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RESPIRATORY DISTRESS IN FULL TERM NEONATES IN THE FIRST WEEK OF LIFE IN BENT AL-HUDA MATERNITY AND CHILDREN HOSPITAL IN 2021-2022.

THIS STUDY DONE BY : 6TH YEAR MEDICAL STUDENTS

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List of Abbreviations

ICU	Intensive care unit
RDS	Respiratory distress syndrome
TTN	Transient tachypnea of the newborn
cl-	Chloride
Na+	Sodium
Hr	Hour
ARDS	Acute respiratory distress syndrome
CHD	Congenital heart disease
Wk	Week
kg	killogram
PPHN	Persistent pulmonary hypertension
ECS	Elective caesarean section

Dedication

To whom who encouraged me
And inspired me
All the way,
To my family and teachers.

ABSTRACT

ABSTRACT

Objectives: a descriptive study was carried out on term neonates with respiratory distress in the early neonatal period who was admitted to the neonatal care units in Bent Al-huda Maternity and Children Hospital to assess the causes, outcome, and neonatal, maternal, labor, and delivery characteristics.

Patients and Methods: a total of (100) full term neonates, (56) males and (44) females, their ages range from less than 24 hour to 7 days who were admitted for respiratory distress (from the first of December to the end of March 2021-2022) were recruited in the study from a total of (1842) cases admitted to the neonatal care units during the study period, (764) of them had respiratory distress. Detailed maternal, perinatal, labor and delivery histories were taken and full clinical examination was performed.

Results : the most common presenting signs were cyanosis and tachypnea. Sixty six (66%) of cases were delivered by caesarean section. It was found that (82%) of cases had a gestational age less than 39 weeks and (71%) were more than 24 hours of age. Both are statistically significant with p value <0.00l. Ninety two (89%) had a normal body weight (2.5kg to 4kg). fifty six (56%) of cases need hospitalization for less than 3 days. It was found that 14 (14%) of the mothers were risky regarding their ages (<18 years and > 35 years) and (35%) of the cases had no antenatal care, 98% of mothers were not employed and 60% had less than 6 years of schooling. It was found that 55 (55%) cases were due to Transient tachypnea of the newborn and 81.8% of them were delivered by caesarean section followed by birth asphyxia in 15 cases; (12) (80%) of them were delivered vaginally. sepsis in 10 , 80% of them were delivered vaginally , and pneumonia in 7 (85.7% of them were delivered vaginally) . Congenital heart diseases was responsible for 7 of cases .The deaths were 13 from 100 cases, the commonest causes were found to be due to sepsis, 9 deaths (16%) occurred among males, more deaths among those who were less than 39 weeks gestation (12.1%), 12 deaths among neonates of mothers parity (1-4). The total deaths due to Respiratory Distress in the study period were (103) from a total (241) of deaths in neonatal care units which constitute less than half of the total deaths.

Conclusion: Respiratory distress in term infants is still a significant cause of admission to NICU and a predisposing factor for neonatal mortality and morbidity. Preventative and anticipatory measures should be further explored to decrease the burden of this disease. (27)

1.Introduction

One of the most prevalent reasons for an infant's admission to the neonatal intensive care unit is respiratory distress. [(1)] Significant respiratory morbidity affects 15% of term infants and 29% of late preterm infants admitted to the neonatal critical care unit; this figure is much greater for infants born before 34 weeks' gestation. [(2)] Certain risk factors make newborn respiratory illness more likely. Prematurity, meconium-stained amniotic fluid (MSAF), caesarian section birth, gestational diabetes, maternal chorioamnionitis, or prenatal ultrasonographic findings such oligohydramnios or structural lung abnormalities are all examples of these factors. [(2)(9)(10)(11)(12)(13)(14)] However, predicting which infants will have symptoms before delivery is not always possible. Respiratory discomfort, regardless of the reason, can swiftly progress to respiratory failure and cardiopulmonary arrest if not diagnosed and treated. As a result, any health care provider caring for newborn children must be able to recognize the signs and symptoms of respiratory distress, differentiate between the numerous causes, and implement management methods to avoid serious complications or death.

1.1 Epidemiology :

Respiratory distress is a frequent neonatal morbidity worldwide with reported prevalence of 18.5% in France [(5)], 4.24% in Pakistan [(6)] , and 20.5% in China [(7)] .Fifty-nine term infants (59/3601, 1.64%) were admitted to the NICU with RDS tertiary care center at King Abdul-Aziz University Hospital (KAUH), Jeddah, Saudi Arabia.The incidence of RDS among full term neonates was 1.64. Higher incidence rates were reported by earlier studies from India (4.2%) [(20),] Turkey (7%) [(21),] and Sudan (4.83%) [(22)] ,Further, prospective multicenter study in Italy, reported a lower (1.16%) incidence of RDS in full term neonates[(2)].

