



Study of Acute Lower Respiratory Tract Infections in Children Aged Between 1-12 Yrs

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BACKGROUND: Infections of the respiratory tract are the substantial cause of morbidity and mortality in young children. ARI is responsible for 18% of all deaths in children below five years of age and 8.2% of all disability as measured by Disability Adjusted Life Years (DALY). The utility of clinical signs in the early detection and treatment of children with pneumonia by primary health care workers forms the basis for the case management strategy.

Objectives: To study the prevalence and clinical characteristics of acute lower respiratory tract infections(ALRI) in children aged 1-12 years admitted to Pediatric department of DR.PSIMS &RF.

Methodology: Cross sectional study done from June 2011 to August 2013 at DR PSIMS and RF with a sample size of 100 children aged 1 - 12 yrs.

Results: Statistical analysis was done using Epi Info 7.1.2.0 of centre for disease control, USA and Medcalc 12.7.5, Belgium. The children were categorised in to three groups, 12-36 months, 37-72 months and 73-144months and found that there is no statistical difference between the groups. Out of 100 children, 44% were girls and 56% were boys and found no significant difference in the median age of girls and boys with lower respiratory tract infection. Most of the children (91%; 95% confidence limits 83.6% to 95.8%) presented to the hospital with history of fever. Most of the children (87%; 95% confidence limits 78.8% to 92.89%) had fever during hospitalization. Twenty three percent (95% confidence limits 15.17% to 32.49%) of children had dyspnea at the admission and 77% (95% confidence limits 67.51% to 84.83%) of children did not have dyspnea at admission. During hospital stay, 77% (95% confidence limits 15.17% to 32.49%) of children did not have dyspnea and only 23% (95% confidence limits 15.17% to 32.49%) had dyspnea.

Conclusion: The median age of children with lower respiratory tract infections is 50 months (4 years) to 65 months (5 years). The prevalence of lower respiratory tract infections is 22.15% with no age and sex predilection. The predominant symptoms are Cough (95%) and fever (91%) with median duration of 4 days and 5 days respectively. On examination most children have Tachypnea (74%), Crepitations (91%) rather than respiratory distress

Keywords: Acute lower respiratory tract infection, children, 1-12yrs

I. INTRODUCTION

Infections of the respiratory tract are perhaps the most common human ailment. While they are a source of discomfort, disability and loss of time for most adults, they are a substantial cause of morbidity and mortality in young children.¹

Every Year ARI in young children is responsible for an estimated 3.9 million deaths worldwide. About 90 percent of the ARI deaths are due to pneumonia which is usually bacterial in origin. The incidence of ARI is similar in developed and developing countries. However, while the incidence of pneumonia in developed countries may be as low as 3-4 percent, its incidence in developing countries range between 20-30 percent. The difference is due to high prevalence of malnutrition, low birth weight, and indoor air pollution in developing countries¹.

In India, during the year 2011, about 26.3 million cases of ARI were reported which gives an incidence rate of about 2,179 cases per lakh population. Pneumonia cases were about 7.15 lakh, with incidence rate of about 59 cases per lakh population. During the year of 2011 about 2,492 people died of ARI and 2,770 died of

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pneumonia. Pneumonia was responsible for about 18 percent of all under 5 year deaths in India. ARI is responsible for 18% of all deaths in children below five years of age and 8.2% of all disability as measured by Disability Adjusted Life Years (DALY)¹.

It is estimated that Bangladesh, India, Indonesia and Nepal together account for 40% of the global ARI mortality. About 90% of ARI deaths are due to pneumonia, which is usually bacterial in origin. The incidence of pneumonia in developed countries may be as low as 3-4%, its incidence in developing countries range between 20-30%.¹

The utility of simple clinical signs like rapid breathing and chest in drawing to diagnose pneumonia in infants and young children has been well established. The use of these clinical signs in the early detection and treatment of children with pneumonia by primary health care workers forms the basis for the case management strategy formulated by the World Health Organization (WHO) to control mortality and morbidity².

II. AIMS AND OBJECTIVES

- 1) To study the prevalence of acute lower respiratory tract infections in children aged 1-12 years admitted to Pediatric department of DR.PSIMS &RF.
- 2) To study the Clinical characteristics in children with ALRI.

III. METHODOLOGY

Study Design: Cross sectional study.

Sample size: 100 children.

Study Period: Present study done in the Period from June 2011 to August 2013.

