Risk Factors, Etiology and Immediate Outcome Of Respiratory Distress Interm Neonates at Owaisi Hospital: A Tertiary Health Center in Hyderabad

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ABSTRACT

Respiratory distress in term neonates poses significant challenges in neonatal care, often requiring immediate attention and intervention. Understanding the underlying risk factors and etiology is crucial for effective management and improved outcomes. A retrospective study was conducted at Owaisi Hospital, a tertiary health center in Hyderabad, to analyze cases of respiratory distress among term neonates. Data regarding risk factors, including maternal and neonatal characteristics, as well as the etiological factors contributing to respiratory distress, were collected and analyzed. The majority of newborns were male, comprising 60% of the total, while females made up the remaining 40% with 19% of SGA. In this study, babies normally weigh roughly 2799gms, based on the mean weight of the data. Among the maternal risk factors, 9% experienced PROM, 18% had hypertension, 21% were diagnosed with GDM and 1% had a twin pregnancy. Transient tachypnea of the newborn (TTN) was the most prevalent diagnosis, accounting for respiratory distress in 39% of cases, followed by meconium aspiration syndrome in 19% and birth asphyxia in 11%. The majority of neonates (62%) experienced complete recovery, while 15% succumbed to their condition and 23% were discharged with lingering sequelae. This study sheds light on the diverse risk factors and etiological factors contributing to respiratory distress in term neonates, emphasizing the need for comprehensive assessment and timely interventions to improve immediate outcomes and long-term prognosis.

INTRODUCTION

Respiratory distress syndrome (RDS) is a common and potentially life-threatening condition affecting newborns, particularly those born at term. Term neonates are expected to transition smoothly from intrauterine to extrauterine life., however, various factors can disrupt this process, leading to respiratory distress. Understanding the risk factors, etiology and immediate outcomes associated with respiratory distress in term neonates is crucial for effective clinical management and improving neonatal outcomes. RDS in term neonates is a significant clinical entity associated with considerable morbidity and mortality. While RDS is more commonly seen in preterm neonates due to surfactant deficiency, its occurrence in term neonates can result from various etiologies, including meconium aspiration syndrome (MAS), transient tachypnea of the newborn (TTN) and pneumonia. The incidence of respiratory distress in term neonates ranges from 1.4-7.2% globally, with higher rates reported in developing countries[1]. Term neonates are susceptible to respiratory distress due to several factors, including prenatal, perinatal and postnatal influences. Maternal factors such as maternal diabetes, maternal smoking and maternal obesity have been implicated in the development of respiratory distress in newborns[2,3]. Additionally, intrauterine infections and prenatal exposure to certain medications or substances can contribute to respiratory compromise in term neonates[4].The etiology of respiratory distress in term neonates is multifactorial, with several risk factors contributing to its development. Maternal factors such as gestational diabetes, maternal hypertension and maternal infection have been implicated, along with perinatal factors such as prolonged rupture of membranes, fetal distress and meconium-stained amniotic fluid[5]. Additionally, neonatal factors including male gender, macrosomia and cesarean section delivery have been associated with an increased risk of respiratory distress in term neonates[6]. Immediate outcomes of respiratory distress in term neonates can vary widely, ranging from mild respiratory compromise that resolves with supportive care to severe respiratory failure requiring mechanical ventilation and intensive care unit (ICU) admission. The identification of risk factors and etiology of respiratory distress in term neonates is crucial for timely intervention and improved outcomes. Understanding these factors can help healthcare providers tailor their approach to diagnosis, management and follow-up care for these neonates. Perinatal factors, including mode of delivery, birth trauma and fetal distress, can also predispose term neonates to respiratory distress[7,8]. Furthermore, postnatal factors such as meconium aspiration syndrome, transient tachypnea of the newborn (TTN) and respiratory distress syndrome (RDS) can exacerbate respiratory compromise in term neonates[9,10]. Despite advancements in neonatal care, respiratory distress in term neonates continues to pose significant challenges in clinical management and can result in adverse immediate outcomes, including the need for respiratory support, admission to the neonatal intensive care unit (NICU) and increased risk of mortality and morbidity[11,12]. Therefore, a comprehensive understanding of the risk factors, etiology and immediate outcomes of respiratory distress in term neonates is essential for guiding clinical decision-making and improving neonatal care practices. The present study made an attempt in early identification of the cause of newborn distress by clinical assessment of its severity, maternal risk factor association and immediate outcomes associated with respiratory distress in term neonates admitted in NICU at Owaisi Hospital, a tertiary health center in Hyderabad. By elucidating these factors, this research seeks to contribute to the existing body of knowledge on neonatal health and inform evidence-based practices in neonatal care.

MATERIALS AND METHODS

Source of Data: Study was conducted on term neonates with respiratory distress admitted in NICU during a time period of 18 months.

Nature of Study: Descriptive study.

Study Period: January 2021 to June 2022.

Sample Size: All term newborns admitted to OHRC NICU during a period of 18 months from January 2021 to June 2022 who developed respiratory distress were studied. These admissions comprised of neonates delivered in our hospital (in- born) as well as those neonates who were referred to our NICU from other hospitals and delivery centers (out born). Sample size-100.

