



## EPIDEMIOLOGICAL FACTORS CONTRIBUTING TO ACUTE RESPIRATORY INFECTION IN UNDER FIVE CHILDREN IN AN URBAN SLUM

**MALLIKARJUN K BIRADAR\***

*Dept of Community Medicine, BLDEU's Shri B M Patil Medical College, Bijapur, Karnataka, India*

### ABSTRACT

Acute respiratory tract infection is the leading cause of morbidity and mortality in children below five years of age. Identification of risk factors for ARI will help in reducing the burden of disease. Objective of the study was to find out the prevalence and socio-economic factors attributing to occurrence of ARI. Cross sectional study was carried out in an urban slum of Raichur. All the children (451) who were permanent residents and below 5 years of age were included in the study. Prevalence rate of ARI at the time of survey was 16.6%. Higher prevalence was seen in children with low socio-economic status (88%), inadequate living condition (31%) and illiterate mothers (64%). Improving these epidemiological factors will help to reduce the burden of ARI.

**KEY WORDS:** Acute Respiratory Infections, Literacy, Living condition, Socioeconomic Status, Under Five Children



**MALLIKARJUN K BIRADAR**

Assistant Professor Dept of Community Medicine, BLDEU's  
Shri B M Patil Medical College, Bijapur, Karnataka, India

## INTRODUCTION

Children aged below five years constitute 14% of total population in our country<sup>1</sup>. They are vulnerable group deserving special health care. Children are considered to be susceptible to the host of disease and infections of respiratory tract are the most common cause of morbidity & mortality in young children<sup>2</sup>. Globally every year around 10.5 million children die before reaching their fifth birthday that is about 30,000 children everyday! Most of these deaths occur in developing and underdeveloped countries<sup>3</sup>. Pneumonia in children is a major concern in developing countries, because almost all childhood related deaths occur in these countries because of Pneumonia. In India an estimated 0.4 million pneumonia deaths occur annually, which is highest among all countries in the world. Childhood pneumonia has been identified as the major "forgotten killer of children" by the UNICEF & WHO<sup>4</sup>. In India, ARI accounts for a morbidity burden of 12.1% prevalence rate with an average occurrence of 2.5 episodes per child per year in under fives<sup>5</sup>. The magnitude of ARI associated morbidity and mortality in Indian children has been reviewed. Social and environmental factors such as socio-economic status, housing conditions, overcrowding, family size, and indoor air pollution have been reported to influence the incidence of ARI<sup>6</sup>. It has been reported that the problem of ARI in urban slum areas is more compared to rural areas<sup>7</sup>.

The knowledge about these risk factors will help in developing preventive measure needed to complement efforts directed at improved case management. Objective of this study was to find out the prevalence and socio-economic factors contributing to occurrence of ARI among under five children residing in the urban slum of Raichur.

## MATERIALS AND METHODS

This community based cross sectional study was carried out in an urban slum of Raichur. The study population comprised of children under five who were permanent residents of the slum. Sample size was calculated using the formula  $n = z^2 pq / e^2$  (total population of slum 10000, under five children constitutes 14% of population and prevalence rate of ARI is 12% with allowable error 25% of proportions,  $e=3$ ). The total sample size was 451. The study subjects were enrolled for the study using systematic random sampling method. The consent was taken from the immediate care taker of the child. Using the interview technique & clinical examination, information was collected from the mothers or immediate care taker in a predesigned & pretested semi structured questionnaire. Statistical methods such as proportions and Chi-square test were used. The statistical software Epi Info Version-3.5.1 was used for the analysis of data.

## RESULTS & DISCUSSION

In our study 75 out of 451 children had ARI at the time of survey. Hence prevalence rate of the ARI was found to be 16.6%.

**Table 1**  
**Distribution of children according to age group, sex, type of family and living condition**

Indicators	Frequency	Percentage
<b>A) Age (in months)</b>		
1-12	69	15.3
13-24	86	19.1
25-36	101	22.4
37-48	94	20.8
49-60	101	22.4
<b>B) Sex</b>		
Male	225	49.9
Female	226	50.1
<b>C) Type of family</b>		
Nuclear	262	58.1
Joint	130	28.8
Three generation family	59	13.1
<b>D) Living condition</b>		
<b>Type of house</b>		
Katcha	47	10.42
Pucca	402	89.1
Katcha Pucca	2	0.4
<b>Overcrowding</b>		
Yes	220	48.8
No	231	51.2
<b>Total</b>	<b>451</b>	<b>100</b>

Table 1: Majority of children were in the age group of 25-36 and 49-60 months constituting about 22.4% each. The numbers of male & female children were 49.9% & 50.1% respectively. Of the total families enrolled, 69.8% of the families were Hindu and 27.9% Muslim. More than half of children (58.1%) were from nuclear families. Majority of the

families (44.8%) were in class IV according to modified B.G Prasad's socio-economic classification. In the present study, 32.2% of mothers were illiterates and 25% were graduates. 89.1% children were living in pucca house. Overcrowding was present in 48.8% of the families.

