



## Original Article

# Impact of Malnutrition and Smoking Habits of Parents on ARI

M I Bari<sup>1</sup>, M I Haque<sup>2</sup>, A B Siddiqui<sup>3</sup>, M H Haldary<sup>4</sup>, M A Hossain<sup>5</sup>

### Abstract

Acute Respiratory Infection (ARI) is one of the leading common causes of death in young children in Bangladesh. Three hundred fifty one patients of ARI below five years of age are selected as per WHO guidelines. Out of 351 patients, one patient died due to very severe pneumonia with severe malnutrition. There was male preponderance in all the age groups and also 41% of male children had recurrent attacks of ARI. In this study, it was statistically proved that malnutrition ( $p=0.00028$ ) and smoking habits of parents ( $p=0.04054$ ) had significant important risk factors on recurrent attacks of ARI.

TAJ 2001; 14 (2): 74-77

### Introduction

ARI is one of the leading causes of paediatric morbidity and mortality throughout the developing countries. About 15 million children under 5 years of age die in the world annually of which 4 million deaths are due to ARI.<sup>1,2</sup> In fact, 20% of infants born in developing countries failed to reach their 5<sup>th</sup> birthday of age and that one fourth of the child morbidity is attributable to ARI alone.<sup>3</sup>

In our country, there is no established figure on mortality due to ARI, but from some hospital based findings it is about 30%.<sup>4</sup>

ARI control program of Bangladesh claims that 1,50,000 children die of ARI each year accounting for 20% of childhood death below 5 years of age.<sup>5</sup> But in developed countries like the USA and Canada it is only 0.85 and 0.60 per

thousand per year respectively under 4 years of age of children.<sup>6</sup> In Bangladesh, incidence of ARI is on an average about 7-9 episodes per child per year among under five kids.<sup>7</sup>

Several risk factors of ARI have been proposed and some of them have been commonly accepted. Synergism between malnutrition and parental smoking has long been recognized as risk factors of ARI in children. Malnutrition is an important factor for increased risk, prolonged duration, recurrent attacks and fatal outcomes of ARI. Malnutrition causes thinning of the lining epithelia of lung alveoli which makes it easier for bacteria to invade the lung and also is associated with a significant impairment of immune mechanism.<sup>8,9</sup> Smoking habits of parents causes indoor smoke pollution which is one of the important risk factors of acute respiratory infection in children.<sup>10,11</sup> In the first year of life exposure to

<sup>1</sup> Senior Consultant, Department of Paediatrics, Rajshahi Medical College Hospital, Rajshahi-6000, Bangladesh.

<sup>2</sup> Junior Consultant, Department of Paediatrics, Rajshahi Medical College Hospital, Rajshahi-6000, Bangladesh.

<sup>3</sup> Professor, Department of Paediatrics, Rajshahi Medical College, Rajshahi-6000, Bangladesh.

<sup>4</sup> Associate Professor, Department of Paediatrics, Rajshahi Medical College, Rajshahi-6000, Bangladesh.

<sup>5</sup> Assistant Professor, Department of Paediatrics, Rajshahi Medical College, Rajshahi-6000, Bangladesh.

cigarette smoke due to parental smoking increases the risk for the infant of an attack of respiratory infection.<sup>12</sup>

Various data from China indicate that there may be synergistic effect of passive smoking and formula feeding leading to malnutrition on the risk of acute respiratory infection.<sup>13</sup>

So this study has been undertaken to find out the impact of malnutrition and smoking habits of parents on frequent attacks of acute respiratory infection in children.

### Materials and Methods

This prospective and cross sectional study was carried out from September 1997 to August 1998 at Horogram Union of Paba Upazilla, Rajshahi. There are 16 villages in this union and average number of under five populations in each village was 124.<sup>13</sup> Three data collectors were selected in this study and they were given two weeks training on ARI before collecting information in six separate villages. They attended each home at every alternate day and samples were collected in simple randomized way. Getting primary information from the data collectors, researchers attended those patients on the next day and confirmed the validity of diagnosis by prescribed proforma and also helped to deliver medical care and advice.

