

PREVALENCE AND OUTCOME OF RESPIRATORY DISTRESS IN NEWBORN IN A TERTIARY CARE HOSPITAL

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Abstract

Background: Respiratory distress is a clinical manifestation of many neonatal diseases. It could be challenging to determine the exact underlying cause of respiratory distress based just on the clinical evaluation. **Objective:** The objective of this study is to determine the etiology, prevalence and outcome of respiratory distress in neonates hospitalized in the SNCU and NICU in Burdwan Medical College and Hospital, Burdwan. **Materials and Methods:** Total 2706 neonates—both inborn and outborn—admitted with respiratory distress were considered after meeting inclusion and exclusion criteria. The guardians of the patient were asked for the necessary demographic information. Investigations and examinations were done. The research was carried out between January 2022 and January 2023. The statistical data were analyzed using SPSS V.25.0 and Microsoft Excel. **Results:** The overall number of newborns admitted in the 1 year period was 11575. Out of which 2706 babies had respiratory distress. So, prevalence of respiratory distress in newborns admitted in SNCU/NICU was 23.4%. Total baby delivered in the hospital is 19042. Out of which 2706 babies admitted with respiratory distress. So, Prevalence of respiratory distress in newborns overall is 14.2%. Males were 1486 (54.9%) while females were 1220 (45.1%). Term neonates occupied maximum number of cases 1401 (51.8%) followed by preterm newborns 1158 (42.8%). Post term neonates constituted 147 (5.4%) cases. Most common cause of respiratory distress was HIE II 906 (33.5%) followed by RDS 764 (28.2%). Other causes were sepsis 528 (19.5%), HIE III 100 (3.7%), MAS 44 (1.6%), HIE I 230 (8.5%), Pneumonia 134 (5%). 2354 (87%) cases were discharged and death occurred in 298 (11%) cases and 54 (2%) cases went LAMA. Among 298 (11%) deaths, the most common cause of death was prematurity 99 (33.2%), followed by Sepsis 92 (31%), HIE III 90 (30.2%), HIE II 10 (3.3%) MAS 7 (2.3%). **Conclusion:** After HIE II, it was found that RDS was the second most common cause of respiratory distress. Prematurity associated with RDS was the most common cause of death, followed by sepsis and HIE III. There are several preventable reasons of respiratory pain. A newborn's respiratory distress may be lessened with proper pregnancy and labor monitoring for the early identification of risk factors, prompt referral to a higher facility, and rapid intervention.

INTRODUCTION

Neonatal respiratory distress, or NRD, is one of the most common conditions that arise in a newborn

during the first few days of life. One of the most frequent reasons for NICU hospitalization is NRD, which presents a difficulty to the treating paediatrician.^[1] It is responsible for almost half of

all deaths. These illnesses are diverse in terms of their frequency, underlying etiology, clinical course, and outcome.^[2,3] Medical conditions or surgical procedures may be the cause of respiratory discomfort.^[4,5] Preterm and postterm neonates are more likely to experience respiratory distress than term neonates (4.2%).^[6] It is characterized by the presence of expiratory grunting or moaning, subcostal or intercostal retractions, and tachypnea (RR > 60/min). Apart from the aforementioned characteristics, the existence of nasal flaring, retractions of the suprasternum, and reduced air entry during chest auscultation also signify respiratory distress. Life-threatening symptoms include bradycardia, apnoea, weak respiratory effort, gasping, choking, or stridor (a indication of upper airways obstruction), poor perfusion, and cyanosis. These conditions call for immediate medical attention. The initial evaluation of a baby experiencing respiratory distress aims to detect potentially fatal conditions such as inadequate or obstructed airway (gasping, choking, stridor), apnea or inadequate respiratory efforts, cyanosis, and circulatory collapse (bradycardia, hypotension, poor perfusion) that call for immediate medical attention. The majority of newborn morbidity and mortality causes.^[7,8] Of the newborns admitted to the NICU, 15% of term infants and 29% of late preterm infants experience substantial respiratory morbidity. When a newborn develops pulmonary abnormalities, these conditions are typically caused by congenital deformities, perinatal events, or lung immaturity. Birth asphyxia, congenital heart diseases, RDS, TTN, MAS, One of the many reasons why a baby experiences respiratory discomfort is septicemia.⁹ The essential principles of care are the same regardless of the cause of respiratory distress in newborns. Scores like the Downe's and Silverman-Anderson scores are very helpful in determining the progression of the respiratory distress. The planning of referrals in underdeveloped nations, where formal neonatal transportation facilities are nonexistent due to budget constraints, would greatly benefit from the completion of such an examination. Even with a quite standard approach to initial management, there might be negative consequences if definitive therapy was put off.

