

Original Research Article

Outcome of pre-term babies born in tertiary care institute

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ABSTRACT

Background: Preterm babies' survival has improved with advances in neonatology care in this era. Even with advances in treatments, there is still morbidity and mortality among preterm. The objective of this study was to know the incidence of prematurity and complications seen in them.

Methods: A cross sectional study was conducted on all preterm babies born in Sapthagiri Institute of Medical Sciences, Bangalore, over period of one year from 1st August 2017 to July 2018.

Results: Out of 500 babies born, 110 babies had RDS, among 110 babies 85 cases were preterm RDS babies included in study. Majority were males 55 (64.5%) and females 30 (35.2%). The gestational age group was maximum in the 28-32 weeks, the most common morbidity noted was sepsis (77.7%) and RDS (22%). Death was 9 (10.5%) only 4 (4.7%) needed intervention in the form of CPAP.

Conclusions: The study concluded that males were commonly affected by respiratory distress syndrome, sepsis was a common cause for morbidity and mortality. In spite of advances in neonatology sepsis continues to be a leading cause of death. Proper hand cleansing has to be emphasized and reinforced to prevent sepsis in NICU. The best possible attempts to delay preterm delivery have to be followed. One should have a high index of suspicion and low threshold to treat sepsis in preterm.

Keywords: Preterm, Respiratory distress syndrome (RDS), Sepsis

INTRODUCTION

Respiratory distress syndrome (RDS) is well known among preterm babies, infant of diabetic mothers and late preterm babies which is respiratory distress secondary to surfactant deficiency.^{1,2} It is also known as hyaline membrane disease (HMD), it is one of the leading causes for death in preterm infants.³ Most of the RDS is secondary to surfactant deficiency but could be because of genetic problem or infection. RDS accounts for up to 80% of hyaline membrane disease cases in weight group of 1000 to 1500 grams to 9% in full term infants.⁴ The incidence decreases with advancing gestational age, about 50% babies born at 26-28 weeks to about 25% at 30-31 weeks.⁵ The risk for development of RDS increases

with maternal diabetes, multiple births, asphyxia, cord stress and prior history of siblings born with RDS, secondary to oxygen toxicity, mechanical ventilation, CDH and pulmonary hypoplasia.⁶ The incidence is highest in preterm male and white infants. The risk of RDS is reduced in pregnancy associated with chronic or pregnancy induced hypertension, heroin uses in mother, prolonged rupture of membranes and antenatal corticosteroids prophylaxis.⁶

Secondary surfactant deficiency may occur in infants as a result of intrapartum asphyxia, pulmonary infection, pulmonary hemorrhage, meconium aspiration, pneumonia, oxygen toxicity along with pressure or volume trauma to the lung's congenital diaphragmatic

hernia and pulmonary hypoplasia.⁶ The first symptom usually appearing within an hour of birth is increased respiratory effort with intercostal retractions and the use accessory muscles of respiration. The respiratory rate may increase to more than 100 breaths per minute and baby becomes cyanotic.⁵

Respiratory distress in the newborn is recognized as one or more signs of increased work of breathing, such as tachypnea, nasal flaring, chest retractions or grunting.⁶⁻⁸ It is uncommon to develop hyaline membrane disease if the infant breaths normally for 6-8 hours. Cyanosis appears late and is relieved by oxygen until the terminal stages of the disease.

Pneumonia and pulmonary hemorrhage are frequently found, especially late in the disease. The pulmonary perivascular lymphatics are increased in diameter and frequently filled with eosinophilic material. Subarachnoid or intraventricular hemorrhage is found in a high percentage of those infants who had pulmonary hyaline membranes on necropsy.

The diagnosis is made by the clinical picture and the chest X-ray, which demonstrates decreased lung volumes, a small, discrete, uniform infiltrate that involves all lobes of the lung (described as a “ground glass” appearance), and the presence of air-bronchograms.⁵ Most cases of infant respiratory distress syndrome can be prevented if mothers are given glucocorticoids during the antenatal period. The American college of obstetricians and gynecologists (ACOG) have recommended antenatal glucocorticoid treatment for women at risk for preterm delivery prior to 34 weeks of gestation.⁹

RDS should be anticipated in the setting of any preterm delivery, delivery where amniotic fluid indices indicate pulmonary immaturity, and in any infant born to a diabetic mother. Maternal corticosteroid therapy can prevent neonatal RDS when it is administered to the mother at least 24 to 28 hours before delivery.¹⁰

METHODS

This is a hospital based cross sectional and descriptive study carried out at NICU of Sathagiri institute of medical sciences and research centre, Bangalore, Karnataka, India, the study was conducted between August 2017 to July 2018, out of 500 babies born 110 babies had Respiratory distress out which 85 babies were preterm which were included in present study.