**Table 2**  
**Age group and occurrence of ARI**

Age (Months)	ARI present	ARI absent	Total
	No (%)	No (%)	No (%)
1-12	5 (6.7)	64 (17.0)	69 (15.3)
13-24	15 (20.0)	71 (18.9)	86 (19.1)
25-36	16 (21.3)	85 (22.6)	101 (22.4)
37-48	19 (25.3)	75 (19.9)	94 (20.8)
49-60	20 (26.7)	81 (21.5)	101 (22.4)
<b>Total</b>	<b>75 (100)</b>	<b>376 (100)</b>	<b>451 (100)</b>

$$\chi^2 = 6.072, d.f. = 4, p > 0.05$$

Highest prevalence (26.7%), was seen in the age group of 49-60 months and lowest prevalence (6.7%) was observed in infants. Similar findings were reported by Gupta KB et al<sup>8</sup> showing a higher number of ARI episodes in the 2-3 years age group. A study by Meena KN<sup>9</sup> et al observed that 58% of ARI cases

were in the age group of 1-5 years. In contrast a study by Chhabra P<sup>5</sup> showed significant decline in ARI incidence with increasing age ( $p < 0.01$ ). The incidence was highest in children <2 years of age and lowest in the 4-5 years age group (1.8 episodes).

**Table 3**  
**Socio economic status and occurrence of ARI**

SES	ARI present	ARI absent	Total
	No (%)	No (%)	No (%)
Class I	0 (0.0)	6 (1.6)	6 (1.3)
Class II	6 (8.0)	96 (25.5)	102 (22.7)
Class III	3 (4.0)	89 (23.7)	92 (20.4)
Class IV	49 (65.3)	153 (40.7)	202 (44.8)
Class V	17 (22.7)	32 (8.5)	49 (10.8)
<b>Total</b>	<b>75 (100)</b>	<b>376 (100)</b>	<b>451 (100)</b>

$$\chi^2 = 41.56, d.f. = 4, p < 0.0001$$

It was observed from the study that 88% of total ARI cases were reported from the families belonging to class IV & class V socio-economic status. There is highly significant association between prevalence of ARI and lower socioeconomic status ( $p < 0.0001$ ). In a

studies by Rahman et al<sup>10</sup> and Biswas et al<sup>11</sup> observed that poverty was significantly associated with the occurrence of ARI. On the contrary, study by Walia BNS et al<sup>7</sup> did not show any correlation of per capita income with ARI.

**Table 4**  
**Living condition and occurrence of ARI**

Living condition	ARI present	ARI absent	Total
	No (%)	No (%)	No (%)
Adequate	53 (13.9)	328 (86.1)	381 (84.5)
Inadequate	22 (31.4)	48 (68.6)	70 (15.5)
<b>Total</b>	<b>75 (16.6)</b>	<b>376 (83.4)</b>	<b>451 (100)</b>

$$\chi^2 = 13.09, d.f. = 1, p < 0.0001$$

ARI is more in houses with inadequate living condition (31.4%). The poor living conditions had favourable association with prevalence of ARI ( $p < 0.0001$ ). In a study by Savitha MR<sup>12</sup> usage of mud/cow dung flooring was a significant environmental risk factor causing

ARI in children. Dharmage SC<sup>13</sup> reported that the risk of ARI increases three fold when there was overcrowding at home. In contrast Nafstad P<sup>14</sup> found that overcrowding in home was not significantly related to the occurrence of respiratory infection in the first year of life.

