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STUDY OF CLINICO-ETIOLOGICAL PROFILE AND RISK ASSESSMENT OF NEWBORNS WITH RESPIRATORY DISTRESS IN A TERTIARY CARE CENTRE OF NORTH INDIA

Paediatrics

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ABSTRACT

Background: Respiratory distress is a common condition in newborns, responsible for 30-40% of NICU admissions and a leading cause of neonatal mortality. In India, its incidence varies due to geographical, socio-economic, and ethnic factors. **Aim of the Study:** To evaluate the risk factors, etiology and immediate outcome of the neonates admitted in NICU with respiratory distress. **Material and Methods:** This hospital-based prospective observational study was conducted in the NICU of MMIMSR, Mullana, over 1.5 years. A total of 150 neonates meeting the inclusion criteria were enrolled based on clinical assessment. Detailed neonatal and maternal data were recorded, and respiratory support was provided according to distress scoring. Case-specific investigations determined the final diagnosis, and outcomes were analyzed using SPSS version 20.0. **Results:** Study found a significant association between respiratory distress and perinatal risk factors. Male infants had a higher incidence (62%), and low birth weight was the common factor (44%). Among the 150 cases, Transient Tachypnea of Newborn (TTN) was the most common diagnosis (30%), followed by Sepsis (18.7%), Respiratory Distress Syndrome (RDS) (17.3%), and Perinatal Asphyxia (14%). Other conditions included Meconium Aspiration Syndrome (9.3%), Congenital Heart Disease (4%), Neonatal Pneumonia (4%). Most neonates received CPAP, and majority were discharged within 10 days. Mortality was highest in Perinatal Asphyxia (42.9%) and RDS (28.6%), particularly in early preterm (52.4%) and extremely preterm (14.3%) infants. Final outcomes showed 79.3% were discharged, 14% died, and 6.7% left against medical advice. **Conclusion:** The study highlights the need for early diagnosis and tailored management to improve outcomes in newborns with respiratory distress. Key recommendations include enhanced prenatal care, cautious use of cesarean sections, and immediate postnatal respiratory support. It also emphasizes the wider use of antenatal steroids and strict management protocols to reduce the risk and severity of respiratory distress.

KEYWORDS

Respiratory Distress, TTN, RDS.

INTRODUCTION

Respiratory distress is a leading cause of NICU admissions, contributing to 30-40% of cases and 20% of neonatal deaths[1]. Infants with respiratory distress are 2-4 times more likely to die, with over a third of neonatal deaths occurring in the first 24 hours. In India, the Neonatal Mortality Rate (NMR) has declined from 38 to 23 per 1000 live births, but remains high[2]. UNICEF's Sustainable Development Goal 3.2 aims to reduce NMR to less than 12 per 1000 live births[3]. Early identification and management of respiratory distress are crucial to prevent severe complications and mortality.

AIM AND OBJECTIVES

To evaluate the risk factors, etiology and immediate outcome of the neonates admitted in NICU with respiratory distress.

METHODS

This hospital-based prospective study included 150 neonates with respiratory distress. Both Inborn and outborn neonates admitted in NICU with respiratory distress were included. Neonates with congenital malformations or without parental consent were excluded.

Detailed Methodology :

Patient Selection & Assessment[4]:

Newborns with respiratory distress were identified using clinical criteria, including rapid breathing (>60 breaths/min), retractions and grunting. Maternal and neonatal data were collected, and gestational age was determined via ultrasound (1st trimester) or New Ballard scoring.

Severity Scoring & Treatment[4]:

Downe's Vidyasagar Score (term neonates) and Silverman Anderson Score (preterm) classified distress as mild (<5), moderate (5-7), or severe (>7).

Mild cases received oxygen therapy; moderate cases were placed on bubble CPAP; severe cases were immediately moved to mechanical ventilation. In case of deterioration/no improvement, step up intervention was considered.

Diagnosis & Statistical Analysis:

Final diagnosis were made based on clinical features, risk factors, and lab/radiological findings[5]. Data were analyzed using SPSS version 20, with a p-value <0.05 considered statistically significant.

Ethical Considerations:

Approval was obtained from the Institutional Ethics Committee, with informed consent from parents and ensured confidentiality. No financial burden was placed on participants.

RESULTS

Among 1203 deliveries, 150 neonates experienced respiratory distress, yielding an incidence rate of 12.47%.

Table 1: Showing Distribution of Study Population According to the Gestation Age and Birth Weight (N=150)

Gestation Age	(N)	(%)	Birthweight (grams)	(N)	(%)
Extremelypreterm	4	2.70%	<1000	2	1.3%
EarlyPreterm	44	29.30%	1000-1499	28	18.7%
Late Preterm	34	22.70%	1500-2499	66	44.0%
Term	68	45.30%	>2500	54	36.0%
Total	150	100%	Total	150	100%

Table 1 showing among 150 newborns, most (45.3%) were born at term, while 2.7% were extremely preterm. In terms of birth weight, 1.3% had extremely low birth weight (<1000g), 18.7% had very low birth weight (1000-1499g), 44% had low birth weight (1500-2499g), and 36% had normal birth weight.