1.2 Respiratory Transition:

at birth passes through three distinct, but overlapping phases:

1.During the first phase, the airways are liquid-filled and so no pulmonary gas exchange can occur. Respiratory support should, therefore, be focused on clearing the gas exchange regions of liquid. In the absence of gas exchange, little or no CO2will accumulate within the airways and, therefore ,interrupting inflation pressures to allow the lung to deflate and exhale CO2is unnecessary. This is the primary rationale for administering a sustained inflation at birth[(31) .]

2.During the second phase, the gas exchange regions are mostly cleared of liquid, allowing pulmonary gas exchange to commence. However, the liquid cleared from the airways resides within the tissue during this phase, which increases per alveolar interstitial tissue pressures and the risk of liquid re-entry back into the airways. As a result, respiratory support should be optimized to minimize alveolar re-flooding during expiration, which can be achieved by applying an end-expiratory pressure[.)28)]

3.The third and final phase occurs when the liquid is eventually cleared from lung tissue.

Although gas exchange may be restricted by lung immaturity ,injury and inflammation during this phase, considerations of how fetal lung liquid can adversely affect lung function are no longer relevant.[26]

1.3 Causes of respiratory distress [30]

The causes of respiratory distress can be divided in to :

A) maternal causes : 1. Hypotension 2. Sever maternal anemia 3. Cardiac disease 4. Seizures 5. Pulmonary diseases 6. Hypertension .

B) fetal causes : 1. Anemia (as in Rh – iso immunization) 2. Infection 3. Twin to Twin transfusion .

C) uterine causes : 1. Tetanic contractions of the uterus 2. Hyper stimulation :The commonest cause , is iatrogenic by uncontrolled oxytocin .

D) umbilical cord causes : 1. Single umbilical artery blood flow to the fetus 2. Vasa – Previa . 3. Short- cord 4.placental hematoma . 5. True-knots in umbilical cord 6. Prolapse of the cord .

E) placental causes : 1. Infection . 2. Placenta abruption . 3. Post mature placenta (reduce functioning due to aging)

Table-1.4 Laboratory Evaluation for Respiratory Distress in the Newborn :

Test	***Indication***
Blood culture	May indicate bacteremia. Not helpful initially because results may take 48 hours.
Blood gas	Used to assess degree of hypoxemia if arterial sampling, or acid/base status if capillary sampling (capillary sample usually used unless high oxygen requirement)
Blood glucose	Hypoglycemia can cause or aggravate tachypnea
Chest radiography	Used to differentiate various types of respiratory distress
Complete blood count with differential	Leukocytosis or bandemia indicates stress or infection
	Neutropenia correlates with bacterial infection
	Low hemoglobin level shows anemia
	High hemoglobin level occurs in polycythemia
	Low platelet level occurs in sepsis
Lumbar puncture	If meningitis is suspected
Pulse oximetry	to detect hypoxia and need for oxygen supplementation[14]

The first chest radiograph taken early during the course of the disease had the greatest impact in the care of neonates with respiratory distress .In such cases , potentially dangerous conditions (e.g.pneumothoraces) could be detected before severe clinical deterioration occurred [3].

1.5 Clinical Presentation of Respiratory Distress :

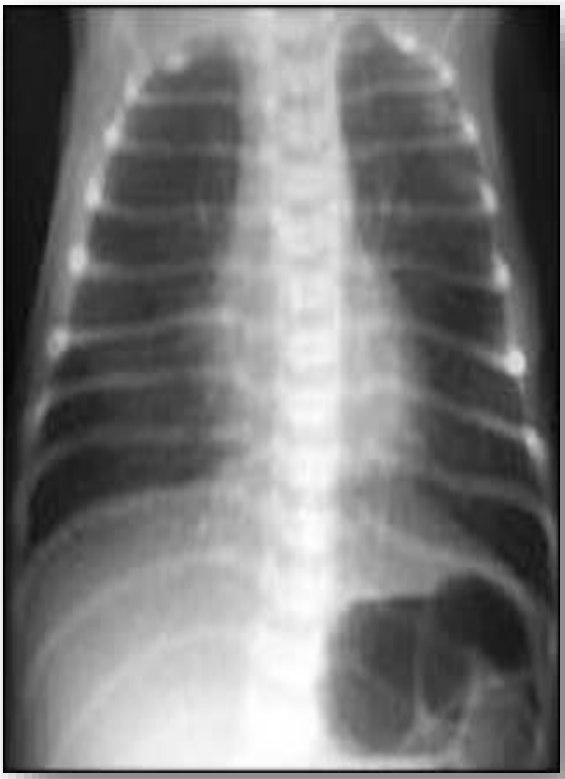
Symptoms and signs of RDS include rapid, labored, grunting respirations appearing immediately or within a few hours after delivery, with suprasternal and substernal retractions and flaring of the nasal alae. As atelectasis and respiratory failure progress, symptoms worsen, with cyanosis, lethargy, irregular breathing, and apnea, and may ultimately lead to cardiac failure if adequate lung expansion, ventilation, and oxygenation are not established .Neonates weighing < 1000 g may have lungs so stiff that they are unable to initiate or sustain respirations in the delivery room. On examination, breath sounds are decreased, and crackles may be heard.[26]

