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OCCURRENCE OF RESPIRATORY DISTRESS SYNDROME ASSOCIATED PNEUMONIA IN INFANTS AND NEONATES A REVIEW

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ABSTRACT

The most common challenge in the beginning of life is Respiratory distress syndrome (RDS). RDS is the leading reason for neonates' admitted to the Neonatal Intensive Care Unit (NICU) in hospitals. The increasing rate of infant morbidity and mortality is because of RDS. Sometimes, RDS become life-threatening in neonates, therefore, it requires a timely diagnosis and treatment. RDS occurs throughout the world but has different causes

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such as small gestational period, gestational diabetes, multiple pregnancies, Excessive Caesarean sections, chorioamnionitis etc. Pneumonia is also known as microbial infection and different microbes just as Streptococcus pneumonia, Pseudomonas aeruginosa, Haemophilus influenzae, and Klebsiella pneumoniae, are the causative agents of pneumonia. Occasionally, genetic problems also become the cause of RDS in which lungs are not fully developed. RDS is a diverse group of illnesses, e.g., RDS in newborns can be diagnosed by a change in breathing rates, i.e., tachypnea or bradypnea, deficiency in pulmonary surfactants, pneumonia and cyanosis are the main clinical manifestations of respiratory distress syndrome. Different methods such as replacement therapy of lung surfactants, ventilator therapy, and improved oxygenation to tissues can be beneficial in treating RDS. If RDS is not diagnosed and treated on time it can lead to respiratory failure and become the ultimate cause of death.

KEYWORDS: Respiratory Distress Syndrome, Neonates, Mortality, Morbidity, Gestational Problems, Tachypnea, Bradypnea, Pulmonary Surfactants, Pneumonia, Cyanosis, Ventilator.

OBJECTIVES

The objective of this review article to understand the basic and major causes of RDS associated pneumonia among infants and neonates. Review will also help out the researchers to find different methods to treat RDS.

INTRODUCTION

Neonatal period span is first 28 days after birth and can be categorized into three phases: very early (less than 24 hours), early (less than seven days), and late (seven to less than 28 days). The vulnerable period for diseases is the neonatal life period (Hussain, 2014). World Health Organization (WHO) reported that 1.6 million deaths in the neonatal period occur worldwide due to infections (Zakariya et al., 2011). The most common problem in the beginning of life is RDS, sometimes also called hyaline membrane disease (HMD), considerable death rate in newborns is due to RDS (Gallacher et al., 2016; Parkash et al., 2015).

The marked features of respiratory distress syndrome are diffused lesions of lung capillaries and proliferate the permeability which consequences in the form of pulmonary edema and the appearance of transparent membranes which becomes the reason for dyspnea and hypoxemia (Chen et al., 2015). Breathing difficulties are usually associated with respiratory distress syndrome in infants (Edwards et al., 2013). RDS is the root of admission to NICU during the first few months after birth and it's a challenging situation (Lakhkar et al., 2017; Najafian and Khosravi, 2020).

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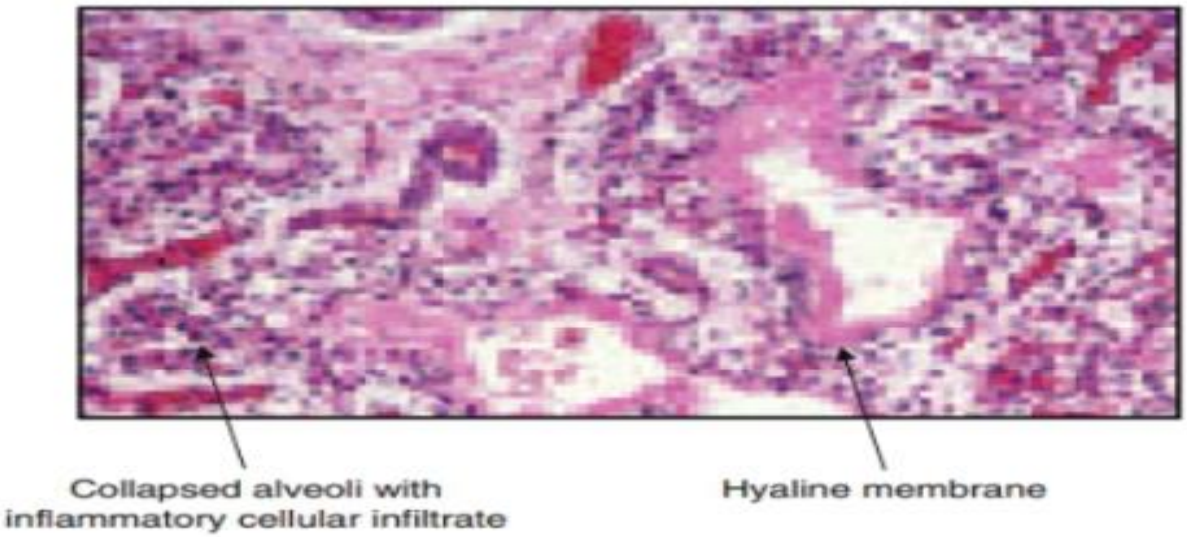


