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COMPARISON OF NEONATAL MORBIDITY AND MORTALITY AMONG LATE PRETERM AND TERM NEONATES AT NEONATAL INTENSIVE CARE UNIT IN GUJARAT

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ABSTRACT

Background: Late preterm infants are physiologically less mature and have limited compensatory responses to the extra-uterine environment, compared with term infants. Although late preterm infants are the largest subgroup of preterm infants, there has been little research on this group until recently.

Aims: The present study is an attempt to obtain actual data on pattern of early neonatal morbidities and mortality among late preterm infant.

Material and Methods: This hospital based retrospective study was carried out by enrolling live newborns admitted during January 2014 to December 2014 in the neonatal intensive care unit at Civil Hospital, Gandhinagar, Gujarat. With ethical permission from Institutional Ethical Committee and administrative permission from medical superintendent files of the neonates were retrospectively reviewed.

Results: Mean weight in term neonates is more (3.14±0.48) than late preterm neonates (2.35±0.43). Chance of any morbidity is almost 3 times higher in late preterm compared to term neonates. Proportional death rate is more than double in late preterm neonates (13.79%) compared to term neonates (6.25%).

Conclusion: Late preterm neonates are at higher risk of different morbidities and mortalities so they required extra care and special attention for prevention of any adverse effect.

Key words: Late preterm neonates, Term neonates, Morbidity and mortality in neonate

INTRODUCTION

Neonatal period, in spite of its shortness, is considered as most critical phases of life. To achieve MDG-4, a substantial reduction in neonatal deaths will be required. The first step in improving early neonatal survival is to document the number and rate of deaths, and identify their common causes. As the late preterm neonates subgroup accounts for nearly 10% of all births, even a modest increase in any morbidity will have a huge impact on the overall health care resources. [1] Thus, it is not surprising that the absolute number of late preterm infant being admitted to NICUs has been increasing worldwide.

Late preterm infants (34 to 36 6/7 weeks of gestation) are physiologically less mature and have limited compensatory responses to the extra-uterine environment, compared with term infants. Alt-

hough late preterm infants are the largest subgroup of preterm infants, there has been little research on this group until recently. This is mainly because of labeling them as ''near-term'', thus being looked upon as ''almost mature,'' with little need to be concerned. However, recent research has revealed a contrary trend [1-4] . While serious morbidities are rare, the late preterm group has 2 to 3 fold increased rates for mild to moderate morbidities, such as hypothermia, hypoglycemia, delayed lung fluid clearance and respiratory distress, poor feeding, jaundice, infection, and readmission rates after initial hospital discharge [1,5-7] .

Understanding morbidity risk among late preterm infants is not only important for helping newborn care providers to anticipate and to manage potential morbidity during the birth hospitalization and earlier follow-up after hospital discharge, but also may possibly assist in guiding non-emergency obstetric intervention decisions.

Several studies in India reported underlying causes of neonatal deaths [5, 7, 8-12] .There are limited reports with special focus on morbidity and mortality pattern of late preterm neonates in Gujarat. The present study is an attempt to obtain actual data on pattern of early neonatal morbidities, and to compare it with term infants.

METHODOLOGY

This hospital based retrospective study was carried out in the neonatal intensive care unit (NICU), Department of Pediatrics, at Civil Hospital, Gandhinagar, Gujarat, India. The hospital caters mainly to rural and semi-urban patients, with a significant number of patients from below the poverty line (BPL) income group patients. This government hospital provides maternal and child health care services in the city, in addition to high percentage of referral of high-risk pregnancies and sick newborns from other peripheral hospitals. With ethical permission from Institutional Ethical Committee and administrative permission from medical superintendent of Civil hospital, Gandhinagar NICU admission files and Monthly & Quarterly reports submitted to higher authority was procured from Department of pediatrics, Civil Hospital, GMERS Medical College, Gandhinagar

All live inborn late preterm infants (34 to 36 weeks) and term infants (37 to 41 weeks) born between January 2014 to December 2014 were eligible for enrollment in the study. Gestational age was recorded as by maternal last menstrual period. Infants with major congenital anomalies and those with clinically identified chromosomal syndromes were excluded. The medical records of the neonates were retrospectively reviewed for the year 2014.

