



"COMPARATIVE STUDY OF EARLY NEONATAL MORBIDITIES OF LATE PRETERM AND TERM NEONATES"

Pediatrics

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ABSTRACT

Background- Newborn infants are unique in their physiology and the health problems that they experience. Neonatal period is defined from birth to under four weeks of age. Late preterm infants may physiologically and physically appear like infants born at term, but most late preterm infants may undergo complications like respiratory distress, apnea, hypothermia, feeding problems, hypoglycemia, hyperbilirubinemia, sepsis, and mortality. **AIM-** To compare the clinical profile of late preterm neonates with term neonates. **MATERIAL AND METHODS:** This prospective observational study was carried out in neonatal division of department of pediatrics MMIMSR, Mullana. Eligible neonates delivered at MMIMSR, Mullana born from 34 weeks up to 42 weeks gestation were included. All infants enrolled in the study was followed daily till first 7 days of life for any morbidity by clinical evaluation and review of hospital records. 104 preterms included in the study and 226 term neonates were included in the study. **Results-** Preterms born via LSCS and NVD were (58% vs. 42%). Morbidities in late preterms were Hypoglycemia (21.2% vs. 9.3%), Hypothermia (15.4% vs. 5.7%), hypocalcaemia (38.4% vs. 5.3%), neonatal hyperbilirubinemia (67.3% vs. 30.5%), feeding difficulties (44.2% vs. 14.6%), sepsis (40.4% vs. 19.5%), respiratory support (53% vs. 47%)

KEYWORDS

INTRODUCTION:-

Newborn infants are unique in their physiology and the health problems that they experience. Neonatal period is characterized by transition to extrauterine life and rapid growth and development. Newborn period, just first 28 days of life, carries the greatest risk of mortality. Neonatal period is defined from birth to under four weeks (0 to 27 days or 1 to 28 days) of age. Term neonates are born between 37 and 42 weeks (259-293 days) of gestation. "Late preterm" is defined as preterm birth between the end of the last day of the 34th week of gestation (34⁰⁷ or beginning of the 239th day since the first day of the mother's last normal menstrual period) through and including the 36^{67th} completed week of gestation (end of the 259th day since the first day of the mother's last normal menstrual period) [1]. Late preterm have limited compensatory responses to the extra-uterine environment, compared with term infants [2]. The difference of physiologic maturation between preterm and term newborns can vary significantly, which also reflects from the biologic differences among infants despite identical gestational ages. Some late preterm infants may physiologically and physically appear like infants born at term, i.e. >= 37 weeks gestation, whereas most late preterm infants may undergo complications seen in infants born before 34 weeks gestational age, including respiratory distress, apnea, hypothermia, feeding problems, hypoglycemia, hyperbilirubinemia, sepsis, and mortality [3]. In India alone, of the 25 million babies who are born every year, one million die, accounting for 25 % of the mortality around the world [4]. In Haryana NMR has declined from 48 in 2010 to 33 in 2016 [5]. In the past few years, the fraction of late preterm deliveries has raised due to :- a. Increased use of reproductive technologies resulting in increase in multi fetal pregnancies b. Recent advancement of obstetric practices has led to increased medical interventions during pregnancy. Fetal abnormalities and anomalies can be identified at early stages and hence delivered earlier [6-10]. Present study is an attempt to compare the clinical profile of late preterm neonates with term neonates.

MATERIALS AND METHODS:-

This prospective observational study was carried out in our neonatal division of department of pediatrics MMIMSR, Mullana. Eligible neonates delivered at MMIMSR, Mullana born from 34 weeks up to 42 weeks gestation were included. Study group comprised of babies with gestation age 34⁽⁰⁷⁾ weeks to 36⁽⁶⁷⁾ weeks. Comparison group included term babies (from 37 completed week to 41 weeks 6 days). 104 late

preterm babies constituted the study group. 226 term babies were studied as comparison group (As per the obstetric delivery data available for our hospital). Outborn babies, neonates with gross congenital malformations / genetic anomalies, babies born to mothers with HIV, TORCH group infections and in those in whom full data of first 7 days was not available, were excluded from our study.

