

Respiratory Distress in Full Term Neonates in the First Week of Life in Basrah Maternity and Children Hospital

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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 Basrah Maternity and Children Hospital to assess the causes, outcome, and neonatal, maternal, labor, and delivery characteristics. **Patients and Methods:** a total of (167) full term neonates, (103) males and (64) females, their ages range from less than one hour to 7 days who were admitted for respiratory distress (from the first of March to the end of August 2010) were recruited in the study from a total of (2858) cases admitted to the 1st and 2nd neonatal care units during the study period, (1348) 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 chest retractions and tachypnea. Eighty four (50.3%) of cases were delivered by caesarean section. It was found that (78.4%) of cases had a gestational age less than 39 weeks and (80.8%) were less than 24 hours of age. Both are statistically significant with p value <0.001. One hundred forty six (87.4%) had a normal body weight (2500 to 4000 gm). Ninety one (54.5%) of cases need hospitalization for 3 days or more. It was found that 39(23.4%) of the mothers were risky regarding their ages (<18 years and >35 years) and (27.5%) of the cases had no antenatal care, 95% of mothers were not employed and had less than 10 years of schooling. It was found that 75 (44.9%) cases were due to Transient tachypnea of the newborn and 50.7% of them were delivered by elective caesarean section followed by birth asphyxia in 22(13.2%) cases; (16) (72.75%) of them were delivered vaginally. Meconium Aspiration syndrome was found in (9.6%) of cases, early sepsis in (8.4%), and pneumonia in (7.8%). Congenital heart diseases was responsible for (7.8%) of cases, while anemia was found in (4.2%) of total cases, pneumothorax in (3%) and Respiratory Distress Syndrome in only (1.2%). The deaths were 15(9%) from 167 cases, the commonest causes were found to be due to birth asphyxia and early sepsis, 13 deaths (12.6%) occurred among males and more deaths among those who were less than 39 weeks gestation (9.16%). The total deaths due to Respiratory Distress in the study period were (35) from a total (174) and (150) from a total of (680) deaths in the 1st and 2nd neonatal care units respectively which constitute one fifth of the total deaths. **Conclusions:** A wise and correct decision of timing of caesarean section is needed with prevention and management of asphyxia and sepsis in addition to adequate measures and facilities of treatment for hospitalized neonates. (MJBU, 30, 2, 2012, 91-98)

عسر التنفس في الحديثي الولادة المكتملين في الأسبوع الأول في مستشفى البصرة للولادة والأطفال

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أجريت هذه الدراسة الوصفية المستقبلية على الأطفال الحديثي الولادة المكتملين النمو الذين يعانون من عسر التنفس في الفترة الوليدية المبكرة والذين ادخلوا الى وحدات العناية الوليدية في مستشفى البصرة للولادة والأطفال لتقييم الأسباب، النتائج وخصائص الأم والوليد مع خصائص عملية المخاض والولادة التي يمكن أن تسبب عسر التنفس. تضمنت الدراسة (167) حالة من الأطفال حديثي الولادة المكتملين النمو الذين ادخلوا الى وحدات العناية الوليدية الخاصة نتيجة عسر التنفس، (103) من الذكور و (64) من الإناث، تتراوح أعمارهم ما بين اقل من ساعة الى سبعة أيام في الفترة (ما بين آذار ولغاية نهاية آب 2010) من مجموع (2858) حالة من الأطفال حديثي الولادة الداخليين الى ردهات الخدج الأولى والثانية، (1348) حالة أدخلت بسبب عسر التنفس. أخذت معلومات مفصلة عن الأم، الفترة ما قبل وبعد الولادة، وتم إجراء فحص سريري كامل لكل طفل. وجد إن الإعراض الأكثر شيوعا لعسر التنفس هي انسحاب الصدر وتسارع التنفس. أربعة وثمانون (50.3%) من هذه الحالات ولدوا بعملية قيصرية. كما وجد إن (78.4%) منهم فترة الحمل كانت اقل من 39 أسبوع و(80.8%) كانت أعمارهم اقل من 24 ساعة وبقيمة احتمالية اقل من 0.001. كما وجد إن (146) طفل لهم أوزان طبيعية ما بين 2500-4000 غم وحوالي نصف الحالات تحتاج أكثر من 3 أيام فترة بقاء في المستشفى. تسعة وثلاثون (23.4%) من الأمهات مخطورات بالنسبة للعمر وليس لديهم أي رعاية طبية خلال الحمل في (27.5%) منهم (95%) من الأمهات غير عاملات وقد درسن اقل من 10 سنوات. وجد إن (44.9%) من الحالات سببها تسارع التنفس الولادي المؤقت وفي (50.7%) منهم الولادة تمت بواسطة عملية قيصرية اختيارية قبل المخاض وبعدها الاختناق الولادي في (22) (13.2%) من الحالات ومنهم (72.7%) ولدوا ولادة طبيعية.

