

# ***Risk factors and outcomes with morbidity and mortality pattern of Respiratory distress in term neonates in a tertiary care centre: a hospital based prospective observational study***

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## ***Abstract***

**Introduction:** Respiratory distress (RD) is a common problem during newborn period with considerable mortality. It occurs in approximately 6.7 percent of neonates. A newborn with nasal flaring, tachypnoea, chest wall retractions, grunting is often judged as having RD. It is common immediately after birth and is transient in most cases. Common medical causes of RD in term newborns include transient tachypnoea of the newborn (TTNB), meconium aspiration syndrome (MAS), birth asphyxia, sepsis, pneumothorax. The risk factors that emerged as being significant included: history of maternal smoking, Caesarean section (CS) extraction and male sex. TTNB is the most common cause of neonatal RD. Inclusion criteria included tachypnoea, retractions and grunting, requiring an increased concentration of inspired oxygen, usually to less than 40%, with chest roentgenogram showing good inflation and perihilar streaking and normal blood culture.

Meconium Aspiration Syndrome (MAS) is considered to be a relatively common event in term newborns. The symptoms are similar to TTNB, but more severe, more tachypnoea, retraction, and may need more oxygen. Bacterial infection is another possible cause of neonatal RD. In spite of the varying recent advances in clinching diagnosis and management, there has been very less clinical studies in term neonatal RD in our country. This study aims to assess the risk factors, and short term outcomes of RD in term newborns and also to decide upon the appropriate intervention to be used. It also aims to study the morbidity and mortality of RD. These prompt us to recommend the reduction of these risk factors to decrease the percentage of RD in full term newborn babies.

## **Methods:**

**Study Design:** Prospective observational study

**Inclusion criteria:** All term neonates with RD admitted to Inborn and Outborn Neonatal Intensive Care Unit (NICU) of a tertiary care centre in Bangalore. The study was conducted from December 2014 - May 2016.

A random sample of 200 babies was selected.

**Exclusion criteria:** Preterm and post term neonates

2) Neonates with congenital anomalies and surgical conditions

**Method of collection of data:** As per World Health Organisation criteria, babies with respiratory rate more than 60 cycles per minute, cyanosis, grunting, nasal flaring and chest wall retractions fulfilling the criteria for RD were enrolled into the study. Relevant investigations, treatment and outcome of all cases during their hospital stay was recorded.

**Statistical Methods:** Multivariate linear regression, spearman ranks correlation coefficient, paired and unpaired test methods were employed to test the defined hypothetical parameters. The association of the variables was tested based on the probability value ( $p \leq 0.01$ ).

## **Results:**

In this study, out of 200 babies admitted, 73% were inborn and 27% outborn. 57.5% with RD were males and 42.5% females. 61% were born to primi mothers. As the parity increased, number of babies admitted with RD decreased. Major risk factors for term RD were Meconium stained amniotic fluid (MSAF) (51%), fetal distress (16.5%), Pregnancy induced hypertension (PIH) (12%), Previous CS (9.5%) ( $p$ -value  $< 0.01$ ). Out of 200 babies, 43% had MAS, 24.5% TTNB and 24% birth asphyxia ( $p$ -value  $< 0.01$ ). 54% with RD were extracted through CS; whereas 46% were born through vaginal delivery ( $p$ -value  $< 0.01$ ).

The main indications for CS were MSAF (32.1%), fetal distress (19.3%) and previous CS (17.4%). Babies born between 37-38 weeks (59.5%) had a higher incidence of RD than those born between 39-40 weeks (35%) ( $p$ -value  $< 0.01$ ). 82.5% of babies with distress had birth weight between 2.5-3 kg; whereas 17.5% were between 3-3.5 kg. Most of the babies had a lower Downe's score in the range of 2-4. ( $p$ -value  $< 0.01$ ), mean score being 3. In this study, out of 200, 82% babies required only Oxygen, 15% Mechanical ventilation whereas 3% required CPAP. It was found that most of the term babies in this study required Oxygen for a mean duration of 13 hours. Out of 6 babies who were put on CPAP support; 50% recovered and 50% were put on mechanical ventilator due to failure.

