

# Clinico-Etiological Profile and Outcome of Neonatal Respiratory Distress

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## Abstract

**Introduction:** Respiratory distress (RD) syndrome is a common cause of admission in the neonatal unit. It poses a diagnostic dilemma. Early recognition of RD and initiation of appropriate treatment is important to ensure optimal outcomes. RD is one of the most common causes of morbidity in newborn.

**Aims and Objectives:** (i) To study clinical profile of neonatal RD (NRD), (ii) to find out most common etiology of RD in newborn, (iii) to assess the immediate clinical outcome of RD in our neonatal intensive care unit (NICU).

**Materials and Methods:** A prospective study was conducted at Kannur Medical College Kannur from January 2015 to July 2015 and study includes 102 cases. Term, pre-term and post-term babies both in-borns and out-borns cases were included in the study.

**Results and Discussion:** The study showed among the 300 newborns admitted in NICU, 102 (34 %) cases were admitted with RD. Of them, 61 babies (60%) were delivered vaginally and 41 (40%) by lower segment caesarean section. There were 44 (43%) pre-term babies, 56 (55%) term and 2 (2%) post-term neonates who were admitted with RD. The most common causes of NRD were transient tachypnea of newborn (TTN) 44%. The majority of cases clinically presented with tachypnea, flaring of alae nasi, and chest indrawing. The RD resolved on the 4<sup>th</sup> day in majority of cases.

**Conclusion:** Increased respiratory rate along with chest in drawing or grunt was the presentation of RD in the majority of cases. The survival rate was 98% among RD cases admitted to NICU. TTN was the most common cause and was observed maximally in babies delivered vaginally (70%).

**Key words:** Hyaline membrane disease, Neonatal respiratory distress, Transient tachypnea of newborn

## INTRODUCTION

Respiratory distress (RD) is a challenging problem and is one of the most common causes of admission in neonatal intensive care unit (NICU).<sup>1</sup> The neonatal mortality rate varies by state but, overall, it is reported to be 39 a 1000 live births in India.<sup>2</sup> Neonatal period is a very vulnerable period of life due to many problems which can occur. Most of the causes of neonatal morbidity and mortality are preventable.<sup>3</sup> The

common causes of RD in neonates includes transient tachypnea of the newborn (TTN), hyaline membrane disease (HMD), birth asphyxia, pneumonia, meconium aspiration syndrome (MAS), and other miscellaneous causes.<sup>4,5</sup>

Since the millennium development goals (MDG) were formed, progress toward reducing child mortality has accelerated but remains insufficient to achieve MDG4. In particular, global progress toward reducing neonatal deaths that is deaths during the first 28 days of life has been slow and neonatal deaths now account for a greater proportion of child deaths than in 1990. India accounts for 27.3% of total neonatal deaths in the world. Distress NRD is ranging from 2.2% to 7.6% in developed countries and from 0.7% to 8.3% in India.<sup>6</sup> It is caused by the delay in the absorption of fluid in the lungs after birth (i.e. excessive lung fluid).<sup>7</sup>

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## Aims and Objectives

The present study was planned to: (i) Find the commonest causes of RD in neonates brought to a referral NICU, (ii) evaluate clinical signs, and (iii) to find out immediate outcome of a neonate who were admitted in the NICU with RD.

## MATERIALS AND METHODS

### Study Design

A prospective study was conducted at Kannur Medical College Anjarakandy, and study included 102 cases of neonates who were admitted in NICU from January 2015 to June 2015. After obtaining permission from the head of the institute and taking informed consent from parents of the baby/guardian, they were enrolled in the study. Ethical clearance was obtained from Institutional Ethical Committee. Data were entered and analyzed using excel spreadsheet.

### Inclusion Criteria

Both in-born and out-born neonate admitted to NICU with RD.

### Exclusion Criteria

- Babies more than 28 days
- Babies <28 weeks of age.

