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Original Article

A STUDY ON PREVALENCE OF ACUTE RESPIRATORY TRACT INFECTIONS(ARI) IN UNDER FIVE CHILDREN IN URBAN AND RURAL COMMUNITIES OF AHMEDABAD DISTRICT, GUJARAT

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ABSTRACT

Background: Acute respiratory tract infection is a major cause of morbidity and mortality in developing and also developed countries. About 13 Million under 5 children dies every year in the world, 95% of them in developing countries, one third of total deaths are due to ARI.

Objective: To find out prevalence of ARI in under 5 children living in urban and rural areas of Ahmedabad district

Materials and Methods: A cross sectional study was covering 500 under 5 children living in urban (five zone) and rural (five PHC of sanand taluka) area of Ahmedabad district from September 2008 to March 2009.

Results: Prevalence of ARI was found to be 22%, it was higher in low social class (III,IV and V)(26.56%), Illiterate mothers (24.4%) and primary (23.9%) mothers, Overcrowded houses (28.5%).

Conclusion: Prevalence of ARI was lower in urban area (17.2%) as compare to rural area (26.8%) (Combine is 22%). In rural area, it is more because of lack of availability of basic health services, lack of awareness, and other associated factors like overcrowding, low socio-economic status, absence of cross ventilation, indoor air pollution are responsible factors.

Keywords: Acute respiratory infections, under five children, overcrowding, illiteracy

INTRODUCTION

Acute respiratory tract infection is a major cause of morbidity and mortality in developing and also developed countries. ARI is an infection of any part of respiratory tract or any related structures including para nasal sinuses, middle ear and pleural cavity. It includes, a new episode means occurring in an individual who has been free of symptoms for at least 48 hours and also all infections of less than 30 days duration except those of the middle ear where the duration of acute episode is less than 14 days[1]. In the developing countries out of ten, seven deaths in under 5 children are due to ARI. National family health survey(NFHS -3) revealed that two weeks before the survey 6% of under 5 children had symptoms of an ARI (cough, short and rapid breathing), out of these children 69% were taken to a health facility or health provider for treatment . Average adult has 2-4 episodes per year and a child has 6-8 episodes per year. In rural area, lack of basic health services, lack of awareness, and other associated factors like overcrowding, environmental factors, defects in immune system, overuse and misuse of antibiotics, poverty, absence of ventilation, indoor air pollution are responsible factors. In developing countries like Kenya,Philippines, Thailand ,Colombia, Nigeria, Uruguav etc,

prevalence was reported in the range of 21.7 to 40%. It is estimated that at least 300 million episodes of ARI occur in India every year, out of these about 30 to 60 millions are moderate to severe ARI. While every 6th child in the world is Indian, every 4th child who dies, comes from India.

MATERIAL AND METHODOLOGY

A cross sectional study was carried out in 500 under children in urban area (five zone) and rural area(five PHC of sanand taluka) of Ahmedabad district during September 2008 to March 2009. Out of 500 studied children, 250 children for Urban and 250 children for Rural areas of Ahmedabad District were studied. For sampling in urban area, Ahmedabad city was chosen for studying urban population. There are 6 zones in Ahmedabad city. By simple Random Technique 5 zones were chosen for the city. Each zone has 7-9 wards.To choose sample from urban area, simple random technique was applied for each 5 zone . One ward was selected by simple random technique (chit method) for each 5 zone .Through simple random technique one area of each ward was selected and study was carried out and start from no 1 house till 50 children were found. For sampling in rural area, Ahmedabad has 10 Talukas. One Taluka (Sanand) was selected by simple random technique. Five Primary Health Centre of Sanand Taluka were selected by simple random technique. 5 villages of each PHC were selected by simple random technique. Through simple random technique one area of each village was selected and study was carried out and start from no 1 house till 50 children were found.Predesigned, pretested questionnaire was used for data collection. The questionnaire included information regarding details of their parents,housing condition,type of using cooking fuel, anthropometric and clinical examination also done. House to house survey was done for data collection. History of episodes of ARI during last one month was enquired for calculating the prevalence of ARI among underfive children. Social classification is done on the basis of Modified Prasad's classification revised according to inflation rate in year 2007-2008. Gradation of **ARI**,[2] according to severity**:** Mild ARI : Presence of cough or cold (No pneumonia) **,** Moderate ARI : Fast breathing without chest indrawing .Severe ARI : Presence of chest indrawing (severe pneumonia) and signs of very severe disease like convulsions, abnormal sleep,severe malnutrition, wheezing, grunting, nasal flaring etc.

Data analysed by Epi-info 2002 package.Chi square test applied for statastical significance.