Figure 1 The particular histological appearance of respiratory distress syndrome is the massive degeneration of distant air spaces and regularly dispersed terminal bronchioles. Bronchioles are closed by nuclear eosinophilic hyaline membranes that consist of necrotic epithelial cells, and both fibrin and other proteins that protrude from capillaries. (Hematoxylin-eosin stain) (Ainsworth, 2005)

The neoteric definition of acute respiratory distress syndrome (ARDS) is, lung inflammation which causes an increase in the permeability of the lungs, hypoxemia condition occurs due to damage in lung tissues and acute respiratory distress syndrome lung compliance also decreases. Usually, RDS occurs in neonates whose lungs are underdeveloped till birth (Qari et al., 2018). ARDS interfere with the oxygen delivery from lung alveoli and leads to hypoxia condition which is a life-threatening situation. About 30% to 40% of admissions to NICU are due to RDS (Zaman et al., 2013). Shortness of breath is the commonest symptom of RDS in 48-72 hours after birth (Kelishadi et al., 2021; Zaazou et al., 2011).

Based on different evidence, respiratory distress syndrome occurs in about 0.96%-6% of live births and approximately 20% of neonatal deaths caused by RDS (Kelishadi et al., 2021; Khadanga et al., 2014; Zaazou et al., 2011). The occurrence rate of RDS in neonates admitted to NICU doubled in recent years. Respiratory distress syndrome has a worldwide prevalence rate of about 1% of all deliveries. The epidemiology of respiratory distress has been studied in developed countries (Barkiya et al., 2016). As claimed by epidemiological studies in the US, 60000-80000 babies are born each year with respiratory distress syndrome, of which approximately 6-12000 die (Kelishadi et al., 2021). The occurrence rate of neonatal respiratory distress (NRD) in developed countries ranges from 2.2%-7.6%, while in India from 0.7%-8.3%. The 5%-29% of newborns admitted to NICU in hospitals have been reported neonatal respiratory distress (Sabzehei et al., 2017).

Over recent years, respiratory distress in neonates has developed great enthusiasm and

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interest. RDS accounts for the prime cause of mortality and morbidity among neonates (Qari et al., 2018). Sometimes, RDS in neonates become lethal which requires accurate and prompt evaluation and medical interventions (Kumar and Vishnu, 1996; Lu et al., 2016; Yang et al., 2018). Newborns with RDS are 2-4 times more at risk of dying than those people without RDS (Swarnkar and Swarnkar, 2015).

CAUSES

Respiratory distress syndrome is a heterogeneous group of different diseases with different spreads and prevalence rates, basic etiology, medical courses and outcomes (Parkash et al., 2015). Although respiratory distress in neonates is not restricted to a single country of the world, however, the major causes of respiratory distress vary from area to area (Adebami et al., 2017).

The reasons for RDS in newborns can be categorized into abnormalities which primarily affect aeration, circulation and chest development (Barkiya et al., 2016; Fratila et al., 2013; Holme and Chetcuti, 2012). A decrease from 3 to 4 weeks in the gestational period increases the chance of developing RDS in newborns. Several other factors such as high rate of Caesarean sections, Gestational diabetes, multiple pregnancies, intra amniotic infection (Chorioamnionitis), and prenatal ultrasound findings like abnormalities in lung structure and Oligohydramnios (deficiency in amniotic fluid) and meconium-stained amniotic fluid (MSAF) [26, 36, 42] (Lakhkar et al., 2017; Parkash et al., 2015; Sabzehei et al., 2017). Caesarean-section deliveries are becoming the known cause of RDS in infants, babies born by vaginal delivery have less chance to develop RDS than the baby born by caesarean-section (Edwards et al., 2013; Zaman et al., 2013). RDS is most prevalent in infants who are born by Caesarean section delivery. Caesarean sections have a strong association with respiratory distress in infants (Sun et al., 2013).