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INTRODUCTION

Mild to moderate respiratory distress (RD) in fullterm neonate is a frequent condition resulting from defect in birth related changes with variable clinical course and complex etiology, and affect neonates after birth.^[1] The incidence of respiratory dysfunction is inversely related to gestational age being more in 37-38 than, 39-42 weeks.^[2] Acute respiratory disease is, beside prematurity, the leading cause for hospitalization in neonatal intensive care units.^[3] Neonatal respiratory distress is a common problem confronting family physicians. It is the most common reason that sick neonates require transfer to a referral center; about 79% of all transports involved a baby with respiratory distress. Although respiratory distress may represent a benign, self limited process, it may also be the first sign of sepsis or serious cardiopulmonary disease.^[4] The overall incidence of respiratory distress in term babies is (4.2%).^[5] The clinical presentation of respiratory distress in the newborn includes: apnea, cyanosis, grunting, inspiratory stridor, nasal flaring, poor feeding, tachypnea (more than 60 breaths per minute), retractions in the intercostal, subcostal, or supracostal spaces.^[6] The causes of respiratory distress can be divided into: upper airway abnormalities which include: choanal atresia, macroglossia, Pierre-Robin syndrome, lymphangioma, teratoma or other mediastinal masses, cysts, subglottic stenosis and laryngotracheomalacia,^[7] lower airway abnormalities which include: Transient tachypnea of the newborn, Respiratory distress syndrome (hyaline membrane disease RDS), meconium aspiration syndrome, infection (e.g. pneumonia, sepsis).^[8] Non-pulmonary causes include birth asphyxia, anemia, congenital heart diseases, congenital malformation, medications, neurologic or metabolic abnormalities, polycythemia, and pneumothorax.^[9,10] Respiratory morbidity is an

important complication of elective cesarean section (ECS) in term infants. The incidence of respiratory distress was reported in 6% of newborns delivered by ECS versus 1% in infants born vaginally.^[11] Deliveries by cesarean section continue to increase in both developed and developing countries, rates as high as 50% have been reported in some regions.^[12] One third of RDS cases are potentially avoidable.^[13] 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.^[14] A significant reduction in neonatal RDS would be obtained if ECS was performed after 39 gestational weeks of pregnancy.^[15] Some studies had shown that delaying non-urgent elective caesarean section until 39 weeks is much more effective in avoiding neonatal admission than giving antenatal steroids.^[16] Neonates with respiratory distress are 2-4 times more likely to die than those without respiratory distress so its prevention and adequate management will decrease mortality.^[17] This descriptive 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 characteristics in full term neonates.

PATIENTS AND METHODS

Patients

A descriptive study had been carried out on 167 full term neonates (gestational age 37 weeks and more) who were admitted to Basrah 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 6 months period from the first of March till the end of August 2010. The total admission during same period was 2858, 1348 of them were fullterm with Respiratory distress, 167 cases of them were studied. Their ages range from one hour to 7

days, (103) of them were males and (64) were females.

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 and date of discharge or death. 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= elective or emergency), 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 <18 yr or >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 concentrating on assessment of gestational age (depending on Ballard Scoring System)^[18] 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. Neonatal, maternal, labour characteristics were studied with causes of RD and deaths. An informed consent was obtained from the family for recruitment in the study.

Statistical analysis

Statistical analysis was done 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. Fisher's Exact Test was used whenever applicable.

RESULTS

Nearly 50% of admission was due to RD and 20% of deaths were due to RD, (Table-1).

Table 1. Cases of respiratory distress and death in relation to total admission and total death.

