



Assessment of Neonatal Respiratory Distress Incidences with Causes, Mortality and Morbidity in a Tertiary Care Hospital

**Kanwal Baloch¹, Delijan Mugheri¹, Abdul Majeed Soomro²,
Wasim Sarwar Bhatti², Muhammad Khan², Shafi Muhammad Wassan¹,
Shumaila Usman³, Uzair Nisar⁴, Waseem Abbas Malhani^{5*}, Nadeem Baloch⁵,
Altaf Ali Mangi⁶, Saika Lashari⁷, Rashid Ali Arbani⁷, Sultan Othman Alolyan⁸,
Shumaila Parveen Arain⁹ and Sultan M Alshahrani⁸**

¹Shaheed Mohtarma Benazir Bhutto Medical University, Pakistan.

²Pir Abdul Qadir Shah Jillani Institute of Medical Science Gambat, Pakistan.

³Department of Research, Ziauddin University Karachi, Pakistan.

⁴Faculty of Pharmacy, Ziauddin University Karachi, Pakistan.

⁵Institute of Pharmacy Shaheed Mohtarma Benazir Bhutto Medical University, Pakistan.

⁶Faculty of Pharmacy, Gomal University, DI Khan, Pakistan.

⁷Department of Pharmacy, Shah Abdul Latif University, Khairpur, Pakistan.

⁸College of Pharmacy, Taibah University, Saudi Arabia.

⁹Faculty of Pharmacy, University of Sindh, Jamshoro, Pakistan.

Authors' contributions

This work was carried out in collaboration among all authors. Authors SU, SOA, SMA and KB designed the study. Authors SMW, AMS, MK, WSB and UN performed the statistical analysis. Authors SL, SPA and RAB wrote the protocol and wrote the first draft of the manuscript. Authors NB, WAM, AAM and DM managed the analyses of the study, collection of data and managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: The objective of this study conducted in a neonatal intensive care unit of a tertiary care hospital Larkana was to check the prevalence of respiratory distress in neonates and their morbidity and mortality associated with respiratory distress.

*Corresponding author: E-mail: waseemmalhani@yahoo.com;

Methods: A retrospective analysis of neonates with the respiratory distress syndrome during the period of one year was evaluated. The prevalence, risk factors related with respiratory distress syndrome were compared on the basis of neonatal and maternal factors.

Results: The Majority of respiratory distress in our study, were due to Transient Tachypnea of newborn (TTN) 29.8%, RDS 22.1%, birth asphyxia 17%, and Meconium Aspiration Syndrome (MAS) 15.7%. Overall outcome of Neonatal Respiratory Distress was cure rate in 65.4%, Neonatal mortality rate 26.84% with highest mortality due to RDS and Sepsis and the morbidity rate is 7.7%.

Conclusion: The TTN was the most common cause of respiratory distress in neonates. Mortality rate was 26.84% and was highest among the neonates with respiratory distress syndrome.

Keywords: Neonates; Respiratory Distress Syndrome (RDS); Transient Tachypnea of newborn (TTN); Meconium Aspiration Syndrome (MAS).

1. BACKGROUND

The most common cause behind the infants admission in neonatal intensive care unit is the respiratory distress [1]. It has been reported that admission of the neonates in NICU having a less than 34 week of gestational age is much higher compare to late preterm and term neonates with a substantial respiratory morbidity [2]. There are certain factors including caesarian delivery, pre mature babies, gestational diabetes, meconium stained amniotic fluid and structural abnormalities that are observed in prenatal ultrasonographic outcomes. In newborn the respiratory distress is recognized as chest retractions, tachypnea, grunting or nasal flaring. Tachypnea is the rate of respiration greater than 60 breathes in a minute [3]. It has been observed that among the all late preterm babies nearly every third child is admitted in NICU with respiratory distress syndrome [4,5]. The pathophysiological basis of the respiratory distress in neonates is the deficiency of surfactant that is closely related with weight of child after birth [7] and the gestational age [6]. The important diagnostic criteria for the diagnosis of respiratory distress are the acidosis and chest X-ray findings [8]. The occurrence of the acute respiratory distress syndrome is one and half per million (4, 702) to 79 cases per million [6]. The incidence of acute respiratory distress syndrome are less in European countries as compare to USA [5].

