

Original Research Article

Prevalence of lower respiratory tract infection in tertiary care hospital, Thane

Shrikant Joshi¹, Kamil Shaikh¹, Vrushali V. Kulkarni^{2*}

¹Department Pediatrics, ²Department of Community Medicine, Rajiv Gandhi Medical College, Kalwa, Thane, Maharashtra, India

Received: 30 July 2021

Revised: 09 September 2021

Accepted: 17 September 2021

***Correspondence:**

Dr. Vrushali V. Kulkarni,

E-mail: vrushalivk2009@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: World health organization (WHO) predicted lower respiratory tract infections (LRTI) as primary cause of mortality world-wide. The present study was undertaken to know the various types of LRTI in children <5 years of age and analyze factors influencing the morbidity and mortality of those cases.

Methods: Prospective cross-sectional study for 100 infected children with LRTI was conducted in a tertiary care hospital of metropolitan city. Demographic, clinical history and examination, necessary investigations were performed and followed regularly for desired outcome.

Results: 51% children were in the age-group of 1 to 5 years who reported acute lower respiratory tract infection (ALRTI) and 49% were below 1 year age. The study reported LTRI incidence in 63% male and 37% female children whereas the family history of incidence of LRTI was present in 18% cases. Fever, cough and retraction complaints were the prominent symptoms. Hyperinflation was the major finding in chest X-ray. *Streptococcus pneumoniae* was the common bacterial pathogens isolated. Bronchiolitis was the commonest cause (39%) followed by lobar pneumonia (37%).

Conclusions: Various types of clinical presentations, risk factors and types of LRTI in children less than 5 years of age were studied. A result of this study will be useful to understand the etiology and bacterial pathogens in management of clinical outcome. Modifiable risk factors for LRTI like family history, past history, immunization status, and malnutrition can be tackled through effective health education of the community, leading to a healthy society.

Keywords: LRTI, Bronchitis, ALRTI, *Streptococcus pneumoniae*

INTRODUCTION

Acute lower respiratory tract infection (ALRTI) is a major cause of pediatric emergency and mortality among children in both developed and developing countries.^{1,2} The 1.2 million deaths have been reported in India among children due to RTI among 5.9 million deaths globally.³ India has the maximum number of deaths among children less than 5 years of age and most of them are due to respiratory tract infections. These infections are broadly divided into upper and LRTI. Pneumonia and

bronchiolitis are most widespread types of LRTI in children. Pneumonia accounts for most of the deaths in children up to 5 years of age.⁴ ALRTI contributes to 15% of all pediatric emergency visits and 18% of global deaths of children under 5 years old.⁵ Among children with ALRTI that show up in pediatric emergency, 30-40% requires hospitalization.¹

LRTI is not a single disease entity, but a cluster of infections with different etiology, risk factors, pathogenesis, clinical presentations and outcomes. The etiology, epidemiology and symptomatology differ with

age, gender, risk factors, season, place and type of population. These LRTI are affected by socio demographic and socio-cultural factor which are adjustable by simple interventional measures.⁶ Risk factors which are adjustable were lack of breast feeding, overcrowding, under nutrition, belated weaning, and pre-lacteal feeding. Other related conditions like PEM, infectious diseases, and secondary bacterial infections make the child weaker for mortality and morbidity. The etiological agents of LRTI are viral, bacterial in origin or both combined together.⁷ Other factors recognized as determinants of these disease entities are maternal education and occupation, duration of breast-feeding, place of residence, household income, infant's birth weight, and the birth order and interval.⁸ Upper respiratory infection in mother, lack of breastfeeding, upper respiratory infection in siblings, severe malnutrition, improper immunization and history of LRTI in the family were the significant contributor of ALRTI in children under 5 year.

Hence a study was needed to determine the respiratory disease pattern in children of various age groups having varied clinical presentations and risk factors. Understanding a clear knowledge of etiology and bacterial pathogens clearly provides guidance for the physician in management and clinical outcome. This study was pursued to study incidences of LRTI in children aged up-to 5 years, their demographic factors and to assess immunization status.

METHODS

Study place

The study was carried out at Chhatrapati Shivaji Maharaj hospital and Rajiv Gandhi medical college, Kalwa, Thane.

