ORIGINAL RESEARCH PAPER

Paediatrics

KEY WORDS: Respiratory Distress, Neonates, Etiology, Outcome.

CLINICAL PROFILE AND OUTCOME OF RESPIRATORY DISTRESS IN NEW BORN ADMITTED IN NICU

Dr. Rohit M Bhandar — Professor, Department Of Paediatrics, M R Medical College, Kalaburagi.

Dr. Kumar Angadi — Associate Professor, Department Of Paediatrics, M R Medical College, Kalaburagi.

Dr. B M Shashidhar — Post Graduate, Department Of Paediatrics, M R Medical College, Kalaburagi.

Dr. Sharan Kumar Deshmukh — Assistant Professor, Department Of Paediatrics, M R Medical College, Kalaburagi.

ABSTRACT

Introduction: Respiratory distress is one of the most common causes of admission (30-40%) in Neonatal Intensive Care Unit and 15 % of term infants, 29% of late preterm infants admitted to the neonatal intensive care unit experience significant respiratory distress and accounts for 20% of neonatal mortality in India. Objectives of the study are:
1. To study the clinical profile, risk factors of respiratory distress in new born
2. To study the morbidity and mortality of respiratory distress in new born admitted in NICU.

Materials And Methods: After obtaining ethical committee clearance and informed consent from parents of the subjects, 100 neonates with respiratory distress were subjected to prospective interventional study. Respiratory distress was diagnosed clinically by the presence of respiratory rate >60/min, subcostal retractions, xiphoid retractions, and suprasternal indrawing, and flaring of ala nasi, expiratory grunt, cyanosis at room air and were assessed by scoring system using Silverman-Anderson score in pre-terms, and Downe's score in term neonates. The outcome was measured. Data was analysed using SPSS 20.0 version software. P value of <0.05 was considered significant. **Results:** Among 100 neonates studied prospectively, birth asphyxia was found to be commonest cause of respiratory distress (28%), respiratory distress syndrome (21%), meconium aspiration syndrome (20%), sepsis (10%), transient tachypnea of newborn (8%), congenital heart disease (6%). 90.3% neonates with birth asphyxia required resuscitation. Mortality with respiratory distress in neonates admitted in NICU was seen to be 12%, recovery rate was 88% **Conclusion:** Respiratory distress is the commonest cause for admission of neonates in NICU. Among various etiologies, birth asphyxia was found to be the commonest cause of respiratory distress followed by RDS, MAS, Sepsis, TTNB. Early identification of maternal illness and its effective management is essential to decrease the incidence of respiratory distress and early diagnosis and management of respiratory distress can reduce the morbidity and mortality in neonatal period.

INTRODUCTION

Respiratory distress is one of the most common causes of admission (30-40%) in Neonatal Intensive Care Unit and 15 % of term infants, 29% of late preterm infants admitted to the neonatal intensive care unit experience significant respiratory distress and accounts for 20% of neonatal mortality in India.

Incidence of respiratory distress varies from 0.7 % to 8.3% of live born babies in India. Babies with respiratory distress are 2-4 times more likely to die than those without respiratory distress[1].

Factors that raise the risk of neonatal respiratory disorders include respiratory distress syndrome transient tachypnoea of new born, meconium aspiration syndrome, air leakage, pulmonary hemorrhage, pulmonary edema, congenital structural lung or thoracic defects, etc

Non respiratory causes of respiratory include metabolic disorders such as hypothermia or hyperthermia, hypoglycemia, polycythemia, cardiac disorders, birth asphyxia, metabolic acidosis and various inborn errors of metabolism.

Among them, perinatal asphyxia, transient tachypnea of newborn, and respiratory distress syndrome are commonest causes. Although respiratory distress may represent a benign, self-limited process, it may also be the first sign of sepsis or serious cardiopulmonary disease.

