MAGNITUDE OF ACUTE RESPIRATORY INFECTIONS IN UNDERFIVES

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ABSTRACT

A community-based study was carried out in a rural area of Delhi to measure the prevalence and incidence of acute respiratory infections among children below the age of 5 years. The prevalence of 12.1%, was similar in boys and girls and was seen to decline with age. The incidence of acute respiratory infections was 2.5 episodes per child per year; it was not different in boys and girls. There was a statistically significant decline in the incidence with age. Upper respiratory tract infections comprised 87.5% of total acute respiratory infection morbidity while lower respiratory tract infections were 12.5%. Both upper and lower respiratory tract infections declined with increasing age; while the former was similar among boys and girls, the incidence of latter was significantly greater in boys (0.4 episodes per year) as compared to girls (0.2 episodes per year). A total of 87.5% episodes were mild, 10.4% moderate and only 2.1% were severe. The results suggest that acute respiratory infections are a major community health problem and an acute respiratory infection control programme needs to be implemented urgently.

Key words: *Acute respiratory infections, Control, Prevalence, Incidence.*

Acute respiratory infections (ARI) are a major cause of morbidity and mortality in children and are of particular significance in developing countries like India. The data base for acute respiratory infections at present is weak and the epidemiological information regarding their magnitude in community is scanty. In view of constraints of financial and manpower resources, it may not be feasible to carry out national level studies on magnitude of the problem of acute respiratory infections in children. Such surveys will have to be carried out in small, defined populations of the community. Against this background, it was decided to conduct the present study on the magnitude of acute respiratory infections among the underfives in a rural area of Delhi.

Material and Methods

The present study was conducted from July 1989 to January 1990 in a village in north rural zone of Delhi with an approximate population of 3700. All the underfives in the village were included in the study. An initial survey was carried out by a house-to-house visit to obtain complete information regarding the child and his family. This was obtained in the month of July 1989 using a prestructured, precoded proforma. Clinical examination including assessment of nutritional status was done.

Subsequently, these children were followed up by fortnightly home visits for a period of six months. During each follow up,

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the informant (usually the child's mother) was asked if the child was suffering or had suffered in the past two weeks from any symptoms of acute respiratory infection including cough, breathlessness, fever, nasal discharge, ear pain or ear discharge. The records of the child's illness, if available were also reviewed. A repeat clinical examination was also done at each visit. A provisional diagnosis of acute respiratory infection was made. It was classified according to the site of involvement as upper or lower respiratory tract infection(1), and also, according to severity as mild, moderate and severe. Children with respiratory rate below 50 were classified as mild, those with respiratory rate above 50 but without intercostal retractions were classified as moderate while those with respiratory rate above 70 with intercostal retractions were classified as severe(2).

All the new births occurring in the village during the study period were also included and followed up as above. The data was compiled and analysed using non parametric statistical tests.

Results

During the baseline survey, 372 children were included. Of these, 340 children were available for the complete follow up period of six months. There were 26 newborns who were included in the study making a total study sample of 366. Of these, 194 were boys and 172 girls. The age distribution was as follows 0-1 yr, 108; 1-2 yrs, 58; 2-3 yrs, 72; 3-4 yrs, 70; and 4-5 yrs, 58.

The prevalence of ARI was recorded during the initial baseline survey (*Table I*) and was observed to be 12.1% for the underfives as a whole. The prevalence was observed to decline with age, being lowest (4.7%) in the 4-5 years age group. The difference in prevalence of ARI among different age groups was, however, not significant ($p>0.05$). The prevalence of ARI was 12.8% in boys and 11.6% in girls, the difference was not significant ($p>0.05$).

TABLE I– *Prevalence of Acute Respiratory Infections*

Age group (yr)	Number of children	ARI episodes	Prevalence (%)
0 - 1	90	15	16.7
1 - 2	63	9	14.3
2 - 3	77	10	13.0
3 - 4	78	8	10.3
4 - 5	64	3	4.7
Total	372	45	12.1

The overall incidence of acute respiratory infections in the underfives was observed to be 2.5 episodes per child per year. The incidence among boys was not significantly different ($p>0.05$) from that among girls. The incidence was highest in children below 2 years of age (3.0 and 3.1 episodes in 0-1 and 1-2 year age groups, respectively) and lowest in the 4-5 year age group (1.8 episodes). There was a statistically significant decline in the acute respiratory infections episodes in children above 2 years of age ($p<0.01$; *Table II*).

Upper respiratory tract infections including nasopharyngitis, pharyngitis, tonsillitis and acute otitis media constituted 87.5% of total episodes of infection. Lower respiratory tract infections including pneumonia and bronchiolitis constituted the remaining 12.5%. The upper respiratory tract infections were clinically mild. The lower respiratory tract infections were moderately severe (8.5%) or severe (4%).