STATISTICAL ANALYSIS:-

Data was presented as frequencies and percentages. Chi square test was used for discrete variables (qualitative data). Student "t" test was applied to continuous data. P value < 0.05 was considered significant. Other statistical tests were applied, as necessary.

RESULTS:-

In our study 58% late preterms were delivered by LSCS and 42.3% were delivered by NVD. In term group 56% were delivered by NVD while 44% were delivered by LSCS. Hypoglycemia was in 21.2% late preterms and 9.3% in term neonates. Hypothermia was in 15.4% late preterms and 5.7% term neonates. Hypocalcaemia was in 38.4% late preterm neonates and 15.7% term neonates. Neonatal hyperbilirubinemia was in 67.3% late preterms and 30.5% term neonates. Feeding difficulty was in 44.2% late preterms and 14.6% term neonates. Sepsis was seen in 40.4% late preterm neonates and 19.5% term neonates. In late preterm group 53% neonates were in need of respiratory support, while in the term group 27% were in need of respiratory support.

DISCUSSION:-

The study compares the clinical profile of late preterm neonates with term neonates. Many studies suggest that, late preterms are in higher need of NICU admissions and also have longer duration of hospital stay. Present study was conducted because there was less data on Indian neonates and especially in our state and it seems apparent that more research looking at this population is required to determine the efficacy and safety of strategies to optimize these outcomes, and to develop interventions that affect physiologic maturation of fetus when delivery is necessary.

In our study 58% late preterms were delivered by LSCS and 42.3% were delivered by NVD. In term group 56% were delivered by NVD while 44% were delivered by LSCS. Higher number of deliveries by LSCS in late preterm group was also shown by the study conducted by

Amin T et al in which 76% late preterm were delivered by LSCS and 24% by vaginal delivery. Similar results were shown by study conducted Modi R et al showed that in late preterms 68% were delivered by LSCS and 32% were by NVD[11,12].

It was seen in the present study that among late preterm neonates, 21.2% were having hypoglycemia, while among term neonates only 9.3% were having hypoglycemia. Almost near results were shown by the study conducted by Arunagirinathan et al. which showed that 18% of late preterms were having hypoglycemia. Studies conducted by Amin T et al had showed that 28% late preterms were having hypoglycemia as compared to term newborns, which were having around 4%[13,11].

In our study, among late preterms 15.4% were having hypothermia, while among term neonates 5.7% were having hypothermia. A study conducted by Manerkar et al showed that 14% late preterms were having hypothermia. Similar results were shown by Arunagirinathan et al showed that 16% late preterms were having hypothermia. This aspect has been studied less in the literature. This might be due to high risk of sepsis and also due to less subcutaneous fat in this group[14,13].

In this study Hypocalcaemia was observed in 38.4% late preterm neonates, while 15.7% term neonates were having hypocalcaemia. Similar percentage of neonates having hypocalcaemia was observed by Picone S et al, which observed that 40.5 late preterms were having hypocalcaemia. In late preterms the accretion of calcium has not taken appropriately, so this might be the reason of higher incidence of hypocalcaemia in late preterms[15].

In the current study NNHB was observed in 67.3% late preterms, while 30.5% term neonates were having NNHB. Higher incidence of late preterms developing NNHB was also observed by Manerkar et al. in which late preterms having NNHB accounted for 64%. Similar results were also shown by Prashanth MV et al which showed that 67.4% late preterms were having NNHB. NNHB occurred more commonly in late preterms than in term neonates because of developmental immaturity in the liver i.e. decreased capacity to handle unconjugated bilirubin, decreased hepatic uptake, decreased Uridine diphosphoglucuronate Glucuronosyl Transferase (UGT) activity, and increased enterohepatic circulation, delayed postnatal maturation of hepatic bilirubin uptake and bilirubin conjugation and feeding difficulties[14,16].