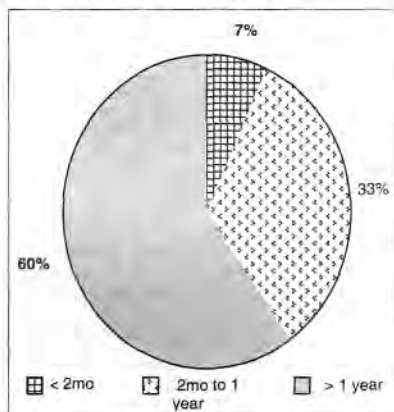
Three hundred fifty one patients of ARI below 5 years of age were selected from six villages of Horogram union during 12 months study period. History was taken in details and presented proforma were filled up. Recurrent attack of ARI means more than one attack during 12 months consecutive study period. The following parameters were encountered- age, sex, clinical pattern, malnutrition, smoking habits of parents and at the end data were processed and analyzed by computer using SPSS win. program.

### Results

Acute respiratory infections were highest among the children of more than 02 months of age.

Fig-I showed age distribution of the children with ARI where 60% of the ARI above 01 year of age and only 7% were below 2 months of age.

**Fig-I** Age distribution of the children affected by Acute Respiratory Infection (ARI)



There was male preponderance in all age group and 41.6% of male had recurrent attacks of ARI. There was a statistically significant association between sex and recurrent attacks of ARI ( $P=0.15$ ).

Impact of malnutrition on ARI showed in Table- I where mild, moderate and severe malnutrition was 36.1%, 48% and 12.8% respectively.

Children with severe and moderate malnutrition suffered more recurrent ARI, which were 44.4% and 44.7% respectively (Table - II). The association between recurrent attacks of ARI of children and their nutritional status was statistically highly significant ( $P=0.00028$ ).

In a family where two or more smokers were present, their children suffered more from ARI than that of no or one smoker in a family. There was a statistically significant association with smoking and recurrent attacks of ARI ( $P=0.04054$ ) (Table- III).

**Table I** - Impact of malnutrition on ARI.

No. of total ARI cases.	ARI with normal child	No. of ARI cases having malnutrition of different grades (n=342)		
		Mild	Moderate	Severe
351	9	127 (36%)	170 (48.5%)	45 (12.8%)

**Table II** - Attack of ARI and nutritional status

Attack of ARI	Nutritional status on MAC				Total N(%)
	Normal N(%)	Mild Malnutrition N(%)	Moderate Malnutrition N(%)	Severe Malnutrition N(%)	
Once	8(88.9)	1(11.2)	9(100.0)	(2.6)	225(64.1)
More than once	98(77.2)	29(22.8)	127(100.0)	(36.2)	126(35.9)
Total	94(55.3) 25(55.6)	76(44.7) 20(44.4)	170(100.0) 45(100.0)	(48.4) (12.8)	351(100.0) (100.0)

Chi Square = 18.98099 DF = 3 P = 0.00028

**Table III** - Attack of ARI and parental smoking

Attack of ARI	Number of Smoker in a family		Total N(%)
	One N(%)	Two or more N(%)	
Once	35(77.8)	190(62.1)	225(64.1)
More than once	10(22.2)	116(37.9)	126(35.9)
Total	45(100.0) (12.8)	306(100.0) (87.2)	351(100.0) (100.0)

Chi Square = 4.19496 DF = 1 P = 0.04054

## Discussion

In the present study the incidence of acute respiratory infection is gradually increasing among the children of more than 2 months of age. The cause of increasing incidence of ARI in this age group is due to lack of antibody against common viral and bacterial pathogens.<sup>15</sup>

The study showed that among the 351 patients of ARI, 342 were suffering from different grades of malnutrition of which mild (1<sup>st</sup> degree), moderate (2<sup>nd</sup> degree) and severe (3<sup>rd</sup> degree) malnutrition were 36.1%, 48.5% and 12.8% respectively (Table - I), where as in child nutrition survey of Bangladesh (1992) these were 39.8%, 47.2% and 6.8% respectively.<sup>4</sup> In another study from Dhaka Shishu Hospital revealed that ARI

(82%), Diarrhoea (78%), UTI (30%) and TB (9%) were the common association among hospital admitted malnourished children.<sup>16</sup>

In our study, the incidence of moderate and severe malnutrition was higher than that of the national survey report. From this we can say that moderate and severely malnourished children were affected more by ARI and so, we got them more in number in our study.