For infants experiencing respiratory distress to be effectively managed, a definitive diagnosis is also required. The aim of this study is to determine the etiology, prevalence, and outcomes of respiratory distress in neonates hospitalized in the SNCU/NICU at Burdwan Medical College and Hospital. This is because understanding the frequent causes of respiratory distress is vital to help better manage neonate.

MATERIALS AND METHODS

This is a hospital-based observational study that was carried out from January 2022 to January 2023 in

West Bengal's Burdwan Medical and Hospital, a tertiary care facility. The purpose of the observation was to track all inborn and outborn babies admitted to NICUs and SNCUs for a maximum of 28 days in order to determine the prevalence and causation of respiratory distress in neonates. Parents' or guardians' informed consent was obtained for this study. The institutional ethical committee's approval was obtained before this study was carried out. The demographic information about the chosen neonates—such as birth weight, gender, gestational age, habitat, birth order, place of delivery, mode of delivery, multiple gestations, large past medical history, maternal disease, and existence of any maternal or foetal risk factors causing respiratory distress—was extracted from the patient dossiers using a questionnaire the researcher created. The medical history and physical examination of the patient are done to find possible reasons of respiratory distress. In addition to the WHO neonatal sepsis screening approach, the National Neonatal Intensive Care Unit Manual was used to screen for sepsis in newborns with suspected septicemia. The gold standard for septicemia diagnosis was to send a sample for blood culture and sensitivity if any two readings were abnormal. This was considered a positive septic screen. The results of transcranial ultrasonography, cardiac echocardiography, chest radiography, blood culture, and sensitivity were used to build a thorough diagnosis. Neonatal respiratory distress outcomes were hospital release with full resolution of respiratory symptoms, referral to an appropriate facility, or death. The NNF standards served as the basis for the diagnosis of the etiology of respiratory distress.^[2,3]

Inclusion Criteria

- All inborn new-born babies admitted in SNCU and NICU including term, preterm, post term up to 28 days age having symptoms of respiratory distress.
- Babies born vaginally or through a Caesarean section.

Exclusion Criteria

- Babies aged more than 28 days
- Infants born with congenital abnormalities such as anencephaly, encephalocele, meningocele, and meningomyelocele
- Babies with surgical causes of respiratory distress
- Babies whose parents did not give consent for the studies

Investigation

Blood culture and sensitivity, CSF study, chest X-ray, complete blood count, transcranial ultrasound, 2D echocardiography, and neonatal sepsis screening are among the procedures that may be performed. Statistical Analysis- The data was tabulated in Microsoft Excel software and analysed SPSS v 25.0 (IBM, New York) software.

Ethical considerations- After receiving participants' informed consent and institutional ethical committee approval, the study was started.

