

# A prospective study on risk factors in acute respiratory distress in 1 month to 5 years old children

CH Sandeep Reddy<sup>1</sup>, G V Harish<sup>2</sup>, B Divya<sup>3</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Associate Professor, <sup>3</sup>Postgraduate student, Department of Paediatrics, Prathima Institute of Medical Sciences, Karimnagar, Telangana, India.

Address for correspondence: : Dr CH Sandeep Reddy, Assistant Professor, Department of Paediatrics, Prathima Institute of Medical Sciences, Karimnagar, Telangana, India.

Email: srchinth@gmail.com

## ABSTRACT

**Introduction:** Acute respiratory distress is a major cause of morbidity and mortality in developing countries in children especially in under-fives. Every year in the world, about 13 million under-5 children die, of which 95% are from developing countries. The aim of this study is to identify the significant risk factors of acute respiratory distress in children less than five years of age admitted in paediatrics department.

**Materials and Methods :** A prospective study of 100 sequential admissions presenting with the chief complaints of acute respiratory distress were included. The study period was from November 2016 to November 2017.

**Results:** As per the data obtained from this study, major cause of morbidity is seen in males (52% of 100 cases) than females (48% of 100 cases), infants less than 6 months are more affected (40% of 100) than older ones, and children of rural background are more affected (80% of 100 cases) than urban (20% of 100 cases). And also patients with low socio economic status (94% of 100 cases), who are not exclusively breast fed upto 6 months (56% of 100 cases), who are incompletely immunized for age (26%), overcrowding (70% of 100 cases), inadequate ventilation (80% of 100 cases), smoking (78% of 100 cases), children of illiterate mothers (40% of 100 cases) and who are malnourished (78% of 100) are more affected.

**Conclusion:** Children are prone for acute respiratory distress due to socio-demographic and socio-cultural risk factors. Identified risk factors in this study are lack of breastfeeding, overcrowding, rural setting, mothers illiteracy, inadequate ventilation, passive smoking and malnutrition which can be removed by education, general public awareness by which burden of disease and cost of treatment can be minimised.

**Keywords:** Acute respiratory distress, children, malnutrition.

## INTRODUCTION

In India, an estimate of 26 million children are born every year. An estimated 12.7 lakh children die every year before completing 5 years of age<sup>1</sup>. Acute respiratory infection (ARI) is a leading cause of mortality and morbidity in under five children in developing countries. Worldwide 3.9 million deaths of young children occur due to ARI every year<sup>2</sup>. Acute respiratory distress<sup>3</sup> is a clinical state characterised by increased rate and increased respiratory efforts. Features of respiratory distress are tachypnoea, dyspnoea, nasal flaring, chest wall retractions, head bobbing, grunting, stridor, decreased breath sounds, and cyanosis. Cardiac signs like weak and thready pulse, capillary refill time > 3 secs, cold, mottled, pale or cyanotic peripheries, pale mucous membranes or nail beds, tachycardia, hypertension and cerebral signs like presence of restlessness, irritability, headache, confusion, drowsiness and seizures.

### Grades of respiratory distress

1. Grade I (mild distress):- tachypnoea, workingalanasi and tachycardia .
2. Grade II (moderate distress):- Chest retractions "in-drawing" (e.g subcostal and intercostal) due to moderate hypoxemia.
3. Grade III (severe distress):- Grunting which is due to severe hypoxemia and indicate alveolar lesion (i.e. parenchymatous lung disease). Here O<sub>2</sub> supply is needed and patient must be hospitalized. Grunting is the last compensatory mechanism.
4. Grade IV:- Cyanosis and disturbed consciousness and endotracheal tube is needed here.