Out of 30 babies who were ventilated, 20 died (66.7%) and 10 survived (33.3%). It was observed that 28% babies with RD were found to have sepsis whereas 9.5% had neurological abnormality. Outcome recorded was that 180 babies (90%) survived whereas 20 babies (10%) died. ( $p$ -value < 0.01). Out of 20 deaths, 70% were male and 30% were female. Major causes of death included MAS (60%), Late onset sepsis (20%), Early onset sepsis (10%) and Birth asphyxia (10%). The risk factors for deaths due to MAS included fetal distress, no antenatal check ups, oligohydramnios and PIH. It was found that 40% of the deaths had Downe's score of 5.

**Discussion:** In the present study, risk factors and outcomes with morbidity and mortality pattern of RD in term neonates was studied. 200 babies were taken up for the study. The major risk factors for term distress were MSAF, fetal distress, PIH, Previous CS. Present study confirmed that frequency of distress is inversely related to gestational age and birth weight.

The main causes included MAS, TTNB and Birth asphyxia. Majority of babies required only Oxygen, others required Mechanical ventilation and CPAP. Among 200 term babies admitted with RD, 90% survived and 10% died. In this study, it was observed that MAS was a major cause of admission (43%) and death (60%) for term RD. In the present study, 25% term babies developed RD. Incidence was higher compared to other studies (2.1% in Numan et al, 7.6% in Santosh et al since our NICU is a major referral centre for many rural hospitals and the total number of maternal and neonatal admissions is more compared to other hospitals.

MAS constituted majority of the cases (43%) compared to other studies (7.8% in Santosh et al [6], 8.3% in Atiye et al, 13.1% in Abhijit et al as our maternity and neonatal unit is a referral centre for remote subdivisional and rural hospitals and fetuses suffer from prolonged hypoxia during long transit time of transport from peripheral centers before delivery. TTNB was found to be less (24.5%) in this study since percentage of babies extracted through elective CS was lower compared to other studies (32.3% in Abhijit et al, 46% in Santosh et al. This study also showed that 100% of TTNB occurred following CS, the reason given, that in absence of labour, anticipatory lung fluid clearance will not have occurred. Birth asphyxia was observed to be higher (24%) compared to the other study (12.5% in Abhijit et al since our neonatal unit is a major referral centre for remote hospitals and fetal distress is a major risk

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factor due to a delay in transportation. The results implied low-level or inappropriate perinatal intervention at the primary health centres. There was a male predominance (57.5%) similar to other studies (68% in Numan et al which suggested that the male infants were more susceptible to hypoxia than the female infants. In comparison with other studies (33% in Bower et al [9], 46% elective CS in Ahmad et al, the percentage of elective CS was less (17.6%), since 82.4% of the babies were extracted through emergency CS as most of the high risk mothers were referred late. Like other studies, it was found that there was a highly significant association between Caesarean extraction and RD in full term newborns. Elective CS if required, might be performed at 39 weeks of gestation. Mortality was less in this study (10%) compared to other studies (16.8% in Qian et al, 24% in Dani et al, 36% in Sirageldin et al since there was prompt management of neonatal RD, including availability of equipped NICU with ventilator and surfactant facilities. Mortality due to MAS was higher (60%) compared to other studies (10.3% in Dani et al, 33.3% in Sirageldin et al, 17.8% in Qian et al because of late referral of high risk mothers from periphery to tertiary care centre and due to major risk factors like fetal distress.

**Contributors:** NC: conceived the study and its design, data acquisition, data analysis, interpretation and drafting the work; CG: critically revised the draft and intellectual content. All authors are accountable for the accuracy of data and accountability of the original work done.

### *Biography:*

Neha Chowdary completed IAP fellowship in Neonatology from Lokmanya Tilak Municipal Medical and General Hospital Mumbai. Neha Chowdary have worked as a senior resident in Pediatrics. She is well equipped in handling emergency situation, counselling families and in performing emergency procedures.

[34<sup>th</sup> Global Summit 2 On Pediatrics](#); September 14-15, 2020.

### Abstract Citation:

Neha Chowdary Risk factors and outcomes with morbidity and mortality pattern of respiratory distress in term neonates in a tertiary care centre: a hospital based prospective observational study, Global Pediatrics Summit 2020, 34<sup>th</sup> Global Summit On Pediatrics; September 14-15, 2020