Original Research Article

Study of respiratory disease pattern in children aged 2 months-5 years admitted in a tertiary care hospital

Raja S. R.¹, Shabin J.², Mathivanan M.³, Muthu Rama Subramanian M.⁴*

¹Department of Paediatrics, Government Sivagangai Medical College and Hospital, Sivagangai, Tamil Nadu, India
²Department of Paediatrics, Government Tirunelveli Medical College and Hospital, Tirunelveli, Tamil Nadu, India
³Department of Paediatrics, Aarupadai Veedu Medical College and Hospital, Puducherry, India
⁴Department of Paediatrics Government Pudhukottai Medical College and Hospital, Pudhukottai, Tamil Nadu, India

Received: 29 March 2021
Accepted: 07 May 2021

*Correspondence:
Dr. Muthu Rama Subramanian M.,
E-mail: muthu.rampaed@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: Acute respiratory infections (ARI) is one of the leading causes of under 5 mortality globally and in India. India accounts for 20% of deaths globally due to pneumonia. Reviewing the prevalence and profile of pneumonia admissions in a tertiary care hospital will reflect the burden in the community and thereby help to plan optimal use of resources and adopting proper preventive measures. Aim of study was to identify prevalence, various risk factors involved, morbidity and mortality of acute respiratory infections in children 2 months to 5 years old.

Methods: A prospective observational study conducted at a tertiary care teaching hospital of southern Tamil Nadu, India over a period of 18 months (January 2016 to June 2017). All cases between the age group of 2 months to 5 years admitted to Paediatric department were included in the study. Demographic and clinical features were recorded. Statistical analysis was done using SPSS version 22.0.

Results: A total of 2793 children were included, of which the prevalence of acute respiratory infection was 10.95% (306 children). Pneumonia was the most common diagnosis (38.5%) followed by bronchiolitis (15.3%). Mortality rate was 5.9% among the ARI cases. There was a significant influence of exclusive breast feeding and malnutrition over the morbidity and mortality of ARI cases.

Conclusions: Identifying ARI cases with risk factors for developing severe and very severe pneumonia and children with risk factors for high mortality need to be referred to tertiary care centres as early as possible for better outcome.

Keywords: Pneumonia, ARI, Bronchiolitis

INTRODUCTION

Acute respiratory infections (ARI) is one of the leading causes of under 5 mortality globally.¹ About 30-60% of paediatric out-patient cases and 20-30% of hospital admissions are due to ARI.² Prematurity and neonatal birth complications (39%) were the biggest killers followed by pneumonia (14.9%), diarrhoea (9.8%) and sepsis (7.9%) in India. India accounted for 20 percent of death worldwide caused by pneumonia. India has a pneumonia mortality rate of 7 per 1000 live births.³

According to WHO, one in every three death in India in under 5 children is caused by pneumonia. Pneumococcal pneumonia and Hib pneumonia are the leading cause of death, accounts for 60% of pneumonia death in children under 5.⁴⁶ In developing countries, child mortality rates related to respiratory and diarrheal disease can be reduced by introducing simple behavioural changes such as exclusive breast feeding, utilisation of immunisation services and proper hand washing measures. Reviewing the incidence and profile of pneumonia admissions in a tertiary care hospital will reflect the burden in the
community and thereby helps to plan optimal use of resources and adopting proper preventive measures.

**Aims and objectives**

The aim and objectives of the study were to study the respiratory disease pattern in children aged 2 months to 5 years admitted in a tertiary care hospital and to assess the various risk factors associated with ARI that determines the morbidity and mortality.

**METHODS**

This was a prospective observational study conducted in the department of paediatrics, government Tirunelveli medical college, Tamil Nadu, India over a period of 18 months (January 2016 to June 2017). Convenient sampling technique was adopted and all children in the age group of 2 months to 5 years admitted with acute respiratory diseases like pneumonia, bronchiolitis, bronchitis, WALRI (Wheeze associated lower respiratory tract infection), croup during the 18 months were included. Children with respiratory complication due to other causes like congenital heart disease and neurological diseases, foreign body aspiration, poisoning, chemical pneumonitis, drowning, inborn error of metabolism, metabolic complication, immunosuppressive conditions were excluded. Institutional ethical clearance was obtained.

Pre-structured proforma was used to obtain information from the parents. After getting the consent, detailed history, clinical details and investigations were collected and entered in the proforma. Morbidity was assessed in the form of need for ventilation, prolonged paediatric intensive care unit stay and hospital stay. Prolonged stay was defined as stay for more than 7 days in this study. Statistical analysis was done using IBM SPSS version 22.

**RESULTS**

A total of 2793 children were included, of which the prevalence of acute respiratory infections was 10.95% (306 children). Male children (60%) were hospitalized maximum as compared to females (40%) as shown in Table 1.

| Gender | Number of cases admitted (%) | Number of cases with ARI (%) | Prevalence (%) |
|--------|-----------------------------|-----------------------------|---------------|
| Mal    | 1678 (60)                   | 186                         | 11            |
| Female | 1115 (40)                   | 120                         | 10.7          |
| Total  | 2793 (100)                  | 306                         | 10.95         |

Maximum children were from the age group of 2 months-1 year (43.5%) as shown in Table 2. The mean age of diagnosis of pneumonia was 22.78 months, severe pneumonia was19.49 months, very severe pneumonia was 16.23 months and bronchiolitis were 11.85 months. Pneumonia was the most common diagnosis among children with respiratory infection constituting about 38.5% followed by bronchiolitis (15.3%) as shown in Table 3.

