

Original article

Clinical Characteristics, Etiology, and Outcomes of Neonatal Respiratory Distress at Al-Zawiya Medical Center, Libya

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Abstract

Neonatal respiratory distress (NRD) is one of the most common neonatal emergencies and a leading cause of admission to neonatal intensive care units (NICUs) worldwide. It contributes substantially to neonatal morbidity and mortality, particularly in low- and middle-income countries. Early recognition and timely management are essential for improving neonatal outcomes. This study was conducted to determine the prevalence, etiological spectrum, clinical characteristics, and outcomes of neonatal respiratory distress among newborns admitted to the Neonatal Intensive Care Unit (NICU) at Al-Zawiya Teaching Hospital, Libya. A retrospective cross-sectional study was conducted in the NICU of Al-Zawiya Teaching Hospital, Libya. Medical records of 200 neonates diagnosed with respiratory distress and admitted between January and December 2021 were reviewed. Data collected included demographic characteristics, gestational age, birth weight, mode of delivery, maternal history, clinical diagnosis, and treatment outcomes. Data were analyzed using SPSS version 27. Categorical variables were summarized as frequencies and percentages. During the study period, 5,300 live births and 2,600 NICU admissions were recorded. A total of 200 neonates were diagnosed with respiratory distress, corresponding to a prevalence of 3.77% among live births and 7.69% among NICU admissions. Male neonates accounted for 112 (56.0%) cases, while female neonates accounted for 88 (44.0%). Term neonates constituted 108 (54.0%) of the study population. The most common etiologies of respiratory distress were transient tachypnea of the newborn (TTN) in 74 (37.0%) neonates, respiratory distress syndrome (RDS) in 66 (33.0%), neonatal sepsis in 28 (14.0%), and meconium aspiration syndrome (MAS) in 14 (7.0%). The overall mortality rate was 4.5% (9/200), whereas 191 (95.5%) neonates were discharged in stable condition. Neonatal respiratory distress remains a major cause of NICU admission at Al-Zawiya Teaching Hospital. Transient tachypnea of the newborn and respiratory distress syndrome were the predominant etiologies. Strengthening early diagnosis, improving perinatal care, and optimizing neonatal intensive care interventions are essential to reduce neonatal morbidity and mortality.

Keywords. Neonatal Respiratory Distress, Intensive Care Unit, Transient Tachypnea, Libya.

INTRODUCTION

Neonatal respiratory distress (NRD) is one of the most common medical emergencies in the neonatal period and remains a leading cause of admission to neonatal intensive care units (NICUs) worldwide. It is characterized by signs of increased work of breathing, including tachypnea, expiratory grunting, nasal flaring, chest retractions, and, in severe cases, cyanosis and respiratory failure [1,2]. NRD may result from a wide spectrum of pulmonary and extrapulmonary conditions. Pulmonary causes include transient tachypnea of the newborn (TTN), respiratory distress syndrome (RDS), meconium aspiration syndrome (MAS), congenital pneumonia, pneumothorax, and persistent pulmonary hypertension of the newborn (PPHN). Extrapulmonary causes include neonatal sepsis, congenital heart disease, metabolic disturbances, and neurological disorders. Neonatal sepsis is an important systemic condition that may present with respiratory distress and significantly contributes to neonatal morbidity and mortality [3,4,5].

Globally, neonatal respiratory disorders remain a major contributor to neonatal morbidity and mortality, particularly in low- and middle-income countries where access to advanced neonatal care is limited [6]. Prematurity is the most important risk factor due to lung immaturity and surfactant deficiency, predisposing preterm neonates to RDS [7,8]. Additional risk factors include cesarean section delivery, maternal diabetes mellitus, perinatal asphyxia, and neonatal infections [9,10]. TTN is more commonly observed in term and late preterm infants, particularly after elective cesarean section, due to delayed clearance of fetal lung fluid. In contrast, RDS predominantly affects preterm neonates because of surfactant deficiency. Other conditions such as MAS, neonatal sepsis, and PPHN also contribute significantly to respiratory morbidity, especially in resource-limited settings [3–5,11]. Early recognition and prompt management of NRD are essential to improve neonatal outcomes. Advances in neonatal intensive care, including CPAP, mechanical ventilation, surfactant therapy, and infection control strategies, have significantly improved survival rates [8,12].

Despite its importance, epidemiological data on NRD in Libya remain limited. Therefore, this study aimed to investigate the prevalence, etiological spectrum, clinical characteristics, and outcomes of neonatal respiratory distress among neonates admitted to the NICU at Al-Zawiya Teaching Hospital, Libya.

Methods

Study Design and period

This was a retrospective cross-sectional study conducted in the Neonatal Intensive Care Unit (NICU) of Al-Zawia Teaching Hospital, Libya. The study covered one year, from January 2021 to December 2021, targeting a total of 200 neonates diagnosed with respiratory distress and admitted to the NICU during the study period.