NCU*	Total admission	Total respiratory distress
NCU1	768	385 (50.1%)
NCU2	2090	963 (46%)
	Total death	Death due to RD
NCU1	174	35(20.1%)
NCU2	680	150(22%)

*NCU= neonatal care unit

The majority of patients (78.4%) were between (37-38) weeks of gestation, males were 103(61.7%) and were less than 24 hours of age in 135(80.8%) of cases. There are statistically significant differences regarding sex distribution, gestational age and postnatal age, (Table-2).

Table 2. Neonatal characteristics of cases with respiratory distress

Neonatal Characteristics		No.	%	P-value
Gestational age	37-38 wk	131	78.4	<0.001
	>38-40 wk	36	21.6	
Body weight	<2500g >4000 g	21	12.6	<0.001
	2500-4000g	146	87.4	
Need for resuscitation	Yes	41	24.6	<0.001
	No	126	75.4	
Sex	Male	103	61.7	0.01
	Female	64	38.3	
Age	<24 hr	135	80.8	<0.001
	≥24 hr	32	19.2	
Days of hospitalization	<3 days	76	45.5	>0.05
	≥3 days	91	54.5	

(Table-3), illustrates that the main signs of respiratory distress at time of presentation are dyspnea with subcostal and intercostals retractions 160(95.8%) Nearly half of the cases showed abnormal findings on chest x-ray while

(Table-4), revealed that 69.5% of mothers had less than 10 years of education, 41.9% of them were primigravida and > P 4, 27.5% had no ANC, 23.4% of mothers had risky age (< 18 and >35 years).

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

Clinical features	No.	%	
Grunting	84	50.3	
Cyanosis	44	26.3	
Retractions	160	95.8	
Tachypnea	150	89.8	
Chest x-ray findings	<i>Normal</i>	83	49.7
	<i>Abnormal</i>	84	50.3

Table 4. Maternal characteristics in cases of respiratory distress

Maternal characteristics		No.	%	P-value
Maternal age	<18 & >35 yr	39	23.4	<0.001
	18-35 yr	128	76.6	
Parity	0 & > 4	70	41.9	0.11
	1-4	97	58.1	
Maternal illness	Yes	32	19.2	<0.001
	No	135	80.8	
ANC	Yes	121	72.5	<0.001
	No	46	27.5	
Signs of infection	Yes	10	6	<0.001
	No	157	94	
Maternal education (yr of school)	<10 yr	116	69.5	<0.001
	>10 yr	51	30.5	
Maternal work	Yes	7	4.2	<0.001
	No	160	95.8	
Residence	Center	95	56.9	0.16
	Periphery	72	43.1	

(Table-5), demonstrated that (50.4%) were delivered at hospital by cesarean section, compared with 83(49.7%) who were delivered vaginally.

Table 5. Characteristics of labor and delivery.

Variable		No.	%	P-vale
Prolonged rupture of membranes	Yes	19	11.4	<0.001
	No	148	88.6	
Prolong labor	yes	16	9.6	<0.001
	No	151	90.4	
Meconium staining liquor	Yes	33	19.8	<0.001
	No	134	80.2	
Type of delivery	Vaginal	83	49.7	>0.05
	C/S	84	50.3	
Place of delivery	Home	15	9	0.001
	Hospital	152	91	

More than half of neonates with transient section while most cases of asphyxia (70.7%) tachypnea were delivered by elective cesarean were delivered vaginally, (Table-6).

Table 6. Clinical diagnosis of newborns with respiratory distress in relation to the mode of delivery

Diagnosis	No. (%)	Vaginal	Elective c/s	Emergency c/s
Transient tachypnea of newborn	75 (44.9)	21 (28)	38 (50.7)	16 (21.3)
Birth asphyxia	22 (13.2)	16 (72.7)	0	6 (27.3)
Meconium aspiration syndrome	16 (9.6)	12 (75)	0	4 (25)
Sepsis	14 (8.4)	9 (64.3)	3 (21.4)	2 (14.3)
Pneumonia	13 (7.8)	10 (76.9)	3 (23.1)	NO
Congenital heart disease	13 (7.8)	9 (69.2)	2 (15.45)	2 (15.4)
Anemia	7 (4.2)	1 (14.3)	0	6 (85.7)
pneumothorax	5 (3)	5 (100)	0	0
Respiratory Distress Syndrome	2 (1.2)	0	2 (1.2)	0
Total	167(100)	83 (49.7)	48 (28.7)	36 (21.6)