About 15% of newborns and 29% of premature infants admitted to NICU have remarkable symptoms of RDS. This rate is even higher for infants delivered before the 34 weeks of the gestation period (Adebami et al., 2017; Rijal and Shrestha, 2018). A baby who is born before the completion of the gestation period has a high risk of developing respiratory distress after birth. This issue is unusual with babies who are born after the completion of a gestation period of about 39 weeks (Qari et al., 2018). Based on different evidence and studies, respiratory distress is becoming the major cause of 30% of deaths of infants during the first month and 20% of infants who survive with respiratory distress have a high risk of developing severe lung disease in future ages. Studies showed an inverse relation between respiratory distress and gestational age and baby weight at the time of birth (Kelishadi et al., 2021). The immaturity of the lungs is usually caused by a shortage of pulmonary surfactant and this clinical condition is developed through hypoxemia, hypoventilation and respiratory acidosis (Najafian and Khosravi, 2020).

Qari et al., (2018) described those neonates whose lungs are not properly developed have a high risk to affect by RDS and genetic problems also be the reason for under development of the lungs (Milner, 1993; Qari et al., 2018). A study was done which described that the

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pathogenesis of RDS involves the immature development of lungs which causes the absence or insufficient production of pulmonary surfactant (Gallacher et al., 2016; Kelishadi et al., 2021; Monica et al., 2017). The alveolar surface of the lungs has surfactant, which is a mixture of phospholipids and some specific proteins that reduce the collapsing of alveoli and also protect the host from bacterial infection. Surfactant deficiency causes respiratory distress syndrome in newborns (Singh et al., 2015). Bacterial infection can also be a cause of neonatal respiratory distress. A study reported that neonatal pneumonia was caused by group B streptococci as these organisms were present in the blood cultures of neonates. Lu et al., (2016) found that pneumonia caused by bacteria is the root cause of neonatal death especially when the infant suffers from ventilator-associated pneumonia (VAP).

A study was conducted by Hameed et al., (2007), which indicates that risk factors of respiratory in full-term infants include maternal smoking and elective caesarian sections. 21.6% was the total RDS in full-term neonates to the total live births. Maternal asthma was also found a risk factor for transient tachypnea of the newborn (TTN), which is also referred to as wet lung, respiratory distress syndrome type II. In full-term infants, caesarian section delivery is closely associated with RDS and it is found that when the caesarian section is done before the onset of labour pain, it increases the risk of RDS complications. This risk leads to lung immaturity and newborn deprive of different beneficial and important effects of normal delivery. Enhanced catecholamine levels, Water reduction in lungs, secretion of sufficient surfactant in alveoli and increase the level of different pulmonary vasodilating substances are included in the beneficial effects of normal deliveries (Hameed et al., 2007).

Table 1: Distribution of organisms isolated from blood (Shah et al., 2010)

Organisms from blood culture	**No.**	**Percentage**	
P. aeruginosa	3	3	
Staphylococcus aureus	2	2	
Klebsiella spp.	1	1	
Organisms cultured from sputum **P. aeruginosa**	9	9	
S. aureus	6	6	
E. coli	5	5	
Klebsiella spp.	3	3	
Strep. pneumonia	1	1	
S. pyogenes	1	1	
Acinetobacter	1	1	

Shah et al., (2010) reported that sputum samples and blood cultures were collected. Shah and colleagues reported that a common causative pathogen of community-acquired

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pneumonia (CAP) isolated from sputum is P. aeruginosa > Staphy. aureus > E coli > K. pneumonia. But the S. pneumoniae is the most common causative agent of CAP worldwide (Shah et al., 2010). Rehman and his colleagues in their prospective study described that K. pneumoniae is the most causative agent of pneumonia followed by S. pneumoniae and patients were treated with cephalosporin antibiotics, aminoglycosides and penicillin's (Rehman et al., 2013). Kelishadi et al., (2021) has described that incomplete development of the lungs either structurally or functionally, surfactant deficiency in the lungs, high chest wall compliance and pulmonary edema be partly responsible for RDS. Studies have shown that the lungs of infants facing RDS non-compliant which requires high pressure to drive in even a low quantity of air and this is provoked by a shortage of lung surfactant which becomes the reason for high surface tension forces at air-water within the alveoli (Monica et al., 2017; Pelegrin et al., 2021).