Early diagnosis and management can reduce the morbidity and mortality in the neonatal period. Identification of the cause of respiratory distress is important for planning and provision of facilities for these babies and thereby achieving reduction in neonatal mortality. In India only very few studies on cause of respiratory distress in term babies are available. Results of such studies are also variable in different centers[2].

In this juncture, this study helps us to identify the causes of respiratory distress in our centre and determine the strategies to improve the outcomes in these babies.

Respiratory distress in the newborn is recognized as one or more signs of increased work of breathing, such as tachypnoea, nasal flaring, chest retractions, or grunting. Normally, the newborn respiratory rate is 30 to 60 breaths per minute. Tachypnoea is defined as a respiratory rate greater than 60 breaths per minute.[3]

There are various factors which determine the progress and outcome in neonatal respiratory distress. The birth weight, gestational age and the degree of respiratory compromise are the key factors which decide the level of care the neonate would require[4]

MATERIALS AND METHODS

- **Study Design:** Prospective interventional study.
- **Study Setting:** Department of Pediatrics, MRMC, Kalaburagi.
- **Study Sample:** 100 cases

- **Sampling Procedure:** Purposive Sampling.
- **Study Duration:** 18 months (1st MARCH 2021- 31st AUGUST 2022)

Source Of Data

The data was collected from babies with respiratory distress admitted in tertiary care hospital attached to Mahadevappa Rampure Medical College, Kalaburagi, Karnataka.

Inclusion Criteria

New born admitted to NICU with respiratory distress

Exclusion Criteria

Babies more than 28 days of life.

METHODOLOGY

After obtaining clearance from the Institutional ethical committee and informed consent from the parents of the subjects, 100 neonates with respiratory distress were subjected to prospective interventional study. Respiratory distress was diagnosed clinically by the presence of respiratory rate >60/min, subcostal retractions, xiphoid retractions, and suprasternal indrawing, and flaring of ala nasi, expiratory grunt, cyanosis at room air and were assessed by scoring system using Silverman-Anderson score in pre-terms, and Downe's score in term neonates.

Data Analysis: Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp. Results on continuous measurement are presented as Mean ± SD and categorical as frequency, percentage. Inferential statistics like Chi-square test/Fisher Exact test and independent t-test were used to compare the two groups. P value <0.05 was considered statistically significant.

RESULTS

This study included 100 neonates. Among the study population, 13.0% were less than 32 weeks, 28.0% were between 32 to 36 weeks and 6 days, 59.0% with a gestational age greater than 37 weeks and neonates of preterm gestation were 41.0% of the total number of neonates and 59.0% of the total number of neonates were term neonates. Out of 100 cases of new born with respiratory distress out of which 55% cases born to multigravida mother and 45% cases are born to primigravida mother, 51 cases (51.0%) were delivered by LSCS and 49 cases (49.0%) were delivered by NVD. Out of these 100 cases, 40 (40.0%) were female and 60 (60.0%) were male.52 (52.0%) weighed less than 2.5 kilograms and 48 (48.0%) weighed more than 2.5 kilograms Out of these 100 cases, 20 (20.0%) were meconium aspiration syndrome (MAS), 21 (21.0%) were respiratory distress syndrome (RDS), 28 (28.0%) were birth asphyxia (BA), 6 (6.0%) were congenital heart disease (CHD), 10 (10.0%) were sepsis, 4 (4.0%) were pneumonia, 8 (8.0%) were transient tachypnoea of the new born (TTNB), and 3 (3.0%) were surgical causes. 12 (12.0%) cases died , while 88 (88.0%) showed improvement .Among neonates with a gestational age of less than 32 weeks, 84.6% had RDS, while with gestational age between 32 and 36+6 weeks, 35.7% had RDS, while 21.4% had sepsis and 10.7% had BA or CHD. Overall, the data shows that there is a statistically significant relationship between the etiology of the respiratory distress i.e RDS, BA, SEPSIS AND TTNB and gestational age, as indicated by p-value of <0.05. Out of the 41 cases of respiratory distress, 17 were preterm neonates. Out of these 17 cases, 7 (41.2%) had mild respiratory distress (based on SAS score), 3 (15%) had moderate distress, and 4 (23.5%) had severe distress. Based on their Downe score and the etiology of the distress, among 100 cases with respiratory distress, 59 were term neonates. In mild respiratory distress score 38.5% of cases were MAS and 30.8% of cases were TTNB. In moderate respiratory distress score 63.3% cases were BA which is statistically significant with p-value of 0.001. Statistically significant association was found in TTNB with LSCS born babies. And BA was more common in NVD born babies. 40.4% cases of RDS had birth weight <2.5 kg, 39.6% cases of babies with BA had birth weight of >2.5kgs and 14.6% of babies with TTNB had birth weight >2.5kgs. Statistically significant association with P= 0.001 was found between BA and NFR i.e. 68.3 % of cases required resuscitation.Statistically significant association with P<0.05 was found between respiratory distress score and etiology i.e. most of the cases with BA had moderate to severe respiratory distress score. The scores are divided into three categories: Mild (1-4), Moderate (5-7), and Severe (>7). The outcomes are divided into two categories: Death and Improved. The data shows that 9 preterm neonates had died and 32 neonates improved, while only 3 term neonates died outcome and 56 had an improved outcome. The p-value for both preterm and term neonates is 0.001, indicating a statistically significant association between respiratory distress scores and outcome of neonate, i.e. mortality of Neonates with moderate and severe respiratory distress scores was more compared to mild score.