### Data Collection

Neonates were classified as term, pre- and post-term were enrolled as cases with RD on the basis of clinical profile. A detailed proforma including name, age, sex, and residence was obtained. Neonatal data recorded includes weight of the baby, gestational age, mode of delivery, APGAR score, if available, the need for resuscitation after birth, onset of RD and resolution of RD. Factors related to labor and deliveries were assessed including type of delivery normal vaginal or C-section. Elective or emergency, place of delivery, (any associated complications like; prolonged rupture of the membrane more than 24 h, prolonged labor, meconium stained liquor, antepartum hemorrhage and others). Maternal information was recorded including age, parity and any systemic diseases.

Other risk factors include delivery prior to 38 weeks of gestation, male sex, low birth weight and macrosomia<sup>8,9</sup> and maternal diseases such gestational diabetes and asthma.<sup>8,9</sup>

The cases were diagnosed clinically by the presence of at least 2 of the following criteria, namely RR of 60/min or more, subcostal in the drawing, and retraction, suprasternal in drawing, flaring of alae nasi, expiratory grunt and cyanosis. The diagnosis of clinical conditions producing RD was based mainly on careful scrutiny of the history, clinical and radiological findings. Continuous

monitoring of oxygen saturation was done using pulse oxymeter. The arterial blood gas (ABG) analysis was done frequently in unstable babies and with changes in ventilator settings. Blood glucose was monitored regularly using the dextrostix, sepsis workup was done when clinically indicated, endotracheal tube and blood culture sensitivity were ordered if septicemia or pneumonia was suspected as per guidelines baby was mechanically ventilated, and modified the settings according to ABG analysis.

## RESULTS

Of the 102 (34%) cases admitted with RD, 61 babies (60%) were delivered vaginally and 41 (40%) by lower segment caesarean section (LSCS) (Table 1).

There were 67 (65%) males and 35 (34%) females in the study (Figure 1).

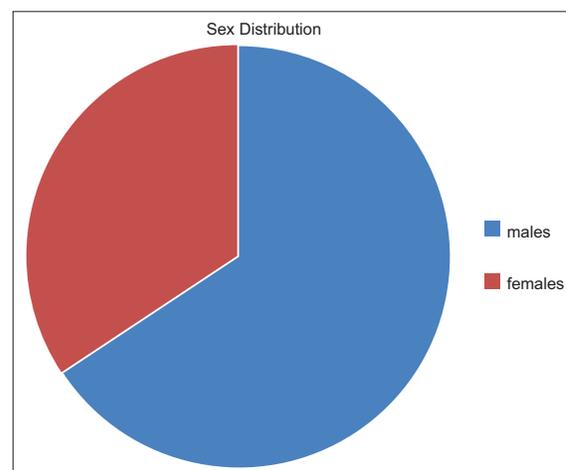
There were 44 (43%) pre-term babies, 56 (55%) term and 2 (2%) post-term neonates who were admitted with RD (Table 2).

## DISCUSSION

The study shows that 67 cases (65%) were males and 35 (34%) were females. Present study observed that male sex is a risk factor for RD syndrome (RDS), another study done by Sarnakar *et al.* demonstrated that male sex is a risk factor for RD. It was also found that vaginally delivered babies (60%)

**Table 1: Mode of delivery**

Admissions	N (%)
Vaginal	61 (60)
C-section	41 (40)
Total	102 (100)



**Figure 1: Gender-wise distribution**

**Table 2: Gestational wise distribution**

Gestation	N (%)
Pre-term	44 (43)
Term	56 (55)
Post-term	2 (2)
Total	102 (100)

**Table 3: Maternal risk factors of NRD**

Maternal risk factors	N (%)
PROM	11 (11)
HT	5 (5)
MSAF	5 (5)
Maternal pyrexia	5 (5)
Foul smelling liquor	2 (2)
DM	1 (1)

NRD: Neonatal respiratory distress, PROM: Premature rupture of membranes, MSAF: Meconium-stained amniotic fluid, HT: Hypertension, DM: Diabetes mellitus