RESULTS

The overall number of newborns admitted in the one-year period was 11575. Out of which 2706 babies had respiratory distress. Consequently, 23.4% of neonates admitted to SNCUs or NICUs had respiratory distress. There were 19042 babies born in the hospital overall. 2706 infants were admitted due to respiratory distress out of this total. Therefore, the overall prevalence of respiratory distress among infants is 14.2%. [Table 1]

Table 2 displays the distribution of cases by gender and gestational age. There were 1220 (45.1%) females and 1486 (54.9%) males. The greatest number of instances consisted of 1401 (51.8%) term newborns, followed by 1158 (42.8%) preterm newborns. Neonatals born after term made for 147 (5.4%) cases. [Table 2]

The different causes of respiratory distress in our investigation are displayed in Table 3. HIE II 906 (33.5%) was the most frequent cause of respiratory distress, followed by RDS 764 (28.2%). Sepsis 528 (19.5%), HIE III 100 (3.7%), MAS 44 (1.6%), HIE I 230 (8.5%), and pneumonia 134 (5%) were the other causes. [Table 3]

The results of NRD in the study population are displayed in Table 4. Of the 2354 (87%) cases that

were discharged, 298 (11%) had deaths, and 54 (2%) had LAMAs. [Table 4]

Table 5 lists the different causes of death for our study's neonates who had respiratory distress. Prematurity accounted for 99 (33.2%) of the 298 (11%) deaths, followed by sepsis (92 (31%), HIE III 90 (30.2%), HIE II 10 (3.3%), and MAS 7 (2.3%). [Table 5]

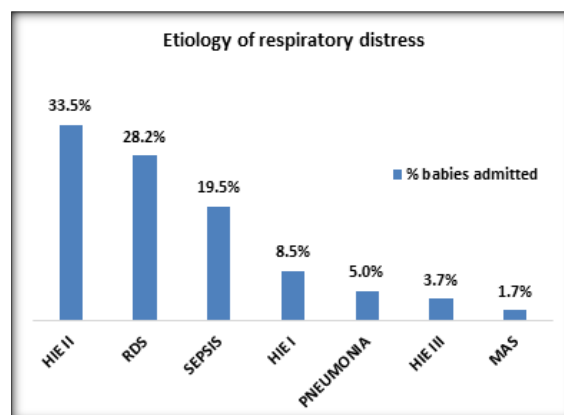


Figure 1: Etiology of respiratory distress in neonates admitted with respiratory distress in NICU/SNCU

The pathogenesis of respiratory distress in infants admitted to NICUs or SNCUs is depicted in Figure 1. 33.5% of babies admitted had HIE II, followed by RDS (28.1%) and sepsis (19.5%).

Table 1: Prevalence of respiratory distress in neonates admitted with respiratory distress in NICU/SNCU

Total SNCU/NICU Admission	n (%)
11575	2706 (23.4%)
Total deliveries	n (%)
19042	2706 (14.2%)

Table 2: Gender and gestational age of the neonates admitted with respiratory distress in NICU/SNCU

Gender and Gestational age	n %
Male	1486 (54.9%)
Female	1220 (45.1%)
Preterm	1158 (42.8%)
Term	1401 (51.8%)
Post term	147 (5.4%)

Table 3: Etiology of respiratory distress in neonates admitted with respiratory distress in NICU/SNCU

Diagnosis	n %
RDS	764 (28.2%)
HIE I	230 (8.5%)
HIE II	906 (33.5%)
HIE III	100 (3.7%)
MAS	44 (1.6%)
Sepsis	528 (19.5%)
Pneumonia	134 (5%)

Table 4: Outcome of neonates admitted with respiratory distress in NICU/SNCU

Outcome	n %
Discharged	2354 (87%)
Referred	0
LAMA	54 (2%)
Death	298 (11%)

Table 5: Causes of mortality in neonates admitted with respiratory distress in NICU/SNCU

Cause of Death	n %
Prematurity	99 (33.2%)
Sepsis	92 (31%)
HIE III	90 (30.2%)
HIE II	10 (3.3%)
MAS	7 (2.3%)

DISCUSSION

The Department of Paediatrics at Burdwan Medical College and Hospital conducted the current study in the SNCU/NICU, which demonstrates the high prevalence of respiratory distress. In our study, 14.2% of newborns admitted to NICUs or SNCUs had respiratory distress. 6.7% is the incidence reported in studies by Dr. Alok Kumar and B. Vishnu Bhat.^[10] The occurrence of respiratory distress is influenced by factors such as health care facilities, newborn intensive care units' accessibility, and factors related to geography and ethnicity.

