Original Article

A STUDY OF FACTORS ASSOCIATED WITH PRESENCE OF ARIIN CHILDREN 1-4 YEARS OF AGE IN AN URBAN SLUM OF PUNE CITY

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ABSTRACT

Objective: To study the incidence Acute respiratory infection (ARI) in children 1-4years in an urban slum.

Background: Every year some 12 million children in developing countries die before they reach their fifth birthday, many during the first year of life. 7 in 10 deaths are due to acute respiratory infections, diarrhea, measles, malaria or malnutrition or a combination of these conditions.

Materials and Method: A longitudinal survey of all children who were in the age group 1-4 years residing in the Landewadi slum, Pune. It was carried out from Nov 2008- Dec 2009. Data on symptoms suggesting ARI, cough, fever and nasal discharge, were collected for the preceding 7 days by recall.

Results: There were 346 households from which 195 children formed the study population. Association between age in months and history ofARI among the study population shows that there were 25.4% of children between 13-24 months age-group followed by 25-36 months age group 18.7 % and the lowest was in the 37-48 months age group 7.5 % suffering from acute respiratory infection.

Conclusions: In study found that there was no significant association between ARI with age, sex and some risk factors for ARI.Where as indoor air pollution was the significant risk factor responsible for ARI in children.

Keywords: Acute respiratory infections (ARIs), longitudinal study, 1-4 years children, pollution

BACKGROUND

Every year about 12 million children in developing countries die before they reach their fifth birthday, many of them during the first year of life. Seven in ten deaths are due to common diseases like acute respiratory infections (mostly pneumonia), diarrhea, measles, malaria or malnutrition or a combination of these conditions which were considered as target diseases to cause a very high mortality and morbidity in this age group.[1]

In India, the under 5 population is about 15% of the total population and most of the deaths occur due to such communicable diseases which comes under the 'Integrated Disease Surveillance Project' (IDSP).[2]The Government of India has already prepared a project implementation plan for integrated disease surveillance in the country with World Bank / WHO assistance.[2,3] The Union Health and Family Welfare Minister stated that IDSP will bring about a sea change in understanding disease patterns and monitoring risk factors for disease control and prevention.[4]

This longitudinal study is formulated with the objectives to determine the incidence of acute respiratory infection (ARI) in children 1-4 years of age in an urban (Landewadi) slum of Pune city and to identify risk factors for such disease.

MATERIALS AND METHOD

A Community-based longitudinal surveillance of all children in the age group of 1-4 years residing in Landewadi slum of Pune city was carried out for a period of one year. A house to house survey was conducted from 01 November 2008 to 31 December 2009. Children 1-4 years of age was monitored through an alternated month visits in their home. Children absent from home at the schedule time were excluded from the study. At all visits information of symptoms of

Acute Respiratory Infection were obtained. Symptoms are recalled for the prior 1-2 weeks. If the parents reported 1 or more respiratory symptoms, clinical examination of respiratory system was carried out. If any of the following signs were recorded, the episode was characterized as a lower respiratory tract infection:Respiratory rate (> 40 per min), Cough or difficult breathing, Strider, Wheezing, Cyanosis or chest in drawing. If none of these but any of following were recorded the episode was characterized as an upper respiratory tract infection: Purulent ear discharge, red bulby tympanic membrane and pharyngeal tonsilarerythema or exudates.[5]

The purpose of the study was explained to the parents / guardians of the child and aninformed consent was taken from them before enrolling a child in the study group. The relevant information on socio-demographic and epidemiological variables of the cases was collected by interviewing the parents/ guardian of the child using pre-designed proforma validated by pre-testing.95 percent confidence intervals were used as measures of relative risk.The number of episodes and days at risk for each child were calculated on a monthly basis. The data was compiled and analyzed on Epi info 2002 and Excel sheet and chi-square tests were applied wherever required.

RESULTS

Table 1: Distribution of study subjects according to their background characteristics

Characteristics	Frequecy (n=195(%)
Age (months)	
13-24	67 (34.3)
25-36	75 (38.5)
37-48	53 (27.2)
Sex	
Male	93(47.7)
Female	102(52.3)
Religion	
Hindu	100 (51.3)
Buddhist	79 (40.5)
Muslims	16 (8.2)
Education of Mother	
Illiterate	62 (31.8)
Primary	97 (49.7)
Secondary	28 (14.4)
H. Secondary	8 (4.1)
Education of Father	
Illiterate	23 (11.8)
Primary	91 (46.7)
Secondary	40 (20.5)
H. Secondary	33 (16.9)
Graduation	7 (3.6)
Post. Graduation	1 (0.5)
Type of family	
Joint	69 (35.4)
Nuclear	126 (64.6)
Socioeconomic class	
III	7 (3.6)
IV	99 (50.8)
V	89 (45.6)

Landewadi slum area had a total population of 346 household's including195 children 1-4 years of age, which is 56.36 % of total slum population of Landewadi and was taken as the study population.

A total of 195 children (1-4 years) were studied. Majority of the study subjects i.e. 75 (38.5 %) were between 25-36 months age-group and belonged to Hindu religion 100 (51.3 %) and they come under the IVth class of the social classification given by the B.G.Prasad method of the social classification.Overcrowding was present in more than half of the houses (83.0%) and 74.8%children were from households using smokeless fuel for cooking food. 88.2 % father of children were literate. History of parental smoking was present in 75.3% of houses. It was also observed that 37.4% of children were malnourished.