Period of the study

The data was collected in the period of May 2019 to April 2020.

Inclusion criteria

The 100 infected children with LRTI aging from 1 month to 5 years were examined as a part of this study.

Exclusion criteria

All the children who were above 5 years age and who were without LRTI symptoms were excluded from the study.

Statistical analysis

After obtaining written permissions from the institutional clinical ethics committee of Rajiv Gandhi medical college, Kalwa, Thane, Pre-tested and pre-designed

questionnaire was used for collection of patients' demographic data, clinical and family history, immunization status, household contact history and type of delivery. Signs and symptoms attached with clinical examinations were conducted separately. Data was collected and analyzed to identify possible dependent factors. Analysis and graphics were designed using MS excel and visualization tools.

RESULTS

A cross-sectional observational study was carried out in 100 children infected with LRTI from 1 month to 5 years age group in a tertiary medical college between May 2019 and April 2020 over a period of 12 months.

Table 1: Age distribution among the 100 children.

Age group (years)	Frequency
Up to 1	49
1 to 2	29
2 to 5	22
Grand total	100

The group of patients comprised of 29% children's aged between 1-2 years, 22% children's aged 2 to 5 years and 49% aged up to 1 year with LRTI. Hence, 51% children were in the age-group of 1 to 5 years reported acute lower respiratory tract infection and 49% were below 1 year (Table 1). Current study reported LTRI incidence in 63% male and 37% female children. Male patients (63%) were more infected with ALRTI than females (Figure 1).

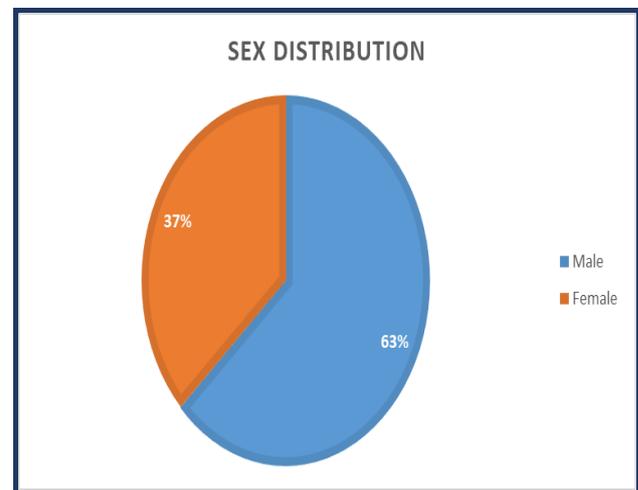


Figure 1: Distribution of gender among participants.

From Table 2 it is observed that in the present study, 60% were infants, 13% were preschool and 27% were the toddlers. Within the infants (i.e., 60% of the patients) with LRTI, 73% were immunized as per standard guidelines. 18% cases were associated with family history of lower respiratory tract infection. The 24% of the cases were associated with malnutrition. Presence of past history was reported for 14% cases.

Table 2: Distribution of demographic characters of patients.

Demographic characters	Frequency	Percentage (%)
Group distribution (years)		
Infants	60	60
Preschool	13	13
Toddler	27	27
Family history		
Yes	18	18
No	82	82
Anthropometry WHO classification malnutrition grading		
SAM	24	24
MAM	56	56
Normal	20	20
Immunization status		
Unimmunized	27	27
Immunized	73	73
Lab findings		
Neutrophilia	43	43
Lymphocytosis	20	20
Eosinophilia	4	4
Normal	33	33

The 20% patient had lymphocytosis while neutrophilia showed in 43% cases and eosinophilia 4% cases (Table 2). Leukocytosis was observed in 67%, hyperinflation in 35%, patchy opacities in 14%, consolidation in 37% and empyema in 10% of the patients. It was observed that the family history of incidence of LRTI was present in 18% cases and was missing for 82% cases. The 14% cases had past history and 86% cases didn't seem to have past history. In the present study, 73 % followed up to date immunization schedule while 27% cases were not clear about the immunization history (Table 2).