RESULTS

Out of 500 children, about 55.0% were in between 1-4 yrs, 33.2% were below age of 1 yr, and 12% were in between 4-5 yrs of age. No major difference was found in between rural and urban area. The sex wise distribution was almost equal (48% boys, 52% girls). Boys were more in urban area (54%), girls were more in rural area (58%). Majority were Hindus (80 %).About one third,30% of children belonged to upper social class(I,II) and remaining were in low social class(III,IV, V).Social class IV and V, which is more in rural area (40.8% and 38.8%) .38% of children living in pukka houses, it was more in urban (59%) as compare to rural area(17%).Overcrowding was present in more than half of the houses (53.2%),it was more in rural area (73.6%).Cross ventilation was present in 44.6% of houses, it was more in urban(62.8%) as compare to rural area(26.4%). 37.2% children were from households using smokeless fuel which is more in urban area (56.8%) as compare to rural area (37.2%). 33% father and 50.8% mother of children were illiterate (more in rural area 42.4%, 70% respectively).According to occupational status of parents, 44.6% fathers were labourers,70.4% mothers were housewives, 18.4% were labourers. History of parental smoking was present in 63.8% of houses, it was more in rural area (75.6%). About 31.8% were malnourished children (14.6% had grade-I, 9.8% had grade-II and remaining had grade-III and IV), it was more in rural area (44%). According to symptoms, about 92.0% of children having cough, 81% nasal discharge, 38% fever, 20% fast breathing and 4% stopped feeding.

Table 1: Distribution of ARI children according to age and sex wise

Age group (yrs)	Male		Female		Total	
	No	%	No	%	No	%
0-1	26	41.3	18	37.5	44	40.0
1-4	28	45.3	24	50.0	14	47.3
4-5	8	13.0	6	12.5	14	12.7
Total	62	56.3	48	43.7	110	100.0

110 ARI cases were found during study, according to sexwise 56.3% were males and

43.7% were females. More ARI cases were seen in 4-5 years of age group (47.3%) and in this age group 45.3% were males and 50.0% were females (Table-1).

According to social class, prevalence of ARI was higher in low social class (in class III - 31.4%, class IV -22.1%, and class- 26.2% respectively). (Table-2)This difference was statistically significant ((x^2 = 13.68, p<0.001). In social class IV and class V, prevalence of ARI was more in rural area (35.3%, 41.5%) as compare to urban area (26.6%, 31.1%). This difference was statistically significant ((x^2 =15.5, p<0.05) (Table-3).

Table 2: Distribution of ARI cases according to social class

Social class	Severity of ARI								Children with No ARI		Total	
	Mild		Moderate		Severe		Total					
	No	%	No	%	No	%	No	%	No	%	No	%
I	11	9.6	1	0.8	0	0.0	12	10.5	102	89.4	114	100
II	9	23.6	2	5.2	0	0.0	11	28.9	27	71.0	38	100
III	9	25.7	1	2.8	1	2.8	11	31.4	23	68.5	35	100
IV	31	19.6	4	2.5	0	0.0	35	22.1	123	77.8	158	100
V	36	23.0	3	1.9	2	1.2	41	26.2	115	73.7	156	100
Total	96	19.2	11	2.2	3	0.6	110	22.0	390	78.0	500	100

(x^2 = 13.68, p<0.001)

Table 3: Distribution of ARI cases according to social class and urban-rural comparison

Social class	ARI cases					
	Urban		Rural		Total	
	No	%	No	%	No	%
I	10	22.2	2	3.0	12	10.9
II	7	15.5	4	6.1	11	10.0
III	2	4.4	9	13.8	11	10.0
IV	12	26.6	23	35.3	35	31.8
V	14	31.1	27	41.5	41	37.2
Total	45	100.0	65	100.0	110	100.0

(x^2 =15.5, p<0.05)

Prevalence of ARI was highest in children of illiterate (24.4%) and primary (23.9%) mothers. This difference was not statistically significant (x^2 =4.49, p>0.05).Prevalence of ARI was highest in children of illiterate (21.0%) and primary (18.2%) fathers, but difference was not statistically significant (x^2= 2.92, p>0.05). According to occupation, prevalence of ARI was lower in children of fathers who were engage in service (17.6%) or in business (18.9%) but difference was not statistically significant (x^2= 8.59, p>0.05). Among children of mothers who were labourers (21.7%) or engaged in agriculture work (26.6%) and housewife (22.4% respectively) had higher occurrence of ARI but difference was not statistically significant (x^2=2.08, p>0.05).

Prevalence of ARI was more in those children having history of parental smoking (24.4%) as compare history of non-parental smoking(17.6%) but difference was not statistically significant (x^2 = 3.09, p >0.05).No difference was observe in between type of house and prevalence of ARI. Overcrowding has a direct relationship with prevalence of ARI, it was higher (28.57%) in children who were living in overcrowded houses as compare to no overcrowding (14.52%). This difference was statistically highly significant (x^2 = 14.30, p<0.001). Mild cases were more (25.5%) in overcrowded houses as compare to no overcrowded (12.3%) houses.