Table-2: Associationof socio demographic characteristics with occurrenceof acute respiratory infection (ARI) among the study population

Characteristics	ARI present	ARI absent	Total
Age			
13-24	17(25.4)	50(74.6)	67
25-36	14(18.7)	61(81.3)	75
37-48	4(7.5)	49(92.5)	53
Sex			
Male	15(16.1)	78(83.9)	93
Female	20(19.6)	82(80.4)	102
Religion			
Hindu	33(18.4)	146(81.6)	179
Non Hindu	2(12.5)	14(87.5)	16
Family type			
Joint	16(23.2)	53(76.8)	69
nuclear	19(15.1)	107(84.9)	126
Education of father			
Literate	29(17.0)	143(83.0)	172
Illiterate	6(26.1)	17(73.9)	23
Indore air pollution			
Present	21(42.9)	28(57.1)	49
Absent	14(9.6)	132(90.4)	146
Indoor smoking			
Present	25(17.0)	122(83.0)	147
Absent	10(20.8)	38(79.2)	48
Overcrowding			
Present	30(18.5)	132(81.5)	162
Absent	05(15.2)	28(84.8)	33
Malnutrition			
Present	15(20.5)	58(79.5)	73
Absent	20(16.4)	102(83.6)	122
Birth weight of children			
< 2.5 kg	04(16.0)	21(84.0)	25
≥ 2.5 kg	31(18.2)	139(81.8)	170
Exclusive breast feeding			
Yes	25(15.6)	135(84.4)	160
No	10(28.6)	25(71.4)	35
Family history of ARI			
Present	24(12.3)	111(57.0)	135(69.3)
Absent	11(05.6)	49(25.1)	60(30.7)

*figure in parenthesis is percentage of row total

The present study shows significant association of age and ARI episode (χ^2=6.4, p<0.05). ARI was significantly higherin children of mothers who were using

smoky chullhas (42.9%) as compared to using smokeless chullhas (9.6%) (χ^2=27.5,p<0.05). Association of overcrowding with ARI was not statistically significant. (χ^2 = 0.393, df= 1; P > 0.05, not significant). But when their relative risk was calculated it was found that there was 1.52 fold increases in the risk of getting ARI when the children resided in the overcrowded environment. RR= 1.52 (95% CI 0.58, 4.01)

Table-3: Association of acute respiratory infection (ARI) caseswith their monthly, gender wise distribution

Month	Male	Female	Total
December	14 (73.3)	16 (83.8)	30 (157.1)
February	11 (57.6)	11 (57.6)	22 (115.2)
April	6 (31.4)	9 (47.1)	15 (78.5)
June	8 (41.9)	9 (47.1)	17 (89.0)
August	28 (146.6)	22 (115.2)	50 (261.8)
October	21 (109.9)	19 (99.5)	40 (209.4)
December-2009	12 (62.8)	16 (83.8)	28 (146.6)
Total	100	102	202

* Figures in the parenthesis are incidence rate (spells) per 1000 per month; χ^2 = 2.164, df= 6; P > 0.05

Monthly incidence rate (spells) of acute respiratory infections was highest in the month of August'09 (261.8/1000 per month) (table 3) and the average incidence rate (spells) was 115/1000/ per year. This difference was not statistically significant. Seasonal incidence rate (spells) of acute respiratory infections was highest in winter season (513.1/1000 per month) followed by monsoon (350.8/1000 per month), summer (193.7/1000 per month). This difference was also not statistically significant.

DISCUSSION

According to "National Child Survival and Safe Motherhood Programme" module,[6] ARI is the major reasons for which the children are brought to hospital and health facilities. ARI is the major causes of mortality [1] and leading cause of child mortality in India followed by diarrhea.[7] Thus cases associated with ARI remain the major cause of morbidity and morbidity in the study which is consistent with the findings published in National CSSM Programme modules.[6]

Present study shows that monthly incidence rate of ARI was highest in the month of August'09 followed by October'09 and lowest rate was observed in month of April 09 similar finding was observed in study conducted by S.K.Deb (2004).[8]

No association was found between ARI and literacy status of father (p>0.05), it is similar to findings of Mitra.[9] Incidence of ARI was higher in children of mothers who were using smoky chullhas (42.9%). Similar study in rural areas of Australia also showed increased risk of developing LRTI among those using wood fuel.[10] In present study incidence of ARI was found more in children those who were malnourished, not exclusively breast feed, similar finding was found in study of Mitra[9] and pore et al.[11] a study by Singh and Nair [12]discussed that the incidence of ARI was found in close associated with nutrition status of child and literacy status. Environmental factor like fuel use for cooking, overcrowding and Indore air pollution were found to be influence the incidence of ARI.

CONCLUSION

The present study found that illiteracy, poor nutritional status, overcrowding, indoor air pollution and parental smoking behaviour were the social and demographic risk factors responsible for ARI in under-five children. Based on the findings, occurrence of ARI could be reduced by improved living, environmental conditions and nutrition of children. Raising female literacy level and awareness regarding indoor pollution will go a long way in prevention of morbidity amongst children in general and ARI. These observations emphasize the need for research aimed at health system to determine the most appropriate approaches to control acute respiratory infection and thus could be utilized to strengthen theARI control programme.

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