



Epidemiology of respiratory distress in preterm neonates admitted to nicu: a comprehensive cross-sectional study

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Abstract

Background: Respiratory distress is the leading cause of neonatal intensive care unit (NICU) admission, particularly among preterm neonates due to structural and biochemical lung immaturity.

Objectives: To evaluate the epidemiological profile, maternal and perinatal risk factors, aetiology, and respiratory support requirements of preterm neonates presenting with respiratory distress.

Methods: A prospective hospital-based cross-sectional study was conducted in the NICU of KVG Medical College from August 2023 to July 2024 including 42 preterm neonates (<37 weeks gestation) with respiratory distress. Maternal and neonatal data were collected and analyzed using SPSS v25.

Results: Late preterm neonates constituted 79% of cases. Low birth weight infants accounted for 57% and very low birth weight for 26%. Caesarean deliveries were 80.95%. Major causes were transient tachypnea of newborn (45.23%) and respiratory distress syndrome (42.85%). Oxygen therapy via nasal prongs (54.76%) and continuous positive airway pressure (38.05%) were the most common respiratory supports.

Conclusion: Respiratory distress predominantly affects late preterm and low birth weight neonates delivered by caesarean section. Early identification and non-invasive respiratory support improve neonatal outcomes.

Keywords: Preterm neonates, respiratory distress, TTNB, RDS, NICU, low birth weight

Introduction

The neonatal period represents a critical physiological transition from intrauterine to extrauterine life. Successful adaptation requires rapid clearance of fetal lung fluid, initiation of effective breathing, and adequate surfactant function. Preterm neonates are particularly vulnerable to respiratory morbidity due to immature lung architecture, surfactant deficiency, and reduced respiratory drive. Respiratory distress remains one of the most common indications for NICU admission worldwide and contributes substantially to neonatal morbidity and mortality. Respiratory distress in preterm neonates may arise from multiple aetiologies including respiratory distress syndrome (RDS), transient tachypnea of the newborn (TTNB), pneumonia, meconium aspiration, and congenital anomalies. Epidemiological patterns vary by region and healthcare setting, influenced by antenatal care, obstetric practices, and neonatal care facilities. High rates of caesarean section, for instance, have been associated with increased TTNB due to delayed lung fluid clearance. Understanding local disease burden and risk factors is essential for optimizing NICU resource allocation and improving neonatal outcomes. This study was undertaken to analyze the epidemiological profile, maternal and perinatal risk factors, aetiology, and respiratory support requirements among preterm neonates admitted with respiratory distress in a tertiary care NICU in South India.

Materials and Methods

Study design and setting: This prospective hospital-based cross-sectional study was conducted in the NICU of KVG Medical College, Sullia, Karnataka, from August 2023 to July 2024.

Study population: A total of 42 preterm neonates (<37

weeks gestation) admitted with respiratory distress within the first 28 days of life were included.

Inclusion criteria: Preterm neonates with at least two clinical signs of respiratory distress such as tachypnea (>60/min), chest retractions, grunting, or nasal flaring.

Exclusion criteria: Term neonates, preterm neonates without respiratory distress, and neonates with major congenital or chromosomal anomalies.

Data collection: Maternal data included age, parity, pregnancy-induced hypertension, gestational diabetes, antenatal steroid exposure, and mode of delivery. Neonatal parameters included gestational age, birth weight, sex, Apgar score, and clinical diagnosis. Diagnosis was based on clinical assessment supported by chest radiography and laboratory investigations where indicated.

Statistical analysis: Data were entered into Microsoft Excel and analyzed using SPSS version 25. Categorical variables were expressed as frequencies and percentages.

Results

Among the 42 preterm neonates studied, late preterm infants (34–36 weeks) constituted the majority (79%), followed by moderate preterm (21%). Low birth weight infants accounted for 57% while very low birth weight for 26%. Male predominance was observed (54.76%). Caesarean section was the predominant mode of delivery (80.95%). The leading causes of respiratory distress were TTNB (45.23%) and RDS (42.85%), followed by neonatal pneumonia (7.14%) and others (4.76%). Regarding respiratory support, oxygen therapy via nasal prongs was used in 54.76% and CPAP in 38.05%, while only a small proportion required mechanical ventilation.

Table 1: Clinical Profile of Preterm Neonates with Respiratory Distress

Parameter	Value
Late preterm	79%
Low birth weight	57%
VLBW	26%
Male	54.76%
LSCS delivery	80.95%
TTNB	45.23%
RDS	42.85%
Oxygen prongs	54.76%
CPAP	38.05%

Discussion

This study highlights that respiratory distress in preterm neonates predominantly affects late preterm and low birth weight infants. Similar observations have been reported in multiple neonatal studies, reflecting the vulnerability of this gestational age group. High caesarean section rates observed in the present study likely contributed to the predominance of TTNB, as elective caesarean delivery before labor is known to impair lung fluid clearance. RDS remained the second most common cause and continues to require specialized NICU care including CPAP and surfactant therapy. The majority of neonates in this cohort were managed successfully with non-invasive ventilation, emphasizing the effectiveness of early CPAP in resource-limited settings. The relatively low requirement for mechanical ventilation suggests early recognition and timely intervention.

These findings underscore the importance of antenatal risk identification, judicious obstetric decision-making, and strengthening of non-invasive respiratory support strategies in tertiary NICUs.

Conclusion

Respiratory distress predominantly affects late preterm and low birth weight neonates, particularly those delivered by caesarean section. TTNB and RDS are the leading causes. Early identification and prompt institution of non-invasive respiratory support such as oxygen therapy and CPAP significantly improve neonatal outcomes. Strengthening antenatal care and optimizing delivery practices may reduce disease burden.

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