Table 2: Pathogens associated with congenital and neonatal pneumonia (Nissen, 2007)

Bacteria	**Viruses**
Escherichia coli	Herpes simplex virus
Enterobacter aerogenes	Respiratory syncytial virus
Group B streptococcus (S. agalactiae)	Human metapneumovirus
Group A streptococcus (S. pyogenes)	Parainfluenza viruses 1,2 and 3
Klebsiella spp	Human cytomegalovirus
P. aeruginosa	Influenza A and B viruses
Streptococcus viridans group	Human adenovirus
S. aureus	Human immunodeficiency virus
Strept. pneumoniae	Fungi
Group D and G streptococci Enterococcus spp	Candida albicans
Haemophilus influenza (non -typeable)	Atypical bacteria
Staphylococcus epidermidis	Chlamydia trachomatis
Salmonella spp	Ureaplasma urealyticum and U. parvum
Acinetobacter spp	Listeria monocytogenes
Neisseria meningitidis	Treponema pallidum
Morganella spp	Mycobacterium tuberculosis
Serratia spp	Pneumocystis jirovecii

Nissen, (2007) revealed that different bacterial pathogens of neonatal pneumonia show antimicrobial resistance. This article demonstrates that E. coli and Klebsiella spp. show

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resistance to ampicillin (Nissen, 2007).

Table 3: Incidence of etiological organisms of Community-acquired pneumonia (CAP), with gender distribution (Menon et al., 2013)

Organism isolated	Total %	Male %	Female%
Strep. pneumoniae	32.41	28.89	38.18
Alpha hemolytic streptococci	6.21	5.56	7.27
Beta hemolytic streptococci	1.38	0	3.64
K. pneumoniae	20	21.11	18.18
E. coli	6.21	5.56	7.27
P. aeruginosa	8.97	7.78	10.91
Atypical coli	0.69	1.11	0
Normal floral	24.14	30	14.55

Menon and colleagues in their study found that the S. pneumoniae is the most common isolated pathogen (Menon et al., 2013).

Methodology

Different approaches were used by scientists to diagnose RDS associated pneumonia in infants.

Clinical Symptoms and Manifestations

Early diagnosis of neonatal respiratory distress syndrome (NRDS) is important due to possible management methods (Najafian and Khosravi, 2020). Infants having respiratory distress may be diagnosed by any of the following physical symptoms such as breathing difficulties i.e.; abnormal fast and rapid breathing tachypnea, slow breathing bradypnea, nasal flaring, chest retractions hyaline membrane disease (HMD), head bobbing, noisy breathing grunting, pneumonia, pulmonary oedema, hypoxaemia, cyanosis, choking, gasping, stridor, urination in infants is also decreased in respiratory distress during 24 to 48 hours (Imkesorn et al., 2015; Kelishadi et al., 2021; Parkash et al., 2015; Sun et al., 2013).

Medical detection depends on the amount of desaturated haemoglobin. In patients with anaemia or high fetal haemoglobin, cyanosis may not be recognizable unless the partial pressure of arterial oxygen (PaO2) is very low (Pickerd and Kotecha, 2009; Warren and Anderson, 2010). The major cause was TTN followed by meconium aspiration syndrome (MAS), congenital heart diseases (CHD), Hyaline membrane disease (HMD) and congenital pneumonia (CP) in RDS (Abdelrahman et al., 2014; Abou-Faddan and Abdelaziz, 2018; Edwards et al., 2013).

A descriptive study was carried out by Mohammed Wadi and Abdul Kareem, (2012) and

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found that tachypnea and chest retraction are the common presentations of RDS (Mohammed Wadi and Abdul Kareem, 2012). Respiratory distress syndrome in neonates can be investigated by Complete blood count (CBC), Blood culture, C-reactive protein, lung ultrasound (LUS) and Chest X-rays (Vergine et al., 2014).