1.6 Differential Diagnosis of Respiratory Distress in the Newborn

The underlying cause of respiratory distress in a baby can vary and isn't necessarily related to the lungs. Following initial resuscitation and stabilization, a complete history, physical examination, and radiological and laboratory data should be used to determine a more specific diagnosis and modify care accordingly[26]. A detailed medical history can help uncover risk factors linked to common causes of newborn respiratory distress. A thorough physical examination should look beyond the lungs to rule out nonpulmonary causes of respiratory distress in newborns, such as airway blockage, chest wall anomalies, cardiovascular disease [10], or neuromuscular disease**.**Diaphragmatic paralysis, congenital pulmonary abnormalities, and intrathoracic space–occupying lesions, such as pneumothorax, mediastinal mass, and congenital diaphragmatic hernia, can all restrict lung expansion, as can radiographic findings. Significant tachypnea without an increase in labour of breathing should be followed up with a lab test to rule out metabolic acidosis or sepsis [12]. Hypoglycemia, hypomagnesemia, and hematologic disorders can all cause a decrease in ventilatory drive or reduced oxygen transport to the peripheral tissues, hence laboratory testing should be done alongside these clinical findings. Hypermagnesemia can cause respiratory distress and impair a newborn's ability to respond to resuscitation by causing hypotonia, a lack of respiratory drive, and even apnea**.**Cardiovascular illness and pulmonary causes of respiratory discomfort can be difficult to identify [22] .Cyanosis, tachypnea, and respiratory distress are common symptoms of congenital heart abnormalities. Because few congenital heart defects present immediately after birth, timing may be an important clue to differentiation. Instead, they commonly present several hours to days after delivery as the ductus arteriosus closes. Any infant with respiratory distress and cyanosis should be evaluated for pulmonary hypertension. The failure to convert from in utero to postnatal pulmonary circulation after delivery causes this syndrome [6]. Because of decreased pulmonary blood flow and right-to-left shunting of blood across the foramen ovale and ductus

arteriosus, pulmonary vascular resistance remains high, resulting in cyanosis. Shunting also causes systemic hypoxia and metabolic acidemia, which both contribute to increased pulmonary vascular resistance. PPHN can be caused by a respiratory condition, such as congenital diaphragmatic hernia[19], MAS, or RDS. Differentiating PPHN from cyanotic heart disease when there is no associated pulmonary illness is challenging. The response to 100% oxygen breathing (hyperoxia test) can assist distinguish the two disorders.[2].

1.6.1 Transient Tachypnea of The Newborn:

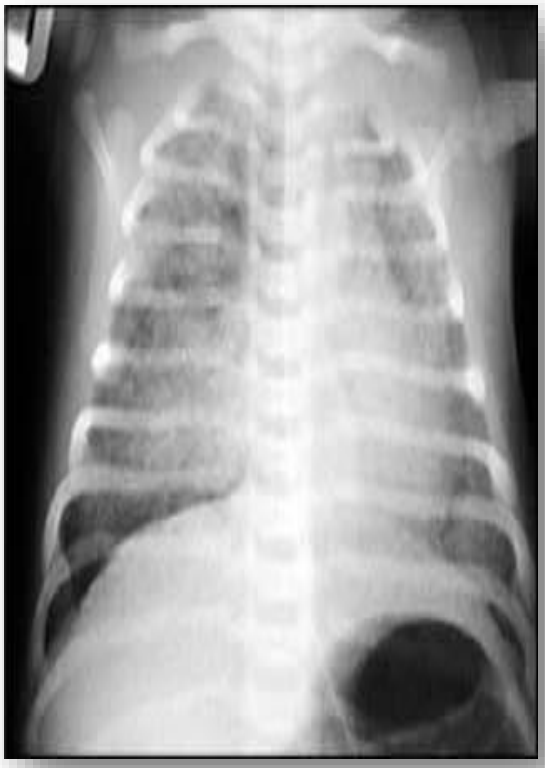


Transient tachypnea of the newborn is the most common cause of neonatal respiratory distress, constituting more than 40 percent of cases. A benign condition, it occurs when residual pulmonary fluid remains in fetal lung tissue after delivery. Prostaglandins released after delivery dilate lymphatic vessels to remove lung fluid as pulmonary circulation increases with the first breath[26]. When fluid persists despite these mechanisms, transient tachypnea of the newborn can result. Risk factors include maternal asthma, male sex, macrosomia, maternal diabetes, and cesarean delivery.The clinical presentation includes tachypnea immediately after birth or within two hours, with other predictable signs of respiratory distress. Symptoms can last from a few hours to two days[17]. Chest radiography shows diffuse parenchymal infiltrates, a “wet silhouette” around the heart, or intrapolar fluid.[1]