Study Population: Children aged 1-12 years, admitted in Pediatric department of DR.PSIMS & RF.

Children with congenital anomalies like Tracheo-esophageal fistula, anomalies of heart and lungs, anatomical defects like cleft lip and cleft palate, immunocompromised states like human immunodeficiency virus infection (HIV), and critically ill children were excluded.

IV. STATISTICAL ANALYSIS

Statistical analysis was done using Epi Info 7.1.2.0 of centre for disease control, USA and Medcalc 12.7.5, Belgium. Normality of distribution is tested by D'Agostino-Pearson test. The Mann-Whitney U test is used to test the significance of the difference between medians of two independent samples. Degree of association between categorical variables is evaluated by Chi-squared test. A test statistic was considered significant if the resulting P-value is small ($P < 0.05$).

V. RESULTS

The Median age of children was 55 months (95% confidence limits 49.5 to 64.5 months). In the age group of 12 to 36 months, 33% of children were present (95% confidence limits 23.92% to 43.12%). In the age group of 37 to 72 months, 33% of children were present (95% confidence limits 23.92% to 43.12%). In the age group of 73-144 months, 34% children were present (95% confidence limits 24.82% to 44.15%). So there was no statistically significant difference in the number of children between the three groups.

Among the 100 children, 44% were Girls (95% confidence limits 34.08% to 54.28%) and 56% were boys (95% confidence limits 45.72% to 65.92%). So there was no sex predilection in ALRI in our study. There was no significant difference in the median age of girls and boys with lower respiratory tract infection.

Most of the children (91%; 95% confidence limits 83.6% to 95.8%) presented to the hospital with history of fever. The median duration of fever at the time of admission was 4 days (95% confidence limits: 3 to 4 days & range: 1 to 30 days). At admission 95% of children were having fever of less than 10 days duration. About 9% (95% confidence limits 4.2% to 16.4%) did not have complaint of fever at the time admission.

Most of the children (87%; 95% confidence limits 78.8% to 92.89%) had fever during hospitalization. During hospital stay the median duration of fever was 2 days (95% confidence limits: 2 to 3 days & range: 1 to 10 days). Ninety five percent (95% confidence limits 88.72% to 98.36%) of children with LRI had complaints of cough at admission and only Five percent (95% confidence limits 1.64% to 11.28%) did not have cough at admission. The median duration of cough at the time of admission was 5 days (95% confidence limits 4 to 5 days) and ranges from 2 to 30 days.

Twenty three percent (95% confidence limits 15.17% to 32.49%) of children had dyspnea at the admission and 77% (95% confidence limits 67.51% to 84.83%) of children did not have dyspnea at admission. Among the children with dyspnea; the duration at the time of admission ranges from 1 to 10 days with a median of 3 days (95% confidence limits 2 to 4 days).

During hospital stay, 77% (95% confidence limits 15.17% to 32.49%) of children did not have dyspnea and only 23% (95% confidence limits 15.17% to 32.49%) had dyspnea. Among those children with dyspnea during hospitalisation, the median duration was 3 days (95% confidence limits 2.35 to 3.65 days) and duration

ranges from 1 to 7 days.

Tachypnea was found in 74% of children (95% confidence limits 64.27% to 82.26%) and in Twenty six percent (95% confidence limits 17.74 to 35.73%) did not have tachypnea . On Physical examination ,most of the children 93% (95% confidence limits 86.11% to 97.14%) had normal air entry in comparison to only Seven percent (95% confidence limits 2.86% to 13.89%) with diminished air entry .

In almost all of them 99% (95% confidence limits 94.55% to 99.97%) the type of breathing was vesicular. In only one child it was bronchial in nature (95% confidence limits 0.03% to 5.45%). Majority of the children 77% (95% confidence limits 67.51% to 84.83%) did not have chest retractions showing absence of respiratory distress. Chest retractions indicative of respiratory distress were found in 23% of children with LRI (95% confidence limits 15.17% to 32.49%). Significant number of children 99% (95% confidence limits 83.60% to 95.80%) had crepitations on auscultation which is one of the important clinical feature of LRI. Most of the children 85% (95% confidence limits 76.47% to 91.35%) did not have wheeze and only in fifteen percent (95% confidence limits 8.65% to 23.53%) wheeze was found.

