RESEARCH ARTICLE

POTENTIAL RISK FACTORS CONTRIBUTING TO ACUTE RESPIRATORY INFECTIONS IN UNDER FIVE AGE GROUP CHILDREN

Atul Choube[1], Bhushan Kumar[2], Syed Esam Mahmood[3], Anurag Srivastava[4]

[1] Department of Pediatrics, Teerthanker Mahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh, India
[2] Department of Community Medicine, Goldfield Institute of Medical Sciences and research, Faridabad, Haryana, India
[3] Department of Community Medicine Rohilkhand Medical College & Hospital, Bareilly, Uttar Pradesh, India
[4] Department of Community Medicine, Teerthanker Mahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh, India

Correspondence to: Syed Esam Mahmood (semahmood@gmail.com)

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ABSTRACT

Background: Acute respiratory infection (ARI) is the leading cause of mortality and morbidity in India, especially in under-fives. In the developing countries, out of ten, seven deaths in under 5 children, are due to ARI. ARI contributes to 15-30% of all under-five deaths in India, and most of these deaths are preventable.

Aims & Objectives: To study the potential risk factors and prevalence of ARI in under five children living in rural area of Moradabad district.

Materials and Methods: This cross sectional study was carried out among 278 under-five children. A questionnaire that included information regarding demographic profile, housing conditions, type of cooking fuel used, birth weight, birth order, feeding practices of the child and pet keeping was used.

Results: Out of the 278 children, 27.69% were suffering from ARI. Majority of those with ARI were males (74.02%) and were aged between 12 to 47 months (59.74%). The percentage of ARI was significantly higher (<0.001) among children having low birth weight, and those not exclusively breastfed. The percentage of ARI was also significantly higher among children having no smoke outlet in their houses (<0.05), those with dampness in their houses (<0.001) and among those having pets (<0.05).

Conclusion: Incidence of respiratory infections cannot be reduced without an overall increase in social and economic development.

Key Words: Acute Respiratory Infections; Risk Factors; Under Five Age Group Children; Housing Conditions; Feeding Practices; Pet Keeping

Introduction

Acute Respiratory Infection (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 (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] ARI is the leading cause of mortality and morbidity in India, especially in under-fives. In the developing countries, out of ten, seven deaths in under 5 children, are due to ARI. Every year, worldwide, ARI is responsible for an estimated 3.9 million deaths in young children. ARI contributes to 15-30% of all under-five deaths in India, and most of these deaths are preventable.[2] 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. Hospital records from states with high infant mortality rate shows that up to 13% of inpatient deaths in pediatric wards are due to ARI. The proportion of death due to ARI in the community is much higher, as many children die at home. In India in 2008, about 27.4 million cases of ARI were reported, which gives an incidence rate of about 2394 cases per lakh population.[3]

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, only 69% were taken to a health facility, or health provider for treatment. Lack of awareness, defects in immune system, overuse and misuse of antibiotics, co morbid illnesses (especially HIV), malnutrition, prematurity or measles, environmental determinants (particularly absence of ventilation, passive smoke exposure, overcrowding or poor living conditions) and social factors (principally poverty and poor access to both preventative, including immunization, and curative health services) are important contributory factors. Comprehensive studies regarding causative, aggravating and associated factors leading to ARI are required to study the problem in depth, and formulate better health policies.

With this background, the present study was carried out to study the potential risk factors and prevalence of ARI in under five children living in rural area of Moradabad district.

Materials and Methods

A cross sectional study was carried out among 278 under-five children living in rural area of Moradabad district during January 2014 to June 2014. Clearance from the Institutional ethical committee was first obtained. The children were selected from rural area, Amroha under the field practice area of Department of Community Medicine, Teerthanker Mahaveer Medical College and Research Centre, Moradabad. Purposive sampling was used. A pre designed and pre-tested questionnaire was used for data collection. The questionnaire included information regarding demographic profile, housing conditions, type of cooking fuel used, birth weight, birth order and feeding practices of the child. House to house survey was done for data collection. Informed consent was obtained from the mother. Data was entered into SPSS package (version 17.0) and was analyzed by using chi-square test and the results were expressed as proportions. Following operational definitions were used:

Acute Respiratory Infections: Children with any one or combinations of symptoms and signs like cough and cold, running or blocked nose, sore throat, rapid breathing, noisy breathing, stops feeding and/or drinking, chest in drawing etc. A new episode was taken as one occurring in an individual who had been free of symptoms for at least three consecutive days or more, as per WHO (1997) definition of ARI.[4]

Weaning: It was divided into weaning at appropriate age and at inappropriate age. (a) Weaning at appropriate age: Weaning started at the age of 6 months was said to be weaning at appropriate age. (b) Weaning at Inappropriate age: Weaning started before age of 6 months or not started even after 6 months was said to be weaning at inappropriate age.