Clinical and laboratory criteria for the diagnosis of TTN:

1. The onset of tachypnea (respiratory rate > 60 beats/minute) within 6 hours after birth.
2. Tachypnea lasting for at least 12 hours.
3. Oxygen requirement more than 21%.
4. Presence of at least one finding supporting TTN on chest X-ray (central vascular scars, signs of fluid, or hyper mutation in interloper fissures).[30]

1.6.2 Meconium Aspiration Syndrome:



Meconium- stained amniotic fluid occurs in approximately 15% of deliveries, causing meconium aspiration syndrome in the infant in 10 to 15 percent of those cases, typically in term and post-term infants.10 Meconium is composed of desquamated cells, secretions, lanugo, water, bile pigments, pancreatic enzymes, and amniotic fluid.[29] Although sterile, meconium is locally irritative, obstructive, and a medium for bacterial culture. Meconium passage may represent hypoxia or fetal distress in utero. Similar symptoms can occur after aspiration of blood or nonstained amniotic fluid. It causes significant respiratory distress immediately after delivery. Hypoxia occurs because aspiration takes place in utero.[26] Chest radiography shows patchy atelectasis or consolidation. a recent meta-analysis provides evidence that induction of labor at 41 weeks' gestation reduces the risk of MAS and perinatal death without increasing the risk of caesarean section. [7]

1.6.3 Neonatal Pneumonia:

Risk factors for perinatal pneumonia include prolonged rupture of membranes (PROM), maternal infection, and prematurity. Infants present with increased work of breathing and oxygen requirement. Chest radiography often reveals diffuse parenchymal infiltrates with air bronchograms or lobar consolidation.[25] Pleural effusions may also be seen. In contrast to older infants and children, neonatal pneumonia is part of a generalized sepsis illness; thus, obtaining blood and cerebrospinal fluid cultures and initiating broad-spectrum antibiotic therapy is recommended for any symptomatic infant.[9]

1.7 Non-pulmonary causes :

These causes include anemia, congenital heart disease, congenital malfomation, medications, neurologic or metabolic abnormalities, polycythemia). In birth asphyxia pulmonary dysfunction occurs in approximately 25% of term infants, this may be caused by meconium aspiration syndrome, pulmonary hemorrhage, or persistent pulmonary hypertension. In some infants it progresses to respiratory failure, severe pulmonary hypertension, and right ventricular failure requiring neonatal intensive care [2].

Those infants may have brain stem malfunction including impaired respiratory derive with resultant irregularities of breathing, heart rate and blood pressure. Death from cardio-respiratory failure may occur [31].

1.7.1 Congenital heart diseases :

Congenital heart disease (CHD) affects ~ 1% of newborn infants and accounts for ~ 10% of all congenital anomalies. Cardiac lesions with reduction in pulmonary blood flow do not result in a significant respiratory distress unless cyanosis is profound. Lesions with poor systemic output and acidosis, as well as those with increased pulmonary blood flow, cause respiratory distress. Respiratory distress or poor perfusion should suggest an associated obstruction of the left side of the heart [32].

Acyanotic heart lesions may cause a pulmonary overflow state leading to congestive heart failure [20].The diagnosis is established by 1 wk of age in 40–50% of patients with congenital heart disease and by 1 mo of age in 50–60% of patients.

CHD remains the leading cause of death in children with congenital malformations and result from interaction between genetic and environmental factors [17].

1.7.2 Neonatal anemia:

The consequences of anemia on tissue oxygenation are so diverse, it increases heart and respiratory rates and increases oxygen consumption. It results in a decrease in oxygen transport capacity to the extent that cardio- respiratory status becomes impaired [33].

1.7.3 Persistent pulmonary hypertension:

(PPHN) is a syndrome of acute respiratory failure, characterized by systemic hypoxemia associated with extrapulmonary shunting of venous blood and evidence of elevated levels of pulmonary artery pressure in the absence of congenital heart disease [34]. The etiology may be idiopathic or secondary to meconium aspiration syndrome, pneumonia or sepsis, RDS or transient tachypnea of the newborn [20].