(Table-7), showed that 2/3 thirds of cases of death related to early sepsis and asphyxia. three days of hospitalization, (73.3%) had mothers studied in the school for less than 10 (80%) of deaths were delivered between 37-38 years with no ANC, (Table-8). weeks of gestation, (66.7%) occurred within

Table 7. Death in relation to clinical diagnosis

Causes of Respiratory Distress	Total No.	Death	
		No.	%
Early sepsis	14	5	33.33
Birth asphyxia	22	5	33.33
Congenital heart diseases	13	2	13.33
Pneumothorax	5	2	13.33
Anemia	7	1	6.70
Transient tachypnea of the newborn	75	0	0
Pneumonia	14	0	0
Meconium aspiration	16	0	0
Respiratory Disress Syndrome	2	0	0
Total	167	15 (9%)	100

Table 8. Death in relation to some neonatal & maternal factors.

Variable neonatal Factors	Total No. (167)	No. of deaths %		% from the group	P-value
		(15)	(8.9)		
Body weight	<2500 & >4000g	21	2	9.5	0.003
	2500-4000 g	146	13	8.9	
Gestational age(wk)	37-38	131	12	9.2	0.02
	>38-40	36	3	8.3	
Sex	Male	103	10	9.9	0.01
	Female	64	5	7.8	
Days	<3 days	76	10	13.1	0.04
	≥3 days	91	5	5.5	
Maternal factors Maternal age(yr)	<18 & >35	39	4	10.2	0.01
	18-35	128	11	8.6	
Parity	Primi & >4	70	5	7.1	0.02
	1-4	97	10	10.3	
Education	<10 yr	116	11	9.5	0.01
	≥10 yr	51	4	7.8	
Antenatal care	Yes	121	4	3.3	0.05
	No	46	11	23.3	

DISCUSSION

Respiratory distress is one of the most common reasons for admission to the neonatal care unit. Some causes are relatively innocent, but others are potentially life threatening. [4] During the study period, about half of the total admissions to the 1st and 2nd neonatal care units were due to respiratory problems in fullterm neonates and their death was nearly 20% of the total deaths. Regarding the number of cases, the result was similar to another study in Switzerland which found that respiratory distress was diagnosed in (52.8%) of all admitted neonates to the neonatal care units and the mortality was about (3.5%). [19] This indicates that the admission rate because of respiratory distress in fullterm neonates is high due to the presence of multiple causes, [19] while the mortality is low in such a developed country due to availability of resuscitation facilities like ventilators and surfactant therapy. Most fullterm 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] This study showed that about (24.6%) of those neonates required resuscitation after birth and majority were less than 24 hour of age or at immediate period after birth at time of admission this might increase the concern about the importance of perinatal factors as a cause for hypoxia which may lead to respiratory distress. Regarding maternal characteristics, majority of mothers are not employed, and of low education. The same finding was reported by Hansen et al [12] who

had shown that the risk of respiratory morbidity in term infants was more if the mother had less than 10 years of schooling. Educated mothers know how to deal with their babies and know when to seek advice also low education is one of the factors that contribute to high risk pregnancy.^[9] The deaths were more among infants of low educated mothers. 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.^[20] In the present study, the commonest clinical diagnosis was transient tachypnea of the newborn (TTN), half of them were delivered by elective 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] Birth asphyxia was found to be 2nd cause of RD.^[1] 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, it also results in brain stem malfunction with the impairment of respiratory

derive.^[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. Regarding deaths, it was found that (9%) of cases died, mostly due to birth asphyxia, and early sepsis. A study in India done by Bang et al^[24] showed that sepsis was the primary cause of death in 52% of neonatal deaths, while Webber, et al in the United Kingdom^[25] demonstrated that death due to pneumonia in neonates presented in the 1st week of life was 14%. Mathur et al,^[17] showed that the fatality in neonates with meconium aspiration was 50% and due to pneumonia was 25.8% but no death was reported in neonates with TTN. Early term neonates (37-38) weeks of gestation and were found to have more deaths, that is because the incidence of respiratory dysfunction is inversely related to the gestational age even in the term infants and they are at significantly increased risk for severe RDS.^[2,12] Thus delaying non-urgent elective caesarean section until 39 weeks gestation, wise indication of caesarean section to decrease iatrogenic respiratory distress, management of asphyxia and sick infants are recommended to decrease RDS among full term early neonates

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