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RESEARCH ARTICLE

EPIDEMIOLOGY OF RESPIRATORY DISTRESS IN PRETERM NEWBORNS ADMITTED WITH RESPIRATORY DISTRESS IN NICU: A CROSS SECTIONAL STUDY

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Key words:-
LSCS (Lower Segment Caesarean Section), NVD (Normal Vaginal Delivery), RDS (Respiratory Distress Syndrome), PIH (Pregnancy Induced Hypertension), PROM (Premature Rupture of Membranes)

Abstract

Background: Respiratory distress is one of the most common cause of newborns admitting to NICUs. The objective of this cross-sectional study was to examine the epidemiological profile of preterm neonates with respiratory distress in the NICU. It was carried out from August 2023 to July 2024 at Akash institute of medical sciences and research centre, Devanahalli, Bengaluru Rural.

Materials and Methods: This cross-sectional study included 42 neonates under the age of 28 days. Respiratory distress was diagnosed using specific criteria, and detailed clinical assessments were performed to confirm the aetiology. Data on demographics, risk factors, and therapeutic modalities were collected and analysed using SPSS version 25.

Results: A total number of 81 neonates are admitted in NICU for respiratory distress, 42 cases were preterm. In those preterm ,late preterm babies 33(79%) had respiratory distress, followed by moderate preterm 5(12%). Males, 23(54.76%) were more prone for respiratory distress compared to females, 19 (45.24%). LSCS ,34 (80.95%)was the major cause for respiratory distress. All cases required oxygen supportbut oxygen prongs was given to 23(54.76%) cases, CPAP was given to 16 (38.05%) cases, 3(7.14%) were mechanically ventilated. Low birth weight infants,24(57%) weremore prone for respiratory distress compared to very low birth weight 11(26%) and extreme low birth weight infants 1 (3%). 15 (35.71%) cases were not having any risk factors but 9 (21.42%) had PIH. TTNB, in 19(45.23%) cases was the most common aetiology for causing respiratory distress.

Conclusion: This study underscores the necessity for heightened awareness and specialized care protocols for preterm neonates, particularly those born via LSCS and those with low birth weight, to mitigate the risks and improve outcomes associated with respiratory distress.

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Introduction:-

1. Respiratory distress is a critical condition frequently encountered in neonates, particularly among those admitted to Neonatal Intensive Care Units (NICUs). It remains one of the leading causes of morbidity and mortality in the neonatal period, necessitating prompt diagnosis and intervention.
2. The aetiology of respiratory distress in newborns is multifactorial, with prematurity being a significant risk factor. Conditions such as respiratory distress syndrome (RDS), Transient Tachypnea of the Newborn (TTNB), and infections like pneumonia are commonly implicated, especially in preterm infants whose lung development is often incomplete.
3. Given the high stakes involved in managing respiratory distress, understanding its epidemiological profile is crucial for developing effective preventive and therapeutic strategies.
4. This study was conducted at the Akash Institute of Medical Sciences and Research Centre, Devanahalli, Bengaluru Rural, from August 2023 to July 2024, to examine the epidemiological characteristics of preterm neonates presenting with respiratory distress. By identifying key risk factors, modes of delivery, and associated conditions, the study aims to contribute to the body of knowledge necessary for optimizing neonatal care and improving outcomes in this vulnerable population.

Objectives:-

1. To assess the epidemiological profile of preterm neonates admitted to the NICU with respiratory distress.
2. To identify the major risk factors associated with the development of respiratory distress in preterm neonates.
3. To evaluate the prevalence of different aetiologies of respiratory distress in preterm neonates.

Materials and Methods:-

Study Design and Setting:

This cross-sectional study was conducted at the Akash Institute of Medical Sciences and Research Centre, Devanahalli, Bengaluru Rural, over a one-year period from August 2023 to July 2024. The institute's Neonatal Intensive Care Unit (NICU) serves as a tertiary care center catering to a diverse population, providing an ideal setting for assessing respiratory distress in preterm neonates.

Study Population:

The study included preterm neonates (born before 37 weeks of gestation) under the age of 28 days who were admitted to the NICU with a clinical diagnosis of respiratory distress. Preterm infants with respiratory distress constituted the study group, while full-term infants and preterm neonates without respiratory distress were excluded from the study.