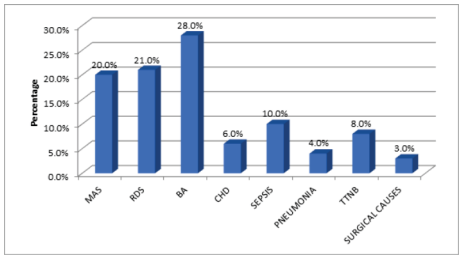

Chart 1: Distribution Of Etiology Of Respiratory Distress In New Born.

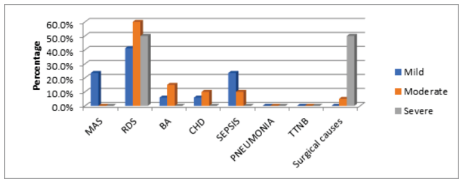

Chart 2: Distribution Of Preterm Neonates Based On Sas Score And Etiology Of Respiratory Distress

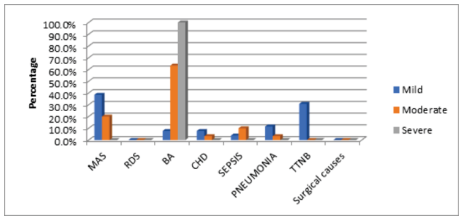

Chart 3: Distribution Of Term Neonates Based On Downes Score And Etiology Of Respiratory Distress

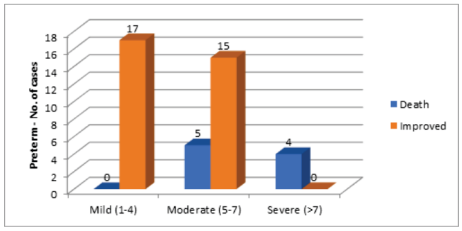

Chart 4: Distribution Of Outcome Of Respiratory Distress In Preterm Neonates

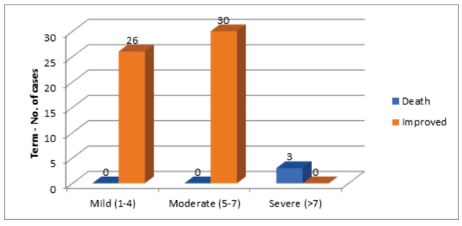

Chart 5: Distribution Of Outcome Of Respiratory Distress In Term Neonates

DISCUSSION

In this prospective interventional study, we examined Respiratory distress in newborns is a common reason for admission in Neonatal Intensive Care Unit which may be transient or pathological; morbidity is high if not prompted for early diagnosis and treatment. Saeed Z et al. described respiratory distress as the most common presenting problem encountered within the first 48-72 hours of life with a prevalence of 4.24% in neonates.