Inclusion Criteria: All term (completed 37 weeks of gestation) babies with appropriate, Small and Large for gestational age babies.

Exclusion Criteria: Babies <37 WOG, Babies with congenital malformations like Anencephaly, Meningocele, Meningomyelocele, Encephalocele etc. Babies born though placental abnormalities.

Type of Study: Descriptive study.

Place: Deccan College of Medical Sciences-attached Owaisi Hospital and Research Centre and Princess Esra Hospital, Hyderabad. Full Term (Gestational Age 37 weeks and above) Neonates (both inborn and outborn) admitted in NICU of Owaisi Hospital and Research

Center, within the above specified period, with respiratory distress, will be consecutively recruited into the study after getting informed consent from the parents.

Respiratory distress is defined as presence of any two of the following features:

- Respiratory Rate >60/mins.
- Subcostal/Intercostal retractions.
- Expiratory grunt.

At birth, weight is recorded and a detailed physical examination is performed to detect congenital anomalies. A special questionnaire is designed for the purpose of the study. The following information will be taken: name, age at admission, sex, date of admission and date of discharge or death. Neonatal data includes: body weight, gestational age according to the date of last menstrual period of the mother antenatal ultrasound or New Ballards score. Factors related to labor and delivery assessed includes: Mode of delivery (vaginal orLSCS or assisted), place of delivery (Inborn or Outborn), complications (prolonged rupture of membranes >18 hr, prolonged labor>18hrs, meconium staining of liquor, antepartum hemorrhage and others) Maternal information recorded includes: age (high risk group$\leq$18 yr or $\geq$35 yr and low risk group 19-34 yr), parity (which is divided into risk group=P0 or P4 and normal group=P1-4), any medical disease complicating pregnancy. This information will be reviewed retrospectively from the clinical records. The final diagnosis of clinical conditions producing respiratory distress will be based mainly on careful scrutiny of the history, clinical and radiological findings.

Investigations: Chest X-ray is done in all cases. Complete blood counts, crp, blood culture/sensitivity and Echo in relevant cases. Data was collected and entered in a Microsoft Excel Sheet and descriptive analysis was done using variables like mean, percentage and proportions. Statistical analysis was performed using chi square test and p value was used to correlate maternal risk factors with respiratory distress. P value<0.05 was considered statistically significant.

RESULTS AND DISCUSSIONS

Most of the babies were male (Table 1).

Table1: Sex Distribution

Sex distribution	No. of patients
Males	60
Females	40

Most of the babies (65%) were normal for the gestational age and roughly the same number of them were small (19%) or large (16%) for gestational age (Table 2).

Table 2: Weight Distribution and Other Weight Measure

Weight distribution	No. of patients
SGA	19
NGA	65
LGA	16
Mean weight (gms)	2799
Median weight (gms)	2800
Weight range (gms)	1500-4100

Most of the babies were delivered by vaginal route, 24 were delivered by elective caesarean and 5 of them were delivered by an emergency caesarean section (Table 3).

Table 3: Mode of Delivery and Maternal Risk Factors

Mode of delivery	No. of patients	Maternal risk factors	No. of patients
Vaginal	71	PROM	9
ElectiveCS	24	Hypertension	18
EmergencyCS	5	GDM	21
		Twins	1

All patients were tachypnoeic, had difficulty in feeding and had chest retractions. Only 22% of them were cyanotic (Table 4).

Table 4: Presenting Symptoms

Presenting symptoms	No. of patients
Grunting	72
Cyanosis	22
Tachypnoea	100
Chestretractions	100
Difficulty in feeding	100
Flaring of alaenasi	43

TTN was the most common diagnosis responsible for respiratory distress in 39% of the patients. This was followed by Meconium aspiration syndrome in 19% of the patients and birth asphyxia in 11% (Table 5).

Table 5: Diagnosis

Diagnosis	No. of patients
TTN	39
Meconium aspiration syndrome	19
Birth asphyxia	11
Pneumoniawithsepsis	10
Anemia	8
Congenital heart disease	3
pneumothorax	3
Hypoglycemia	2
Pulmonary hemorrhage	2
Congenital heart disease	1
Hypothermia	1
Metabolic acidosis	1

Most of the neonates (62%) were completely cured, 15% of them died and 23% were discharged with sequelae (Table 6).