Inclusion and Exclusion Criteria

Inclusion Criteria:

1. Neonates born before 37 weeks of gestation.
2. Age of less than 28 days at the time of admission.
3. Clinical diagnosis of respiratory distress based on predefined criteria.

Exclusion Criteria:

1. Full-term neonates (born at or after 37 weeks of gestation).
2. Preterm neonates without signs of respiratory distress.
3. Neonates with congenital anomalies that could independently cause respiratory distress.

Diagnostic Criteria for Respiratory Distress:

Respiratory distress was diagnosed using specific clinical criteria, which included the presence of at least two of the following signs:

1. Tachypnea (respiratory rate > 60 breaths per minute).
2. Nasal flaring.
3. Chest retractions (intercostal, subcostal, or suprasternal).
4. Grunting.
5. Cyanosis or pallor.

Detailed clinical assessments, including physical examinations and relevant investigations (e.g., chest X-ray, blood gas analysis), were performed to confirm the diagnosis and determine the underlying aetiology of respiratory distress.

Data Collection

Data were systematically collected using a structured proforma that captured the following information:

Demographic Data:

1. Age (in days) at admission.
2. Sex (male/female).
3. Birth weight (categorized as >2500g, 1500-2499g, 1000-1499g, <1000g).

Perinatal and Maternal Factors:

1. Gestational age (extreme preterm, very preterm, moderate preterm, late preterm).
2. Mode of delivery (Lower Segment Caesarean Section [LSCS] or Normal Vaginal Delivery [NVD]).
3. Maternal conditions (e.g., anaemia, eclampsia, gestational diabetes mellitus [GDM], hypothyroidism, oligohydramnios, preeclampsia, premature rupture of membranes [PROM], placental insufficiency, etc.).

Clinical Data:

1. Clinical signs and symptoms of respiratory distress.
2. Associated conditions (e.g., apnea, birth asphyxia, pneumonia, respiratory distress syndrome [RDS], transient tachypnea of the newborn [TTNB]).

Therapeutic Interventions:

1. Types of oxygen delivery devices used (e.g., oxygen prongs, Continuous Positive Airway Pressure [CPAP], mechanical ventilation).
2. Duration and response to therapy.

Data Analysis

Collected data were entered into a computer and analysed using Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population. Frequencies and percentages were calculated for categorical variables such as gestational age categories, modes of delivery, sex distribution, associated maternal conditions, etiologist of respiratory distress, and types of therapeutic interventions. The analysis aimed to identify prevalent risk factors, common aetiologies, and the effectiveness of different therapeutic modalities in managing respiratory distress among preterm neonates.