In our study, we found feeding difficulty was in 44.2% late preterms and 14.6% term neonates were having feeding difficulties. Similar results were observed by Prashanth M.V et al, which showed that 44% late preterms were having feeding difficulties. Feeding difficulties are higher in late preterms because of poor suck-swallow coordination and due to other morbidities which restricts the feeding in preterms.[16]

Present study revealed, sepsis was seen in 40.4% late preterm neonates and in term neonates 19.5% were having sepsis. Previous study conducted by Amin T et al, showed that sepsis was the leading cause of morbidity in late preterms (50%). Sepsis might be less in our study because of the better hand hygiene practices, better disinfection practices and good antibiotic policy followed in our NICU. Late preterms are more prone to sepsis because of the immature defense mechanism and also this group is at risk of invasive monitoring required for them due to some other morbidities[11].

Our study showed that late preterms were in need of respiratory support for the underlying respiratory morbidities more than term neonates. In late preterm group 53% neonates were in need of respiratory support, but 47% did not required it. In the term group 27% needed respiratory support, but 73% did not required any respiratory support. Similar results were shown by Arunagirinathan et al which showed that 52% of late preterms were having respiratory morbidities[13].

Strengths and limitations of our study:-

In this study we compared the early neonatal morbidities of late preterms and term neonates. We included only the inborn babies, so that we know the antenatal history of the mother in detail and also instruct the delivery receiving team about their task. Our centre is the tertiary care centre in the area, which had expertise in preterm deliveries. The high number of deliveries in our centre helped us in observing the varied types of morbidities in late preterms. To our

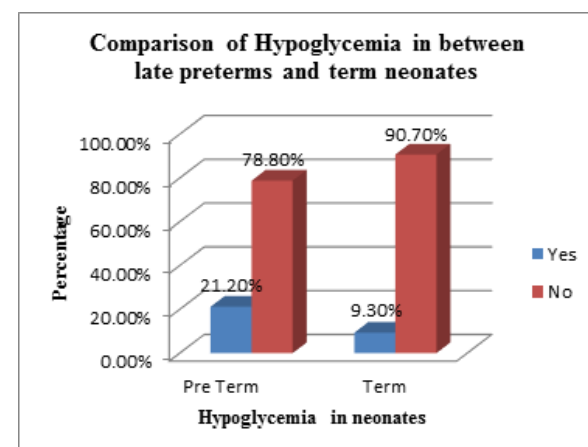
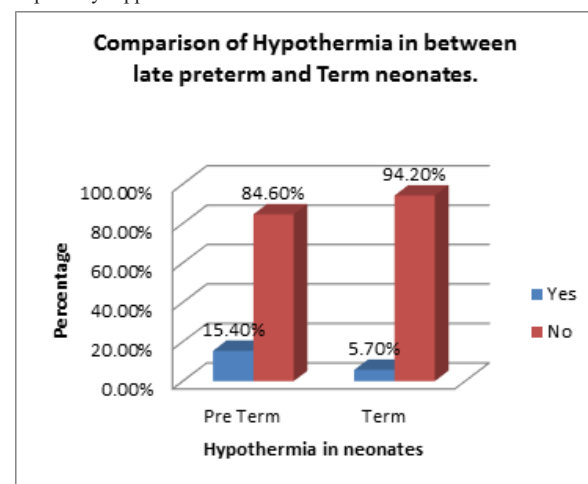
knowledge, this study is the first study in our region, which highlighted the early neonatal morbidities in late preterm deliveries.

Limitations which we observed that we have not compared the morbidities as per gestation wise. We did not assess the long term morbidities and their outcomes in the infant period. Among the neonatal units, often there is as wide variation in antenatal use of steroids, intrapartum monitoring, feeding policy, sepsis protocols and management of jaundice/ respiratory distress and hence the results of our study are more applicable to the similar NICU settings, but cannot be generalized. Size of the sample was also not adequate. We have not described that what type respiratory morbidities are more common in late preterms.

