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Research Paper

A Hospital Based Cross Sectional Study on Prevalence of Acute Respiratory Infections (ARI) in Under Five Children of Lucknow District

Medical Science

KEYWORDS : Acute respiratory infections; Under-five children; Indoor air pollution.

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ABSTRACT

Background: Childhood ARI/pneumonia is a significant public health problem in India, although robust epidemiological data is not available on its incidence. On an average, children below 5 years of age suffer about 5 episodes of ARI per child per year, thus accounting for about 238 million attacks and about 13 million deaths every year in the world. Identification of modifiable risk factors of ARI may help in reducing the burden of disease. Objectives: To study the social demographic factors and prevalence of ARI in under five children living in urban and rural areas of Lucknow district. Material and Methods: It was a cross sectional study covering 300 under-five children living in urban and rural area of Lucknow district from December 2014 to May 2015(6months). Results: Prevalence of ARI was found to be 46.67%. Out of 300 children 140 had one or more episode of ARI. The sex wise distribution of ARI cases was slightly higher in males with 54.28% males and 45.71% females. It was higher in children with lower socioeconomic status (35.70%), illiterate mother (46.4%), overcrowded conditions (85.71%), inadequate ventilation (82.14%), and use of smoky chullah (71.42%), malnutrition (28.57%) and parental smoking (78.57%). Conclusion: The present study found that low socioeconomic status, maternal illiteracy, poor nutritional status, overcrowding, indoor air pollution and parental smoking behavior were the significant social and demographic risk factors responsible for ARI in under-five children. 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 the ARI control programme.

Introduction

Childhood Acute Respiratory Infection (ARI) is the largest cause of morbidity among under-five children across the world. Pneumonia - the most serious presentation - is singly responsible for almost one fifth of total mortality in this vulnerable age group.

Therefore the importance of ARI and pneumonia cannot be over-emphasized. Consequently, global health-care agencies such as the World Health Organization (WHO), United Nations Children's Fund (UNICEF), national and state Governments, as well as international and local agencies involved with aid, academics, and research- have all focused on this area. In India, ARI has been given top priority in all Government programs including the current Reproductive and Child Health Program, Phase-II (RCH-II)[1].

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. 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[2].

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[3].

Even though the etiology is often undetermined in a clinical situation, the most frequent agents causing pneumonia in children are *Streptococcus pneumonia, Hemophilus influenzae* and to some extent *Staphylococcus aureus*. The incidence of pneumonia in developed and developing countries are similar, but mortality is five times higher in developing countries. Acute bronchiolitis is another, one of the common serious lower respiratory tract infection in infants. *Respiratory syncytial virus* is implicated in most cases. Other causative organisms include *parainfluenza virus*, *adenovirus, influenza viruses* and rarely *Mycoplasma pneumoniae*[4].

Aim and objectives

The present study was conducted to determine the prevalence and important socio-demographic factors associated with ARI.

Material and methods

A cross sectional study was carried out among 300 under-five children living in urban and rural area of Lucknow district and visiting the pediatric OPD of Career Institute of Medical Sciences and Hospital during December 2014 to May 2015 (6months). Clearance from the Career Institute of Medical Sciences ethical committee was first obtained. Simple random sampling was used after obtaining all hospital records for under five children in last 6 months. A pre-designed and pre-tested questionnaire was used for data collection. The questionnaire included information regarding socio-demographic profile, housing conditions, type of cooking fuel used, anthropometric and clinical examination. History of episodes of ARI during last one year was enquired for calculating the prevalence of ARI among children under-five. Social classification is done on the basis of Modified Prasad's classification revised according to inflation rate in year 2012-2013. Data was entered into SPSS package (version 17.0) and was analyzed by using chi-square test and the results were expressed as proportions.

Results

Out of 300 children 140 had one or more episode of ARI. The sex wise distribution of ARI cases was slightly higher in males with 54.28% males and 45.71% females. In the study, about 45.71%

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(64) were in between 0-1 yrs, 35.0% (49) were between age of 1-4 yrs and 19.28% (27) were in between 4-5 yrs of age. (Table 1)

Age group	Male	Female	Total
	No. (%)	No. (%)	No. (%)
0-1	36(47.3)	28(43.7)	64(45.71)
1-4	25(32.8)	24(37.5)	49(35)
4-5	15(19.7)	12(18.75)	27(19.28)
Total	76(54.28)	64(45.71)	140(100)