Data entered in Microsoft Excel and analyzed using Epi-Info. 7.1.5. Continuous variables will be expressed as mean (±SD). Categorical variables will be expressed as percentages. Appropriate statistical tests will be applied accordingly. p-Value less than 0.05 will be considered as significant.

RESULTS

During study period 913 admission occur in NICU during study period. A total of 913 babies were admitted to our NICU 88 babies were excluded from the study because they can't fulfill the eligibility criteria. Of these eligible babies, 348 (42.18%) were late preterm and 448 (54.30%) were term and 29 (3.52%) were early preterm. Mean gestational age in late preterm neonates is 35.32±0.67 and in term neonates is 38.36±0.98 weeks. Mean weight in term neonates is more (3.14±0.48) than late preterm neonates (2.35±0.43). More male neonates were admitted compared to females in both groups. Only 32.18 percent neonates had history of normal delivery. On comparing two groups, there was significant difference in mean gestation, mean birth weight, weight for gestation and mode of delivery. In NICU stay of late preterm neonates is higher than term neonates. More than sixty percent of term neonates required less than three days admission in NICU, while forty one percent late preterm neonates required 3 to 7 days admission in NICU. Fifty nine (16.96%) late preterm neonates require more than 7 days NICU admission. (Table-1)

Table 1: Baseline variables of the study population

Variable	Late preterm neonates (n=348)	Term neonates (n=448)	P value
Mean gestational age (in weeks)*	35.32 (±0.67)	38.36 (±0.98)	<0.05
Mean birth weight (in Kg)*	2.35 (±0.43)	3.14(±0.48)	< 0.001
Sex †			
Male	190 (54.60)	229 (51.12)	0.329
Female	158 (45.40)	219 (48.88)	
Weight of neonates ‡			
≥ 2.5 Kg	21 (6.04)	79 (17.63)	<0.001
1.5 - 2.499 Kg	291 (83.62)	348 (77.68)	
<1.499 Kg	36 (10.34)	21 (4.69)	
Mode of delivery †			
Vaginal	112 (32.18)	257 (57.36)	<0.001
Caesarean	236 (67.82)	191 (42.64)	
Average duration of hospital stay ‡			
< 3 days	143 (41.09)	287 (64.06)	<0.001
3-7 days	146 (41.95)	126 (28.13)	
>7 days	59 (16.96)	35 (7.81)	

* Standard error of mean, † Standard error of proportion,‡ chi square test

Table 2: Comparison of morbidity in late preterm and term infants

Type of Morbidity	Late preterm neonates (n=348)	Term neonates (n=448)	P value	Odds ratio (CI)
Any morbidity	198 (56.90)	134 (29.91)	< 0.001	3.09 (2.30-4.15)
Respiratory distress syndrome	156 (44.83)	78 (17.41)	< 0.001	3.81 (2.79-5.32)
Sepsis/pneumonia/meningitis	58 (16.67)	28 (6.25)	< 0.001	3.01 (1.86-4.82)
Jaundice	83 (23.85)	45 (10.04)	< 0.001	2.80 (1.89-4.16)
Hypoglycaemia	10 (2.87)	4 (0.89)	> 0.05	3.01 (1.02-10.56)

Table 3: Outcome of the admitted neonates at the NICU

Variables	Late preterm neonates (n=348)	Term neonates (n=448)	P value	Odds ratio (CI)
Outcome				
Death	48 (13.79)	28 (6.25)	< 0.001	2.4 (1.47-3.91)
Discharged	300 (86.21)	420 (93.75)		
Age at the time of neonatal death*				
Early neonatal death	39 (81.25)	25 (89.28)	0.916	0.52 (0.12-2.10)
Late neonatal death	9 (8.75)	3 (10.72)		