Out of 150 cases, 64.7% had mild distress, 25.3% had moderate distress, and 10% had severe distress.The initial interventions for respiratory distress included nasal prongs for 20% of cases, CPAP for 66.7%, and MV for 13.3%. Only 31 neonates (20.7%) needed a step-up intervention: 4 (2.7%) were upgraded to CPAP, and 27 (18%) required MV. Most neonates were stabilized with the initial treatment.

Table 2 : Showing comparison Between Etiology and Outcome of Study Population (N=150)

Etiology	Outcome						Total	Chi- square (p-value)
	Discharge		Death		LAMA			
	N	N%	N	N%	N	N%		

TTN	43	36.1%	0	0.0%	2	20.0%	45	42.055 (0.01)*
SEPSIS	24	20.2%	1	4.8%	3	30.0%	28	
RDS	18	15.1%	6	28.6%	2	20.0%	26	
PA	11	9.2%	9	42.9%	1	10.0%	21	
MAS	13	10.9%	0	0.0%	1	10.0%	14	
CHD	4	3.5%	2	9.5%	0	0.0%	6	
Pneumonia	3	2.5%	2	9.5%	1	10.0%	6	
PPHN	2	1.7%	0	0.0%	0	0.0%	2	
CongenitalTB	1	0.8%	0	0.0%	0	0.0%	1	
Pneumothorax	0	0.0%	1	4.7%	0	0.0%	1	
Total	119	100%	21	100%	10	100%	150	

This table 2 shows that there is a significant relation between the etiology and outcome of the newborn. There is significant higher incidence of mortality among the newborn with perinatal asphyxia (42.9%), RDS (28.6%) compared to the newborns with TTN and sepsis who were mostly discharged . ($p<0.05$)

Table 3: Showing Comparison Between Gestation Age and Outcome of the Study Population (N=150)

Gestation age	Outcome						Total	Chi-square (p-value)
	Discharge		Death		LAMA			
	N	N %	N	N %	N	N %		
Extremely preterm	1	0.8%	3	14.3%	0	0.0%	4	21.437 (0.01)*
Early Preterm	30	25.2%	11	52.4%	3	30.0%	44	
Late Preterm	29	24.4%	3	14.3%	2	20.0%	34	
Term	59	49.6%	4	19.0%	5	50.0%	68	
Total	119	100%	21	100%	10	100%	150	

Table 3 showing significant relation between gestation age and outcome of newborns with respiratory distress.

There is higher incidence of mortality among the early preterm newborn (52.4%) and extremely preterm (14.3%) compared to late preterm and term group.($p<0.05$)

Majority of the neonates with TTN were discharged within 10 days. Neonates with RDS and Sepsis showed longer duration of hospital stay when compared to other groups. ($p<0.01$)

Table 4 : Showing Comparison Between Etiology and Gestational Age of the Study Population (N=150)

Etiology	Gestation age								Total	Chi square (p-value)
	Extremely Preterm		Early preterm		Late Preterm		Term			
	N	N%	N	N%	N	N%	N	N%		93.09 (0.01)*
TTN	0	0.00%	3	6.80%	13	38.30%	29	42.60%	45	
SEPSIS	0	0.00%	9	20.50%	8	23.50%	11	16.20%	28	
RDS	3	75.00%	21	47.70%	2	5.90%	0	0.00%	26	
PA	1	25.00%	9	20.50%	2	5.90%	9	13.20%	21	
MAS	0	0.00%	0	0.00%	1	2.90%	13	19.10%	14	
CHD	0	0.00%	2	4.50%	3	8.80%	1	1.50%	6	
Pneumonia	0	0.00%	0	0.00%	3	8.80%	3	4.40%	6	
PPHN	0	0.00%	0	0.00%	2	5.90%	0	0.00%	2	
CongenitalTB	0	0.00%	0	0.00%	0	0.00%	1	1.50%	1	
Pneumothorax	0	0.00%	0	0.00%	0	0.00%	1	1.50%	1	
Total	4	100%	44	100%	34	100%	68	100%	150	

The table 4 demonstrates a significant association between etiology and gestational age. RDS was most prevalent in extremely preterm neonates (75%) and early preterm neonates (47.7%), with sepsis affecting 20.5% of the early preterm group. TTN and MAS were more common in late preterm and term neonates. Sepsis was observed across all gestational ages without specificity ($p<0.05$).

Mechanical ventilation was most needed in newborns with perinatal asphyxia (35%). CPAP was the primary support for TTN (31%) and RDS (21%), while nasal prongs were beneficial for TTN and sepsis cases ($p<0.05$)

DISCUSSION

The study included 150 newborns, with a respiratory distress (RD) incidence of 12.5%, similar to Keerti Swarnakar et al.[6] (2015), while Khaled A. Abdel Baseer et al.[7] (2020) and Abdelrahman et al.[8] (2014) reported higher incidences. Among the neonates, 76.7% were inborn with 62% being male. Birth weight distribution showed 1.3% as ELBW, 18.7% VLBW, 44% LBW, and 36% normal. Gestational age distribution included 45.3% term, 29.3% early preterm, 22.7% late preterm, and 2.7% extremely preterm. Khaled A. Abdel Baseer et al.[7] (2020) reported 49.6% preterm and 50.4% term births, while Santosh S et al.[9] (2013) in Bangalore found 61% preterm and 39% term.