The present study will provide essential data to find out some risk factors of Acute respiratory distress in paediatric patients. It has been reported that there are links between environmental risk factors such as (overcrowding, outdoor air pollution, and indoor pollution) and other risk factors in children (such as breast feeding<sup>4</sup>, low birth weight<sup>5</sup>, malnutrition<sup>6</sup>, and vitamin A deficiency) with Acute respiratory distress<sup>7-9</sup>. In India, most of the population is integrated in rural

area and therefore there is a need to have knowledge of these risk factors related to acquisition of Acute respiratory distress, as it will help in its prevention, through community health education.

## MATERIALS AND METHODS

The purpose of the study was explained to the parent or guardian of the child and informed consent was taken before enrolling them in the study. The sociodemographic and epidemiological information of the cases were collected by interviewing the parents or guardians of the child using a pre-tested proforma<sup>10</sup>. A detailed clinical review, including history and clinical examination was done.

Children with acute respiratory distress admitted during the above period in the age group of 1 month to 5 years were included and children aged more than 5 years and less than 1 month and with respiratory distress due to other causes (foreign body, aspiration, poisonings) were excluded.

## RESULTS

Out of 626 cases admitted to paediatric ICU over a period of one year 100 cases presented with acute respiratory distress, of which 40 (40%) cases are in the age group of 1 month to 6 months followed by 25 (25.00%) in the age group of 6 months to 1 year, 20 (20%) between 3 to 5 years and remaining 15 (15%) in the age group of 1 to 3 years. The mean age at presentation was 3 months to 6 months. [Table 1]

There were 52 (52%) males and 48 (48%) females, with male:female ratio of 1.08:1. [Table 2] The most common clinical feature was cough and cold seen in 72 (72%) cases followed by irritability in 64 (64%), fever in 36 (36%) and wheeze in 66 (66%). Tachypnea and nasal flaring Chest retraction was a most common finding with Downes 11 score of 1-4 in 43 cases (43%), 4-6 in 37 cases (37%) and more than 6 in 20 cases (20%). Out of 100 patients 20 cases have saturations of (95-100%), 60 cases have (90-95%) and 20 cases (<85%) on pulse oxymetry.

Most of the patients 94 (94%) were in the low socio economic status, 6 (6%) were in the high socio economic status ( $X^2$  value 77.44 ; p-value 3.84). Out of 100 patients, 74 (74%) were completely immunized and 26% (26) were incompletely immunized ( $X^2$  Value-23.04; P-Value 1.00). Out of 100 patients, 56% (56) were not exclusively breast feed and 44% (44) were exclusively breast feed ( $X^2$  value 1.44).

In the present study out of 100 cases 80 (80%) are from rural background, 20 (20%) from urban background ( $X^2$  value-36 ; p-value-0.05), patients whose mothers were illiterate are 40% and literate (60%) ( $X^2$  value- 4; p-value-0.05). Maximum patients were having history of overcrowding (70%) and non

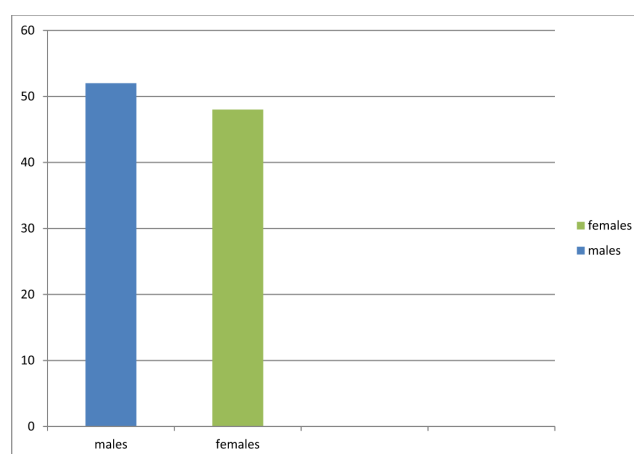
overcrowding (30%) ( $X^2$  value- 16; p-value 0.05), inadequate cross-ventilation (80%) and adequate ventilation (20%) ( $X^2$  value-36; p-value 0.05) and malnourished (78.65%) and well nourished (21%) ( $X^2$  value-32.82; p-value-0.05) and smoking 50% in their home. Significant association was found between respiratory distress and socio-economic class, mother's education, history of parental smoking, overcrowding, cross ventilation, use of domestic fuel and nutritional status. [Table 3]

Out of 100 patients, 20 children had NICU admissions in view of preterm, low birth weight, meconium aspiration syndrome, respiratory distress, 7 cases were ventilated and 2 patients had prolonged ventilation and later presented as bronchopulmonary dysplasia. Out of which 40 were low birth weight and remaining 60 were of normal birth weight.