VI. DISCUSSION

The prevalence of LRI is similar to our observation in other studies like Farzana et al³(26.22%) and Mallikarjuna⁴ (16.6%) except kapil goel et al⁵ study where the prevalence of LRI is high (52%).In our study, all the age groups of 1-12 years were having LRI in similar proportion. There is no decreasing trend in the prevalence of LRI with increasing age in our study. In Mallikarjuna's⁴ study also, the proportion of children with pneumonia did not change from 1-5yrs, but their proportion are less than the study in all age groups. But in the studies done by kapilgoel et al⁵, Ripal P et al⁶, Sameeh et al⁷, Broor et al⁸ demonstrates with the increasing age there is declining lower respiratory tract infection.The prevalence in all age groups was high and was not decreasing with increasing age probably due to some epidemiological factors and nutritional factors which need to be studied in detail.

In our study, there was no sex predilection. Similar observation was found in the study of Mallikarjuna's⁴ and Farzana et al³, Sameeh et al⁷, Kapil goel et al⁵, Rijal P et al⁶, Roy V et al⁹. But in the study by Thamer.K.Yousif et al¹⁰ and Broor et al⁸ the prevalence of lower respiratory tract infections in boys was more

In our study, most of the children were having fever and was a significant finding at the time of admission as well as during hospitalization. At admission, 91% (95% confidence limits 83.6% to 95.8%) were having fever and during hospital stay 87% (95% confidence limits 78.8% to 92.89%) continued to had fever for few days. In others study like Rijal P et al⁶(90.4%), Thameer.K.Yousif et al¹⁰ (93.5%) also , fever was a predominant feature. But in the study by Kapil goel et al⁵ and Roy V et al⁹ fever was found only in 30% and 45% respectively.

In our study, cough was the most dominant feature at admission and during hospitalization. At admission and during hospitalization, 95% (95% confidence limits 88.72% to 98.36%) were having cough, which was similar to studies done by Kapil goel et al⁵ 71%, Rijal P et al⁶ 71.2%, and Thameer.K.Yousif et al¹⁰ 92.9%. But the study done by Roy V et al cough was present only in 50.5% of cases.

In our study, dyspnea at admission and during hospitalization was found in 23% (95% confidence limits 15.17% to 32.49%) of cases. In others study like Kapil goel et al⁵, Rijal P et al⁶, Roy V et al⁹ also dyspnea was found in 16%,10.9%,and 1.5% cases respectively. These indicate that pneumonia was not a severe form. But in study by Thameer.K.Yousif et al¹⁰ nearly 45% of children were having dyspnea indicating that lower respiratory tract infections were relatively severe form.

Features of respiratory distress like chest retractions were found only in 23% (95% confidence limits 15.17% to 32.49%) of cases. In other studies by Rijal P et al⁶, Thameer.K.Yousif et al¹⁰ and Key et al¹¹ chest retractions were found in 10.9%, 1% and 35% respectively. So in most of the studies except Key et al¹¹ lower respiratory tract infections were of non severe type.

Tachypnea was also found in significant proportion of cases (74%; 95% confidence limits 64.27% to 82.26%).Similar observation was seen in Key et al¹¹ study. Tachypnea is one of the important diagnostic features of lower respiratory tract infection. But in Roy V et al⁹ study, Tachypnea was found in only 7% of their cases.

Crepitations were one of the significant finding in our cases 91% (95%confidence limits 83.6% to 95.8%) and in other study like Roy V et al⁹ (67.5%) and Key et al¹¹ (58%) it is one of the important of the clinical feature.

Wheeze was a uncommon finding in lower respiratory tract infection in our cases but in Roy V et al⁹ and Key et al¹¹ studies wheeze was found in higher proportion of cases.

VII. SUMMARY AND CONCLUSION

In our hospital based study of Acute Lower respiratory tract infections:

- The prevalence of lower respiratory tract infections is 22.15%.

- The median age of children with lower respiratory tract infections is 50 months (4 years) to 65 months (5 years). There is no significant difference in the three age groups (1-3years,3-6years,6-12years). All the three age groups are equally affected.
- There is no sex predilection in our study. Both sexes are equally affected.
- The predominant symptoms of lower respiratory tract infection in our study are Cough (95%), Fever (91%). The median duration of fever is 4 days and cough is 5 days.
- On clinical examination, the predominant signs are Tachypnea (74%), Crepitations (91%). Most of the children do not have features of respiratory distress.
- Among the children with Tachypnea, the magnitude of tachypnea is more in children aged 12-36 months.

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