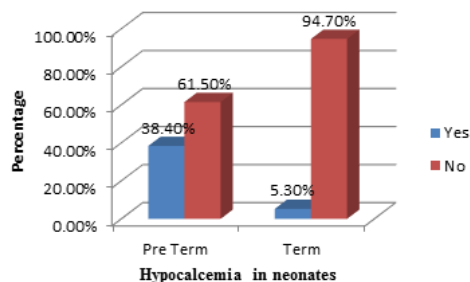
Morbidities	Preterm	Term	P value
Hypoglycemia	21.2%	9.3%	<0.05
Hypothermia	15.4%	5.7%	<0.05
Hypocalcaemia	38.4%	5.3%	<0.05
Hyperbilirubinemia	67.3%	30.5%	<0.05
Sepsis	40.4%	19.5%	<0.05
Feeding Difficulties	44.2%	14.6%	<0.05
Respiratory morbidities	52%	27.4	<0.05

	Preterm	Term	P value
NVD	42.3%	55.7%	0.023
LSCS	57.7%	44.2%	

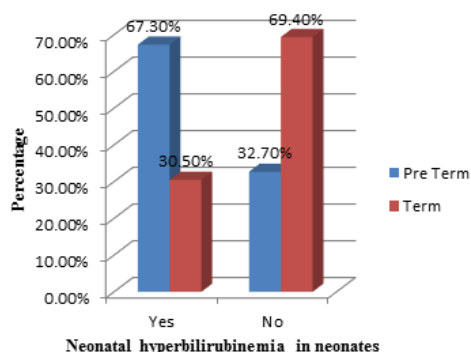
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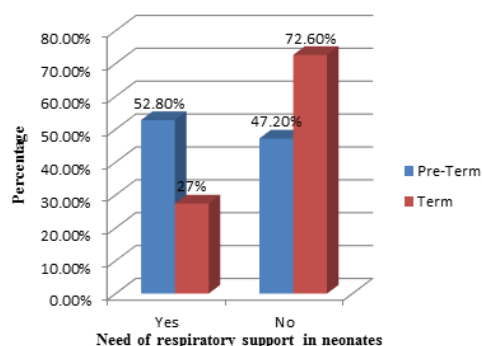
Comparison of Hypocalcaemia in between Late preterm and Term neonates.



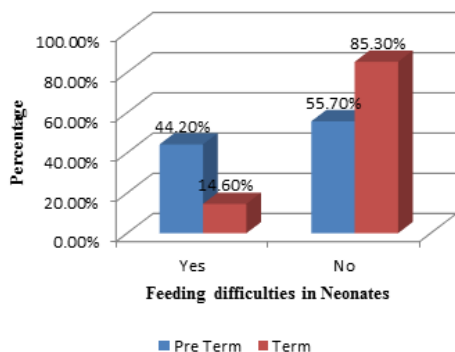
Comparison of neonatal hyperbilirubinemia in between Late preterm and Term neonates.



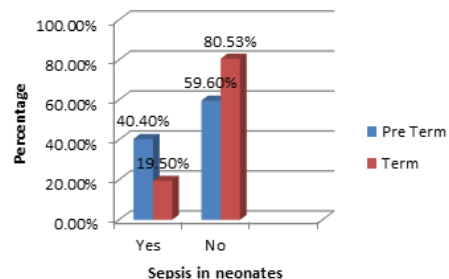
Comparison of neonatal Respiratory Support in between Pre-term and Term neonates



Comparison of feeding difficulties in between Late preterm and Term neonates.



Comparison of sepsis in between Late preterm and Term neonates.



CONCLUSION:-

Our study showed that late preterms though look similar to term neonates, but they were physiologically and immunologically immature than term neonates. Morbidities were more in late preterms like respiratory morbidities, hypoglycemia, hyperbilirubinemia, feeding difficulties and hypothermia as compared to term neonates. We as a clinician should pay extra attention towards this group and also identify the high risk deliveries and treat then intensively.

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