1.7.4 Pneumothorax:

Pulmonary air leaks incidence varies from 1% in term infants to 20% in preterm infants. They are associated with increased mortality and morbidity [37]. Pneumothorax results in abrupt worsening of the respiratory or circulatory status of infants at risk. It may occur spontaneously (idiopathic) or secondary to an underlying lung disease such as RDS, meconium aspiration syndrome , vigorous resuscitation, positive pressure ventilation, pulmonary hypoplasia, pneumonia and congenital pulmonary cystic malformations [38]. In surgical causes of respiratory distress in neonates the underlying mechanisms include airway obstruction, pulmonary collapse or displacement and parenchymal disease or insufficiency such as congenital diaphragmatic hernia, congenital cystic adenomatoid malformation, congenital lobar emphysema and esophageal atresia with or without tracheo-esophageal fistula [10].

1.8 Iatrogenic Respiratory Distress Syndrome:

Respiratory morbidity that occurs in term or near term newborns following caesarean section especially if carried out before the beginning of labor is referred to as "iatrogenic RDS" [8]. The incidence of respiratory distress was reported in 6% of newborns delivered by elective caesarean section (ECS) versus 1% in infants born vaginally [42]. Deliveries by cesarean section continue to increase in both developed and developing countries, rates as high as 50% have been reported in some regions [43]. One third of RDS cases are potentially avoidable [44]. Infants born at 37-38 wk by elective delivery are 120 times more likely to receive ventilatory support for surfactant deficiency than those born at 39-41wk [45]. The risk of RDS was reduced with labor before cesarean section. It is important to be certain of fetal lung maturity before cesarean delivery, particularly when done before labor [46]. During spontaneous labor there is a decrease in secretion of fetal lung liquid and an increase in its absorption and the surfactant is stimulated. This may be mediated by a raised level of catecholamines in the fetus in response to rupture of membranes and labor. When cesarean sections are carried out before labor this catecholamine surge is absent [43]. A significant reduction in neonatal RDS would be obtained if ECS was performed after 39^{+0} gestational weeks of pregnancy [47]. Antenatal betamethasone given to mothers before ECS halved neonatal respiratory morbidity. This will reduce the incidence of transient tachypnea of the newborn from 4% of ECS to 2.1% and that of RDS from 1.1% to 0.2% .

Aim of the Study:

This prospective study was carried out to:

evaluate the cases of respiratory distress in early neonatal period in relation to causes, outcome, neonatal, maternal, labor and delivery characteristic.

2.1 Patients and methods

A descriptive study had been carried out on 100 full term neonates (gestational age 37 weeks and more) who were admitted to Bent Alhuda Maternity and Children Hospital with signs of respiratory distress in both neonatal care units, the first neonatal unit (inborn cases) and the second neonatal care unit (outborn) for 4 months period from the first of December till the end of March 2021-2022. The total admission during same period was 1842, 764 with Respiratory distress, 100 cases of them were studied. Their ages range from less than 24 hour to 7 days. (56) of them were males and (44) were females.

2.2 Data collection

A special questionnaire was designed for the purpose of the study. The following information were taken: name, age at admission, sex, and residence of the family, date of admission .Neonatal data included: body weight, gestational age according to the date of last menstrual period of the mother, singleton or multiple births, Apgar score if available, need for resuscitation after birth, days of hospitalization. Factors related to labor and delivery were assessed including: type of delivery (vaginal or cesarean section ,place of delivery (home or hospital), complications (prolonged rupture of membranes >18 hr, prolonged labor, meconium staining of liquor, antepartum hemorrhage and others). Maternal information were recorded including: age (high risk group 35 yr and low risk group 18-35 yr, [18] parity (which is divided into risk group=P0 or > P4 and normal group = P1-4), any medical disease, antenatal care attendance (if present or not), history of any sign of infection before labor, maternal education and work also were inquired. Full examination was done for all patients and only fullterm were included in the study with signs of respiratory distress (grunting, cyanosis, retractions, tachypnea or apnea), all were weighed and classified to risky weight (small for gestational age (SGA) $\leq$ 2.5 kg and large gestational age (LGA) $\geq$ 4 kg)and normal weight group(2.5-4 kg). Chest x-ray was sent for all patients and classified into normal and abnormal findings (depending on opinion of the physician and radiologist). Then they were followed in the ward for duration of hospitalization and outcome) The frequency of RD and deaths were calculated from total admission and total deaths. Neontal, maternal, labour characteristics were studied with causes of RD and deaths.

2.3 Statistical analysis

It was done by using SPSS program (version15), data were expressed and comparisons of proportions was performed using the chi square, P-value of < 0.05 was considered as statistically significant. Descriptive summarization of the data consisted of frequency counts and percentages.

3.1 Results

A total of 100 live term neonates with signs of respiratory distress who were admitted to the neonatal care unit included in the study, 56 are males and 44 are females.