**Table 4: Symptoms and signs of respiratory distress**

Signs and symptoms	N (%)
Tachypnea	83 (81)
Flaring of alae nasi	82 (80)
Chest in drawing	83 (81)
Grunting	42 (41)
Cyanosis	42 (41)

**Table 5: Onset of respiratory distress**

Onset	N (%)
24 h	82 (80)
48 h	14 (14)
72 h	5 (5)
>72 h	1 (1)

**Table 6: Etiology of RD**

Diagnosis	N (%)
TTN	45 (44)
RDS	25 (24)
Sepsis	14 (13)
Birth asphyxia	10 (10)
MAS	5 (5)
CCHD (TGA)	1 (1)
Pneumothorax	1 (1)
Pneumonia	1 (1)
Total	102 (100)

RD: Respiratory distress, MAS: Meconium aspiration syndrome, RDS: Respiratory distress syndrome, CCHD: Critical congenital heart disease, TGA: Transposition of great artery, TTN: Transient tachypnoea of the newborn

**Table 7: Distribution of outcome of RD**

Outcome	N (%)
Survived	100 (98)
Deaths	2 (2)
Total	102 (100)

RD: Respiratory distress

had RD more when compared to LSCS babies (40%). 43% cases of RDS were pre-terms of 34-36 weeks of gestation, 55% term, and 2% post-term babies. The most common cause of NRD were TTN (44%) RDS (24%), sepsis (13%), birth asphyxia (10%), MAS (5%), and others (3%) similar study done Santhosh *et al.* in their study showed 39% term and 61% pre-term neonates who were developed RD in newborn. the incidence of MAS in developed countries is on the decline possibly due to improved obstetric care.<sup>10</sup> 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.<sup>11</sup> Similar study done by Sarnakar *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%.<sup>11,18</sup> and present study observed that most of the cases developed RD at time of birth (80%) followed by 1<sup>st</sup> day (14%), 2<sup>nd</sup> day (5%), and 3<sup>rd</sup> day (1%). The RD resolved on the 2<sup>nd</sup> day (29%) and 3<sup>rd</sup> day (27%). However, it took more than 4 days to resolve in 41% of cases. There were 2 deaths (2%) and one case was referred to higher center. The majority of cases 83 (81%) presented with increased respiratory rate, chest in drawings. 82 (80%) babies had flaring of alae nasi. TTN babies develop an oxygen requirement that necessitates admission to the neonatal unit for a few days accounting for approximately 10% of all newborn term admissions.<sup>13</sup> In a review of TTN, Yurdakok suggests a genetic link between TTN and later onset asthma.<sup>14</sup> A similar study done by Keerti *et al.* showed that of all the symptoms, grunting, flaring of alae nasi had high specificity for RD in newborn while tachypnea, chest retractions and difficulty in feeding has high sensitivity.<sup>12,15</sup> Every year a significant number of term-born infants are admitted to neonatal units for management of their respiratory distress.<sup>15</sup> And that the most common clinical presentations were tachypnea, flaring of alae nasi and chest retraction.<sup>1</sup> It was also observed that there was a male preponderance with a ratio more than 1.5:1.<sup>1,7-9</sup> And showed inversely proportional to gestational age and birth weight, and C section can favor the onset of RD in newborns.<sup>15</sup> Study conducted by Ravindra *et al.* they observed that the most common causes for mortality were prematurity (42.1%) and RDS (Tables 3-7).<sup>16-18</sup>

## CONCLUSION

Increased respiratory rate along with chest in drawing, flaring of alae nasi are the presentation of RD in majority of cases. Most common causes of RD were TTN, RDS, birth asphyxia and MAS. The survival rate was 98% among RD cases admitted to NICU. TTN was the commonest cause and observed maximally in babies delivered vaginally (70%) in all infants presenting with RD. The most common cause of death was pre-term with HMD.

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