TABLE II—*Incidence of ARI According to Age and Site of Involvement*

Age group (yr)	No. of children	Acute respiratory infection episodes*	Upper respiratory infection episodes**	Lower respiratory infection episodes*
0 - 1	108	3.0	2.5	0.5
1 - 2	58	3.1	2.8	0.4
2 - 3	72	2.2	1.9	0.3
3 - 4	70	2.2	2.0	0.2
4 - 5	58	1.8	1.7	0.1
Total	366	2.5	2.2	0.3

Episodes are expressed per child per year; * $p<0.01$, ** $p<0.05$

The overall incidence of upper respiratory tract infections in boys was 2.1 episodes per year which was not significantly different from that among girls (2.2 episodes per year; $p>0.05$). The incidence of upper respiratory tract infections was the highest in the first two years of life and declined to lowest in the 4-5 years age group. The decline in incidence with age was significant ($p<0.05$; *Table II*).

The overall incidence of lower respiratory tract infections was 0.3 episodes per year. Boys had a significantly higher incidence as compared to girls (0.4 episodes and 0.2 episodes, respectively; $p<0.05$). The incidence was highest in infancy (0.5 episodes) and decreased steadily with age, being the lowest in the 4-5 year age group (0.1 episodes). The decline in incidence with age was significant ($p<0.01$; *Table II*).

Discussion

The overall prevalence of ARI in underfives was observed to be 12.1% in the month of July when the initial baseline survey for prevalence was carried out. A higher prevalence of 28.4% was reported by Sharma *et al.*(3) who, however, did not indicate the time of the year in which the survey was carried out. A still higher prevalence of 44.7% for different clinical entities constituting acute respiratory infections was reported by Bhansali *et al.*(6). The time of the year when the survey was carried out was also not stated. In the surveys conducted by National Institute of Communicable Diseases(4) in rural areas, the overall prevalence of acute respiratory infections in underfives was observed to range between 12.6% and 20.7%. The lower rate in the present study could have been due to the fact that the survey for measuring prevalence was carried out in July when the rates of acute respiratory infections are expected to be low because of the summer season.

The incidence of ARI in the present study was observed to be 2.5 episodes per child per year. Comparable figures have also been reported in various studies conducted in rural areas. Gupta and Walia(7) reported 2.5 episodes while Kumar *et al.*(8) observed an incidence of 3.5 episodes in another study in rural Punjab. More recently, Walia *et al.*(9) reported an annual incidence of 1.3 episodes in Haryana while Raddiah and Kapoor(10) reported 3.7 episodes from another rural area of Haryana.

Upper respiratory tract infections, constituted 87.5% of all acute respiratory infections while lower respiratory infections accounted for 12.5%. This is in agreement with other studies. Kamath *et al.*(11) observed that upper respiratory tract infections accounted for approximately 80% of

all respiratory diseases while Manchanda and Sachdev(12) found pneumonia to constitute 9% of all respiratory infections.

The incidence of upper respiratory tract infections in the present study was 2.2 episodes per year. Similar incidence has been reported by Bhansali *et al.* (1.6 episodes)(6) and Raddiah and Kapoor (3.1 episodes)(10). There have been few community based studies on the incidence of lower respiratory tract infections in India. Keilman *et al.*(13) reported an annual incidence of 0.09 episodes of pneumonia in rural Punjab while Bhansali *et al.*(6) observed 0.13 episodes annually. In the incidence of lower respiratory tract infections (0.3 episodes). This could be due to the fact that the present study was a six month longitudinal study carried out during the rainy and winter seasons when the attack rate of severe, lower respiratory disease is more. Raddiah and Kapoor(10) observed an even higher incidence of 0.5 episodes of moderate and severe cases.

No significant association was observed between the overall incidence of acute respiratory infection and sex of the child. This is an agreement with studies by other(6,9,13). Some authors have reported a higher incidence in the male children than in the female(14-16). The incidence of upper respiratory tract infections was also similar in the two sexes. However, lower respiratory tract infection incidence was observed to be significantly higher in boys as compared to girls. Bhansali *et al.* observed a similar sex difference for lower respiratory tract infections(6). Manchanda and Sachdev(12) reported a 2.6 times higher morbidity due to pneumonia in males.

In conclusion, acute respiratory infections constitute an important cause of under-fives morbidity. The magnitude of acute respiratory infections in the rural area surveyed in the present study clearly implicates it as a major public health problem. The need and the urgency to mount a community based programme to control the morbidity and mortality due to acute respiratory infections cannot be over emphasized.

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NOTES AND NEWS

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