Out of 100 patients 30% of them are labelled as hyperreactive airway disease, 10% of them are diabetic ketoacidosis and 3 patients are having congenital anomalies (laryngomalacia, diaphragmatic hernia) and 3 are with congenital heart diseases with recurrent respiratory tract infections 1 (VSD) 2 (ASD).

**Table 1: Age and gender group distribution of the study population**

AGE	MALES	FEMALES	TOTAL	TOTAL (%)
1-6 months	27	13	40	40
6-12 months	10	15	25	25
1-3 years	10	5	15	15
3-5 years	5	15	20	20
	52	48	100	



**Table 2: Gender Distribution of Study Population**

**Table 3: Showing various parameters**

Variables	Cases	x <sup>2</sup> value	P value	
			0.05	0.001
Socio economic status	Low- 94% High- 06%	77.44	3.84	10.82
Immunisation	74% 26%	23.04	1.0	1.0
Completely immunized				
Incompletely immunized				
Breast feeding	44% 56%	1.44	-	
Exclusive breast feeding				
Top feeds				
Rural background	80%	36	0.05	0.01
Urban background	20%			
Mothers education	40% 60%	4	0.05	-
Illiterate				
Literate				
Over crowding	70% 30%	16	0.05	0.01
No over-crowding				
Adequate ventilation	80%	36	0.05	0.001
Inadequate ventilation	20%			
Nutritional status	78.65 21.35	32.82	0.05	0.001
undernourished				
Well nourished				

## DISCUSSION

In the present study, maximum number of patients were from the age group of 1-6 months, 40 (40%) followed by 6mths to 1year 25 (25 %), between 3 to 5years(20%) and remaining 15 (15%) in the age group of 1 to 3years. In the present study, acute respiratory infections were more in lower socio-economic classes i.e. 94% than in the high socio economic status 6% (X<sup>2</sup> value 77.44 ; p-value 3.84). Out of 100 patients, maximum numbers of patients 74 (74%) were completely immunized and 26% (26) were incompletely immunized (X<sup>2</sup> Value-23.04; P-Value 1.00). Even after 29 years

of initiation of the Universal immunisation programme<sup>12</sup> in our country, vaccination coverage is low.

Mothers have close bond with her child than fathers, as mother stays all the time taking care of the child, so she recognizes the minor changes in child's behavior and health. As mother plays important role in child care, mother's literacy might play important role in child's disease. 78% children are malnourished and 21% are wellnourished (X<sup>2</sup> -value 32.82; p-value-0.05), malnutrition and infection goes hand in hand. Infection leads to malnutrition and malnourished children are more prone for various infections. Because of increased availability of LPG gas stove, use of kerosene lamp and biomass fuels (wood, animal dung) coal has decreased these days. Nearly half the world's households, mainly in developing countries (90%), in rural areas because of poverty main source of cooking is by biomass fuels and kerosene, so exposure to indoor air pollution in the form of combustion from fuel are at increased risk of developing acute respiratory distress. The risk is highest for young children and mothers due to longer indoors stay and close proximity during cooking. The measure which decreases this risk is provision of clean fuels, householder's education and modification of stoves.

History of parental smoking, overcrowding, inadequate cross-ventilation and use of smoky domestic fuel has a direct relationship with occurrence of Acute respiratory distress.