Prevalence of ARI was more in children living in houses with inadequate ventilation (24.4%) as compare to houses with adequate ventilation (19.2%). This difference was statistically significant (x^2 =11.89, p <0.001). Severity of disease depicts mild, moderate and severe cases (20.6%, 3.0%, and 0.7%) more in inadequate ventilation than adequate ventilation (17.5%, 1.2% and 0.4%) respectively.

Prevalence of ARI was higher in children of mothers who were using smoky chullhas (24.8%) as compared to using smokeless chullhas (17.2%). This difference was statistically significant (x^2 = 3.97, p <0.001). According to exposure to type of fuel and types of ARI, ARI cases were more seen in rural area(72.3%) as compare to urban area (68.8%) where smoky fuel was used but difference was not statistically significant (p >0.05).

Nutritional status of child has direct bearing on children's susceptibility to ARI. Prevalence of ARI amongst children who had no malnutrition was lowest (14.0%), while it was more in Grade-I to IV malnutrition. This difference was statistically significant (x^2 =39.86, p<0.001) (Table- 4 &5).

Table 4: Distribution of ARI cases according to nutritional status

Nutritional status	Severity of ARI								Children with No ARI		Total	
	Mild		Moderate		Severe		Total					
	No	%	No	%	No	%	No	%	No	%	No	%
Normal	43	12.6	4	1.1	1	0.7	48	14.0	293	85.9	341	100.0
Grade-I	26	35.6	0	0.0	1	1.3	27	36.9	46	63.0	73	100.0
Grade-II	16	32.6	4	8.1	1	2.0	21	42.8	28	57.1	49	100.0
Grade-III	9	31.0	2	6.8	0	0.0	11	37.9	18	62.0	29	100.0
Grade-IV	2	25.0	1	12.5	0	0.0	3	37.5	5	62.5	8	100.0
Total	96	19.2	11	2.2	3	0.6	110	22.0	390	78.0	500	100.0

(x^2 =39.86, $p<0.001$)

Table 5: Distribution of ARI cases according to nutritional status and urban-rural comparison

Nutritional status	ARI cases					
	Urban		Rural		Total	
	No	%	No	%	No	%
Normal	22	48.8	26	40.0	48	43.6
Grade-I	11	24.4	16	24.6	27	24.5
Grade-II	7	15.5	14	21.5	21	19.0
Grade-III	4	8.8	7	10.7	11	10.0
Grade-IV	1	2.2	2	3.0	3	2.7
Total	45	100.0	65	100.0	110	100.0

(x^2 = 1.15, $p>0.05$)

DISCUSSION

Overall prevalence of ARI was found to be 22.0%. Our finding are compare with the study done by Sikolia D N[3], Ram kishore Gupta[4] and Rahman MM[5].

According to social class, prevalence of ARI was higher in low social class. The present study found a significant association between ARI and social class ($p <0.001$).Various studies like by Deb SK[6], Ram kishore Gupta[4], Nilanjan kumar Mitra[7], M.R.Savitha[8] and Biswas A[9] found similar association.

According to area, Prevalence of ARI was lower in urban area (17.2%) as compare to rural area (26.8%). Similar observations were seen in study done by Deb SK[6]. According to diagnosis, severe ARI cases more seen in rural area (4.2%) as compare to urban area (2.4%).

The present study found no association between ARI and literacy status of mothers ($p >0.05$). Similar findings observed in study done by Nilanjan kumar Mitra[7].

The present study found no significant association between ARI and history of parental smoking and type of house ($p>0.05$). Our finding are compare with the study done by Rahman MM[5] and J.K Peat[10].

Overcrowding has a direct relationship with prevalence of ARI. The present study found a significant association between ARI and overcrowding ($p <0.001$). Various studies like by Rahman MM[5], Ram kishore Gupta[4] and Berman[11] found similar association.

Smoky chullhas contributed to higher prevalence of ARI. It was higher in children of mothers who were using smoky chullhas. Our finding are compare with the study done by Rahman MM[5], Nilanjan kumar Mitra[7], Wafula EM[12], Berman[11], M.R.Savitha[8] and Biswas A[9] .

There was a strong correlation between nutritional status and occurrence of ARI .observations indicate that nutritional status of child has direct bearing on his susceptibility to ARI. The present study found a significant association between ARI and nutritional status ($p <0.001$). Similar observations where noted by Deb SK[6] , Nilanjan kumar Mitra[7], Biswas A[9], M.R.Savitha[8], Fonseca W[13] and Pandey A[14].

The present study found nutritional status, smoky chullha, low socio economic class, overcrowding, absent cross ventilation are the significant risk factors for ARI in under fives.Strengthening of RCH-2 or IMNCI programme,raising female literacy level will go a long way in prevention of morbidity amongst children in general and ARI.Reorientation of health workers in peripheral area i.e anganwadi, subcentres and PHCs regarding identification, management and timely referral cases of ARI and strong supervision, monitoring and evaluation RCH services specifically ARI component.

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