Gülersoy et al., (2023) for the diagnosis of respiratory problems collected blood samples for complete blood count (CBC), erythrocyte sedimentation rate (ESR), C reactive protein (CRP), and blood serum were stored. Secretions including nasopharyngeal secretions (NPS), sputum and pleural fluid or Broncho alveolar lavage (BAL) sent for bacteriological tests. A chest x-ray was also done. Immunofluorescence was used for NPS (Gülersoy et al., 2023).

Chest X-rays and arterial blood gas analysis can be used for RDS diagnoses. Lung ultrasound is usually not used for the diagnosis of RDS in neonates, but in current years for diagnosis of different lung illnesses, ultrasound has been used extensively (Liu et al., 2014). Corsini et al., (2019) described that chest X-ray (CXR) is always included in the manifestation of NRDS as a first-line imaging technique (Corsini et al., 2019).

In Dhaka to identify the cause of pneumonia blood and sputum samples were cultured and the Polymerase chain reaction (PCR) technique was used. In this study, 105 samples of patients were collected suffering from pneumonia for identification of bacterial agent by Gram staining, culturing of blood and sputum, biochemical tests and PCR. After tests it was concluded that S. pneumoniae was the major cause of pneumonia but along with S. pneumoniae other bacteria just as P. aeruginosa, H. influenzae, and K. pneumoniae were the causative agents of pneumonia in patients (Akter et al., 2014; Al-Hussaniy et al., 2022|).

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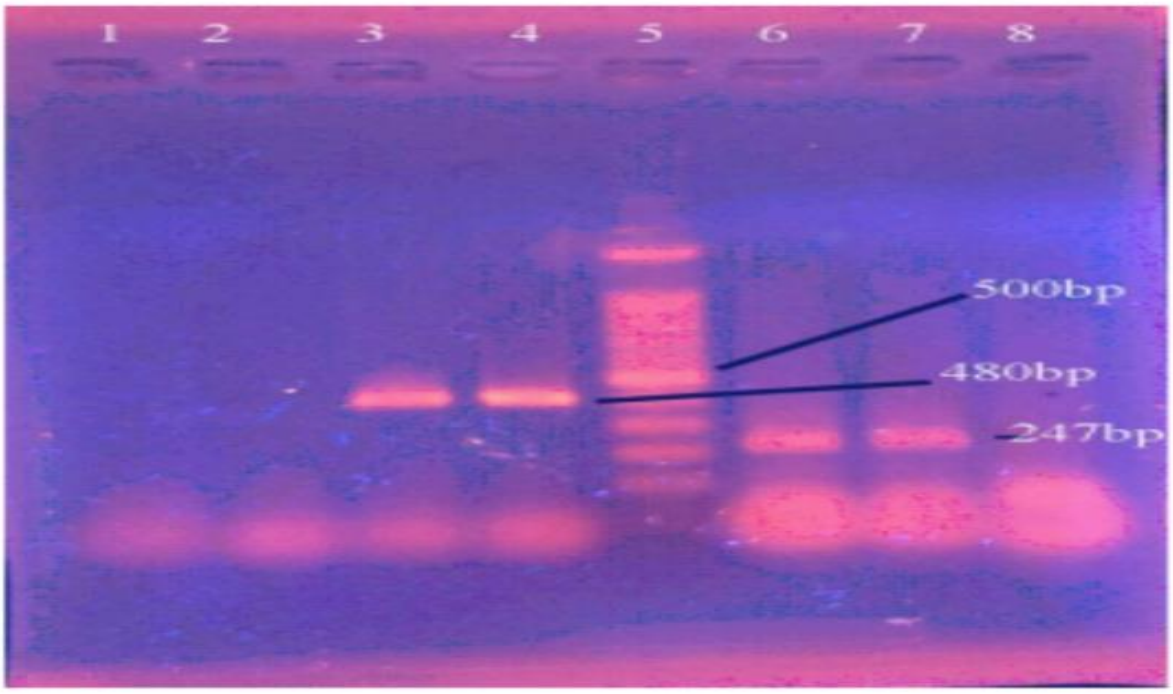


Figure 2: Gel electrophoresis of multiplex Polymerase chain reaction (PCR) product for detection of S. pneumonia and H. influenza from sputum samples.
Lane 1: K. pneumoniae (negative control);
Lane 2: negative sample;
Lane 3: positive sample (S. pneumoniae),
Lane 4: Positive control (S. pneumonie).
Lane 5: 100bp DNA ladder,
Lane 6: positive sample (H. influenza);
Lane 7: positive control (H. influenzae);
Lane 8: negative sample (Akter et al., 2014).

