

Incidence and Risk Factors of Respiratory Distress Syndrome in Special Neonatal Care Unit

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Abstract: *The main objective of the study is to determine the incidence rate and common risk factors that cause RDS. By this we can advise mothers on early precaution and safety measures which helps to reduce the mortality rate. Our study involves 414 neonate subjects out of which 202 are under inclusion criteria and 212 are under exclusion criteria. Among which neonates are assessed using hospital criteria of RDS along with risk factors considerations, in which chest indrawing, grunting are common physical signs and c-section, prematurity, GD are more prone risk factors to neonates. All neonates' mothers are examined by considering baby demographic details, antenatal details, details of labor, perinatal history, clinical examinations and risk factors was ascertained. Finally, we conclude that the incidence rate of RDS is 48.9% and prematurity, c-section and gestational diabetes are more prone risk factors for RDS.*

Keywords: RDS, respiratory distress syndrome, C-S, Caesarean Section, GD, Gestational Diabetes, PROM, Premature Rupture of Membranes

1. Introduction

RDS is most common breathing problem in newborns, which occurs mostly in preterm babies (who are born before 28 weeks of pregnancy) ⁽¹⁾ which is characterized by the deficiency of surfactant coating on inner surface of lungs ⁽²⁾. According to United States RDS has been estimated to occur in 20, 000-30, 000 new born infants each year and is a complication of 1% pregnancies. Approximately 50% of the neonates born at 26-28 weeks gestation develop RDS where as less than 30% premature neonates born at 30-31 weeks of gestation develop this condition ⁽³⁾.

The most important risk factors of RDS prematurity, low birth weight and others include white race, male sex, late term delivery, GD, peritoneal hypoxia, ischemia and delivery in the absence of Labor, Prom, Maternal Infection ⁽⁴⁾. Signs and symptoms of RDS may appear within minutes of birth or may not see for several hours includes Tachypnea, nasal flaring, chest retractions, stridor, wheezing, grunting ⁽⁵⁾. Chest radiography, arterial blood gases analysis, electro cardiography, x-ray findings are commonly used diagnostic tests ⁽⁶⁾. Common treatment used for RDS are antibiotics, antenatal corticosteroids ^(7, 8) oxygen, nasal CPAP and surfactant administration ^(9, 10, 11)

2. Methodology

Study Population

A prospective observational study was carried out in SNCU in Tertiary Care Hospital. Neonates with RDS who are born prematurely are having symptoms of low respiratory rate, grunting, retractions, nasal flaring, and cyanosis. the exclusion criteria for this study includes Neonates with Jaundice, Seizures and other diseases and Neonates who do not meet diagnostic criteria. Whereas inclusion criteria for this study includes Who show consent to the study and Subjects who meet diagnostic criteria which includes respiratory rate > 60, grunting

sounds and chest indrawing. An informed consent form was obtained from all neonate mothers who are willing to participate in our study. A complete examination was performed to each neonate.

Variables

RDS was ascertained as per NCBI Guidelines, the diagnosis with clinical presentations consists of nonspecific respiratory symptoms including Tachypnea, Nasal flaring, Grunting, Chest retractions, cyanosis with decreased air entry on Auscultation and risk factors associated with RDS include prematurity, low birth weight and others include white race, male sex, late term delivery, GD, Peritoneal hypoxia, Ischemia and delivery in the Absence of labor, Prom, Maternal Infection.

Variables evaluated for all study neonates includes baby demographic details (date and time of birth age of admission, diagnosis type of admission and mothers name), antenatal details (age, abortions, history of RDS, chronic health conditions, amniotic fluid volume), details of labor like type, perinatal history (gestational age, weight at birth, maturity) clinical examination (general condition, respiratory rate, grunting, colour, heart rate, chest indrawing), risk factors were ascertained.

3. Results

Participant Characteristics:

In total of 412 neonate cases 202 were under our inclusion criteria and 212 were under exclusion criteria. The overall incidence rate of RDS IS 48.9%.

Chest Indrawing

According to data analysis among 202 cases/patients, 91.1% (n=184) babies showed chest indrawing and 8.9% (n=18) babies did not have chest indrawing as shown in **Figure 1**.

Table 1: Chest indrawing data analysis and frequency

Chest indrawing	Total no of cases (n=202)
Present	91.1 % (n=184)
Absent	8.8% (n=18)

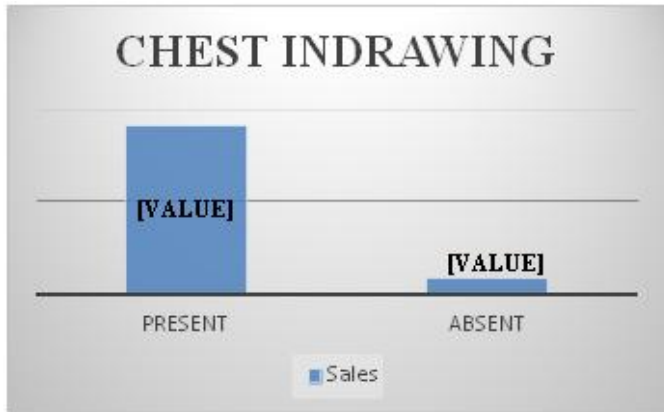


Figure 1: Chest indrawing of baby’s data analysis

Grunting

According to data analysis among 202 cases, 52% (n=105) cases showed grunting symptom and 48% (n=97) cases does not showed grunting symptom as shown in the **Figure 2**

Table 2: Grunting sounds data analysis and frequency

Grunting	Total no of cases (n=202)
Present	52% (n=105)
Absent	48% (n=97)



Figure 2: Grunting sounds in baby’s data analysis

Risk factors:

Risk factors are analyzed and their frequency, percentage and significant values are shown in the **Table 3**. The percentage of risk factors are shown in **Figure 3**.

