

ORIGINAL RESEARCH

A study to assess the aetiology and outcome of term newborn admitted in NICU with respiratory distress

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Abstract

Introduction: Preventive and therapeutic measures for some of the most common causes for respiratory distress can be analyzed and when implemented can reduce the burden of disease. So, to assess the prevalence and various factors associated with respiratory distress in term neonates admitted at NICU of a tertiary care centre this study was planned.

Materials and Method: The present hospital based cross sectional observational study was conducted at department of Paediatrics, L.N. medical college and research centre. All term neonates with respiratory distress admitted to neonatal intensive care unit were enrolled for the study purpose. Downe Score was used to assess the severity of respiratory distress. associated Risk factors, Morbidity and mortality pattern of term neonates with respiratory distress was studied. Statistical analysis was done using SPSS version-20.

Results: In our study the incidence of RD in term admitted babies was 27.83%. 91.91% babies were discharged after treatment and death occurred in 8.08% babies. Etiology wise distribution of study subjects results revealed that 39.50% subjects admitted due to Transient Tachypnea New Born, 17.80% admitted because of Delayed Physiological Adaptation, 14.04% due to Meconium Aspiration Syndrome and 3.40% due to sepsis.

Conclusion: Respiratory Distress is one of the commonest cause of admissions in NICU. Transient tachypnoea of the newborn is the most common cause of respiratory distress in term babies. The most important risk factors for respiratory distress are delivery by caesarian section and maternal infection. Early respiratory support help in better outcomes for infants with respiratory distress. Although decreasing the incidence through preventive measures is ideal, early recognition and treatment of the common neonatal respiratory diseases will decrease both short- and long-term complications and related mortality of at-risk infants.

Keywords: New born; Respiratory Distress, Transient Tachypnea , Meconium Aspiration Syndrome;

Introduction

Respiratory distress is one of the important causes of morbidity and NICU admissions in newborn. It is recognized as any signs of breathing difficulties in neonates. The clinical diagnosis of respiratory distress in newborn is suspected when the respiratory rate is more than 60 per min in a quiet resting baby and there are inspiratory costal recessions or expiratory grunt.¹ In addition to the presence of cyanosis and its response to oxygen supplementation. Respiratory distress (RD) is reported to occur in 4.7% - 8.3 % of neonates of all gestational ages²⁻⁵ Common causes of respiratory distress in term newborn infants include transient tachypnoea of the newborn, pneumonia, meconium aspiration syndrome, persistent pulmonary hypertension of the neonate, infections, pneumothorax, perinatal asphyxia and congenital surgical causes.⁴

Increasing rate of elective cesarean section, higher risk of certain disorders such as Meconium Aspiration Syndrome, Birth asphyxia, and a greater predisposition to PPHN increase the morbidities in the term neonate. Severity of respiratory distress can be checked by using respiratory distress scores. Downe score is one of the score commonly used to assess respiratory distress.¹

Preventive and therapeutic measures for some of the most common underlying causes are well studied and when implemented can reduce the burden of disease. So, to assess the prevalence and various factors associated with respiratory distress in term neonates admitted at NICU of a tertiary care centre this study was planned.

Materials and Method

The present hospital based cross sectional observational study was conducted at department of Paediatrics, L.N. medical college and research centre and associated J.K. hospital, Bhopal. All term neonates with respiratory distress admitted to neonatal intensive care unit were enrolled for the study purpose. Ethical permission was

obtained from the ethical committee of our institute written informed consent from mother/family member, details of the term neonates with respiratory distress admitted in NICU was recorded on a predesigned and pre-structured Performa

Inclusion criteria comprised of all term neonates with respiratory distress as per standard definition, admitted in Neonatal Intensive Care Unit of L.N Medical College and J.K. Hospital Bhopal. Exclusion criteria consisted of preterm and post term neonates and parents of patients not giving consent.

Downe Score was used to assess the severity of respiratory distress. There are 5 parameters used in Downe score they are Respiratory Rate, Retractions, Cyanosis, Air entry, Grunting. Each of these is rated on a scale of 0, 1, 2. The total score is then evaluated. The score is used in babies who are breathing spontaneously and even those on CPAP.

A score of

- < 5 indicates mild respiratory distress.
- 5-8 moderate respiratory distress.
- >8 severe respiratory distress.

Relevant laboratory and radiological investigations, treatment and outcome of all cases during their stay in hospital was recorded.

The outcomes was recorded based on number of days of hospital stay, number of days of oxygen requirement, ventilator support, number of babies recovered, number of babies who died. Morbidity and mortality pattern of term neonates with respiratory distress was studied.

Statistical analysis was done using SPSS version-20. Analysis was done in the form of percentages, proportions and represented as tables and figures wherever necessary. Appropriate tests of significance were applied. Final data was analysed quantitatively in terms of Frequency/ Number and percentages.