Data Collection

Data were extracted from medical records using a structured data collection sheet. The variables collected included gender, gestational age, birth weight, mode of delivery, maternal history, clinical diagnosis of respiratory distress, and final outcome (discharged or deceased).

Eligibility Criteria

All neonates admitted to the NICU with a clinical diagnosis of respiratory distress during the study period were included. Neonates with incomplete medical records or those admitted outside the study period were excluded.

Statistical Analysis

Data were analyzed using SPSS version 27. Descriptive statistics were used to summarize the data. Categorical variables were expressed as frequencies and percentages. A p-value <0.05 was considered statistically significant where applicable.

Results

During the study period, a total of 5,300 live births and 2,600 neonatal intensive care unit (NICU) admissions were recorded. Among these, 200 neonates were diagnosed with respiratory distress. The overall prevalence of neonatal respiratory distress was 3.77% among live births and 7.69% among NICU admissions. Out of the 200 neonates with respiratory distress, 112 (56.0%) were males, and 88 (44.0%) were females. Regarding gestational age, 108 (54.0%) were term neonates, 68 (34.0%) were preterm, 18 (9.0%) were early preterm, and 6 (3.0%) were extremely preterm.

Table 1. Demographic characteristics of neonates with respiratory distress

Variable	N	%
Gender		
Male	112	56.0
Female	88	44.0
Gestational age	N	%
Term	108	54.0
Preterm	68	34.0
Early preterm	18	9.0
Extremely preterm	6	3.0

The leading cause of respiratory distress was transient tachypnea of the newborn (TTN), accounting for 37.0% of cases (n=74), followed by respiratory distress syndrome (RDS), 33.0% (n=66). Neonatal sepsis was identified in 14.0% (n=28), while meconium aspiration syndrome (MAS) accounted for 7.0% (n=14). Less common causes included congenital pneumonia 3.0% (n=6), congenital heart disease 2.5% (n=5), persistent pulmonary hypertension of the newborn (PPHN) 2.0% (n=4), and pneumothorax 1.5% (n=3).

Table 2. Etiological causes of neonatal respiratory distress

Cause	n	%
TTN	74	37.0
RDS	66	33.0
Sepsis	28	14.0
MAS	14	7.0
Congenital pneumonia	6	3.0
CHD	5	2.5
PPHN	4	2.0
Pneumothorax	3	1.5
Total	200	100

Of the 200 neonates with respiratory distress, 191 (95.5%) were discharged in stable condition, while 9 (4.5%) died.

Table 3. Outcomes of neonates with respiratory distress

Outcome	N	%
Discharged	191	95.5
Died	9	4.5
Total	200	100

Discussion

The present study demonstrated that neonatal respiratory distress remains a major cause of NICU admission at Al-Zawiya Teaching Hospital. This finding is consistent with global evidence identifying respiratory disorders as a leading cause of neonatal morbidity, particularly in low- and middle-income countries [13]. In this study, transient tachypnea of the newborn (TTN) was the most common cause of respiratory distress, followed by respiratory distress syndrome (RDS). This pattern is consistent with previous studies reporting TTN as more frequent in term and late preterm infants, especially following cesarean delivery due to delayed fetal lung fluid clearance [14,15]. RDS remains strongly associated with prematurity and surfactant deficiency, as described in international neonatal guidelines [7,16].

A male predominance was observed among affected neonates, which aligns with previous literature showing increased respiratory morbidity in male infants due to delayed pulmonary maturation and reduced surfactant production [17,18]. The mortality rate in this study was lower than that reported in several low-resource settings, where rates range between 8% and 20% [19,20]. Poor outcomes in such settings are often related to delayed referral, limited respiratory support, and inadequate NICU resources. Outcomes in extremely preterm infants have been widely documented in large international cohorts [21]. Current neonatal resuscitation and respiratory support guidelines emphasize early intervention to improve survival [22], while global initiatives such as WHO “Born Too Soon” continue to address preterm-related mortality [23,24]. Overall, the predominance of TTN alongside favorable outcomes highlights the importance of early recognition and management. However, prematurity remains the key determinant of severe disease. Preventive strategies such as antenatal corticosteroids and improved perinatal care are essential to reduce morbidity and mortality [7].

Conclusion

Neonatal respiratory distress remains a major cause of morbidity and a leading indication for admission to the Neonatal Intensive Care Unit at Al-Zawia Teaching Hospital, Libya. Transient tachypnea of the newborn (TTN) and respiratory distress syndrome (RDS) were identified as the most common etiological causes. The findings of this study emphasize the importance of early recognition and prompt management of affected neonates. Strengthening neonatal intensive care services, ensuring timely diagnosis, and providing appropriate respiratory support interventions can significantly improve clinical outcomes and reduce neonatal mortality.

Conflict of interest. Nil

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