Inclusion criteria

- Preterm Neonates who are admitted in NICU with features of respiratory disease and sepsis <37 weeks.

Exclusion criteria

- Neonates with Apgar score <2 at 5 minutes

- Congenital malformations
- Pneumonia and incomplete treated pneumothorax
- Born through MSAF.

RESULTS

A total of 500 neonates were admitted during the study period at NICU of Sathagiri medical college. Of them 85 were diagnosed with RDS (HMD). The incidence of RDS is 22%. In the present study majority of the preterm was male (64.7 %) and female (35.2%) this is in accordance with studies stating male preponderance in RDS probably due to testosterone secretion (which inhibits surfactant synthesis). Males were more symptomatic than females (Table 1).

Table 1: Distribution of preterm based on gender.

Gender	Frequency	Percentage
Female	30	35.2
Male	55	64.7
Total	85	100.0

In the present study, majority of the preterm were inborn (68.2%) and out born was 31.7%. Majority of the inborn who had distress were male 47(81%) and females were 11 (18%) (Table 2).

Table 2: Distribution of preterm based on type of admission.

Type of Admission	Frequency	Percentage
Inborn	58	68.2
Outborn (Health facility referred)	27	31.7
Total	85	100.0

In the present study majority of the preterm belonged to Peenya (43.5%), followed by Abigere (27%), Makali (15.2%) followed by Nelamangala (8.2%) and Hessargatta (5.8%) the population belongs to rural and suburb areas (Table 3).

Table 3: Distribution of preterm based on their residence (district).

Residence (District)	Frequency	Percentage
Makali	13	15.2
Nelamangal	7	8.2
Peenya	37	43.5
Abigere	23	27
Hessargatta	05	5.8
Total	85	100.0

In the present study majority of the preterm were admitted because of prematurity (36.4%), followed by feeding intolerance (23.5) and respiratory distress (Rate>60 or grunt/retractions) (16.4%) (Table 4).

Table 4: Distribution of preterm based on indication of admission.

Indication of admission	Frequency	Percent
Apnea/ gasping	2	2.3
Low birth weight <1800g	6	7
Meconium aspiration	2	2.3
Neonatal jaundice	6	7
Perinatal asphyxia	4	4.7
Prematurity <34weeks	31	36.4
Feeding intolerance	20	23.5
Respiratory distress (rate>60 or grunt/retractions)	14	16.4
Total	85	100.0

In the present study majority of the preterm mother were in 28-32 weeks of gestation (52.9%), followed by 32-36weeks (38.8%) and <28 weeks (8.2%) (Table 5).

Table 5: Distribution of preterm based on gestational age.

Gestational age of mother in weeks	Frequency	Percentage
<28	07	8.2
28-32	45	52.9
32-36	33	38.8
Total	85	100.0

In the present study shows that majority of babies needed minimal resuscitation and less intervention in the form positive pressure ventilation (CPAP). Only 4.7% required bubble CPAP (Table 6).

Table 6: Distribution of preterm based on resuscitation.

Resuscitation	Frequency	Percentage
Bag and mask	10	11.7
No	49	57.6
Only oxygen	8	9.4
Tactile Stimulation	14	16.4
Ventilation (CPAP)	04	4.7
Total	85	100.0

Distribution of preterm babies with respiratory distress was done based on Silverman score; majority of babies in this study had mild respiratory distress (with score of 0-3) (Table 7).

Table 7: Distribution of preterm based on Silverman score.

Silverman score	Frequency	Percentage
0-3	60	70.5
3-5	21	24.7
6-10	4	4.7
Total	85	100.0

Table 8: Distribution of preterm based on outcome.

Outcome	Frequency	Percentage
Discharged	69	81.1
Expired	9	10.5
LAMA	7	8.2
Total	85	100.0

Distribution of preterm based on outcome was done in this study the results were majority were discharged (81.1%) followed with death (10.5%) and LAMA (8.2%) (Table 8).

Table 9: Distribution of preterm based on cause of death.

Cause of death	Frequency	Percentage
Respiratory distress syndrome	2	22.2
Sepsis	7	77.7
Total	09	100.0

Distribution of preterm babies in this study was done based on cause of death according to that majority died because of sepsis (77.7%) followed by respiratory distress (22.2%) (Table 9).

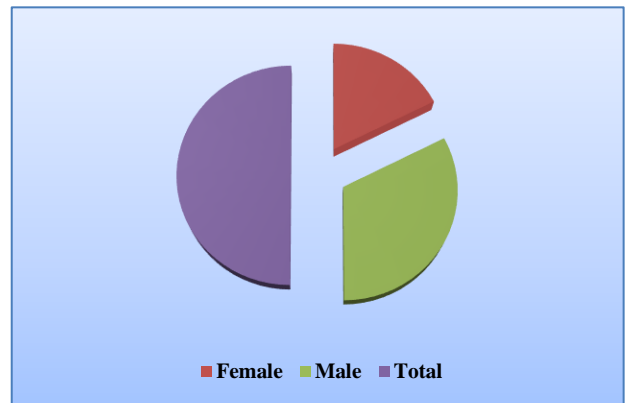


Figure 1: Distribution of preterm based on gender.

