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CLINICAL PROFILE OF NEONATES WITH RESPIRATORY DISTRESS: A PROSPECTIVE OBSERVATIONAL STUDY AT A TERTIARY CARE CENTRE

Paediatrics

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ABSTRACT

Background: Respiratory distress is a leading cause of neonatal morbidity and NICU admission. Timely recognition and accurate diagnosis are crucial for optimizing outcomes. **Methods:** A prospective observational study was conducted on 100 neonates admitted with respiratory distress to the NICU of CPR Hospital, Kolhapur, between June 2024 and December 2024. The Silverman-Anderson score was used to grade severity. **Results:** The most common clinical sign was tachypnea (98%). Hyaline membrane disease (25%), birth asphyxia (24%), and neonatal sepsis/pneumonia (23%) were the leading causes. The overall mortality rate was 22%. Mortality was highest in hyaline membrane disease (36%) and lowest in transient tachypnea of the newborn (0%). A highly significant association ($p<0.001$) was found between severity scores and outcome: no deaths occurred in the mild group (0%), 9.7% mortality in the moderate group, and 48.5% mortality in the severe group. **Conclusions:** Hyaline membrane disease, birth asphyxia, and sepsis are the most common causes of respiratory distress, with severity directly correlating with mortality. Early recognition and intervention are essential.

KEYWORDS

Respiratory Distress, Hyaline Membrane Disease, Neonatal Sepsis, Meconium Aspiration, Silverman Score

INTRODUCTION

Respiratory distress is among the commonest indications for neonatal intensive care admission and remains a major contributor to early neonatal morbidity and mortality worldwide. The clinical spectrum ranges from self-limited transient tachypnoea of the newborn (TTN) to severe respiratory distress syndrome (RDS), meconium aspiration, pneumonia/sepsis, and pulmonary hypertension, with presentation and trajectory shaped by gestational age, perinatal events, and health-system capacity (1,2). In preterm infants, surfactant deficiency–driven RDS remains the dominant aetiology of respiratory failure; although antenatal corticosteroids, early continuous positive airway pressure (CPAP), selective surfactant, and caffeine have improved outcomes, the burden is still substantial, especially in low- and middle-income countries (LMICs) (2).

Timely, structured bedside assessment is therefore pivotal. Simple non-invasive scores such as the Silverman–Anderson and Downes scores quantify work of breathing and correlate with risk of progression, oxygen need, and need for escalation, offering practical triage tools in busy postnatal wards and resource-variable NICUs (3,4). Pragmatic trials and implementation studies from LMIC settings demonstrate that bCPAP can be delivered safely with context-adapted devices and protocols, with signals toward improved survival compared with oxygen alone, while underscoring the need for training, device quality assurance, and monitoring to prevent complications such as nasal trauma and air leak (3,4).

However, contemporary data from diverse tertiary centres—capturing evolving obstetric practices, referral patterns, and device availability—are essential to refine local protocols. A prospective description of clinical profile, aetiologies, severity, support modalities, and early outcomes can identify modifiable delays, target training, and inform resource allocation tailored to regional needs (5, 6). The present study therefore profiles neonates presenting with respiratory distress to a tertiary care centre, using standardised definitions and scoring to map patterns of disease, support strategies, and short-term outcomes.

Clinical profiling of neonatal respiratory distress is crucial to align bedside assessment, early CPAP use, and antibiotic stewardship with WHO-endorsed, family-centred care pathways, particularly in resource-constrained settings. This study aims to assess the clinical profile, etiology, and outcomes of neonates with respiratory distress admitted to a tertiary care centre in western India.

MATERIALS AND METHODS

This prospective observational study was conducted at the Neonatal Intensive Care Unit, Department of Pediatrics, CPR Hospital, Kolhapur, Maharashtra, over a period of 7 months (June 2024 – December 2024). After ethical clearance and informed consent, all neonates (≤28 days old) admitted with signs of respiratory distress were enrolled. 100 Neonates presenting with ≥2 of Tachypnea (>60/min), Intercostal/subcostal retractions, Nasal flaring, Grunting were included. Neonates discharged against medical advice (LAMA), major lethal congenital anomalies were excluded.

A structured proforma was used to record demographic data, clinical features, and diagnostic workup. Gestational age was assessed using the LMP or modified Ballard scoring. Severity was assessed using the Silverman-Anderson score and classified as - Mild: 1–3, Moderate: 4–6 and Severe: >6. Neonates were followed until discharge or death. Outcomes were analyzed in relation to etiology and severity.

RESULTS

A total of 100 neonates with respiratory distress were included. The most common clinical sign was tachypnea (98%), followed by chest indrawing and grunting.

Table 1: Clinical Features of Neonates with Respiratory Distress (N=100)

Clinical Feature	Number of Neonates	Percent
Rapid Breathing	98	98%
Chest Indrawing	74	74%
Cyanosis	27	27%
Grunting	25	25%
Lethargy/Not feeding	11	11%
Hypothermia	6	6%

Rapid Breathing (Tachypnea) was the most universal sign, present in 98% of cases. This indicates it is a near-essential criterion for diagnosing respiratory distress in this population. Chest Indrawing was the second most common feature, seen in 74% of neonates, signifying significant increased work of breathing. Cyanosis (bluish discoloration due to lack of oxygen) was observed in 27% of infants. Grunting (a sign of trying to maintain lung volume) was present in 25% of cases. Lethargy/Not feeding, a concerning sign of systemic illness or fatigue, was seen in 11%.

