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Original Research Article

Neonatal outcome in early term and late term pregnancy

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ABSTRACT

Background: Full-term neonates born between 37- and 41-weeks' gestational age have been considered a homogeneous, low-risk group. However, recent evidence from studies has pointed toward increased NICU admissions and morbidity associated with births (37-38 weeks) compared with term neonates (39-41 weeks). The objective of this study was to compare the short-term morbidity of early-term vs term neonates in a county-based birth cohort using the primary objective of admission to a neonatal intensive care unit (NICU) or neonatology service.
Methods: Retrospective observational population-based 2 year birth cohort study at Department of Obstetrics and Gynecology GSVM Medical College, Kanpur. All full-term live births comprised the birth cohort; this information was obtained from the hospitals' perinatal databases, and data pertaining to NICU, or neonatology service admissions were extracted from individual medical records. Gestational age of early term (37 0/7-38 6/7 weeks) verses term (39 0/7-4 10/7 weeks). Admission to the NICU or neonatology service.
Results: There were 17,132 live births during the 2 year period, of which 13679 had a gestational age between 37 and 41 weeks. Of all live births, 6204 (45.3%) were early term. Compared with term infants, early-term neonates had significantly higher risks for the following: hypoglycaemia (29.9% verses 14.7%), NICU or neonatology service admission (20.9% vs12.05 %), need for respiratory support (36.8% verses 29.9%), treatment with intravenous antibiotics [39.4% verses 25. Delivery by caesarean section was common among early-term births (45.9%)].
Conclusions: Early-term births are associated with high neonatal morbidity and with NICU or neonatology service admission. Evaluation of local prevalence data will assist in implementation of specific preventive measures and plans, as well as prioritize limited health care resources.

Keywords: Full-term neonates, NICU, Neonatal outcome

INTRODUCTION

Singleton pregnancy lasts for 40 weeks (280 days) from the first day of last menstrual period to the estimated date of delivery. In the past, the period from 3 weeks before until 2 weeks after the estimated date of delivery was considered term with the expectation that neonatal outcomes from deliveries in this interval were uniform and good.[1] Increasingly however, research has identified that neonatal outcomes, especially respiratory morbidity, vary depending on the timing of delivery even within this 5-week gestational age range. The frequency of adverse neonatal outcome is lowest among uncomplicated pregnancies delivered between 39 0/7 weeks of gestation and 40 6/7 weeks of gestation.[2,3] The American College Of Obstetrics And Gynaecology and Society for Maternal Fetal Medicine endorses and encourage the uniform use of work group's recommended new gestational age designations by all clinicians, researchers, and public health officials to facilitate data reporting, delivery of quality health care, and clinical research.[4]

To address the lack of uniformity in neonatal outcomes between 37 0/7 weeks of gestation and 42 0/7 weeks of gestation a work group was convened which included representatives from the Eunice Kennedy Shriver National

Institute of Child Health and Human Development, ACOG, SMFM and other professional societies and stake holder organizations.[5] The work group recommended that the label 'term' be replaced by designations early term, full term and late term to more accurately describe deliveries occurring at or beyond 37 0/7 weeks of gestation.

Many studies have focused on infants born at <37 weeks of gestation, but much less is known about early-term infants. In this study, we investigated the clinical and demographic characteristics and short-term outcomes of early-term infants who were admitted to a neonatal intensive care unit (NICU).

The objectives of this study were to determine the effect of gestational age at birth for all term neonates born in Department of Obstetrics and Gynaecology, UISEMH, GSVM Medical College, Kanpur as an independent factor for NICU admissions and neonatal morbidity.

Table 1: Recommended classification of deliveries from 37 weeks of gestation.

Term	Duration
Early term	37 0/7 weeks through 38 6/7 weeks
Full term	39 0/7 weeks through 40 6/7 weeks
Late term	41 0/7 weeks through 41 6/7 weeks

METHODS

A retrospective study was conducted in the department of obstetric and gyanecology in collaboration with NICU in GSVM medical College, Kanpur from January 2020-January 2022. The hospital was established in the year 1995 and provides referral and non-referral services to millions of people around Kanpur. Early term (born between 37 0/7-38 6/7 weeks of gestation) and full term (born between 39 0/7-41 6/7 weeks of gestation) were enrolled in this study. Clinical and demographic data were retrospectively collected from patient's medical record. The study was approved by local ethics committee of our institution.

The demographic data that were collected included-Maternal age, sex of the baby, gestational age, birth weight and mode of delivery.

The primary outcome measured was NICU admissions. The secondary outcome measures included respiratory distress, duration of hospital stay, requirements of IV antibiotics, rates of caesarean section.

Statistical analysis

The data were collected and analysed using SPSS version 17.0. Student t test and Mann Whittney U test were used to compare continuous parametric and non-parametric variables. Data are expressed as mean±standard deviation, or as percentages the p value considered significant was <0.05.

RESULTS

There were 17,132 live births in department of obstetrics and gynaecology UISEMH GSVM Medical College, Kanpur. Among all the live births 13679 deliveries were between 37 week to $41^{6/7}$ week of gestation. O

f all the term neonates 6204 (45.3%) were early term and 7475 (54.6%) were full term. Of all the early term deliveries 434 (6.9%) neonates were admitted in NICU and 224 (2.9%) of full term neonates were admitted in NICU. Of all the term neonates 312 (2.2%) were excluded because of congenital malformations therefore 13679 constituted the final population for study.