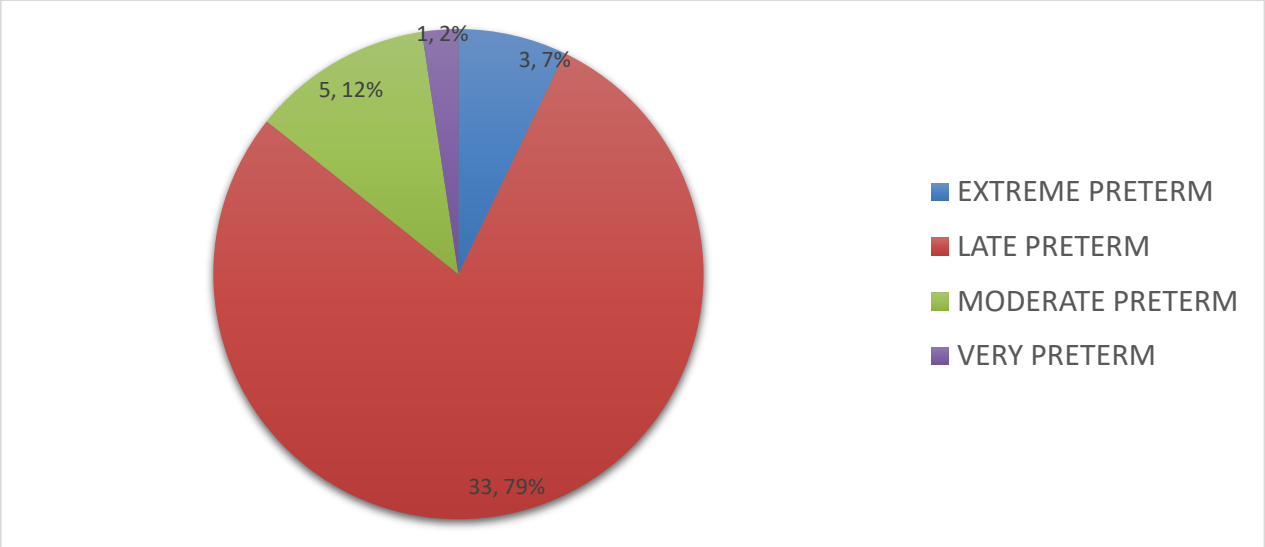
Ethical Considerations

The study was conducted in accordance with ethical guidelines, and approval was obtained from the institutional ethics committee. Informed consent was obtained from the parents or guardians of all participating neonates. Confidentiality of patient information was maintained throughout the study.

Results:-

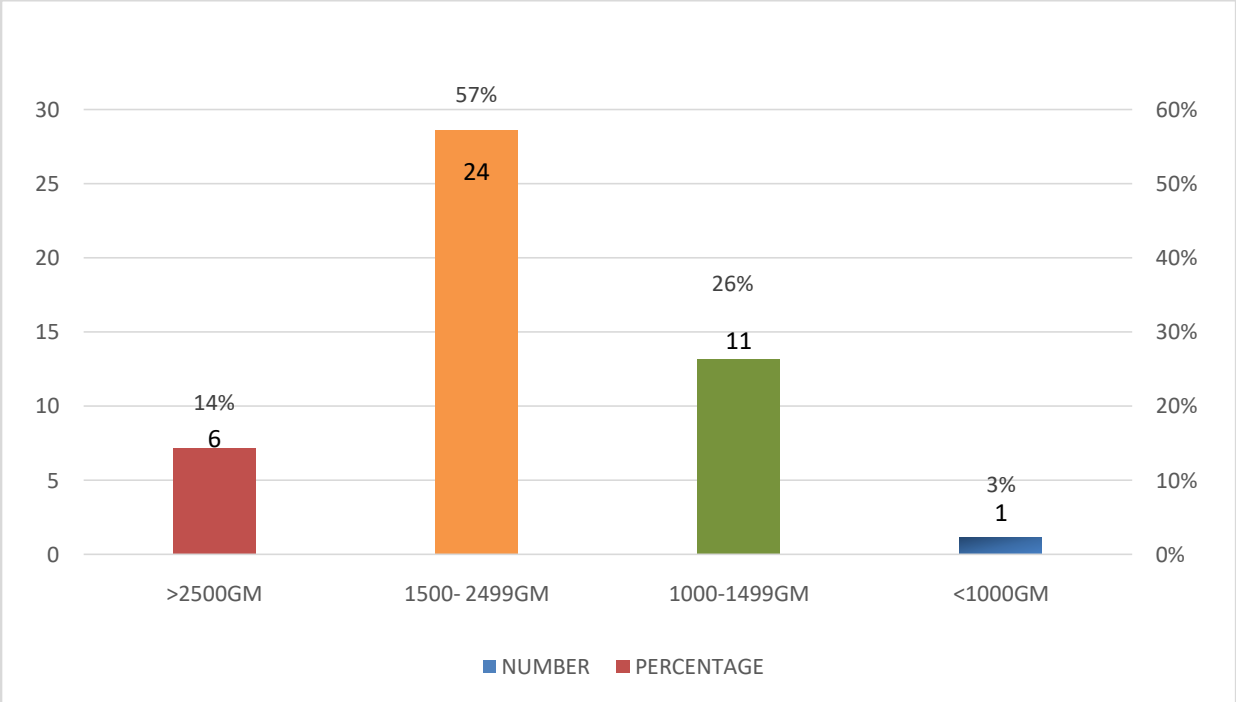
In this study, out of total 42 preterm neonates, 79% cases were late latepreterm babies who developed respiratory distress. 12% cases were moderate preterm, 7% were very preterm and 2% were extreme preterm as shown in table 1.

Table 1:- Total number cases based on gestational age.