1.1 Study Objective

The objective of this study conducted in a neonatal intensive care unit of a tertiary care hospital Larkana was to check the respiratory distress prevalence in neonates admitted at NICU of a tertiary care hospital and their morbidity and mortality associated with

respiratory distress along with the clinical features and investigations and risk factors.

2. METHODOLOGY

A retrospective analysis of neonates who were admitted in neonatal intensive care unit with the respiratory distress syndrome during the period of one year was evaluated with the help of complete medical record. A sample size was calculated by using WHO sample size calculator. The prevalence, risk factors related with respiratory distress syndrome were compared on the basis of

- Maternal factors like the age of mother, gestational diabetes and hypertension due to pregnancy and way of delivery
- Factors related with neonates including gestational age, asphyxia, inhalation syndrome, premature membrane rupture and placental or umbilical factors.

2.1 Inclusion Criteria

All the neonates who were diagnosed with respiratory distress.

2.2 Exclusion Criteria

The neonates diagnosed with respiratory distress but their guardian or parent not willing to share medical record.

The neonates with congenital heart diseases, structural abnormalities of brain and lungs the cases with incomplete data.

2.3 Statistical Analysis

All the results were analyzed by SPSS 20 software.

3. RESULTS

Among 1188 newborn were admitted to NICU, 298 of them develop respiratory distress comprising 25% of all NICU admissions.

The Majority of respiratory distress were due to Transient Tachypnea of newborn (TTN) 29.8%, RDS 22.1%, birth asphyxia 17%, and Meconium Aspiration Syndrome (MAS) 15.7%.

Table 1. Neonatal respiratory distress etiology and relation to mode of delivery

Diagnosis	Number (%)	Vaginal (%)	Elective C/S (%)	Emergency C/S (%)	
Transient Tachypnea of newborn (TTN)	89 (29.8%)	24 (26.96)	47 (52.8)	18 (20.2)	
Respiratory Distress Syndrome (RDS)	Group 1	47 (15.7%)	0	31 (66%)	16 (34%)
	Group 2	19 (6.3%)	0	7 (36.8%)	12 (63.2%)
Birth asphyxia (BA)	51 (17.1%)	37 (72.5%)	2 (3.9%)	12 (23.5%)	
Meconium Aspiration Syndrome (MAS)	47 (15.7%)	34 (72.3%)	5 (10.6%)	8 (17%)	
Sepsis	25 (8.3%)	13 (52%)	5 (20%)	7 (28%)	
Pneumothorax	20 (6.7%)	20 (100%)	0	0	
Total	298	128 (42.9%)	97 (32.5%)	73 (24.5%)	

*RDS categorized into two groups on the basis of Gestational age, Group 1 25-32 weeks and Group 2, 32-34 weeks

Table 2. Maternal and neonatal characteristics of commonest origins of neonatal respiratory distress

Neonatal and maternal characteristics	TTN	RDS		Birth asphyxia	MAS
		Group1	Group2		
Gestational age (weeks)					
Range	32-42	25-32	32-36	30-42	35-40
Mean	37	30	34	36.8	38.6
Number in each group (%)	89 (29.8%)	47(15.7%)	19 (6.3%)	51 (17.1%)	47(15.7%)
Sex Ratio	1.1:1	1.6:1	1.5:1	1.8:1	2:1
Weight (gm)					
Range	1500-3500	700-1750	1050-2500	1800-3000	2400-3500
Mean	2490	1150	2030	2550	2700
Mode of delivery					
CS	65 (73%)	47(100%)	19 (100%)	14(27.4%)	13 (27.6%)
VD	24(26.96%)	0	0	37(72.5%)	34(72.3%)
Maternal Risk Factors (%)					
PROM	13 (14.6%)	14(29.8%)	7(36.8%)	9(17.6%)	00
Hypertension	7(7.8%)	8(17%)	4(21%)	6(11.7%)	15(31.9%)
DM	3(3.3%)	3(6.3%)	1(5.2%)	2(3.9%)	1(2.1%)
Abruptio Placenta	2(2.2%)	2(4.2%)	0	3(5.8%)	0
Twin	6(6.7%)	2(4.2%)	1(5.2%)	0	0