Results

Parameters		Percentage (%)
Gender	Male	61.70%
	Female	38.29%
Birth Weight	<2.5 OR >4 KGS	23.40%
	2.5 -4 KGS	76.59%

Table 1 shows gender and weight wise distribution of study subjects results revealed that 61.70 % study subjects were male and remaining 38.29% were female 23.40% study subjects had their weight <2.5 OR >4 KGS and remaining 76.59% newborn had weight ranges 2.5 to 4 kg.

MODE	Percentage
LSCS	53.19%
VAGINAL	46.80%
Total	100%

Table 2 shows mode of delivery wise distribution of study subjects results revealed that 53.19% subjects born by LSCS and 46.80% by vaginal delivery.

Total no. Of admission	990
Respiratory distress in term	235
Incidence	27.73%

Table 3 shows Incidence of Respiratory Distress it was found that incidence of RD was 27.83%

Etiology	Percentage
Transient Tachypnea New Born	39.50%
Meconium Aspiration Syndrome	14.04%
Delayed Physiological Adaptation	17.80%
Birth Asphyxia (PPHN)	3.40%
SEPSIS	12.70%
OTHERS	12.37%
Total	100%

Table 4 shows etiology wise distribution of study subjects results revealed that 39.50% subjects admitted due to Transient Tachypnea New Born, 14.04% due to Meconium Aspiration Syndrome, 17.80% admitted because of Delayed Physiological Adaptation, 3.40% subjects admitted because of PPHN, 12.70% due to sepsis, 2.55% due to Polycythemia, 1.27% because of Necrotizing Enterocolitis and 1.70 % due to congenital anomalies.

Etiology	Mild	Moderate	Severe
TTNB (93)	90	3	0
MAS (33)	19	11	3
DPA (42)	41	1	0
BA (8)	4	3	1
SEPSIS (14)	14	7	9
POLYCYTHEMIA (6)	6	0	0
NEC (3)	2	1	0
CA (4)	2	1	1

Table 5 shows Downe's Scoring in term neonates with respiratory distress results found that 93 subjects with TTNB out of them by Downe's Scoring system 90 had mid score, 3 moderate and none of them had severe , 19 subjects with MAS out of them by Downe's Scoring system 19 had mid score, 11 moderate and 3 of them had severe, 42 subjects with DPA out of them by Downe's Scoring system 41 had mid score, 1 moderate and none of them had severe , 8 subjects with BA out of them by Downe's Scoring system 4 had mid score, 3 moderate and one of them had severe , 14 subjects with Sepsis out of them by Downe's Scoring system 14 had mid score, 7 moderate and 9 of them had severe , 3 subjects with NEC out of them by Downe's Scoring system 2 had mid score, 1 moderate and none of them had severe , and 4 subjects with CA out of them by Downe's Scoring system 2 had mid score, 1 moderate and one of them had severe.

Etiology	Abnormal	Normal
TTNB(93)	2	91
MAS(33)	24	9
DPA(42)	0	42
BA(8)	2	6
SEPSIS(30)	26	4
MET CAUSE(16)	2	14
POLYCYTHEMIA(6)	1	5
NEC(3)	1	2
CA(4)	2	2
TOTAL(235)	60	175

Table 6 shows chest x-ray finding wise distribution of study subjects results revealed that x- ray was taken in 93 subjects admitted to NICU due to TTNB out of them x-ray finding were abnormal in 2 subjects , x- ray was taken in 33 subjects admitted to NICU due to MAS out of them x-ray finding were abnormal in 24 subjects, x- ray was taken in 42 subjects admitted to NICU due to DPA out of them x-ray finding were abnormal in none of the subject , x-ray was taken in 8 subjects admitted to NICU due to BA out of them x-ray finding were abnormal in 2 subjects , that x-ray was taken in 30 subjects admitted to NICU due to sepsis out of them x-ray finding were abnormal in 8 subjects ,that x-ray was taken in 16 subjects admitted to NICU due to metabolic out of them x-ray finding were abnormal in 2 subjects ,that x ray was taken in 6 subjects admitted to NICU due to polycythemia out of them x-ray finding were abnormal in 1 subject , that x ray was taken in 3 subjects admitted to NICU due to NEC out of them x-ray finding were abnormal in 1 subject, that x ray was taken in 4 subjects admitted to NICU due to CA out of them x-ray finding were abnormal in 2 subjects.

Parameters		Percentage
Outcome	Discharge	91.91%
	DEATH	8.08%

Table 7 shows outcome wise distribution of study subjects results revealed that 91.91% subjects discharged after treatment and death occurred in 8.08% study subjects. Statistical analysis using chi square test showing significant ($P<0.001$) association. etiological outcome wise distribution of death in study subjects results revealed death occurred among maximum 50% with CA and NEC 33.33% and all the subjects survive those were admitted due to TTBN, DPA and Polycythemia. Statistical analysis using chi square test showing significant ($P<0.001$) association.