Table 6: Immediate Outcome

Immediate outcome	No. of patients
Cured	62
Death	15
Discharge with sequelae	23

Respiratory distress is one of the commonest disorders encountered within the first 48-72 hours of life. It occurs in 0.96-12% of live births and is responsible for about 20% of neonatal mortality. We aimed to study

the various risk factors and etiology associated with development of respiratory distress in term neonates. We also aimed to assess the immediate clinical outcome of respiratory distress in term neonates. We conducted a hospital based descriptive cross-sectional study over a period of 18 months (January 2021 to June 2022) in a tertiary care hospital in a total of 100 term neonates who developed respiratory distress and admitted to OHRC Neonatal Intensive Care Unit (NICU). These admissions comprised of neonates delivered in our hospital (inborn) as well as those neonates who were referred to our Neonatal Intensive Care Unit (NICU) from other hospitals and delivery centers (out born). In our study, 60 of the neonates were male (60%) and the rest were female. This proportion was similar to another similar study by Parkash[13] where 58.6% were boys and 41.4% were girls. When Parkash[13] compared sex with respiratory distress, the higher proportion of birth asphyxia, Transient Tachypnea of Newborn, pneumonia and Respiratory Distress Syndrome was found in boys, while the girls had predominantly sepsis and Meconium Aspiration Syndrome. In the study by Baseer[14] in Egypt, they were 81 (55.9%) males, 61 (42%) females and 3 (2.1%) were of undefined sex. Similarly, in the study by Kommawar[15], males were affected more than females M:F ratio was 1.36:1. In our study the mean weight of the neonates was 2799.5±558gms. In the study by Parkash[13], the mean weight was 2.41±2.4kg. In the study by Baseer[14], it was 2108.19±810.92 g with range of 740g-3330g. This difference is probably due to their inclusion of preterm neonates. In the study by Gouyon[16], the mean weight was 3201±546g. In our study, Meconium aspiration syndrome babies were typically normal for gestational age. In the study by Rijal[17], the mean weight of TTN neonates was not too different at 2995±230.

Most of the babies were delivered by vaginal route, 24 were delivered by elective caesarean and 5 of them were delivered by an emergency caesarean section. In the study by Baseer[14], only 23.45% of the neonates were born by vaginal delivery and the rest 76.55% were born of caesarean section. In our study, delivery by Caesarean section was a specific risk factor for Transient Tachypnea of Newborn with 75% specificity. There was no difference between elective and emergency caesarean section in this regard. Similarly, Baseer[14] showed that Cesarean section had the highest risk for Transient Tachypnea of Newborn followed by gestational diabetes and prematurity. In our study only 22% of the neonates were cyanotic. Parkash[13] reported much higher rate of cyanosis at 39.5% (n=81). Just as in our study, in the study by Parkash[13], tachypnoea was found in all 205 (100%) neonates. About 125(60.9%) had grunting, 205(100%) had subcostal retractions, nasal flaring was in 205(100%). Gestational diabetes mellitus was only 41% sensitive in predicting Transient Tachypnea of Newborn, however it was 91% specific. It was not significantly specific or sensitive in predicting any other diagnosis. Baseer[14] noted much higher rates of maternal diabetes in 25 cases (17.24%) of neonates with respiratory distress. In the study by Swarnkar[18], maternal diabetes was a risk factor in significant number of cases of transient tachypnea of newborn and respiratory distress syndrome. By contrast Rijal[17] noted only one case of gestational diabetes mellitus which was associated with Transient tachypnea of newborn. This may be due to regional differences in diet, access to tertiary healthcare and genetic factors. Transient Tachypnea of Newborn was the most common diagnosis responsible for respiratory distress in 39% of our patients. In a large epidemiological study conducted by Gouyon[16] covering about 14,813 neonates, the most common diagnosis was Transient Tachypnea of Newborn at 36.4% In a similar study by Swarnkar[18], commonest cause of neonatal respiratory distress was transient tachypnea of newborn (40.7%) In our study, most of the neonates (62%) were completely cured. In their study Swarnkar[18] reported 72.14% cure. Mortality rate in developing countries is much higher than in developed countries where it is about 8.2%. Overall fatalities were lower in our study (15%) when compared to other studies like Sauparna[19], who reported deaths of 41% of the infants included in their study. We noted two deaths each due to congenital heart disease, pneumothorax, pulmonary hemorrrhage. Similarly, Kommawar[15] reported two deaths due to congenital heart disease. Ajeli[20] noted a higher rate at 5.4%. Baseer[14] noted the best outcome with Transient Tachypnea of Newborn. Similarly, Kommawar[15] reported only one death with Transient Tachypnea of Newborn.

CONCLUSION

The etiological factors and maternal risk profiles differ between term neonates experiencing respiratory distress and those born prematurely. In our research, Transient Tachypnea of Newborn (TTN) emerges as the predominant diagnosis for neonatal respiratory distress, a trend consistent across various studies encompassing preterm infants. This prevalence can be attributed partially to the uptick in elective cesarean sections, which, notably, are linked with a favorable prognosis. However, further investigation is warranted to delve into specific causative factors. While elective cesarean sections have become commonplace, they correlate with a heightened incidence of TTN. Yet, it could be contended that since TTN, characterized by generally low mortality and morbidity rates and typically self-resolving, dominates neonatal respiratory distress cases, it should not be the sole determinant

for delivery mode. Enhanced labor practices can mitigate other prevalent causes of respiratory distress, such as pneumonia with sepsis. Whenever feasible, delaying cesarean sections until 39-41 weeks of gestation or after attempting labor is advisable. Striking a balance between reducing maternal morbidity and mortality through cesarean sections and averting neonatal anoxic brain and organ damage is imperative.

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