in our unit.

Delay in initiating and maintaining adequate oral milk intake was recorded as feeding difficulties in the absence of respiratory distress and septicaemia.

The clinical suspicion of neonatal sepsis to indicate septic work up and investigations was counted as morbidity because it delayed hospital discharge and administration of appropriate antimicrobials till septicaemia was excluded or confirmed.

Results

A total of 3253 live born singletons were delivered over the study period. Figure-1, shows the distribution of the gestational age at birth to be, term in 2904(89.3%), late preterm in 235(7.8%) and early preterm in 95(2.9%), born before 34 completed weeks of gestation. A total of 253 (72.7%) of all preterm infants, were late preterm as shown in Figure-2.

The characteristics of the study group which is the late preterm and the control group which is the term infants is shown in Table.

All the complications were significantly higher in the

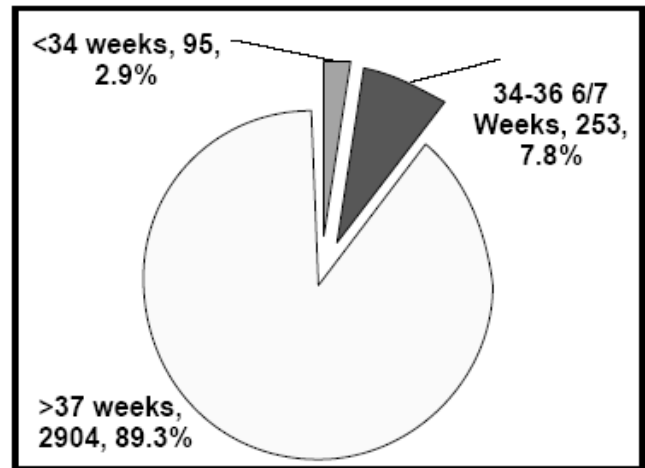


Figure-1: The gestational age distribution of 3252 live born singletons into, those that were born before 34 completed weeks of gestation, between 34 and 36 7/6 and beyond 37 weeks gestation. Post term and infants with major congenital malformations are excluded.

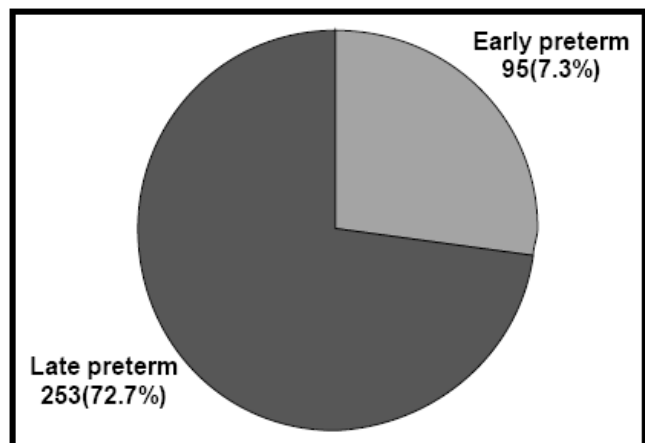


Figure-2: The distribution of number and percentage of all 348 preterm infants into early, 95(27%) infants and late preterm 235(72.7%) infants born over a 12 months period.

Table: Comparison of characteristics of the term and late pre-term group of infants.

Category	Total, Number of term and late preterm, number(%)	Term Number (%)	Late preterm (%)	P Value/CI
Singletons live births (3253 infants)	3157 (97.1)	2904 (89.3)	253 (7.8)	
Male	1534 (48.6)	1477 (52.3)	125 (49.4)	P=0.657
Birth weight mean Grams	3186(SD:418)	3245 (SD:422)	2511 (SD:383)	CI: 680.61-787.39
Admission	326 (10.3)	152 (5.2)	84 (33.2)	p<0.001
Caesarian Delivery	867 (27.5)	723 (24.9)	98 (38.7)	p<0.001
Respiratory Distress	115 (3.6)	80 (2.8)	35 (13.8)	p<0.001
Hypoglycaemia	69 (2.2)	33 (1.1)	36 (14.2)	p<0.001
Evaluation for sepsis	161(5.1)	83 (2.9)	78 (30.8)	p<0.001
Feeding difficulties	76(2.4)	36 (1.2)	40 15.8	p<0.001
Phototherapy	62(2.0)	35 (1.2)	27 (10.7)	p<0.001

The number and percentage (in brackets) of various characteristics in total births beyond 34 completed weeks divided into preterm (between 34 to 36 6/7) and those born beyond term (37 completed weeks).Showing total numbers, sex, caesarian delivery and various morbidities; respiratory distress, hypoglycaemia, were evaluated for sepsis, had feeding difficulties and required phototherapy.

late pre-term infants.

Discussion

The frequency of preterm births is rising in many countries¹⁰ and this rise is mainly due to rise in late preterm births.¹¹ Unfortunately, there are no previously published data from Jordan to allow the evaluation of any trend in this rate. Many reasons were proposed to explain this trend including increase surveillance of the mother and foetus, increasing maternal age and reproductive technologies which is associated with multiple pregnancies. It is suggested that as a result of increased surveillance, foetuses considered to be at risk of stillbirth, including those with intrauterine growth restriction, foetal anomalies, and intrapartum asphyxia, may be identified earlier, which results in more deliveries at 34 to 36 weeks' gestation.¹ In our cohort, the higher rate of Caesarian births among late preterm infants may be a manifestation of this observation.