Najafian and Khosravi, (2020) reported that different laboratory tests such as the Arterial oxygen pressure (PaO2) test and gastric aspirate shake test (GAST) can be as a marker to diagnose NRDS. Transforming growth factor β1 (TGF-β1) and Interleukin-6 (IL-6) can also be used as a scanner and diagnostic tool for neonatal respiratory distress (Najafian and Khosravi, 2020).

Table 4: LUS criteria for Several NRDs taken from (Corsini et al., 2019), but studies have shown that lung ultrasound (LUS) is not useful for chest imaging of neonates due to air level interference and this can result in tissue damage (Najafian and Khosravi, 2020)

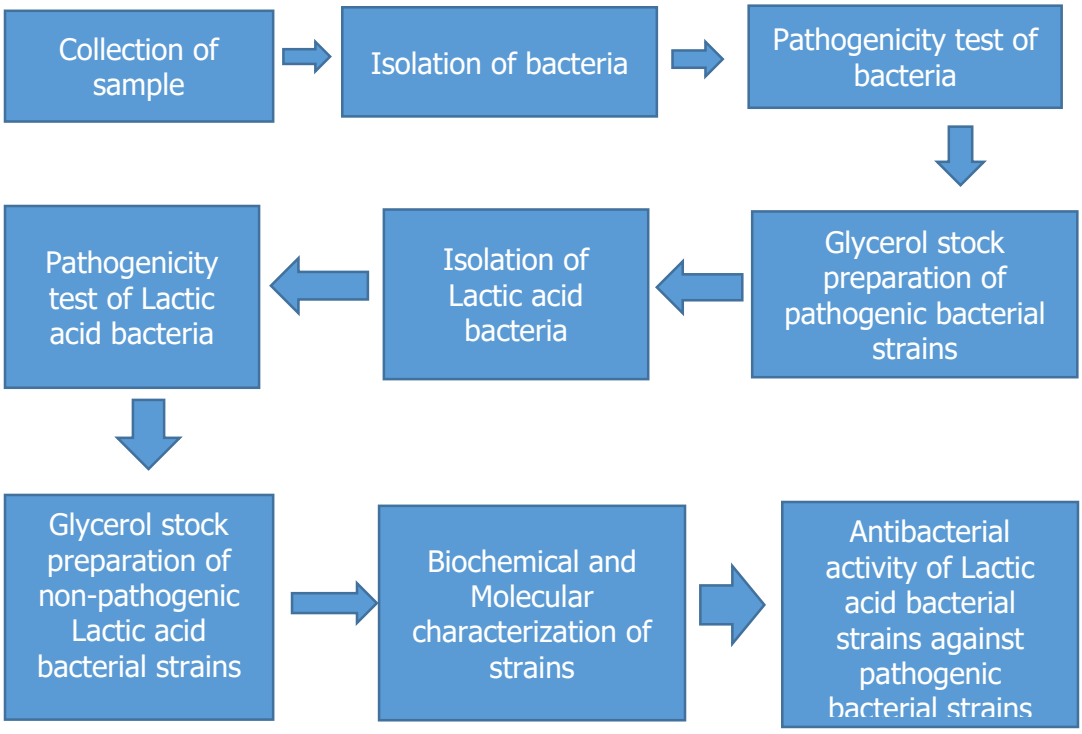
Thickened and Irregular Pleural Lines

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No spared area in all lung field
Tachypnea **Meconium aspiration syndrome**
Pneumothorax



Flow chart to show methodology

TREATMENT

Regardless of the reason for respiratory distress if it is not diagnosed and treated immediately it can lead to apnea, cardiopulmonary arrest, respiratory failure and ultimately death (Adebami et al., 2017). The basic care of neonatal respiratory distress is the same despite any of the causes. Therefore, timely diagnosis and cure of RDS in infants is necessary otherwise it leads to respiratory failure which is the extreme case of neonate deaths and it is about 15 per cent of mortality in infants (Sabzehei et al., 2017). With the increase in gestational period and birth weight, the risk of developing respiratory distress syndrome is decreased (Liu et al., 2014).