*RDS categorized into two groups on the basis of Gestational age, Group 1 25-32 weeks and Group 2, 32-34 weeks

Table 3. The mothers mean age and their parity

Parameter	(Mean +/- SD)N=155	Minimum	Maximum
Age of mother	26.4+/- 6.3 years	16	44
Parity	2.5+/-1.7	0	9

Table 4. Mortality in relation to cause of neonatal respiratory distress

Causes	Treated	Develop complication	Expired	Case mortality rate (%)	Total	
Transient Tachypnea of newborn (TTN)	89	0	0	0	89	
Respiratory Distress Syndrome (RDS)	Group1	9	6	32	68%	47
	Group2	10	2	7	36.8%	19
Birth asphyxia (BA)	26	10	15	29.4%	51	
Meconium Aspiration Syndrome (MAS)	29	4	14	29.7%	47	
Sepsis	13	1	11	44%	25	
Pneumothorax	19	0	1	5.2%	20	
Total	195(65.4%)	23 (7.7%)	80	26.84%	298	

Overall outcome of Neonatal Respiratory Distress was cure rate in 65.4%, Neonatal mortality rate 26.84% with highest mortality due to RDS and Sepsis and the morbidity rate is 7.7%

4. DISCUSSION

Respiratory distress the one of the commonest reason of admission of neonates in a hospital during first 72 hours of life. It was studied that that 25% of the admission were due to respiratory distress. It was reported in current study that most of the admission in NICU with respiratory distress were due to Transient Tachypnea of newborn (TTN) that comprises 29.8% of total cases followed by respiratory distress syndrome (RDS) 22.1%, birth asphyxia 17%, Meconium Aspiration Syndrome MAS 15.7%, sepsis 8.3% and pneumothorax 6.7% as compare to another study that the 42.7% of neonates with respiratory distress were due to Transient Tachypnea of newborn (TTN) followed by 17% due to infection, 10.7% with Meconium Aspiration Syndrome (MAS), 9.3% with hyaline membrane disease and 3.3% of respiratory distress cases were due to birth asphyxia [9].

It has been observed that mean gestational age was 37 for all the 89 neonates who represent the respiratory distress due to Transient Tachypnea of newborn and majority of the total cases of respiratory distress associated with RDS the mean gestational age was 30 representing 47

cases out of 66 and remaining 19 cases of respiratory distress associated with RDS the mean gestational age was 34 showing that the preterm neonates were more prone for the development of RDS that is also supported by another study from Iran [10] that reported the incidence of RDS in preterm infants was 65.6%. The mean body weight of 2490 grams of neonates with respiratory distress due to Transient Tachypnea of newborn and 2550 grams and 2700 grams was the mean weight of neonates who admitted in NICU with respiratory distress due to birth asphyxia and MAS respectively whereas 1150 gram was the mean body weight of all preterm neonates in RDS and 2030 grams was the mean weight of neonates categorized in group 2 of RDS. The elective way (cesarean section) of delivery was the core cause of respiratory distress in neonates with Transient Tachypnea of newborn and RDS representing 73% and all 100% of total cases respectively whereas neonates by vaginal delivery was more represent with respiratory distress associated with birth asphyxia and MAS.

Total mortality rate was 26.84% in this study compare to another study [11] in which mortality rate was 21.6%. The mortality rate was highest among the neonates with RDS group 1 with mean gestational age of 30 as 68% of neonates of this group was died followed by 44% of neonates from sepsis group and 36.8% was the mortality rate of neonates among RDS group 2.

Not a single death was reported in Transient Tachypnea of newborn neonates group.

5. CONCLUSION

The Transient Tachypnea of newborn was the commonest reason of respiratory distress in neonates followed by respiratory distress syndrome, MAS, birth asphyxia and pneumothorax. The mortality rate was 26.84% in this study and mortality was highest amongst the neonates with respiratory distress syndrome. CS was the major risk factor for Respiratory Distress Syndrome and Transient Tachypnea of newborn.

CONSENT AND ETHICAL APPROVAL

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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