Type of infections observed were *Streptococcus pneumoniae*, *Streptococcus aureus*, *Streptococcus viridans* and *Haemophilus influenza*. Parental history of allergic diseases, past history of hospitalization for respiratory illnesses and immunization history were the significant risk factors for incidence of LRTI. It was observed that 5% cases infected with *Haemophilus influenza*, 2% with *Streptococcus aureus*, 15% *Streptococcus pneumonia* and 4% children were infected with *Streptococcus viridans* infection. Presenting complaints of LRTIs were like cough, tachypnea, respiratory distress, and breathing difficulties with grunting or wheezing sounds with rales. Among this 59% participated patients were having fever, cough and retraction complaints (Figure 2).

No bacterial infection observed in 74% cases. Neutrophilia was seen in 43 patients, lymphocytosis was seen in 20 patients, eosinophilia was seen in 4 patients. Blood culture analysis useful for the analysis of bacterial infection. Out of the 100 cases with LRTI, 37 cases had

bronchiolitis, 35 cases had lobar pneumonia, 14 cases had bronchopneumonia with CHD, and remaining 8 cases had empyema. Hence bronchiolitis was the commonest cause (39%) followed by lobar pneumonia (37%).

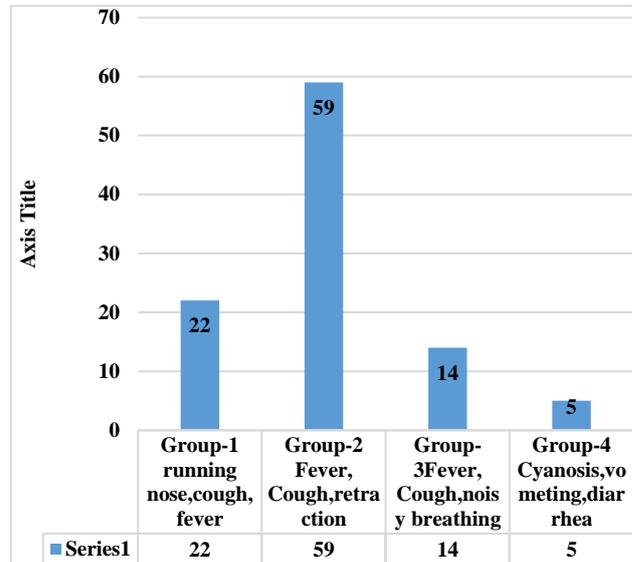


Figure 2: Presenting complaints in the patients with incidence of LRTI

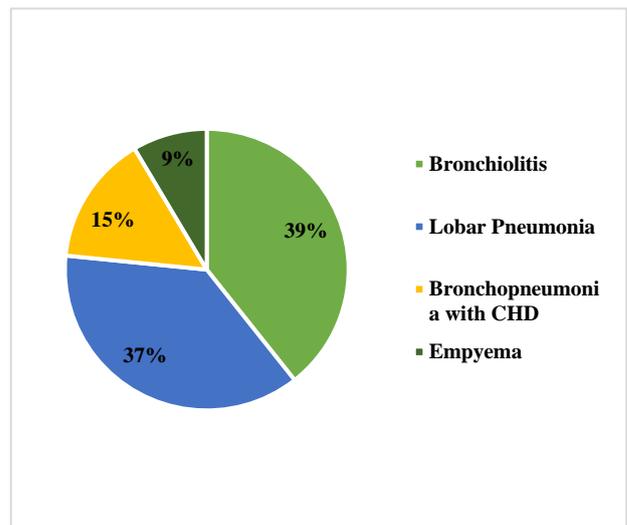


Figure 3: Final diagnosis of patients of LRTI.

DISCUSSION

As a part of this study LRTI cases the highest for children aged 1-5 years (51%) and it was 49% for patients under 1 year age, which varies with Savitha et al research that says 62.5% infants reported ALRTI and 58.4% patients were under 1 year.⁹

Within a total of 100 children, there were more (63%) male patients infected with LRTI than female patients (37%) similar to the results found in Savitha et al, Thamer et al and Broor et al.⁹⁻¹¹ These studies showed

64.42%, 65.8% and 73.1% males respectively while 35.58%, 34.2 and 64.42% females respectively. Hence proportion of infected male children is more than that of female children.