The present study can be compared to other studies such as Ashish Wanare et al[5], Barkiya et al[6], Harshini B.P et al[7], Santhosh et al[8], Keerti Swarnakar et al[9], and Abhijit et al[10]. with a higher percentage of Birth Asphyxia (BA) cases (28%) and a lower percentage of Transient Tachypnea of the Newborn (TTN) cases (8%). The percentage of MAS (20%) and sepsis/pneumonia cases (14%) in the present study is similar to the other studies. However, the percentage of congenital heart diseases (CHD) in the present study (6%) is lower compared to other studies, whereas the percentage of Respiratory Distress Syndrome (RDS) is 21% and others/Surgical causes (3%) are higher.

Observed that present study has 60% male neonates and 40% female neonates. This distribution is relatively similar to the study conducted by Barkiya et al[6], which had 65% male neonates and 35% female neonates. On the other hand, the study conducted by Ashish Wanare et al[5] had a slightly higher percentage of female neonates (39.47%) compared to male neonates (46.77%). The study conducted by Kshirsagar VY et al[11] had a more balanced distribution, with 51% male neonates and 49% female neonates.

In the present study, 51% of deliveries were via LSCS and 49% were via NVD and the study by Ashish Wanare et al shows that 52.64% of deliveries were via LSCS (Lower Segment Caesarean Section) while 47.36% of deliveries were via NVD (Normal vaginal delivery). In the study by Barkiya et al, 40% of deliveries were via LSCS and 60% were via NVD. In the study by Keerti Swarnakar et al, 67.6% of deliveries were via LSCS and 32.4% were via NVD.

In the study conducted by Assel Mohammed Wadi et al[12], 24.6% of neonates required resuscitation while 75.4% did not. In the present study, 31% of neonates required resuscitation while 69% did not. The data suggests that there is a higher percentage of neonates that did not require resuscitation in both studies.

In the study by Haquea et al[13], a higher percentage (16.7%) of neonates died compared to the present study (12%). The study by Palod PH et al[14] showed a similar percentage (12.5%) of neonates who died. In contrast, the study by Barkiya et al showed a much lower percentage (2%) of neonates who died. The study by Santhosh et al[15] showed a slightly lower percentage (7.8%) of neonates who died compared to the present study. The study by Keerti Swarnakar et al showed a higher percentage (22.86%) of neonates who died compared to the present study.

When comparing these results to previous studies, the percentage of babies weighing less than 2.5kg in the present study is relatively similar to that of Ashish Warne et al (48.15%) but lower than that of Ravindra Sonawane et al[16] (57.15%). On the other hand, the percentage of babies weighing more than 2.5kg in the present study is relatively similar to that of Ravindra Sonawane et al (42.85%).

In the study by Kshirsagar VY et al and Sahoo MR et al[17], the majority of the newborns had moderate respiratory distress (45% and 50% respectively), while in the present study, the majority of the newborns had mild respiratory distress (43%). A smaller percentage of newborns had severe respiratory distress in the present study (7%) compared to the other two studies (30% and 27%). So, we can see that the severity of respiratory distress in the present study was less compared to the other two studies.

CONCLUSION

Respiratory distress is the commonest cause of admission of neonate in NICU. Among the various etiologies, birth asphyxia (28%) was found to be the commonest cause of respiratory distress followed by RDS (21%), MAS (20%), Sepsis (10%), TTNB (8%), CHD (6%) and other causes being (3%). Incidence of respiratory distress was found to be more in term babies (64%) when compared to preterm babies as per the present study. Recovery rate of respiratory distress in neonates admitted in NICU was 88% and mortality was 12%.