Results

Out of the 278 children, 77 (27.69%) were suffering from ARI. Majority of those with ARI were males (74.02%), and were aged between 12 to 47 months (59.74%). (Table 1) The percentage of ARI was significantly higher (<0.001) among children having low birth weight, and those not exclusively breastfed. The percentage of ARI was also significantly higher among children having no smoke outlet in their houses (<0.05), those with dampness in their houses (<0.001), and among those having pets (<0.05). (Table 2)

Table-1: Demographic profile of respondents with ARI

Characteristics		Children without ARI	Children with ARI	Total	χ^2 (df); P-value
Gender	Male	121 (43.5%)	57 (20.5%)	178 (64.0%)	4.621 (1); **0.032**
	Female	80 (28.8%)	20 (7.2%)	100 (36.0%)	
Age (Months)	0-11	47 (16.9%)	7 (2.5%)	54 (19.4%)	24.572 (2); **0.000**
	12-47	136 (48.9%)	46 (16.5%)	182 (65.5%)	
	48-60	18 (6.5%)	24 (8.6%)	42 (15.1%)	

Table-2: Correlates of ARI among the study participants

Variables		Children without ARI	Children with ARI	Total	χ^2 (df); P-value
Birth Weight	< 2500 gm	71 (25.5%)	50 (18.0%)	121 (43.5%)	19.860 (1); **0.000**
	≥ 2500 gm	130 (46.8%)	27 (9.7%)	157 (56.5%)	
Birth Order	≤2	153 (55.0%)	61 (21.9%)	214 (77.0%)	0.302 (1);
	>2	48 (17.3%)	16 (5.8%)	64 (23.0%)	0.583
Exclusive Breast feeding	Yes	191 (68.7%)	61 (21.9%)	252 (90.6%)	16.402 (1); **0.000**
	No	10 (3.6%)	16 (5.8%)	26 (9.4%)	
Weaning	Inappropriate	174 (62.6%)	69 (24.8%)	243 (87.4%)	0.469 (1);
	Appropriate	27 (9.7%)	8 (2.9%)	35 (12.6%)	0.494
Smoke Outlet	Present	62 (22.3%)	14 (5.0%)	76 (27.3%)	4.495 (1); **0.034**
	Absent	139 (50.0%)	63 (22.7%)	202 (72.7%)	
Dampness	Present	101 (36.3%)	69 (24.8%)	170 (61.2%)	36.308 (1); **0.000**
	Absent	100 (36.0%)	8 (2.9%)	108 (38.8%)	
Type of fuel used	LPG	63 (22.7%)	21 (7.6%)	84 (30.2%)	0.437 (1);
	Wood	138 (49.6%)	56 (20.1%)	194 (69.8%)	0.508
Pets	Present	70 (25.2%)	38 (13.7%)	108 (38.8%)	4.944 (1); **0.026**
	Absent	131 (47.1%)	30 (14.0%)	170 (61.2%)	

Discussion

Nearly a quarter of children were suffering from ARI in our study. Similar finding (26.8%) has been reported in rural Gujarat by Prajapati et al.[7] Higher prevalence (52%) has been reported in rural Meerut by Goel et al.[8] Male children were more prone for ARI than females and it has been noticed in previous studies.[7-9] On the contrary, females were more affected in the study by Islam et al.[10] In our study, most of the children with ARI were aged between 12 to 47 months (59.74%), which is in contrast to the findings of Islam et al where infants were more affected.[10] The percentage of ARI was significantly higher among those having low birth weight in our study. This was in agreement to the findings of Yousif et al.[11] Prematurity was found as a significant risk factor for ARI in under-fives of Solapur.[12] The premature children are underweight and their immune system is also not well developed. So these children are more prone for various infections like respiratory infections. The percentage of ARI was also higher among those children, who were not exclusively breastfed, and had inappropriate weaning. In developing countries, children who are exclusive breast fed for 6 months, had 30%-42% lower incidence of ARI, compared to children who did not receive breast feeding for the same duration.[13] A significant association between weaning status and ARI was also reported by Pore et al in their study conducted among under-fives of Solapur.[12]

Observations, made by Prajapati et al in their rural Gujarat study among under-fives, also revealed that timely initiation of complementary feeding protect against ARI. [7] A significant higher proportion of ARI was found among those having no smoke outlet in their houses in the current study. Smoke outlet provides an opportunity to keep children away from harmful exposure of household air pollution. The prevalence of ARI was also found to be significantly higher among those having dampness in their houses in this study. Poor housing conditions like inadequate cross ventilation are important determinants of ARI.[14] Higher proportion of ARI was seen among children in whose houses, wood was used as cooking fuel, as compared to those where LPG was used, though the difference being statistically insignificant. Compared with gas stoves, even stoves using wood, one of the cleaner biomass fuels, can release 50 times more pollution during cooking.[15] Exposure to indoor air pollution has 2.3 (1.9-2.7) times increased risk of respiratory infections (especially lower respiratory tract infections).[13] Million deaths study has also reported increasing prevalence ratio (PR = 1.54 among males, 1.94 among females) of respiratory infections due to use of solid fuel.[16]

The percentage of ARI was significantly higher among those children having pets in their houses in the current study. Although no association between respiratory tract infections and pet keeping was reported from a study conducted in Geneva by Rylander et al.[17] On the contrary, dog and cat contacts were found important, possibly leading to better resistance to infectious respiratory illnesses during childhood by Bergroth et al.[18] Incidence of respiratory infections cannot be reduced without an overall increase in social and economic development. Every reduction in death due to ARI would give an incremental benefit toward achieving the Millennium Development Goal (MDG 4).[19]

The strength of our study is that it is first of its kind as we could not find any previous study from rural India reporting the association between respiratory tract infections and pet keeping. The limitation of our study is that, due to time and resource constraints, we did not attempt to explore all the causative factors responsible for the high prevalence of ARI.

Conclusion

Incidence of respiratory infections cannot be reduced without an overall increase in social and economic development. Nearly a quarter of children were suffering from ARI in our study. Male children are repeatedly shown to be more prone for ARI than females. The percentage of ARI is shown to be higher among those having low birth weight (mostly premature) in our study. The percentage of ARI is also shown to be higher among children who have inappropriate weaning. ARI is significantly higher among those having smoke exposure (no outlet in houses using biomass fuel) or dampness. Those having pets might have initial increased incidence with later development of protective immunity.

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