Table (3-1).Cases of respiratory distress and death in relation to total admission and total death:

NCU	total admission	total RD
	1842	764 (41.4%)
	total death	Death due to RD
NCU	241(13%)	103 (42.7%)

*NCU= neonatal care unit

Table(3-1) showed the total cases of full term neonates with respiratory distress who were admitted to the 2nd neonatal care units in Bent ALhuda maternity and children hospital in relation to the total admissions and deaths during the study period. It demonstrated that 1842 of total admissions to the 2nd neonatal care unit 764 due to early respiratory distress, while death was about 103 cases from a total of 241 deaths in the neonatal care unit for same causes . Nearly (41.4%) of admission was due to RD and (42.7%) of deaths were due to RD

Table (3-2). Neonatal characteristics of cases with respiratory distress

neonatal characteristics		NO. %	%	P-value
gestational age	37-38wk	82	82%	<0.001
	39-40wk	18	18%	
body wt.	<2.5kg	8	8%	<0.001
	2.5-4kg	89	89%	
	>4kg	3	3%	
need resuscitation	yes	85	85%	<0.001
	no	15	15%	
sex	male	56	56%	0.01
	female	44	44%	
age	1day	29	29%	<0.001
	1-7days	71	71%	
days of hospitalization	<3days	56	56%	>0.05
	≥3days	44	44%	

*P-value of < 0.05 regarded as statistically significant.

Table (3-2) reveals that the majority of patients included in the study (82%) were between (37- 38) weeks of gestation, most of them were males (65%) and were more than 24 hours of age in (71%) of cases. There is statistically significant differences regarding gestational age, and postnatal age. More than two third (89%) neonates their weights were between 2500gm to 4000 gm. About (85%) of them need resuscitation there is significant association but there is no significant association from statistical points regarding the duration of hospitalization.

Table (3-3) . Clinical and radiological findings of neonates with respiratory distress

clinical features	NO. %	
grunting	51 (51%)	
cyanosis	83 (83%)	
retractions	56 (56%)	
tachypnea	85 (85%)	
CXR findings	normal	90 (90%)
	abnormal	10 (10%)

Table (3-3) illustrates that the main signs of respiratory distress at time of presentation are tachypnea and cyanosis 85%, 82% respectively followed by subcostal and intercostal retractions (56%) .Nearly 90% of the cases showed normal findings on chest x-ray .

Table (3-4) . Characteristics of labor and delivery.

variable		NO. %	%	P-value
prolonged rupture of membranes	yes	5	5%	<0.001
	no	95	95%	
prolonged labor	yes	20	20%	<0.001
	no	80	80%	
meconium staining liquor	yes	2	2%	<0.001
	no	98	98%	
type of delivery	CS	66	66%	0.01
	vaginal	44	44%	
place of delivery	home	2	2%	<0.001
	hospital	98	98%	

P- value regarded as statistically significant if <0.05.

Table (3-4) shows the characteristics of labor and delivery for the newborn infants with respiratory distress which illustrates that Majority of these neonates (98%) were delivered at hospital by cesarean section with or before the onset of labor, compared with (44%) who were delivered vaginally 2% of them delivery occurred at home.

Table (3-5) maternal characteristics in cases of respiratory distress

Maternal characteristics		NO.	%	p-value
maternal age	<18&>35y	14	14%	<0.001
	18-35y	87	87%	
parity	0&>4 p	7	7%	<0.001
	1-4 p	93	93%	
maternal illness	Yes	29	29%	<0.001
	No	71	71%	
ANC	yes	65	65%	<0.001
	no	35	35%	
signs of infection	yes	42	42%	0.11
	No	58	58%	
maternal education	<6y	60	60%	0.01
	>6y	40	40%	
maternal work	housewife	98	98%	<0.001
	employed	2	2%	
residence	center	37	37%	0.01
	periphery	63	63%	

P- value regarded as statistically significant if <0.05.

This table shows the characteristics of mothers of the index cases which reveals that a higher percent (87%) of them are between (18-35) years, and have (1-4) children (93%). Majority of them (71%) had no medical illness and (65%) had antenatal care (weather regular or irregular) which are significant statistically. One hundred sixteen (60%) of the mothers had studying years of less than 6 years and (98%) are not employed that is statistically significant with p-value of less than (0.001). Most of those mothers live in peripheral of the city (63%).