There have been different processes to manage respiratory distress in neonates to improve the aftereffects such as ventilator therapy, replacement therapy of surfactant, oxygenation of corporeal membrane and sophisticated monitoring gadgets (Chen and Chen, 2022; Yang et al., 2018). Stevens and his colleagues reported nasal continuous positive airway pressure (NCPAP) and supply of oxygen are the common cures for RDS (Monica et al., 2017). For

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lung maturation of fetal, antenatal steroids are used which promote the maturation of the antioxidant system and administration of pulmonary surfactant, prepare the lungs for breathing decrease the seriousness of respiratory distress and reduce the chances of death in infants (De Luca et al., 2021; Gallacher et al., 2016). Surfactant deficiency can be overcome by obtaining surfactant either derived from animal sources (naturally) or prepared synthetically (artificially). Natural surfactants appear more potent than synthetic surfactants (Yeung et al., 2023).

Liu et al., (2014) study showed that lung maturation and development of fetal animals can be accelerated by stimulating their adrenal cortex which can be done by administration of glucocorticoid hormone. However, in the past and current years, using antenatal corticosteroids and pulmonary surfactants in delivery rooms can greatly minimize the chance of RDS in neonates and infants (Liu et al., 2014; Liu et al., 2010).

Table 5: Observed incidence of individual pathogens and patterns of antimicrobial susceptibility in the studied population (Menon et al., 2013)

Organism	**Incidence (%)**	**Most sensitive antimicrobials**
P. aeruginosa	9	Amikacin
Beat hemolytic streptococci	1.38	Amikacin, gentamicin, ofloxacin, linezolid
E. coli	6.2	Amikacin
Alpha hemolytic streptococci	6.2	Linezolid
Atypical coli	0.7	Amikacin, azithromycin, zznetilmicin
Strep. pneumonia	32.4	Linezolid
K. pneumoniae	20	Amikacin

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Menon and colleagues in their study reported that the pathogens described in the above table show sensitivity to various antibiotics. Patterns of sensitivity of pathogens to various antibiotics are as follows: amikacin > ofloxacin > gentamicin > gatifloxacin > augmentin and ciprofloxacin > ceftriaxone linezolid. The least sensitivity is shown to levofloxacin and penicillin G < ampicillin and piperacillin-tazobactam < clarithromycin, amoxicillin and cefoperazone (Menon et al., 2013).

DISCUSSION

The death rate in the neonatal period of human life is much higher. Therefore, need to determine the root cause of the ailment, its physiopathology and the reason for death. The major cause of mortality in neonates is respiratory distress (Abou-Faddan and Abdelaziz, 2018). In India, about 20% of mortality is due to infections in respiratory tracts and among these infections, pneumonia has prime importance (Khadanga et al., 2014).

The term respiratory distress is usually used to denote a number of clinical hallmarks that reflect poor health Respiratory distress is the major and prime cause of infants' admission to NCIU (Adebami et al., 2017). The major causes of respiratory distress syndrome are small gestation period, gestation diabetes, caesarean section deliveries MSAF, Infection in amniotic fluid, immature development of lungs, deficiency in lung surfactant (Bush, 2021; Lakhkar et al., 2017; Sabzehei et al., 2017; Varvarigou et al., 2012).

Nissen, (2007) described that the diagnosis and treatment of neonatal and congenital pneumonia depend on different factors such as the environment from which the baby belongs (developed or developing country), hospital conditions, and age of gestation (Nissen, 2007). In a study, Ghafoor and colleagues revealed that RDS is associated with a short period of gestation as there is a 100% chance of RDS in infants during a gestation period of 26 or fewer weeks of pregnancy period and about 3.70% chance at 36 weeks of pregnancy (Qari et al., 2018).