DISCUSSION

A total of 500 neonates were admitted during the study period at NICU of Sims at Bangalore. 110 (22%) were diagnosed with RDS (HMD). The incidence of RDS was 22% in our NICU, of them 85 with RDS were selected for study which met the inclusion and exclusion criteria. Risk of RDS increases with decreased gestational age owing to delay in production of the pulmonary surfactant. In the present study majority of the subjects were male 55(64.7%) and female 30(35.2%). The incidence of RDS was 2.42% in the study conducted by Nagendra K et al. out of 48 neonates who developed RDS, 25 were male and 23 were female.¹¹ Study done by Townsel et al, also has stated that males tend to develop RDS and CLD at much higher rate than their female counterparts.¹²

Surfactant production however has been shown to appear earlier in female lung development than in males. This earlier presence of surfactant seems to prevent early closure of alveoli and small airways which may contribute to the higher airflow and decrease resistance found in the female respiratory system, Fleisher et al showed that both L/S ratio and appearance of phosphatidylglycerol, a component of surfactant, occur a week earlier in female than males.¹³ Although hormonal regulation may be one influence causing this drastic difference in respiratory morbidity, interplay of other factors is crucial to understand the divergent physiology of lung development between sexes.¹¹ In present study majority of preterm were weighing between 1.2-1.45kg (17%), 1.5-2kg (58.8%) followed by 2-2.5kg (23%). Retrospective study done in Iran reported that majority of preterm admitted with RDS were weighing between 1000-1500g (52.5%), followed by >1500g (30.1%) and <100g(16.4%).¹⁴ Very low birth weight infants, birth weight less than 1500g, account for only 1% of the preterm population but represent greater 80% of the morbidity and mortality attributed to infants born preterm.¹⁵ In present study out born subjects were 27(31.7%) and inborn 58(68.2%). Distribution based on their location, in the present study majority of preterm belonged to Peenya (43.5%) followed by Abigere (23%).

Among the symptoms feeding intolerance (23.5%), Respiratory distress (14.4%), jaundice (7%), apnea (2.3%) were common symptoms, among these babies 9 babies (22.2%) expired of which 7 (77.7%) sepsis and remaining had had RDS. According to Suzanne Reules et al, the symptoms observed was increased work of breathing, tachypnoea, grunting.¹⁶ According to West JB et al, the common symptoms were tachypnoea and increased work of breathing.¹⁷ Shresta et al and karki et al, reported the most common condition leading to ICU admissions was respiratory distress.^{14,18}

In the present study majority of subjects had mild to moderate respiratory distress with only 4.7% had severe respiratory distress. For new born babies a review of following events in and around birth is important.¹⁹

- a) Were there any risk factors in the ante partum period or evidence of foetal distress prior to delivery?
- b) Did the mother receive antenatal steroids if it was a preterm delivery?
- c) As there a history of premature rupture of membrane and fever?
- d) Was there Meconium stained amniotic fluid?
- e) a look at the antenatal ultrasonography for the amount of amniotic fluid would tell us the status of the foetal lung
- f) Was resuscitation required at birth?
- g) Did the distress appear immediately or a few hours after birth?
- h) Was it related to feeding or frothing at the mouth?
- i) Does the distress decrease with crying?

Majority of the babies in present study were 28-32 weeks 45 (52.9%) followed by 32-36weeks 63 (38.8%). This study is similar to a study done in Iran which reported that 28-32 weeks of gestation accounted (52.1%) and 32-34 weeks for (30.1%).¹⁴

In present study majority did not require intervention 49 (57.6%). Only Oxygen was needed in 8 (9.4%), bag and mask ventilation in 10(11.7%) and ventilation in 4(4.7%). According to the study done by Sunil B et al, Girish N et al, (22.1%) required ventilation and surfactant 16.9%.²⁰⁻²² In present study none of the babies required surfactant. According to Esch et al, the incidence of mechanical ventilation was 31%, CPAP 26% and mortality 3.5%, in present study also there is a trend of increase in CPAP 4.7% compared to ventilation.

The mortality was mainly secondary to sepsis in this study, which is in agreement with other studies like WHO young infant study group in study by Besani et al, Been JV et al, babies died secondary to chorioamnionitis and had TTNB as cause of respiratory distress though born premature.^{15,20,23,24}

CONCLUSION

The study concluded males were commonly affected by respiratory distress syndrome, sepsis was a common cause for morbidity and mortality. In spite of advances in neonatology sepsis continues to be a leading cause of death. Proper hand cleansing has to be emphasized and reinforced to prevent sepsis in NICU. The best possible attempts to delay preterm delivery have to be followed. One should have a high index of suspicion and low threshold to treat sepsis in preterms.