The gender distribution of all patients admitted with respiratory distress showed that women accounted for 45.1% of cases, while males made up the majority (54.9%). When cases are categorized according to gestational age, term neonates account for the majority of instances (51.8%), with preterm babies coming in second (42.8%). Post-term neonates made up just 5.4% of cases.

Table 3 shows that, out of all the NRD etiologies in our investigation, HIE II (33.5%) and RDS (28.2%) were the most frequent causes of respiratory distress. Sepsis (19.5%), HIE I (9.5%), Pneumonia (5%), HIE III (3.7%), and MAS (1.7%) were the remaining causes. The incidence of causal diseases is depicted differently in several research. Transient tachypnea (42.7%) is the most common cause of respiratory distress in neonates, according to research by Dr. Alok Kumar and B. Vishnu Bhat.^[10] Other common causes include birth asphyxia (3.3%), meconium aspiration syndrome (10.7%), infection (17.0%), and hyaline membrane disease (9.3%). In both term and preterm neonates, TTN was the most common cause of respiratory distress (32.8% and 50.3%, respectively), according to their research. In Adebami's et al,^[11] investigation, it was discovered that septicemia, birth asphyxia, RDS, and TTN were the most frequent causes of neonatal respiratory distress. Sauparna et al,^[12] reported that pneumonia, RDS, MAS, TTN, CHD, diaphragmatic hernia, and pulmonary hemorrhage were the most common causes of hospitalization for newborn respiratory distress. Common causes of neonatal respiratory distress include asphyxia, MAS, RDS, and TTN, according to research by Kommawar et al,^[13] and Swarnkar et al.^[15]

According to Table 4, the majority of the cases in our study have been released (87%) and then have resulted in death (11%). 2% of them experienced LAMA.

In our analysis, preterm accounted for 99 (33.2%) of the 298 (11%) deaths in babies with respiratory

distress. Sepsis came in second with 92 (31%), HIE III 90 (30.2%), HIE II 10 (3.3%), and MAS 7 (2.3%), in that order. Birth asphyxia (17.4%) was the second most common cause of death for infants with respiratory distress admitted to the NICU, following respiratory distress syndrome (61.62%), according to a study by Ankush Kommawar et al,^[13] In the study by Dr. Jnanindra Nath Behera et al,^[14] the most common cause of death was prematurity (35.4%), which was followed in order by HIE III (28.3%), HIE II (18.5%), and sepsis (17.58%). Study by Gaurav et al,^[15] suggested that by reducing the frequency of LSCS, using antenatal steroids according to protocol, using CPAP at an early age, using surfactant on time, and ensuring sufficient ventilation are all essential to reducing the prevalence of respiratory distress and the mortality that goes along with it in newborns.

CONCLUSION

Neonatal respiratory distress is a major cause of hospitalization for neonates, with a significant mortality rate. In our study, HIE II was the most common cause of respiratory distress, with RDS, sepsis, HIE I, pneumonia, HIE III, and MAS following in order of frequency. Male babies at full gestation were more affected than preterm neonates. Most of them were released. Among those newborns, preterm was the most common cause of death, with sepsis, HIE III, HIE II, and MAS following in order of prevalence. Many of the etiologies and risk factors for respiratory distress are preventable. A newborn's respiratory distress may be lessened with proper pregnancy and labor monitoring for the early identification of risk factors, prompt referral to a higher facility, and rapid intervention. Corticosteroids given to expectant mothers can lower the prevalence of hyaline membrane disease, and better prenatal, intrapartum, and postpartum care can lower the number of instances of meconium aspiration syndrome.

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