A total of 100 children were admitted with LRTIs during the study period. All had presenting complaints of LRTIs: i.e., cough, tachypnea, respiratory distress, and breathing difficulties with grunting or wheezing sounds with rales, Cyanosis which is similar to the study done by Joon et al and Esposito et al as cough, tachypnea, dyspnea or respiratory distress, and breathing with grunting or wheezing sounds with rales. It is another significant risk factor in our study.^{12,13}

The 18% cases were associated with Family history of LRTI. In the study by Broor et al they found 40% cases with family history as risk factor.¹¹ In case report of Savitha et al study shows less (9%) cases associated with family history of LRTI.⁹

Final diagnosis in this study showed that the children with the incidence of LRTI, in which 35 cases had bronchiolitis, 14 cases had bronchopneumonia with CHD, 37 cases had lobar pneumonia and empyema 10% cases which is similar to the study by Shay et al.¹⁴

Limitation

This study was focused on only 100 children reported in one hospital hence the results obtained after the detailed analysis of the data collected from these children cannot be generalized to the entire neonatal group explicitly.

CONCLUSION

Study clearly highlighted the various types of clinical presentations, risk factors and different types of LRTI in children less than 5 years of age. Understanding a clear knowledge of the etiology and bacterial pathogens clearly provides guidance for the physician in management and clinical outcome. From the result of this study, we can conclude that there are some modifiable risk factors for LRTI like family history, past history, immunization status, and malnutrition. The risk factors can be tackled through effective health education of community, leading to a healthy society and a healthy nation as a whole.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Nair H, Simões EA, Rudan I, Gessner BD, Azziz-Baumgartner E, Zhang JS et al et al. Global and regional burden of hospital admissions for severe

- acute lower respiratory infections in young children in 2010: a systematic analysis. Lancet. 2013;381:1380-90.
2. Liu L, Johnson HL, Cousens S, Perin J, Scott S, Lawn JE et al et al. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. Lancet. 2012;379:2151-61.
3. WHO. World health organization pneumonia. 2012. Available at: <http://www.who.int/medicacentre/factsheets/en/>. Accessed on 19 March 2020
4. Francis BV, Abhilash TG. Study of acute respiratory tract infections in children. Int J Sci Res. 2016;5(9):1791-2.
5. Beaglehole R. The World Health Report 2004- Changing History. WHO. 2004;120-4.
6. Alter SJ, Vidwan NK, Sobande PO, Omolaja A, Bennett JS. Common childhood bacterial infections. Curr Probl Pediatr Adolesc Health Care. 2011;41(10):256-83.
7. Erling V, Jalil F, Hanson LA, Zaman S. The impact of climate on the prevalence of respiratory tract infection in early childhood in Lahore, Pakistan. J Pub Health. 1999;21:331-9.
8. Harper PJ, Holm VA, Cassidy SB: In: Kendig's textbook of pediatric, 8th edi, Saunders. 1994;120-240.
9. Savitha MR, Nandeeshwara SB, Pradeep Kumar MJ. Modifiable risk factors for acute lower respiratory tract infections. Indian J pediatr. 2007;74:477-82 .
10. Thamer K, Yousif BAN, Khaleq A. Epidemiology of acute lower respiratory tract infections among children under five years. Middle eastern J Fam Med. 2006;4(3):48-51.
11. Broor S, Pandey RM, Ghosh M, Maitreyi RS, Lodha R, Singhal T et al. Risk factors for severe acute lower respiratory tract infection in under-five children. Indian Pediatr. 2001;38:1361-9.
12. Joon HK, Ji-Yeon C, Na YK. Clinical risk factors associated with the development of wheezing in children less than 2 years of age who required hospitalization for viral lower respiratory tract infections. Korean J Pediatr. 2015;58(7):245-50.
13. Esposito S, Daleno C, Baggi E, Ciarmoli E, Lavizzari A, Pierro M et al. Circulation of different rhinovirus groups among children with lower respiratory tract infection in Kiremba, Burundi. Eur J Clin Microbiol Infect Dis. 2012;31:3251-6.
14. Shay DK, Holman RC, Newman RD, Liu LL, Stout JW, Anderson LJ. Bronchiolitis-associated hospitalizations among US children, 1980-1996. JAMA. 1999;282(15):1440-6.

Cite this article as: Joshi S, Shaikh K, Kulkarni VV. Prevalence of lower respiratory tract infection in tertiary care hospital, Thane. Int J Contemp Pediatr 2021;8:1700-3.