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REFERENCES

1. Infant respiratory distress syndrome. [cited 2016 March 22] Available at: https://en.wikipedia.org/wiki/Infant_respiratory_distress_syndrome.
2. Hyaline membrane disease [cited 2016 March 22] Available at: <https://www.medicinenet.com/script/main/art.asp?articlekey=10677>.
3. Rodriguez RJ. Respiratory distress syndrome and its management. *Neonatal-Perinatal Med.* 2002;1001-117.
4. Usher R the respiratory distress syndrome of prematurity *ped.clin North America.* 1961;8;525.
5. Sharma M. Preterm infants: is prophylactic surfactant therapy and early vitamin A supplementation the way ahead?. *Med J Armed Forces India.* 2011;67(2):102-3.

6. Edwards MO, Kotecha SJ, Kotecha S. Respiratory distress of the term newborn infant. *Paediatr Respir Rev.* 2013;14(1):29-36.
7. Warren JB, Anderson JM. Newborn respiratory disorders. *Pediatr Rev.* 2010;31(12):487-95.
8. A S, PN R S, Jose J. Downes Score vs. Silverman Anderson Score for Assessment of Respiratory Distress in Preterm Newborns. *Pediatric Oncall.* 2016[cited 2016 July-September 1];13. Art #30. Available at: <http://www.pediatriconcall.com/pediatric-journal/View/fulltext-articles/1027/J/0/0/542/0>.
9. Crowley P. Antenatal corticosteroid therapy: a meta-analysis of the randomized controlled trials, 1972 to 1994. *Am J Obstet Gynecol.* 1995;173:322-35.
10. Given J. Respiratory distress syndrome. In Berman's *Pediatric Decision Making (Fifth Edition)*. 2011. [cited 2016 March 22] Available at: <http://www.sciencedirect.com/topics/medicine-and-dentistry/infant-respiratory-distress-syndrome>.
11. Col KN, Col CW, Col BR, Col SS. Incidence and etiology of respiratory distress in newborn. *Med J Armed Forces India.* 1999;55(4):331-3.
12. Townsel CD, Emmer SF, Campbell WA, Hussain N. Gender differences in respiratory morbidity and mortality of preterm neonates. *Frontiers Pediatr.* 2017;5:6.
13. Fleisher B, Kulovich MV, Hallman M, Gluck L. Lung profile: sex differences in normal pregnancy. *Obstet Gynecol.* 1985; 66(3):327-30.
14. Saboute M, Kashaki M, Bordbar A, Khalessi N, Farahani Z. The Incidence of respiratory distress syndrome among preterm infants admitted to neonatal intensive care unit: A retrospective study. *Open J Pediatr.* 2015;5:285-9.
15. Hamilton BE, Martin JA, Osterman MJK, Curtin SC, Mathews TJ. Births: Final data for 2014. *Natl Vital Stat Rep.* 2015;64(12):8.
16. Reuter S, Moser C, Baack M. Respiratory distress in the new-born. *Pediatr Review.* 2014;35(10):417.
17. Shrestha S, Karki U. Indications of admission and outcome in a newly established neonatal intensive care unit in a developing country (Nepal). *Nepal Med College J.* 2012;14(1):64-7.
18. Ersch J, Roth-Kleiner M, Baeckert P, Bucher HU. Increasing incidence of respiratory distress in neonates. *Acta Paediatr.* 2007;96(11):1577-81.
19. Mathai S, Raju U, Kanitkar M. Management of Respiratory Distress in the Newborn. *Med J, Armed Forces India.* 2007;63(3):269-72.
20. The World health organisation young infant study group. Bacterial etiology of serious bacterial infections in young infants in developing countries: Results of a multicenter study. *Pediatr Infect Dis J.* 1999;18(10):S17-22.
21. Sunil B, Girish N, Bhuyan M. Outcome of preterm babies with respiratory distress syndrome on nasal CPAP. *Int J Contemporary Pediatr.* 2017; 4(4):1206-9.
22. Neonatal morbidity and mortality: Report of the national neonatal perinatal data base. *Indian Pediatr.* 1997;34:1039-42.
23. Bersani I, Thomas W, Speer CP. Chorioamnionitis-the good or the evil for neonatal outcome? *J Matern Fetal Neonatal Med.* 2012;25(1):12-6.
24. Been JV, Zimmermann LJ. Histological chorioamnionitis and respiratory outcome in preterm infants. *Arch Dis Child Fetal Neonatal Ed.* 2009;94(3):F218-25.

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