Discussion

Respiratory distress in neonates is one of the important clinical manifestations of a variety of disorders of the respiratory system and non respiratory disorders. It has been estimated that 40-50% of all the perinatal deaths occur following respiratory distress. Schaffer⁶ and Cunningham⁷ Prodham⁸ found that RDS is the leading cause of respiratory distress followed by massive aspiration and pneumonia.

In the present study 61.70 % study subjects were male and remaining 38.29% were female (table 1).

Etiology wise distribution of study subjects results revealed that 39.50% subjects admitted due to Transient Tachypnea New Born, 14.04% due to Meconium Aspiration Syndrome, 17.80% admitted because of Delayed Physiological Adaptation, 3.4% subjects admitted because of Birth Asphyxia, 12.76% due to sepsis, 2.55% due to Polycythemia, 1.27% because of Necrotizing Enterocolitis and 1.70 % due to congenital anomalies (table 2). Similar to our study Barkiya SM et al (2016) conducted a study and found that the most common cause of NRD were TTN (44%) RDS (24%), sepsis (13%), birth asphyxia (10%), MAS (5%), and others (3%).⁹ Pneumothorax usually develops secondary to an underlying disease process but can occur spontaneously in 1% of newborns around the perinatal period, although only about 10% of these are symptomatic.¹⁰ Similar study done by Swarnakar K et al the most common causes of RD in their study were TTN 40.7%, followed by RDS 17.2%, birth asphyxia 11.4% and MAS 9.3%.¹¹

In our study, 91.91% subjects discharged after treatment and death occurred in 8.08% study subjects (table 5). Ahmed et al (2021) found that most of the infants admitted with respiratory distress survived and were discharged on room air (98.97%), and 1% of infants expired.¹² Barkiya SM et al found that the survival rate was 98% among RD cases admitted to NICU.⁹ In our study, death occurred among maximum 50% with Congenital Anomalies and Necrotizing enterocolitis 33.33% and all the subjects survive those were admitted due to Transient Tachypnea of new born, Delayed Physiological Adaptation and Polycythemia (table 6). Contrary to our study, P. Brahmaiah, found mortality 17% and deaths are due to Hyaline membrane disease (47%), Septicemia (23%), Severe birth asphyxia (12%), Pulmonary hemorrhage (12%) and CHD (6%).⁹ Santosh S et al (2013) found that the survival rate was 92.2% among RD cases admitted to NICU. The common cause of death was preterm and RDS.¹³

Table 6 shows Downe's Scoring in term neonates with respiratory distress results found that 93 subjects with TTNB out of them by Downe's Scoring system 90 had mild score, 3 moderate and none of them had severe, 19 subjects with MAS out of them by Downe's Scoring system 19 had mild score, 11 moderate and 3 of them had severe, 42 subjects with DPA out of them by Downe's Scoring system 41 had mid score, 1 moderate and none of them had severe, 8 subjects with BA out of them by Downe's Scoring system 4 had mid score, 3 moderate and one of them had severe, 14 subjects with Sepsis out of them by Downe's Scoring system 14 had mid score, 7 moderate and 9 of them had severe, 3 subjects with NEC out of them by Downe's Scoring system 2 had mid score, 1 moderate and none of them had severe, and 4 subjects with CA out of them by Downe's Scoring system 2 had mid score, 1 moderate and one of them had severe. P. Brahmaiah et al (2017) in the study noted, Downe's score of > 7 in 12.7%. Score of > 7 is mostly associated with MAS (44.4%) followed by Pneumonia (22.2%). All the deaths (100%) in term babies was significantly associated with score of >7.⁹ Nagendra K et al (1999) carried out a study in which screening of 1986 consecutive live births was done for evidence of Respiratory Distress by administering Downe's scoring in a prospective study at level II nursery of a medical college.

In our study the incidence of RD was 27.83% (table 7). Santosh S et al (2013) found 13.7% babies Developed respiratory distress.¹³ Contrary to our study, Nagendra K et al (1999) found the incidence of RDS was 2.42%.¹⁴

Conclusion

Respiratory Distress is one of the commonest cause of admissions in NICU. Respiratory distress accounts for 27.83% of all NICU admissions in the present study. Transient tachypnea of the newborn was the most common cause of respiratory distress in term babies. The most important risk factor for respiratory distress was delivery by caesarian section. Early referral and early respiratory support help in better outcomes for infants with respiratory distress. Learning to readily recognize respiratory distress in the newborn and understanding physiologic abnormalities associated with each of the various causes will guide optimal management. Although decreasing the incidence through preventive measures is ideal, early recognition and treatment of the common neonatal respiratory diseases will decrease both short- and long-term complications and related mortality of at-risk infants.

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