| Age (Years)       | Number of patients | Percentage (%) |
|-------------------|--------------------|----------------|
| 2 months-12 months| 133                | 43.5           |
| 1-3               | 93                 | 30.3           |
| 4-5               | 80                 | 26.2           |

| Diagnosis        | Number of patients | Percentage (%) |
|------------------|--------------------|----------------|
| Bronchiolitis    | 47                 | 15.3           |
| Croup            | 15                 | 5              |
| WALRI            | 43                 | 14             |
| Pneumonia        | 117                | 38.5           |
| Severe pneumonia | 45                 | 14.7           |
| Very severe pneumonia | 39     | 12.5          |

P=0.002 (Significant)

| Diagnosis        | Exclusive breastfeeding for 6 months | Exclusive breastfeeding for 6 months |
|------------------|-------------------------------------|-------------------------------------|
| Pneumonia        | Yes 60                              | No 57                               |
| Severe pneumonia | Yes 18                              | No 27                               |
| Very severe pneumonia | Yes 15 | No 24 |
| P=0.002 (Significant) |                                      |                                      |

| Diagnosis        | Malnutrition | Malnutrition |
|------------------|--------------|--------------|
| Pneumonia        | Yes 3        | No 114       |
| Severe pneumonia | Yes 25       | No 20        |
| Very severe pneumonia | Yes 29  | No 10    |
| P=0.001 (Significant) |                        |                                      |

| Diagnosis        | Outcome | Outcome |
|------------------|---------|---------|
| Death            | 6       | 12      |
| Alive            | 167     | 121     |
| P=0.041 (Significant) |            |          |
The mortality rate in our study was 5.9% (18 out of 306 expired). Absence of exclusive breast feeding had significant influence on the disease severity (p<0.002) and outcome (p<0.04) among children with respiratory infections as shown in Table 4. The prevalence of malnutrition in our study was 27% and the presence of malnutrition had significant influence on the disease severity (p<0.001) and outcome (p<0.001) as shown in Table 5. Mechanical ventilation and PICU length of stay of more than 7 days have significant association with mortality in children with severe disease. Similar findings were observed in studies done by Ramachandran et al.

The main strength of the study was that it is done over a period of one and a half years and thereby excluding the seasonal variations.

**Limitations**

Being a hospital-based study the applicability of the results to the community may differ.

**CONCLUSION**

ARI cases with risk factors for developing severe and very severe pneumonia and also children with risk factors for high mortality to be referred to a tertiary care centre as early as possible. At the tertiary level one should anticipate complications in those children having the risk factors and treat them aggressively to reduce morbidity and mortality.

**Funding:** No funding sources

**Conflict of interest:** None declared

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

**REFERENCES**

1. Klugman KP, Madhi SA. London: Acute Respiratory Infections. International Bank for Reconstruction and Development/The World Bank. 2006:11.

2. Vashishtha V. Current status of tuberculosis and acute respiratory infections in India: much more needs to be done. Indian Pediatr. 2010;47(1):88-9.

3. UNICEF. UNICEF Data: Monitoring the Situation of Children and Women. Available at: https://data.unicef.org/topic/child-health/pneumonia/. Accessed on 10 Jan 2020.

4. Fischer Walker C, Rudan I, Liu L. Global burden of childhood pneumonia and diarrhoea. Lancet. 2013.

5. O’Brien KL, Wolson LJ, Watt JP, Henkle E, Deloria-Knoll M, McCall N et al. Burden of disease caused by Streptococcus pneumoniae in children younger than 5 years: global estimates. Lancet. 2009;374(9693):893-902.

6. Watt JP, Wolson LJ, O’Brien KL, Henkle E, Deloria-Knoll M, McCall N et al. Burden of disease caused by Haemophilus influenzae type b in children younger than 5 years: global estimates. Lancet. 2009;374(9693):903-11.

7. Ramachandran P, Nedunchelian K, Vengatesan A, Suress S. Risk Factors for Mortality in Community-Acquired Pneumonia Among Children Aged 1-59 Months Admitted in a Referral Hospital. Indian Pediatr. 2012;49:889-95.

8. Chhabra P, Garg S, Mittal SK, Satyanarayana L, Mehra M, Sharma N. Magnitude of acute respiratory infections in under-fives. Indian Paediatrics. 1993;30:1315-8.
9. Zaman K, Baqui AH, Yunus M, Sack RB, Bateman OM, Chowdhury HR et al. Acute respiratory infections in children: A community based longitudinal study in rural Bangladesh. J Trop Paediatr. 1997;43:133-6.
10. Bashour HN, Webber RH, Marshall TF. A community-based study of Acute respiratory infections among preschool children in Syria. J Trop Paediatr. 1994;40:207-13.
11. Lamberti, Laura M. Breastfeeding for Reducing the Risk of Pneumonia Morbidity and Mortality in Children under Two: A Systematic Literature Review and Meta-Analysis. BMC Public Health. 2013;13(3):S18.
12. Mihrlshahi S, Oddy WH, Peat JK, Kabir I. Association between infant feeding patterns and diarrhoeal and respiratory illness: a cohort study in Chittagong, Bangladesh. Int Breastfeed J. 2008;24:3:28.
13. Savitha MR, Nandeeshwara SB, Pradeep Kumar MJ, Ul-Haque F, Raju CK. Modifiable risk factors for acute lower respiratory tract infections. Indian J Pediatr. 2007;74(5):477-82.
14. Biswas A, Biswas R, Manna B, Dutta K. Risk factors of Acute respiratory infections in under-fives of urban slum community. Indian J of Public Health. 1999;43(2):73-5.

Cite this article as: Raja SR, Shabin J, Mathivanan M, Subramanian MMR. Study of respiratory disease pattern in children aged 2 months-5 years admitted in a tertiary care hospital. Int J Contemp Pediatr 2021;8:1070-3.