The study found that 66.7% of newborns received CPAP, 20% nasal prongs, and 13.3% MV, with 20.7% requiring escalation, mainly to MV (18%). In contrast, Haque et al.[10] (2013) reported all cases initially needed oxygen via head box, with 29.1% requiring assisted ventilation, including 25% MV and 4.1% bubble CPAP.

The study identified TTN as the leading cause of respiratory distress (30%), followed by sepsis (18.7%) and RDS (17.3%). PA affected 14% of neonates, MAS 9.3%, and pneumonia 4%. Mortality was 14%, with higher rates among early preterm (52.4%) and extremely preterm neonates (14.3%). PA (42.9%) and RDS (28.6%) had the highest mortality rates.

Mishra et al.[11] (2020) also found TTN as the most common cause (35.3%), followed by HMD (27%) and MAS (18.4%). Abdelrahman et al.[8] (2014) reported higher mortality in newborns with HMD (86.7%) and CHD (55.6%), while Patel A et al.[12] (2022) found RDS to be the leading cause of death (40%), followed by birth asphyxia (21.8%), MAS (9.3%), sepsis, pneumonia (21.8%), and CHD (6.2%). These findings highlight the importance of early recognition and targeted management to improve neonatal outcomes.

Maternal comorbidities like hypertension and hypothyroidism were common, with risk factors including maternal age, parity, PROM, and prolonged labor. LSCS was the predominant mode of delivery, and over 20% of neonates required resuscitation. The mean birth weight was 2.17 kg, and hospital stay averaged 10.49 days. The discharge rate was 79.3%, while mortality was 14%, highest among early preterm infants, especially those with PA and RDS, highlighting the need for targeted interventions and close monitoring in high-risk cases.

CONCLUSIONS

Respiratory distress is a common reason for NICU admissions, with TTN, sepsis, RDS, PA, MAS, CHD, and pneumonia as primary causes. While TTN usually resolves on its own, PA and RDS are major contributors to mortality. Male newborns and those delivered via CS are at higher risk, emphasizing the need for careful delivery planning. Maternal illnesses, labor complications (PROM, MSAF), and parity status also influence RD incidence. Many newborns require resuscitation, highlighting the importance of skilled intervention. CPAP effectively reduces MV dependence, particularly in TTN cases. The study stresses early identification, targeted interventions, and vigilant monitoring to improve neonatal outcomes and reduce mortality.

Limitations

The study's limitations included a small sample size, short study duration, single-investigator approach, and lack of long-term follow-up on complications and outcomes. A larger, more extensive, and long-term study is recommended for a deeper understanding of respiratory distress in newborns.

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REFERENCES

1. Neonatal morbidity and mortality: report of the National Neonatal- PerinatalDatabase. Indian Pediatr. 1997 Nov;34(11):1039–42.
2. Kumar P, Singhal N. Mappingneonatal and under-5 mortalityin India. The Lancet. 2020 May 23;395(10237):1591-1593.
3. HugL, AlexanderM, YouD, Alkema L.National, regional, and global levels and trends in

neonatal mortality between 1990 and 2017, with scenario-based projections to 2030: a systematic analysis. The Lancet Global Health. 2019 Jun 1;7(6):e710-20.
4. Ramesh Agarwal Ashok Deodari Vinod Paul M Jeeva Sankar Anu Sachdeva. Respiratory distress in neonates. In: AIIMS Protocols in Neonatology. DELHI: NOBLEVISION; 2019. p. 167.
5. Singh Y, Lakshminrusimha S. Pathophysiology and Management of Persistent Pulmonary Hypertension of the Newborn. Clin Perinatol.2021;48(3):595-618.
6. 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
7. Baseer KAA, Mohamed M, Abd-Elmawgood EA. Risk Factors of Respiratory DiseasesAmongNeonatesinNeonatalIntensiveCareUnit of Qena University Hospital, Egypt.Ann Glob Health. 2020;86(1):22. Published 2020 Feb 26. doi:10.5334/aogh.2739)
8. AbdelrahmanSM, HamedSM, NasrA.Neonatal respiratorydistressin Omdurman Maternity Hospital, Sudan. Sudan J Paediatr. 2014;14(1):65–70.
9. Santosh S, Kumar K, Adarsha E. A clinical study of respiratorydistress in newborn and its outcome. Indian J Neonatal Med Res. 2013;1(1):2-4.
10. 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.
11. Mishra, Kripa Nath, et al. "Aetiology and Prevalence of Respiratory Distressin NewbornsDeliveredatDMCH,Darbhanga,Bihar ,India."JournalofEvolutionofMedicaland DentalSciences,vol.9,no. 48, 30 Nov. 2020, pp. 3655+.
12. Patel A, Barua DK, Mulye S. Clinico-etiological profile of respiratory distress in newborns. J Cardiovasc Dis Res. 2022;13(2):1132–40.