Table (3-6) Clinical diagnosis of newborns with respiratory distress in relation to the mode of delivery:

diagnosis	NO.	%	vaginal	CS
transient tachypnea of newborn	55	55%	10 (18.2%)	45 (81.8%)
birth asphyxia	15	15%	12 (80%)	3 (20%)
Sepsis	10	10%	8 (80%)	2 (20%)
Pneumonia	7	7%	6 (85.7%)	1 (14.3%)
congenital heart diseases	7	7%	5 (71.4%)	2 (28.6%)
other congenital defects	6	6%	3 (50%)	3 (50%)
Total	100	100%	44 (44%)	66 (66%)

Table (3-6) illustrates the relation between the mode of delivery and the clinical diagnosis of neonates admitted for respiratory distress with most cases are diagnosed with transient tachypnea of the newborn (55%), (81%) of them are delivered by cesarean section while most cases of asphyxia (80%) were delivered vaginally .

Table (3-7) death in relation to clinical diagnosis of neonates with respiratory distress

causes of RD	Total No.	Death		Deaths % from total death(13) (mortality)
		NO.	% from the group	
transient tachypnea of newborn	55	0	0	0
birth asphyxia	15	3	20%	23%
Early Sepsis	10	6	60%	46.1%
pneumonia	7	1	14.30%	7.6%
congenital heart diseases	7	2	28.60%	15.3%
other congenital defects	6	1	16.60%	7.6%
Total	100	13(13%)		

Table (3-7) demonstrates that total death is 13 cases, most of them occurred in neonates with neonatal sepsis (60%) of cases, followed by birth asphyxia (20%) of cases then congenital heart disease.

Table (3-8) Death in relation to neonatal & maternal factors

variables		NO.	No. of deaths (13) 13%	% From the group	p-value
gestational age	37-38wk	82	10 (76.9%)	12.1	<0.001
	39-40wk	18	3 (23%)	16.6	
body wt.	<2.5kg	8	5(38,4%)	62.5	<0.001
	2.5-4kg	89	8 (61.5%)	8.9	
	>4kg	3	0	0	
sex	male	56	9 (69.2%)	16	0.04
	female	44	4 (30.7%)	9	
age	1day	29	8 (61.5%)	27.5	0.05
	1-7days	71	5 (38.4%)	7	
days of hospitalization	<3days	56	7 (53.8%)	12.5	0.02
	≥3days	44	6 (46.1%)	13.6	
maternal age	<18&>35y	14	3 (23%)	21.4	0.01
	18-35y	87	10 (76.9%)	11.4	
parity	0&>4 p	7	1 (7.6%)	14.2	0.02
	1-4 p	93	12 (92.3%)	12.9	
ANC	regular	65	4(30.7%)	9.6	<0.001
	irregular	35	9 (69.2%)	57.1	
maternal education	<6y	60	8 (61.5%)	13.3	0.02
	>6y	40	5 (38.4%)	12.5	

P- value regarded as statistically significant if <0.05.

Table (3-8) demonstrates the relation between maternal and neonatal factors and death. It shows that death is higher between 37-38 weeks of gestation (76%), Majority of those neonates who died (61.5%) their weights are between 2500 to 4000 gm at birth, Both are

significant statistically view p value <0.001. Also shows that death is higher in males (69.2%) than in females and there is no statistically significant Also there is significant relation between mothers those had (1-4) children and the death .In nine cases who died their mothers did not have any antenatal care visits. Also eight cases who died their mothers studied in the school for less than 6 years.

4.1 Discussion

Respiratory distress is one of the most common reasons for admission to the neonatal care unit. The cause may be of pulmonary or non-pulmonary origin (such as cardiac, infectious, metabolic, central nervous system and other miscellaneous conditions). There is a highly variable range of diseases that can present with respiratory distress in the full term newborns.

The physician must consider the potential causes of respiratory distress and the difficulties in attempting to make a definitive diagnosis in the first hours of life. Some causes are relatively innocent, but others are potentially life threatening [(43)].

In this study, the main presenting clinical features were tachypnea followed by chest retractions . This is in contrast to that reported by Dehdashtian et al in Iran [(42)], the commonest clinical features were grunting followed by tachypnea and intercostal retractions.

Most full term neonates who were admitted to the neonatal care unit for respiratory distress were found to be less than 39 weeks of gestation. This result is similar to that reported by Stutchfield [(16)] and Madar et al [(14)] who demonstrated an increased incidence of respiratory distress with decreasing gestational age from 41 to 37 weeks. Donaldsson, et al [(2)] reported that the incidence of respiratory dysfunction was inversely related to the gestational age even in the term infants. Wax et al [(13)] showed that infants born at 37-38 weeks were at significantly increased risk for severe respiratory distress syndrome (RDS), and deaths. The explanation for this is that with increasing gestational age the lungs become sufficiently mature to support respiration and the incidence of hyaline membrane disease decreases rapidly .[(20)]