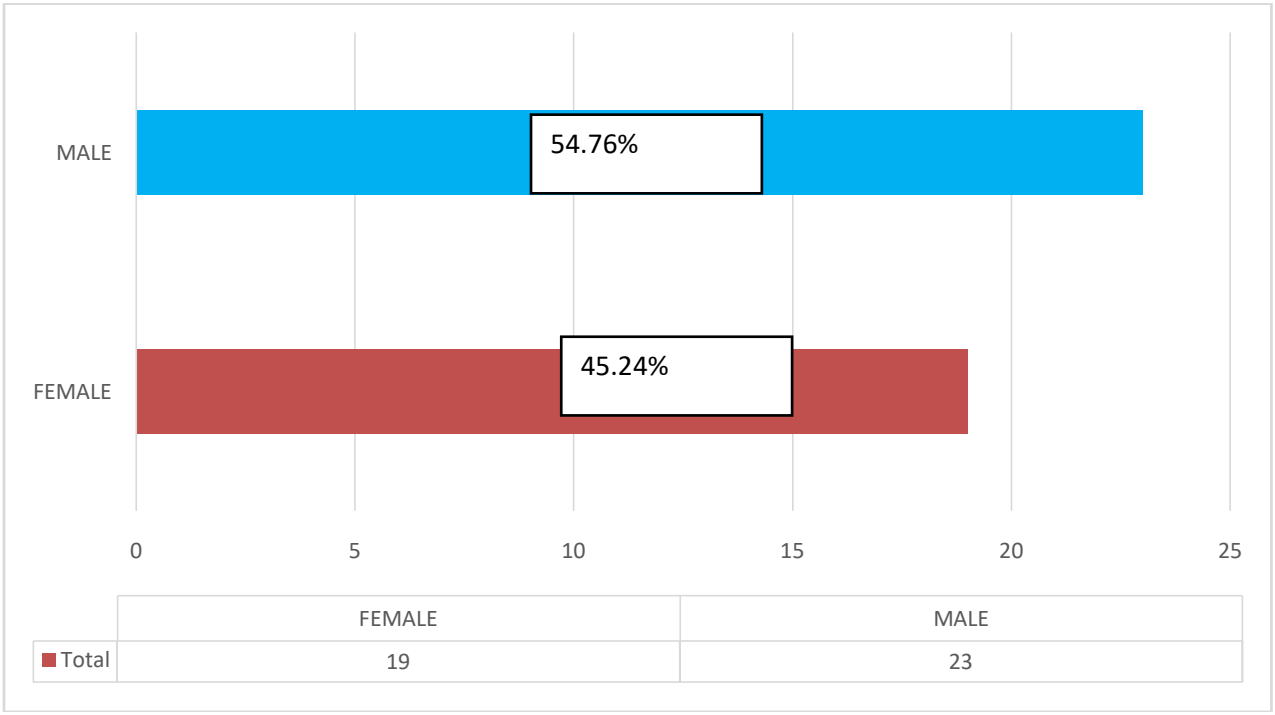
When we considered birth weight of the babies, low birth weight babies were having more signs of respiratory distress compared to very low birth weight and extreme low birth weight babies as shown in table 2.

Table 2:- Distribution of birth weight in neonatal respiratory distress.



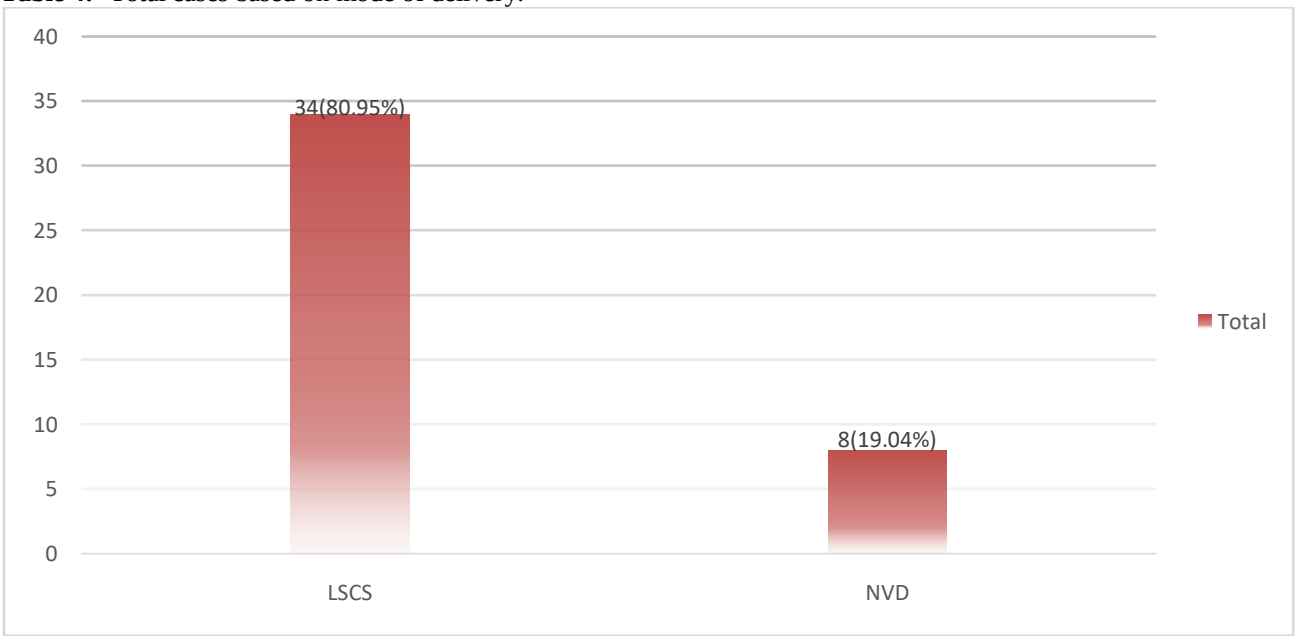
54.76 % cases were males and 45.24% cases were females as shown in table 3.
There was no much difference in males and females.