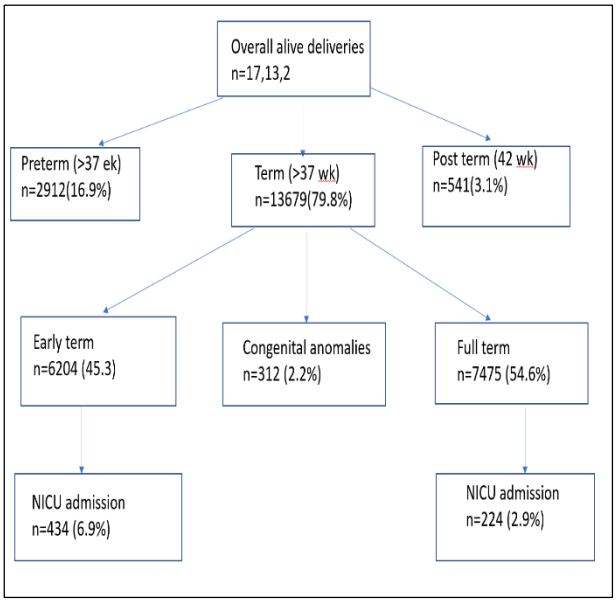

Figure 1: Cohort population flow.

Mothers delivering full term neonates were slightly older than the mothers delivering early term neonates but it was statistically insignificant. There was significant difference in mode of deliveries between the two groups. Mothers delivering early term neonates with caesarean section 2853 (45.99%) were higher than mother delivering full term neonates 2691 (36.0%). Early term neonates were also more likely to be male (51.9%) than full term neonates (49.9%).

Early term neonates were at higher risk of NICU admissions, respiratory distress, hypoglycemia and need for IV antibiotics (Table 3).

Of all the early term neonates admitted in NICU 91 (20.97%) had prolonged hospitalization (>5 days stay) while only 12.05% of full term neonates had prolonged hospitalization. There was slightly but non-significant mortality rates in early term infants (1.61%) compared to full term neonates (1.34%).

Table 2: Maternal and neonatal demographic characteristics of early term and full term infants.

Variables	Early term N=6204 (%)	Term N=7475 (%)	Chi square value	P value
Age group (years)				
<18	103 (1.66)	97 (1.30)	4.13	0.126
18-34	5964 (96.13)	7231 (96.74)		
≥35	137 (2.21)	147 (1.97)		
Caesarean sections	2853 (45.99)	2691 (36.00)		
Male sex	3226 (51.9)	3737 (49.9)		

Table 3: Admission diagnosis of early term and full term infants.

Diagnosis	Early term N=434 (%)	Term N=224 (%)
Respiratory distress	160 (36.87)	67 (29.91)
Hypoglycemia at birth	130 (29.95)	33 (14.73)
Need for IV antibiotic therapy	171 (39.40)	56 (25.00)

Note: Chi square value=4.38; p value=0.111.

Table 4: NICU morbidities in early term and late term infants.

Diagnosis	Early term N=434 (%)	Term N=224 (%)
Prolonged hospitalization	91 (20.97)	27 (12.05)
Neonatal death	7 (1.61)	3 (1.34)

Note: Chi square value=4.38; p value=0.111.

DISCUSSION

There is increasing awareness of the clinical risks and morbidities of early-term infants. There are approximately 8500 births every year at our hospital. Of these 79.8% of born infants are term, and 45.3% of term infants are born between 37 and 38 6/7 weeks of gestation (Figure 1). Our results show that early-term infants had a higher incidence of neonatal morbidity with the risk of being admitted to the NICU, and prolonged hospitalization compared to full term infants (Table 4). Most early-term infants weighed at least 2500 g at birth and had normal Apgar scores and cord pH similar to those in term infants and appeared mature, providing false assurance to the clinical provider and parents. However, these neonates were physiologically immature as evidenced by significantly lower blood glucose levels, often necessitating intravenous fluid administration and greater need for respiratory support. Significantly more early-term infants (45.99%) were delivered by caesarean section compared with term infants (36%) (Table 2), which is a contributor to longer duration of hospital stay and more respiratory morbidity in this population. This is in contrast to WHO report which suggest ideal rate of caesarean section is 15%.[6] Previous studies have focussed on mode of delivery as a cause of neonatal morbidity in term infants.[7-10]

Our study had several limitations. We were unable to perform a detailed analysis of maternal factors and obstetric indications for early-term deliveries. Hence, we could not categorize these deliveries into spontaneous and indicated categories. It is possible that the reason for the early term delivery (e. g. fetal distress) could have been responsible, in turn, for the observed increase in morbidity, resulting in confounding by indication. Secondly, there was a lack of information on long term outcomes, including readmission to other hospitals in either the neonatal or infancy period; this limited our ability to accurately assess the long-term consequences and utilization of appropriate healthcare.

CONCLUSION

We concluded that early term delivery is associated with greater morbidity and with increased admission to the NICU or neonatology service in a geographic area-based setting. This increased risk is more profound with caesarean section deliveries but exists for vaginal deliveries as well. There is a continuous relationship between gestational age and neonatal morbidity from early pregnancy onward, with a nadir at about 39 weeks. Evaluation of local prevalence data will assist in implementation of specific preventive measures and plans, as well as prioritize limited health care resources.

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