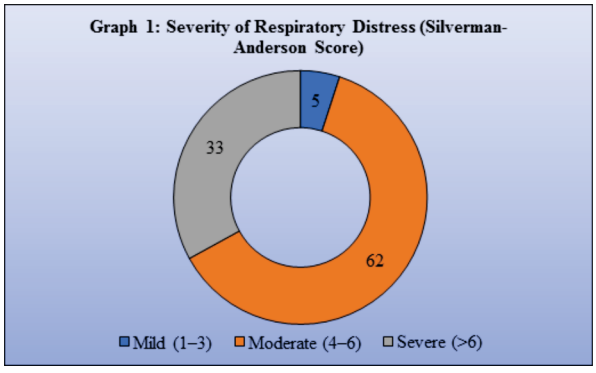
Table 2: Etiology and Outcome

Diagnosis	Number of Cases (%)	Mortality (%)
Hyaline Membrane Disease (HMD)	25	9 (36.0)
Birth Asphyxia (BA)	24	5 (20.8)
Neonatal Sepsis/Pneumonia	23	4 (17.4)
Meconium Aspiration Syndrome	7	1 (14.3)
Tracheoesophageal Fistula	6	1 (16.7)
Congenital Heart Disease	5	1 (20.0)
Transient Tachypnea (TTN)	5	0 (0.0)
Others	5	1 (20.0)
Total	100	22 (22%)

Hyaline Membrane Disease (HMD) or Respiratory Distress Syndrome (RDS) was the most common cause, accounting for 25% of cases. Birth Asphyxia (BA) (24%) and Neonatal Sepsis/Pneumonia (23%) were the next most frequent diagnoses. Less common causes included Meconium Aspiration Syndrome (7%), Tracheoesophageal Fistula (6%), Congenital Heart Disease (5%), and Transient Tachypnea of the

Newborn (TTN) (5%). A group of "Other" diagnoses made up the remaining 5%.

Severity of Respiratory Distress (Silverman-Anderson Score):



The majority of neonates (62%) had Moderate respiratory distress. A substantial number (33%) had Severe distress. Very few (5%) had only Mild symptoms.

Table 3: Association Between Outcome of Patients and Severity of Respiratory Distress

Severity Score	Mortality (%)	Discharge	Total	P value
Mild (1–3)	0 (0.0%)	5 (100%)	5(100%)	<0.001
Moderate (4–6)	6 (9.7%)	56 (90.3%)	62(100%)	
Severe (>6)	16 (48.5)	17 (51.5%)	33(100%)	
Total	22 (22%)	78 (78%)	100 (100%)	100

All the patients with mild Score were discharged. 90.3% patients with moderate Score were discharged and 9.7% died. : 9.7% mortality (6 out of 62). 48.5% (16 out of 33) patients with severe Score died. Nearly half of all neonates with a severe Silverman-Anderson score died. The association was significant (p value <0.001).

DISCUSSION

This study highlights the clinical profile and outcomes of neonates with respiratory distress in a tertiary care NICU in western India. The overall mortality rate was 22%, similar to other Indian studies (7). HMD (25%), BA (24%), and sepsis/pneumonia (23%) were the top causes, consistent with data from other tertiary centres (8,9). In a recent study by Ahmed et al., HMD was the leading cause in preterm neonates (27%), while TTN predominated in term babies (10).

A male predominance (approx. 2:1) was noted, similar to previous Indian studies (11), possibly due to delayed lung maturity in male fetuses. There was a clear association between the severity of respiratory distress and mortality. Nearly half the neonates with severe Silverman-Anderson scores (>6) succumbed, emphasizing the prognostic value of this scoring system (12). The highest case fatality was observed in HMD (36%), followed by BA (20%) and sepsis (17%). These rates are similar to the findings of a multicentric Indian study by Mohan et al. (13). No deaths were recorded in TTN, consistent with its self-limiting course (14).

Mathur et al. reported HMD as the leading cause in 29% of preterm RD cases with a mortality of 33% (15). In a 2022 meta-analysis by Sharma et al., pooled mortality in neonatal respiratory distress in Indian settings was estimated at 23% (16). This study also reaffirms the need for timely diagnosis, antenatal steroids for preterm labor, and availability of surfactant and advanced ventilation to reduce mortality.

CONCLUSION

Hyaline membrane disease, birth asphyxia, and sepsis were the most common causes of respiratory distress among neonates in our study. Mortality was highest among neonates with severe distress and those diagnosed with HMD. Early recognition, appropriate grading using clinical scoring systems, and timely intervention are essential to improving neonatal outcomes.

Widespread training in early diagnosis and Silverman-Anderson scoring. Improved availability of antenatal care, resuscitation, and surfactant therapy. Strengthening of NICU infrastructure in resource-limited settings.

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