Table 3:- Total cases based on sex.



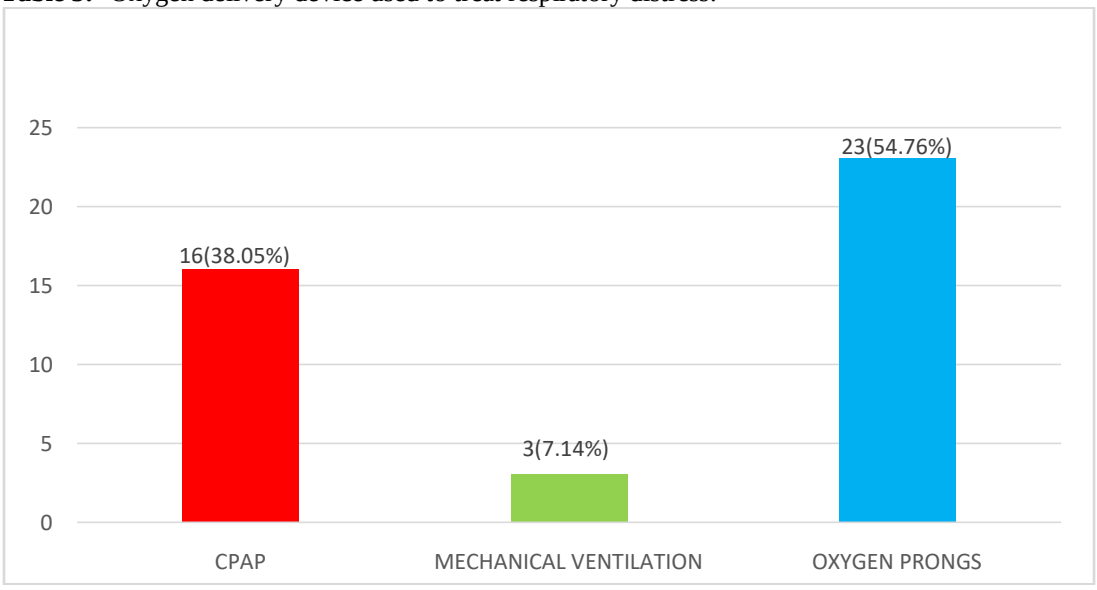
Lower segment caesarean section was most common risk for development of respiratory distress which accounts for 80.95% cases and normal vaginal delivery accounts for 19.04% cases as shown in table 4.

Table 4:- Total cases based on mode of delivery.