Qari et al (2018) revealed that respiratory problems are the major cause of death in infants. About 3% of infants suffer any kind of respiratory problem. Different factors such as gender, gestational period and body weight lead to respiratory problems but some studies showed that pneumonia is the main cause of respiratory distress syndrome in neonates. Haque et al., (2013) described that respiratory distress can be defined and diagnosed by the presence of any of the symptoms such as tachypnoea, nasal flaring, grunting and chest retractions. Diagnosis can be done within 24 hours of admission to the hospital due to the presence of any sign (Haque et al., 2013).

A study conducted by Tochie and colleagues, in which they revealed that NRD can be diagnosed by any of the following signs such as abnormal breathing, transient tachypnea, and cyanosis. The risk factors for NRDS include caesarean delivery, prematurity, asphyxia and multiple pregnancies (Tochie et al., 2016). The common presentation of RDS in newborns is cyanosis, tachypnea, nasal flaring, grunting,

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surfactant deficiency, and retraction (Warren and Anderson, 2010). The normal breathing rate of infants is 30/40 breaths to 60 breaths per minute but in the case of tachypnea, infants breathe too fast as the rate of breathing is more than 60 breaths per minute (Lakhkar et al., 2017). Infants who have less production and secretion of pulmonary surfactant face breathing issues such as rapid, fast breathing tachypnea or shallow or slow breathing bradypnea. Due to surfactant deficiency, grunting a sound is also produced in respiratory distress because alveoli are prone to collapse. Retraction in chest and lung walls is also observed due to surfactant deficiency, it disturbs the lung mechanics and extreme retraction obstructs airway passage. Nasal congestion results in a significant decrease in nasal resistance, which can reduce the total resistance of the lungs and reduce breathing. Cyanosis is the advanced symptom of respiratory distress (Mohammed Wadi and Abdul Kareem, 2012).

Blood culture, Complete blood count (CBC), C-reactive protein, Chest x-rays, and arterial blood gas analysis can be used to diagnose (RDS) respiratory distress syndrome (Hameed et al., 2007; Liu et al., 2014). Pickerd and Kotecha, (2009) have shown in their study that mortality and morbidity are predominantly caused by RDS in neonates. The etiology of RDS includes immature development of lungs, especially developmental immaturity of the surfactant system of lungs. Type II pneumocytes are produced, stored and recycled lung surfactant and it is detected during 24 weeks of pregnancy. The composition of surfactant includes phospholipids, proteins, neutral lipids and dipalmitoylphosphatidylcholine (DPCC), lung surfactant prevents the collapsing of the alveolar wall of the lungs by making a film coat over the surface of alveoli for reducing the surface tension of alveoli. DPCC act as a major source to reduce surface tension (Bhandari et al., 2023; Tang et al., 2022).

Adebami et al., (2017) in his study revealed that RDS is a complicated issue in infants and this is due to surfactant deficiency which leads to lung immaturity and lung damage. There are several therapeutical approaches to prevent RDS in infants such as the administration of antenatal maternal corticosteroid which induces fetal lung maturation, and surfactant replacement therapy in infants also becoming the major therapeutic option for combating RDS in infants. However, in developing countries management of RDS can become a problematic task due to no proper ventilation systems and support. No doubt, respiratory distress in developing countries is the major reason for the admission of neonates to NICU but still, there is no proper and known research and study to find out the causes and outcomes of RDS (Adebami et al., 2017).

EXPECTED RESULTS

These data will be applicable for research and planning of control tactics for pathogen prevalence prediction studies.

NOVELTY AND FUTURE PERSPECTIVE OF THIS STUDY

In Pakistan, very less research study has been conducted on this issue. Mostly case

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studies have been done.

To treat the native Pathogenic bacteria, Lactobacilli may be considered as potential Antibacterial agent as the miss use and over use of antibiotics is resulting in high antibiotic resistance in bacteria.

CONCLUSION

From all of these discussions, it is concluded that RDS is the prime cause of newborns' admission to the NICU and the death rate of newborns is high due to problems in the respiration process. Breathing problems, nasal flaring, pulmonary surfactant deficiency, Pneumonia, and cyanosis are the basic physical presentations of respiratory distress. There are several reasons to develop respiratory distress in neonates but despite the cause treatment of RDS is the same as by replacing the pulmonary surfactant and provision of the proper ventilation system to provide oxygen to the lungs.

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