**Table 5**  
**Education of mother and occurrence of ARI**

Education	ARI present	ARI absent	Total
	No (%)	No (%)	No (%)
Illiterate	48 (64.0)	97 (25.8)	145 (32.2)
Primary	14 (18.7)	86 (22.9)	100 (22.2)
Secondary	9 (12.0)	84 (22.3)	93 (20.6)
Graduate	4 (5.3)	109 (28.9)	113 (25.0)
<b>Total</b>	<b>75 (100)</b>	<b>376 (100)</b>	<b>451 (100)</b>

$$\chi^2 = 46.08, d.f. = 3, p < 0.0001$$

The children of illiterate mothers had higher occurrence of ARI (64%). There is a positive association between occurrence of ARI in children and illiteracy of mothers ( $p < 0.0001$ ). Similar findings were observed by Hamid et al<sup>15</sup>, where as studies conducted by Monto AS<sup>16</sup> and Madhav SM<sup>17</sup> observed high prevalence in educated families.

## CONCLUSION

Efforts should be made to improve the literacy status of both parents especially mothers by encouraging them to avail adult literacy programme conducted by government. Improving socio economic conditions of the people will favour better living conditions and reduce overcrowding in the family. Community health education

programmes needs to be conducted to create awareness with regards to the risk factors and preventive measures to be taken during the illness. These measures will eventually help to reduce ARI morbidity and mortality in the children.

## ACKNOWLEDGEMENT

Author would like to thank all the participants of study and also acknowledges the immense help received from the scholars whose articles are cited and included in references of this manuscript. The author is also grateful to authors, editors and publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

## REFERENCES

1. Health information of India, Central Bureau of Health Intelligence, Directorate General of Health Services, Ministry of Health & Family Welfare, Govt of India, Nirman Bhavan, New Delhi, 1991:118.
2. Park. K. Acute Respiratory Infections. In: Park's Textbook of Preventive and Social Medicine, 19th Edition. Jabalpur: Banarasidas Bhanot Publishers; 2007:142-148.
3. UNICEF statistics: Child survival progress for Children: a child survival report card; 2006. (From: <http://www.childinfo.org/areas/childmortality/> Accessed 24 June 2009)
4. Pneumonia: The forgotten killer of children. New York: United Nations Children's Fund; 2006.
5. Chabra P, Garg S, Mittal SK, Satyanarayan L, Mehra M, Sharma N. Magnitude of ARI in under five. Indian Paediatric; 30: 1315-1319, 1993.
6. Walia BNS, Gambhir SK, Singhi S, Sroa RS. Socio-economic and ecologic correlates of acute respiratory infection in pre-school children. Indian Paediatrics; 25(7):607-612, 1988.
7. Deb SK. Acute respiratory disease survey in Tripura in case of children below five years of age. J Indian Med Assoc; 96: 111-116, 1998.

8. Gupta KB, Walia BNS. A longitudinal study of morbidity in children in rural area of Punjab. *Indian J Pediatr* ; 47: 297-301,1980.
9. Meena KN, Sam Ahuja. Drug prescribing pattern in upper respiratory tract infection in children aged 1 – 14 years. *International Journal of Pharma and Bio Sciences: Volume 3: Issue 1; 299-308: 2012.*
10. Rahman MM, Rahman AM. Prevalence of acute respiratory tract infection and its risk factors in under five children. *Bangladesh Med Res Council Bull; 23(2): 47-50, 1997.*
11. Biswas A, Biswas R, Manna B, Dutta K. Risk factors of Acute Respiratory infections in under fives of urban slum community. *Indian Journal of Public Health; 43(2):73-75, 1999.*
12. Savitha MR, Nandeeshwara SB, Pradeep MJ, Farhan-ul-haq, Raju CK. Modifiable risk factors for acute lower respiratory tract infections. *Indian Journal of Paediatrics; 74:477-482, 2007.*
13. Dharmage SC, Rajapaksa LC, Fernando DN. Risk factors of acute lower respiratory tract infections in children under five years of age. *Southeast Asian Journal of Tropical Medicine and Public Health; 27(1):107-110, 1996*
14. Nafstad P, Jorgen AH. Lower respiratory tract infections among Norwegian infants with siblings in day care. *American Journal of Public Health; 86(10):1456-1459, 1996.*
15. Hamid M, Qazi SA, Khan MA. Clinical, nutritional and radiological features of pneumonia. *J Pak Med Assoc; 46 (5):95-99, 1996.*
16. Monto AS, Ullman BM. Acute respiratory illness in an American Community-The Tecumseh Study. *Journal of American Medical Association; 14: 227:164-169, 1974.*
17. Madhav SM, Dixit GC, Prakasam PS, Sundharam NS, Shrivastava KN, Datta KK et al. A study of two weekly incidence of ARI in under five children of rural area of Alwar (Rajasthan). *Journal of Communicable Disease; 22(4): 243-246, 1990.*