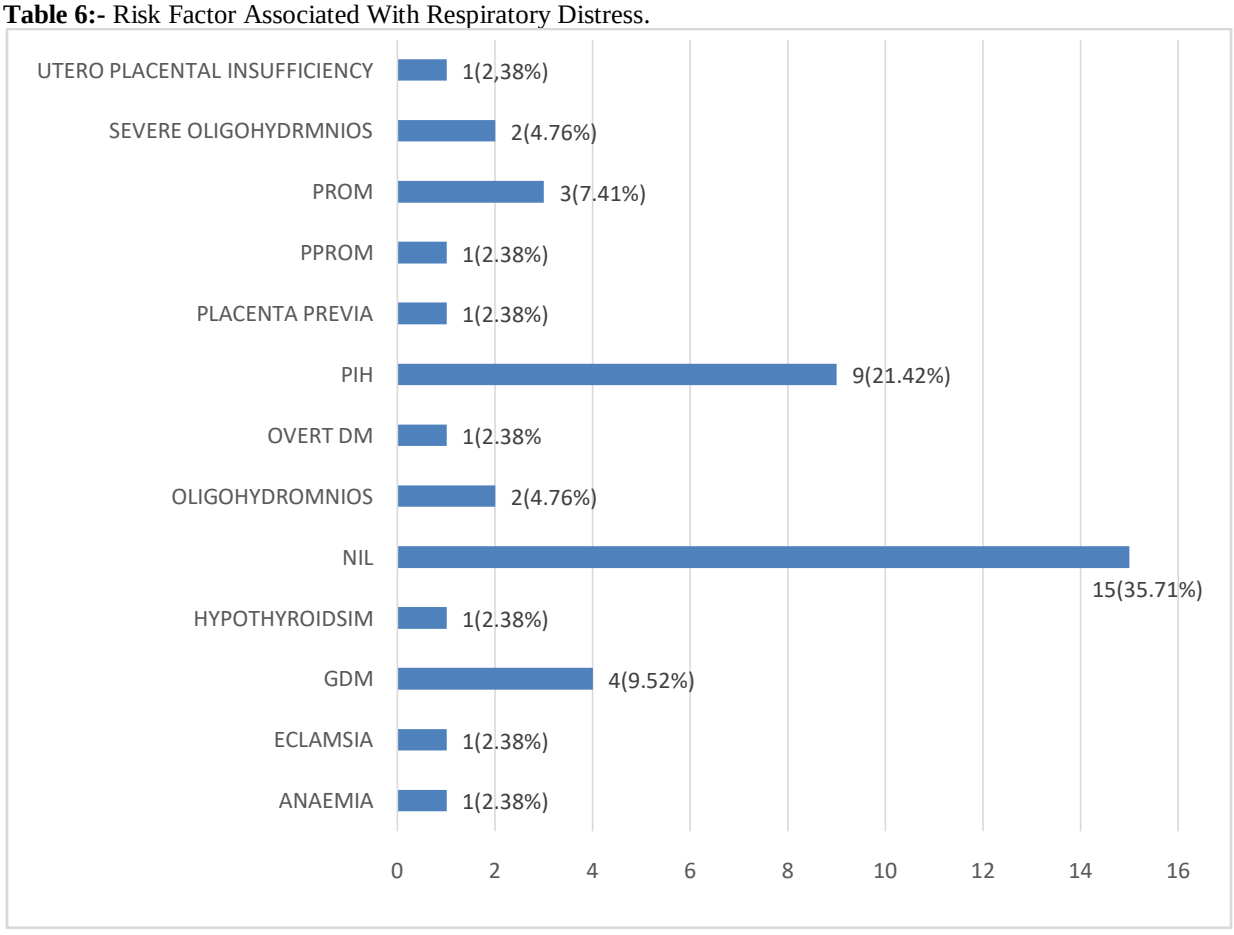
Most of babies required oxygen support. 54.76% babies required oxygen with nasal prongs, 38.05% babies required CPAP and 7.14% babies required mechanical ventilation as shown in table 5.

Table 5:- Oxygen delivery device used to treat respiratory distress.



