

Original Research Article

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

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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 5.⁴⁻⁶ 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.

Table 1: Distribution of cases according to gender.

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 was 19.49 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.

Table 2: Age-wise distribution of cases.

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

Table 3: Distribution of cases based on diagnosis.

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

Table 4: Effect of exclusive breast feeding on diagnosis and outcomes.

Diagnosis	Exclusive breastfeeding for 6 months	
	Yes	No
Pneumonia	60	57
Severe pneumonia	18	27
Very severe pneumonia	15	24
P=0.002 (Significant)		
Outcome		
Death	6	12
Alive	167	121
P=0.041 (Significant)		

Table 5: Effect of malnutrition on diagnosis and outcomes.

Diagnosis	Malnutrition	
	Yes	No
Pneumonia	3	114
Severe pneumonia	25	20
Very severe pneumonia	29	10
P=0.001 (Significant)		
Outcome		
Death	14	4
Alive	68	220
P=0.001 (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.

DISCUSSION

ARI especially pneumonia is one of the leading causes of morbidity and mortality in developing countries like India. The prevalence of respiratory infection in our study was 10.95%. It was almost similar to both males and females. The prevalence rate of our study is lower than the prevalence of ARI reported by studies done by Ramachandran et al, Chhabra et al.^{7,8} The variations could be because of differences in study population, study settings, age categories studied, comorbidities, variations in the study period and season of the study.

Maximum number of cases included in our study was in the age group of 2 months to 12 months (43.5%). Among the cases, pneumonia was the most common diagnosis constituting 38.5%, followed by bronchiolitis (15.3%). Severe pneumonia and very severe pneumonia constituted 14.7 and 12.5% respectively. 60 % of the severe pneumonia cases 62% of the very severe pneumonia were infants. This was comparable with other studies done by Zaman et al, Bashour et al.^{9,10} The higher risk of ARI among infants might be due to less developed immunity.

Among the total admitted, 57% of children had history of exclusive breast feeding. 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. Studies done by Lamberti et al, Mihrshahi et al.^{11,12} Shows significant mortality following pneumonia in babies not exclusively breast fed which was comparable with our study.

In our study a total of 27% children had malnutrition with WHO for weight for age less than -2 Z score. The presence of malnutrition had significant influence on the disease severity ($p < 0.001$) and outcome ($p < 0.001$) among children with respiratory infections. Our results were similar to other the studies done by Savitha et al, Biswas et al.^{13,14}

A total of 9% children required mechanical ventilation and was significantly associated with mortality in children with severe disease. A total of 19% children required more than 7 days stay in PICU and was significantly associated with mortality in children with

severe disease. Similar findings were observed in studies done by Ramachandran et al.⁷

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.

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