Children with severe and moderate malnutrition suffered from more recurrent ARI (Table - II), and the association of recurrent attacks of ARI and the nutritional status were statistically highly significant (P= 0.00028). This study co-related well with Mamoon's study.<sup>17</sup>

Parental smoking has a definite effect on the frequency of the attack of ARI (Table - III). Exposure to passive smoking, particularly maternal smoking, was a risk factor of ARI in infancy.<sup>18</sup> Even exposure to cigarette smoke due to parental smoking in the first year of life doubles the risk for infant of an attack of pneumonia and bronchiolitis.<sup>19,20</sup>

This study co-related well with the above study and statistically proved that parental smoking was one of the most important risk factors, which predispose to ARI in children.

## Conclusion

This study reflected that malnutrition and smoking habits of parents were responsible for recurrent attacks of ARI. Proper health education about ARI can definitely reduce the incidence, morbidity and mortality of ARI in the country.

## References

1. WHO Acute respiratory infections in children: Case management in small hospital in developing countries. A manual for doctors and other senior health workers. WHO program for control of acute respiratory infections. WHO/ARI/90.4. Geneva, World Health Organization, 1991.
2. WHO Global medium - term Program, Program 13.7; Acute respiratory infection, ARI/MTP/83.1 Geneva, World Health Organization, 1983.

3. A Joint WHO/UNICEF Statement on basic principles for control of infection in children in developing countries, 1986.
4. Khatoon S A, Begum S, Dewan S. Decline of ARI admission in paediatrics in-patient wards following implementation of WHO guideline. *Mymen Med J* 1995; 4(9): 12.
5. Shah N, Raman K V, Premila PG. Risk factors for severe pneumonia in children in South Kerala: A hospital based case-control study. *J Trop Paediat* 1994; 40(4): 20-6.
6. Tupasi T E, Tan S A, Sanieel M C. Determinates of morbidity and mortality due to ARI. *J Infect Dis* 1988; 157(4): 615-23.
7. DOC ARI. 011-2/5/Training Disk, ARI control programs in Bangladesh.
8. Recognized causes and signs of pneumonia. *ARI News, AHRTAG, London, UK.* 1992; 24: 2 - 3.
9. Improving treatment of sick child. *ARI News, AHRTAG, London, UK.* 1993; 23: 1-2.
10. Rahman M H. National program for control of acute respiratory infection. *In Touch* 1993; 123:2-3.
11. Dharmage S C, Rajapaksha L C, Fernando D N. Risk factors of acute respiratory infections in children under five years of age. *South East Asian J Trop Med Public Health* 1996; 27: 107-10.
12. Morbidity and Mortality survey of diarrhoeal disease in rural area of Bangladesh 1983. National Health Services, GOB.
13. Chen Y. Synergistic effect of passive smoking and artificial feeding on hospitalization for respiratory illness in childhood. *Chest* 1989; 95:1004-7.
14. Census report of Paba Thana Health Complex, 1991.
15. Aruolb J F, Stern H C. Respiratory System. In: Behrman RT, Nelson's Text Book of Paediatrics, Saunders W B. Philadelphia, 14<sup>th</sup> ed. 1992; 1054-77.
16. Amin M, Begum K A, Ehsan M A, Akbar M S. Socio-economic determinants and Biochemical status of severely malnourished Children. *Dhak Shis Hosp J* 1991; 7(7): 77.
17. Mamoon K A H M, Mannan N. Malnutrition and severity of the Acute Respiratory Infection. *Bang Med J (Khu)* 1998; 31(31): 10 - 12.
18. Mc Connochie, Roghmann K J. Parental smoking, presence of older sibling and family history of asthma as increased risk of bronchiolitis. *Am J Dis Child* 1986; 140:806-817.
19. Colly J R T, Holland W W. Influences of passive smoking and parental bronchitis in early childhood. *Lancet* 1974; 2: 1031 - 34.
20. Mc Connochie K M, Roghmann K J. Bronchiolitis as a possible cause of wheezing in childhood. *New Evid Paediat* 1984; 74: 1-10.

All correspondence to:

Dr. M I Bari  
Senior Consultant  
Department of Paediatrics  
Rajshahi Medical College Hospital  
Rajshahi-6000, Bangladesh.