This study demonstrated that males were more frequently affected than females and the death was more among them. This is the same as Stutchfield [16] and Roth–Kleinberg et al [(3)] who stated that male sex is a risk factor for respiratory distress. The cause for that is unexplained.[(19)] Condò et al.[(26)] concluded that low-birth weight in term infants was the main risk factor for RD . Regarding delivery, this study demonstrated that large number of cases were delivered by caesarean section, this might be associated with increased number of iatrogenic caesarean section for many causes like wrong calculation of gestational age, repeated caesarean section or for tubal ligation and many studies demonstrated an increase in the incidence of respiratory distress due to

iatrogenic caesarean section ,Gouyon et al. [26]studied risk factors of RD in term infants and concluded that elective cesarean section is the main risk factor for respiratory distress in term infants. Thus, it is evident that the onset of spontaneous labor is associated with rapid clearance of fetal lung fluid and lung maturation [26,20] In the present study, the commonest clinical diagnosis was transient tachypnea of the newborn (TTN),two third of them were delivered by caesarean section, Hales et al, [20] found that TTN was more frequent in infants born by cesarean section in the absence of labor, this finding can be explained by the possibility that labor and delivery enhance neonatal lung adaptation by inducing a surge of catecholamines in the fetus which stimulate the absorption of fetal lung fluid, inhibit secretion of fetal lung fluid and increase the release of surfactant [12] This is similar to a study by Zanardo, et al [15] and Dehdashtian et al in Iran.[11] Derbent, et al [21] observed that vaginal delivery had a protective effect compared with elective caesarean section delivery for all gestational age groups. The potential beneficial effect of compression in the birth canal remains a plausible explanation. [22] Asphyxia was also found to be important an cause of RD in other study by Majeed et al [10] who showed that (46%) of neonates with birth asphyxia presented with respiratory distress and pulmonary dysfunction may be caused by meconium aspiration syndrome or persistent pulmonary hypertension.[9] The present study demonstrated that most cases of early sepsis were delivered by vaginal route, this is the same as Jain et al [23] in Nepal, who showed that more than half of the cases with suspected sepsis were delivered vaginally. Liu et al. [26] studied the characteristics of full-term infants with RD , and they reported a high mortality rate associated with severe infection complicating the course of the disease .[26]

Perinatal asphyxia is a global problem causing serious sequelae regarding morbidity and mortality. Majeed et al [31], showed that 46% of neonates with birth asphyxia presented with respiratory distress.

Meconium aspiration syndrome is one of the common causes of respiratory distress in the newborn. Term neonates with meconium aspiration syndrome are a high risk population with significant morbidity and often require intensive therapy[27].

In the present study, the commonest clinical diagnosis was transient tachypnea of the newborn followed by birth asphyxia and pnemonia . This is in contrast to Shiva F.[44], who demonstrated that the commonest diagnoses were pneumonia, meconium aspiration syndrome, sepsis followed by transient tachypnea of the newborn, while

Kuri et al [3], found that TTN was the most common cause for mild to moderate early respiratory distress .

This study shows that, most deaths among neonates who were admitted for respiratory distress due to birth asphyxia and early neonatal sepsis, about two third of death occurred among males and were less than 39 weeks of gestation.

No death was reported due to TTN or neonatal pneumonia. This is unlike what is reported by Webber et al [45], who demonstrated that fatality rate for neonatal pneumonia in the first week of life was 14% and Mathur et al [16], showed that fatality in neonates with meconium aspiration was 50% and due to pneumonia was 25.8% but no death was reported in neonates with TTN.

4.2 Conclusion :

From this study it can be concluded that:

- About half of the admitted cases to the neonatal care units represent term neonates with respiratory distress and forty-two precent of the deaths were due to respiratory distress in the early neonatal period.
- Eighty two percent of those term neonates were early neonates (37-38) weeks gestation.
- Eighty nine percent of them had normal birth weight .
- Most of the mothers had less than 6 years of education and are housewives.
- Half of the cases were delivered by caesarean section .
- Transient tachypnea of the newborn was the commonest cause of respiratory distress in the full term neonates and about ¼ of cases were due to extrapulmonary causes.
- Males were admitted more frequently than females and death

4.3 Recommendations:

- Delaying non-urgent elective caesarean section until 39 weeks gestation to reduce neonatal admission to special neonatal care units for respiratory distress with wise indications for caesarean section to decrease iatrogenic respiratory distress.
- Good fetal monitoring during labor to detect any sign of fetal distress early, prevent meconium aspiration and birth asphyxia with immediate intervention in the delivery room and health care providers should be trained in newborn resuscitation because perinatal asphyxia is an important cause of respiratory distress and large number of these cases died .
- Intrapartum antibiotics for premature rupture of membranes with the use of antiseptic techniques during labor and delivery to decrease the risk of neonatal sepsis
- Being oriented about the extrapulmonary causes and the presence of adequate diagnostic tools.

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