Table 3: List of Risk factors with frequency, percentage and significant values

Risk factors	Frequency (n)	Total %
Caesarean	95	47%
Prematurity	67	33.2%
Gestational diabetes	64	31.7%
Pregnancy induced hypertension	56	27.7%
Insufficient antenatal	52	25.7%

care		
Low birth weight	42	20.8%
Maternal age	33	16.3%
Multiparity	10	5%
History of abortions	1	0.5%

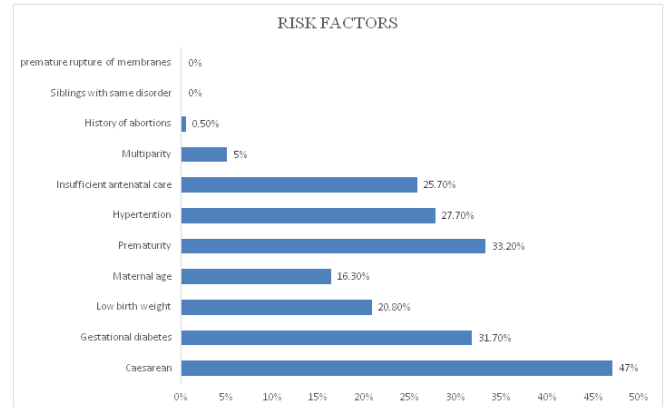


Figure 3: Data Analysis of Risk Factors

4. Discussion

Respiratory Distress Syndrome (RDS) is most common breathing problem in newborns. Incidence of RDS was increasing day by day due to multiple neonatal, maternal factors as well as environmental and social factors. The result of the study shows that selective caesarean section, prematurity, gestational diabetes, pregnancy induced hypertension, insufficient antenatal care; low birth weight and maternal age are the main risk factors of RDS.

This study focused on the incidence and high-risk factors of RDS among 202 participants. In our study we have noticed that, high risk for RDS mainly in caesarean section, prematurity, gestational diabetes. A study by Jing Liu et al. risk factors of RDS in term neonates among 205 full term neonates shows selective caesarean section, Prom, male sex, gestational diabetes, low birth weight, maternal infection are high risk factors of developing RDS - which are clinical implications for the early diagnosis and treatment for RDS ⁽¹²⁾. In our observational study caesarean section (47%), prematurity (33%), gestational diabetes is the high-risk factors for RDS.

Selective caesarean section is one of the most important risk factors of RDS in term neonates by mechanism of (There is less activity of amiloride-sensitive sodium channels in alveolar epithelial cells following caesarean section, leading to reduced fluid clearance and leading to relative premature birth). When a caesarean section is performed early, the incidence of RDS increases in full-term neonates ^(13, 14).

Gestational diabetes with the mechanism of foetal hyperinsulinism inhibits lung surfactant synthesis; thereby surfactant deficiency can result in RDS in order to meet the metabolic demands of the developing foetus, normal pregnancy is a state of insulin resistance, which intern results in an increase in insulin production by pancreatic beta cells ^(15, 16).

Prematurity is a typical risk factor for RDS in neonates in a study by Lt Col K Nagendra et al showed that in a total of 1986 neonates 32% of preterm developed RDS, when compare with full term neonates, and their study reveals that preterm were 30 times more prone to develop RDS than full term neonates⁽¹⁷⁾. Similarly in our study we have found that, in 202 cases among all other risk factors 33% of RDS cases were due to prematurity. Previous studies show that incidence of RDS was significantly increased with relatively lower gestational age, although it was a study on full term neonates. These results suggest that lower gestational age makes maturation of the foetal lungs slower.

In our study, according to hospital guidelines chest indrawing and grunting were found to be the common physical symptom of RDS affected neonates. Among 202 patients, 91.1% and 52% of cases show chest indrawing and grunting respectively.

5. Conclusion

From this we concluded that, for every 100 new born 49 neonates were affected. RDS is a respiratory disorder usually caused by different risk factors but in the present study, caesarean section, prematurity, gestational diabetes was found to be the most common risk factors of RDS.

From the study we also observed that there is no relation between number of risk factors per patient and RDS. The careful monitoring of risk factors and taking precautions accordingly could be an important step to reduce effect of RDS.

Acknowledgements

The authors thank Staff and Guides of QIS College of Pharmacy, special thanks to Dr. P. Narendra (Assistant professor, SNCU, GGH, Ongole) for his extended support to carry out this work.

Conflict of Interest

The authors declare no conflict of interest.

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