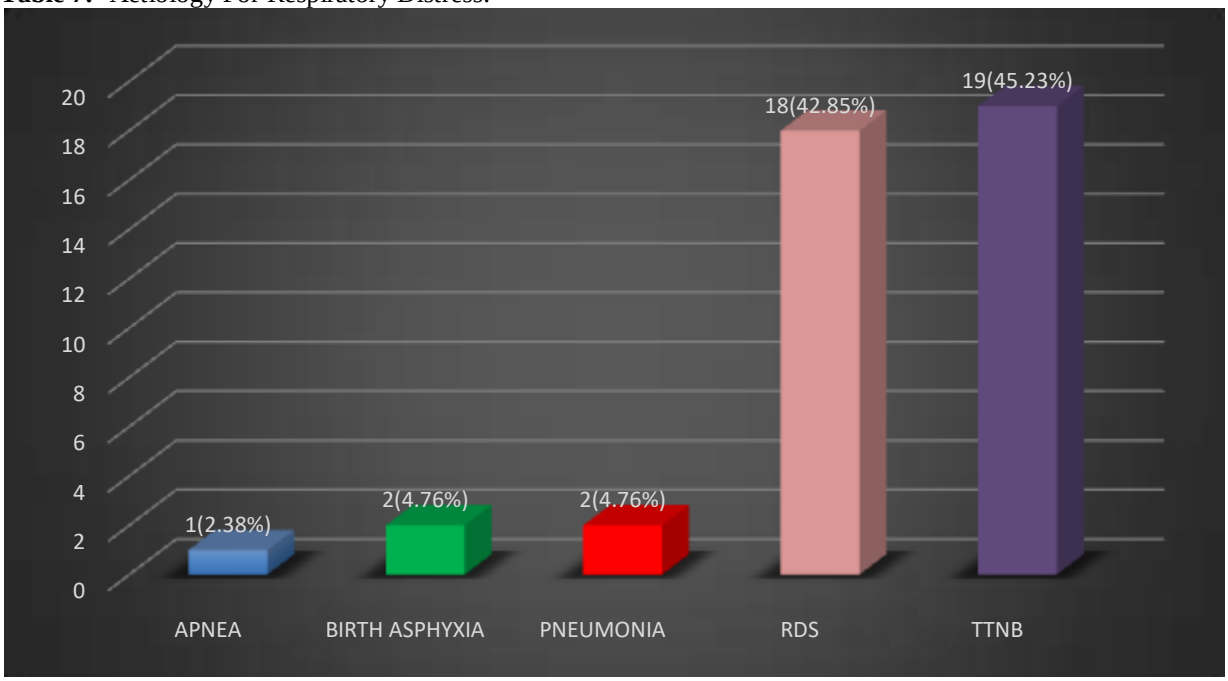
Maternal risk Factors:
35.71% of mothers were not having any risk factors, 21.42%of mothershad pregnancy induced hypertension, 9.52% of mothers had gestational diabetes mellitus and 4.76 % of mothers had PROM and 2.38% of mothers hadPPROM and other risk factors are listed in table 6.

Table 6:- Risk Factor Associated With Respiratory Distress.



45.23% cases had TTNB followed by RDS which was about 42.85% cases. 4.76% had birth asphyxia and pneumonia. 2.38% cases had apneicepisodes as shown in table 7.

Table 7:- Aetiology For Respiratory Distress.



Discussion:-

In this hospital based cross sectional study, the prevalence of respiratory distress in preterm neonates was 51.85%. This findingscontrasts with a study conducted by Lensa Tamiru Bacha et al, which showed prevalence was 62.8%. It shows that preterm babies will have more respiratory distress than term and post term. In our study incidence of respiratory distress more in low birth weight babies which accounts for 57% compared to other babies. In a study conducted by Niloy Kumar Das et al, in their study also low birth weight babies had more respiratory distress which accounts for 56.25%. It shows that low birth weight babies are more prone for respiratory distress.

In our study male (54.76%)were prone for respiratory distress compared to females (45.24%). It similar to a study conducted by Mugdha Todkar et al , in their study also male (54.73%) were affected more compared to females (45.27%). It confirms that males babies tobe carefully monitored for post natal outcomes.

If we consider mode of delivery causing respiratory distress, Sanajay Chavan et al study showed that LSCS (70.3%) was most common aetiology for development of respiratory distress compared to NVD (29.7%). Our study also showed LSCS (80.95%) was most common aetiology for causing respiratory distress compared to NVD (19.05%). So to reduce respiratory distress, NVD should be conducted more.

A study conducted by Maria Bulimba et al, 64.2% babies were needed CPAP support followed by nasal prongs (33.3%) which was contrast with our study where we gave oxygen support by prongs for 54.76% of babies and CPAP was given to 38.05% of babies. It shows most of the babies were needed both CPAP and prongs.

Conclusion:-

This study underscores the necessity for heightened awareness and specialized care protocols for preterm neonates, particularly those born via LSCS and those with low birth weight, to mitigate the risks and improve outcomes associated with respiratory distress.

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