*Column total for this variable is equals to 'Death' in 'Outcome' variable

In the present study, 56.90% of late preterm and 29.91% of term infants had at least one neonatal morbidity requiring inpatient hospital observation first 28 days of life. Respiratory distress syndrome (44.83%) followed by jaundice requiring phototherapy (23.85%), any infection (16.67%) and hypoglycaemia (2.87%) were the frequently identified morbidities in late preterm infants. Chance of any morbidity is almost 3 times higher in late preterm compared to term neonates. (Table-2)

Proportional death rate is more than double in late preterm neonates (13.79%) compared to term neonates (6.25%). This difference in death is statistically significant. Most of the deaths occur in early neonatal period (< 7 days age) in both groups. (Table-3)

DISCUSSION

Our aim should be to prevent morbidity and mortality among neonates during providing care to them. For that we required proper data and knowledge of risk factors that leads to higher chances of morbidity and mortality. The sex distribution of population in this study is in concordance to National Neonatal-Perinatal Database (NNPD) and other studies of rural India. [13-16] This may be due to gender bias prevalent in India where male children are given more care or a greater tendency of male children to face neonatal complications. Mean weight is higher in term neonates compared to late preterm neonates. This finding is similar to prospective study done by Jaiswal, *et al*. [17] Caesarean delivery, low birth weight and sex of neonates significantly contribute to neonatal morbidities. Compared with term infants, these variables are more common in late preterm infants.

In the present study, 56.90% of late preterm and29.91% of term infants had at least one neonatal morbidity for which they require any intervention in NICU. Compared with term infants, late preterm infants were at three times higher risk for overall morbidity due to any cause, 3.8 times higher risk for respiratory morbidity, 2.8 times higher risk for jaundice, and 3 times higher risk for hypoglycaemia and any infection. Similar to our findings, in a retrospective study by Wang, *et al.* [1] , 77.8% near term infants compared with 45.3% of term infants had at least one clinical problem and nearly all clinical outcomes differed significantly between near-term and full term neonate. Melamed, *et al*. [18] also found that compared with full-term infants, spontaneous late preterm delivery was independently associated with an increased risk of neonatal morbidity, including respiratory distress syndrome, sepsis, intraventricular haemorrhage, hypoglycaemia, and jaundice requiring phototherapy. Another study Tomashek, *et al*. [19] found that late preterm infants were 1.5 times more likely to require hospital-related care and 1.8 times more likely to be readmitted than term infants. In another study, new born morbidity was 7 times more likely in late preterm compared with term infants (22% *vs* 3%). [20] The higher risk for neonatal morbidity in our study may be attributed to the inclusion of neonates of 34 weeks gestation in our data, difference in definition of morbidities and different admission policy for NICU.

There is significant difference in propositional mortality rate was found between late preterm neonates and term neonates. Late preterm neonates also require long duration hospital stay and also extra care to prevent mortality. Even with proper care in NICU mortality was high in late preterm neonates compared to term neonates, so they should not be

considered as near term neonates. Late preterm neonates are at higher risk of different morbidities and mortalities so they required extra care and special attention for prevention of any adverse effect.

CONCLUSION

In the present study late preterm neonates had more neonatal morbidity compared to term neonates requiring inpatient hospital care. Respiratory distress syndrome (44.83%) followed by jaundice requiring phototherapy (23.85%), any infection (16.67%) and hypoglycaemia (2.87%) were the frequently identified morbidities in late preterm infants. There is significant difference in propositional mortality rate was found between late preterm neonates and term neonates. Late preterm neonates also require long duration hospital stay and also extra care to prevent mortality.

LIMITATION

The present study is one of the first attempts to obtain actual data on late preterm births and associated neonatal morbidities from India. A major limitation of present study isretrospective nature of the study, due to this cause of death was determined by the extent and depth of information in the official records. As it was a hospital based study and as most of the patients had a low socio-economic status, the results of this study may not reflect the true burden which is prevalent in the community as a whole. Maternal details were not studied in the present study.

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