Maternal risk factors were shown to be associated with late preterm deliveries. In a study from British Columbia,¹⁰ chorioamnionitis, hypertension, diabetes, thrombophilia, premature rupture of membranes, primigravida, and teenage pregnancy were found to be more common in late preterm than term infants.

In our data late preterm accounted for 72.7% of all preterm infants which is comparable to USA figures of late-preterm accounting for 74% of all preterm in 2002.¹¹

In our cohort, late preterm comprised 8% of all live singleton births. McIntire et al,³ analyzed records of about 250 000 live-born singletons between 34 and 40 weeks gestation over 18 years in a Texas hospital, and found that late-preterm infants made up 76% of preterm infants and 9% of the cohort. In a Canadian study² on births from 1992-1994, the rate of late preterm infants was 5%.

The workload needed to provide care to late preterm was a significant portion of the work load of our neonatal unit as 33% of late preterm infants required hospitalization. Added to that is the emotional price paid by the family and the infant of being separated because of these admissions. Other studies also described a similar rate of hospitalization.

Even at gestations up to 39 weeks, infants were found to be at increased risks of morbidity.¹² The American College of Obstetricians and Gynaecologists, recommends that no pregnancy should end before 39 weeks of completed gestation except for justifiable medical indications.¹³

Many authors,^{12,14} suggest that term pregnancy needs to be redefined to a later gestation than 37 weeks.

The anatomic, physiologic and metabolic immaturity of late preterm is understudied and in many cases

extrapolated from studies on the early premature and the term infants and assuming a continuum of infant development.⁴ The late preterm period is the period of maximum rate of foetal growth. For example the brain size at 35 weeks is 60% of that at term.¹⁵ Many immunological hormonal and enzymatic activities are underdeveloped.¹⁶

This increase in respiratory distress was also reported in many previous studies. A large study,¹⁷ reported that the overall, respiratory morbidities occurred in 9% of their late preterm birth and this risk decreased with each advancing week of gestation until 38 weeks. In our cohort it was 13.8%. In a Chinese cohort⁷ 12.5% had Respiratory Distress Syndrome and 16.1% had TTN in high risk centers. The rate of respiratory morbidity in our term infant cohort was 2.8%. In other studies, the term rate of respiratory distress, ranged from 0.6 to 4.2%,^{18,19} immature lung structure, surfactant deficiency, lack of clearance of lung fluid due to high rate of caesarian birth and the immaturity of lung fluid clearance mechanisms and pulmonary hypertension all contributed to the increase rate of respiratory morbidity.^{4,17}

Hypoglycaemia may occur in newborn infants of all gestational ages as the result of an insufficient metabolic response to the abrupt loss of maternal glucose supply after birth.^{1,20} In our cohort, hypoglycaemia was diagnosed in 1.2 and 10.3% of term and late preterm infants respectively. Other studies reported higher incidence of hypoglycaemia in 18% at 35-36 weeks and 4% at term.²²

Phototherapy was required in 1.2 and 10.7% of term and late preterm infants respectively. Previous studies also showed similar trends.^{9,19} The immaturity of the hepatic enzymes and the enterohepatic circulation offer an explanation for the increase in significant neonatal jaundice necessitating phototherapy.⁴ Most infants develop visibility observed jaundice and we only reported cases with significantly elevated serum bilirubin.

Evaluation for septicaemia regardless of whether or not a bacterial growth was obtained or not was done in 2.8 and 30.8% of term and later preterm infants respectively. Although, blood culture confirmation of sepsis, was less than 1%. This evaluation, resulted in administration of antibiotics for variable periods of time and delaying discharge from hospital.

Later preterm infants are more prone to septicaemia because of immunological immaturity and less developed host defense mechanisms.^{4,16} Although the rate of early onset sepsis in the late preterm neonate is low the rate of mortality and morbidity is high. This, together with overcrowding and staffing level all contribute to the high sepsis evaluation rate in our unit compared to other studies. Of late preterm admissions to our unit, 78 of the 84 (92.8%) were evaluated for sepsis. In a study in a tertiary centre in the USA,²¹ the rate

was only 70%.

Immaturity of the gastrointestinal tract, in the sucking swallowing breathing coordination²¹ and other illnesses, predisposed to feeding difficulties and the need to administer venous or gastric tube feeds to these infants. In our cohort, 1.1 and 15.9% of term and later preterm infants respectively experienced difficulty in initiating and continuing breastfeeding or difficulty in coordinating suckling and swallowing.

Wang et al¹⁹ reported rates of 7.4 and 32.2% in term and later preterm infants respectively among hospitalized infants.

Previous studies, showed that the risks associated with late preterm births extend to beyond the neonatal period. One such study, reported a three fold increase in mortality in the first year of life.²² Other studies, reported an increase in various morbidities, including behavioural problems, cerebral palsy, intellectual disability and learning difficulties.^{6,23}

Our study did not include infants that are admitted from home after discharge from birth hospitalization and also did not look into the mortality rates among our cohort. Both are reported to be higher in late preterm infants.^{2,3}

Conclusion

Late preterm infants are at increased risk of morbidity and adverse outcome. Prolonging pregnancy to the maximum safest gestation will result in decrease in such morbidities. Further studies in the physiology, developmental maturity that are specific to late preterm infants are required. Treating late preterm infant as almost term and almost normal infants should be avoided.

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