Incidence of Acute respiratory distress is more in those patients who are not breast feeding exclusively. maximum numbers of patients i.e. 56% (56) were not exclusively breast feed and only 44% (44) were exclusively breast feed (X<sup>2</sup> value 1.44). Due to lack of education about importance of colostrum and exclusive breastfeeding to most of the mothers, they discard the colostrum and exclusive breast feeding is not given. As colostrum is rich in immunoglobulins, children who have not received, have decreased immunity levels and nutritional status and are more susceptible to infections. Early weaning is started by working mothers and in case of less spacing between two children.

## CONCLUSION

Acute respiratory distress are affected by sociodemographic and socio-cultural risk factors, which can be modified with simple interventions. In this study risk factors were lack of breastfeeding, delayed weaning, inadequate ventilation, overcrowding, undernutrition. So, for the prevention of Acute respiratory distress, the basic health promotional measures like proper infant feeding practices, proper nutrition and socio-economic improvement is needed. The appropriate measure which decreases the risk of Acute respiratory distress is provision of clean fuels, householder's

education and modification of stoves. The promotion of breastfeeding in first six months and appropriate nutritional supplements is highly recommended to reduce the risk of Acute respiratory distress in children

#### REFERENCES

1. NHM Components: RMNCH+A: Child Health. Available at: <http://nhm.gov.in/nrhm-components/rmnch-a/child-health-immunization/childhealth/background.html>. Accessed on 4 June 2017.
2. Williams BG, Gouws E, Boschi-Pinto C, Bryce J, Dye C. Estimates of world-wide distribution of child deaths from acute respiratory infections. *Lancet Infect Dis* 2002;2:25-32.
3. Singhi S. Acute respiratory distress. Text book on medical emergencies in children. 2000;295-319.
4. Butz WP. Does breast-feeding really save lives, or are potential benefits due to biases? *Am J Epidemiol* 1986; 123:279–290.
5. McCormick MC. The contribution of low birth weight to infant mortality and childhood morbidity. *N Engl J Med* 1985; 312:82–90.
6. WHO Child Growth Standards Length/height-for-age, weight-for-age, weight-for-length, weight-forheight and body mass index-for-age Methods and development. Available from: [http://www.who.int/childgrowth/publications/technical\\_report\\_pub/en/index.html](http://www.who.int/childgrowth/publications/technical_report_pub/en/index.html). Accessed on 4 June 2017
7. Hussain SF, Irfan M, Naqi YS, Islam M, Akhtar W. Acute respiratory failure in Pakistani patients: risk factors associated with mortality. *J Coll Physicians Surg Pak* 2006;16(4):287-290.
8. Fonseca W, Kirkwood BR, Victora CG, Fuchs SR, Flores JA, Misago C. Risk factors for childhood pneumonia among the urban poor in Fortaleza, Brazil: a case – control study. *Bull World Health Organ* 1996;74:199-208.
9. Yoon PW, Black RE, Moulton LH, Becker S. Effect of not breastfeeding on the risk of diarrheal and respiratory mortality in children under 2 years of age in metro Cebu, the Philippines. *Am J Epidemiol* 1996;143:1142-8.
10. Kumar N, Gupta N, Kishore J. Kuppaswamy's socioeconomic status scale – Updating income ranges for the year 2012. *Indian J Public Health* 2012;56:103-4.
11. Wood DW, Downes' JJ, Locks HI. A clinical score for the diagnosis of respiratory failure. *Amer J Dis Child* 1972;123:227–229.
12. Park K. Park's Textbook of Preventive and Social Medicine. 23rd Edition. Jabalpur (INDIA): M/s BanarsidasBhanot Publishers; 2015: 123,167,168. 9.

**How to cite this article :** Sandeep Reddy CH, Harish G V, Divya B. A prospective study on risk factors in acute respiratory distress in 1month to 5 years old children. *Perspectives in Medical Research* 2018; 6(3):70-73.

**Sources of Support:** Nil, Conflict of interest: None declared