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

	Urban	Rural	Total
ARI Present	65	75	140(46.67)
ARI Absent	100	60	160(53.33)
Distribution of ARI cases according to gender			
Male	40	36	76(54.28)
Female	34	30	64(45.71)
Distribution of ARI cases age wise			
0-1	28	36	64(45.71)
1-4	20	29	49(35)
4-5	09	18	27(19.28)
Distribution of ARI cases according to SES status			
Social class I	04	01	05(3.5)
Social class II	18	10	28(20)
Social class III	22	28	50(35.7)
Social class IV	12	20	32(22.8)
Social class V	10	15	25(17.8)
Distribution of ARI cases according to maternal education			
Illiterate	15	50	65(46.4)
Primary	10	25	35(25)
High school	14	06	20(14.28)
Intermediate	07	03	10(7.14)
Above intermediate	08	02	10(7.14)
Distribution of ARI cases according to father's occupation			
Laborer	05	25	30(21.4)
Private service	03	02	05(3.5)
Agriculture	00	80	80(57.1)
Government service	12	03	15(10.71)
Business	07	03	10(7.14)
History of parental smoking			
yes	30	80	110(78.57)
no	20	10	30(21.42)
Distribution of ARI cases according to overcrowding			
yes	20	100	120(85.71)
no	15	05	20(14.28)
Distribution of ARI cases according to cross ventilation			
Inadequate ventilation	13	102	115(82.14)
Adequate ventilation	20	05	25(17.8)
Distribution of ARI cases according to use of domestic fuel			
Smoky chullah	20	80	100(71.42)
Smokeless chullah	15	05	20(14.28)
Others	10	10	20(14.28)
Distribution of ARI cases according to nutritional status			
Normal	35	20	55(39.28)
Grade I	10	05	15(10.71)
Grade II	15	25	40(28.57)
Grade III	11	14	25(17.8)
Grade IV	01	04	05(3.5)

Table 2: Social demographic factors and ARI cases in under five children of Lucknow district

According to social class, prevalence of ARI was higher in low social class (in class III – 35.7%, class IV -22.8%, and class V-17.8% respectively) (Table 2). This difference was statistically significant (x2=11.72, p<0.001). Prevalence of ARI was highest in children of illiterate (46.4%) and primary (25.0%) mothers. According to occupation of father, prevalence of ARI was highest in children of fathers who were engaged in agriculture (57.1%) and laborers (21.4%). Prevalence of ARI was more in those children having history of parental smoking (78.57%) as compared history of non-parental smoking (21.42%). Overcrowding and inadequate ventilation has a direct relationship with prevalence of ARI. ARI was higher in children (85.71%) who were living in overcrowded houses as compare to no overcrowding (14.28%) and inadequate ventilation was 82.14%. Prevalence of ARI was higher in children of mothers who were using smoky chullhas (71.42%) as compared to using smokeless chullhas (14.28%). Nutrition status of children had also a direct bearing on children's susceptibility to ARI. It was more in Grade-II (28.57%), Grade-III (17.8%), and Grade-IV (03.5 %) respectively.

Discussion

In the study overall prevalence of ARI was found to be 46.67%. Our findings are much similar to the findings of a study done by Rahman and Rahman[5] in Bangladesh where prevalence of ARI was found to be 58.7%. Our findings are in contrast to the findings of the studies conducted by Prajapati et al.[6] in Gujrat where the prevalence of ARI was found to be 22% and Gupta et al.[7] where the prevalence of ARI was 4.5%. In present study 54.28% of ARI cases were males and 45.71% were females. This study showed that ARI was more prevalent among male children and similar study conducted in London, United Kingdom by Leeder et al.[8] had similar results showing male sex was more prone as compared to female. 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 Gupta et al.[7], Deb et al.[9] and Mitra[10] found similar association.

According to area, Prevalence of ARI was lower in urban area (46.42%) as compared to rural area (53.57%). Similar observations were seen in study done by Deb[9]. The present study found no association between ARI and literacy status of mothers (p>0.05). Similar findings observed in study done by Mitra[10].

Prevalence of ARI was more in those children having history of parental smoking (78.57%). Similar findings were observed in a study by Rahman and Rahman[5] in Bangladesh. Studies done on exposure of cigarette smoke in Australia and risk of parental smoking in UK have increased risk of hospitalization with ARI[11,12]. Prevalence of ARI was higher in children of mothers who were using smoky chullhas (71.42%). Similar study in rural areas of Australia also showed increase risk of developing LRTI among those using wood fuel[13].

An another study conducted by Pore et al.[14] revealed that significant association was found that between ARI and nutritional status, immunization status, weaning, mothers' literacy status in pediatric ward of S.C.S.M. General Hospital, Solapur. A study conducted by Gupta et al.[7] suggested that the factor analysis, crowding, economic status, and sanitary conditions are important associates of prevalence of ARI. The incidence of pneumonia was found to be the highest in infant group. Lower socioeconomic status and malnourished had the greater risk of ARI episodes[15].

In a study done by Mitra[10] showed that low socio-economic class, low birth weight, under-nutrition of the child, inadequate immunization, children not exclusively breastfed and indoor smoke pollution were significantly associated with increasing number of ARI episodes.

Conclusion

The present study found that low socioeconomic status, maternal illiteracy, poor nutritional status, overcrowding, indoor air pollution and parental smoking behaviour were the significant 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 the ARI control programme.

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