REFERENCES

1. Edwards MO, Kotecha SJ, Kotecha S. Respiratory distress of the term newborn infant. Paediatr Respir Rev. 2013; 14:29-37.
2. Williams, Olivia, et al. "Pulmonary effects of prolonged oligohydramnios following mid-trimester rupture of the membranes-antenatal and postnatal management." Neonatology, Vol. 101, No. 2, 2012, pp. 83-90.
3. Warren JB, Anderson JM. Newborn respiratory disorders. Pediatr Rev. 2010;31(12):487–495, quiz 496
4. John BM, Venkateshwar V, Dagar V. Predictors of Outcome in Neonates with Respiratory Distress. J Nepal Paediatr Soc. 2015;35(1)31-37. doi: [Article] [Crossref][PubMed][Google Scholar
5. Ashish Wanare, Pradeep Agrawal, Guruveerajeysingh Malini, Mitesh Chawda, Ganpat Jha, Ravi Pandey, Bhushan Khadse, Hitav Someshwar, Akshay Patil. Clinical Profile of Respiratory Distress in Newborn in Chhattisgarh, India. European Journal of Clinical and Biomedical Sciences. Vol. 6, No. 3, 2020, pp. 35-42. doi: 10.11648/j.ejcbs.20200603.12
6. Barkiya SM ,venugopal N, Kumari V, clinico –etiological profile and outcome of neonatal respiratory distress. International journal of scientific study 2016;3(11);189-192
7. Harshini BP, Ananda Kumar TS, Kumar GV, Khan I. An etiological study of respiratory distress in neonates in a tertiary care medical college hospital. Pediatric Rev Int J Pediatr Res. 2020;7(1):22-26.
8. Santosh S, Kushal kumar K, Adarsha E. A Clinical study of Respiratory Distress In Newborn and its Outcome. Indian Journal of Neonatal Medicine and Research. 2013 April; 1:2-4
9. Swarnkar K, Swarnkar M. Neonatal respiratory distress in early neonatal period and its outcome. Int J Biomed Adv Res. 2015 Sep 8;6(9):643–7.
10. Dutta A. Spectrum of Respiratory Distress in Newborn: A Study from a Tertiary Care Hospital in Kolkata. 2011 Apr 30;15(2).
11. Vinayak Y. Kshirsagar, Ashok Y. Clinical profile and outcome of respiratory distress in newborns admitted to nicu. International journal of contemporary paediatrics, 2019 march;6(2):713-717
12. Wadi1 AM. Respiratory Distress in Full Term Neonates in the First Week of Life in Basrah Maternity and Children Hospital. Med J Basrah Univ. 2012;30(2):91–8.
13. Haque A, Baki MA, Begum T, Akhter S, Begum S, Nahar N. Etiology of Respiratory Distress in Newborn – Experience in BIRDEM. BIRDEM Med J. 2013 Nov 24;3(1):19–22.
14. Pushpak H, Palod, Bhagwat B . A study of clinical profile of neonates with respiratory distress and predictors of their survival admitted to nicu, international journal of contemporary paediatrics, vol4, no6(2017).
15. Santosh S, Kushal kumar K, Adarsha E. A Clinical study of Respiratory Distress in Newborn and its Outcome. Indian Journal of Neonatal Medicine and Research. 2013 April; 1:2-4
16. Sonawane, Ravindra, Akshay Patil, and Sagar Sonawane. "Clinical profile of respiratory distress in newborn." MVP Journal of Medical Science, Vol. 5, No. 2, 2019, pp. 151-55
17. Sahoo MR, Vasundhara A, Rao MS, Alekhya J, Nagasree P. Clinico-etiological profile and risk assessment of newborn with respiratory distress in a tertiary care centre in South India. Int J Contemp Pediatr. 2015;2(4):433-9.