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**РАСПРОСТРАНЕННОСТЬ И ПОСЛЕДСТВИЯ РЕЦИДИВИРУЮЩЕЙ**  
**ОСТРОЙ РЕСПИРАТОРНОЙ ИНФЕКЦИИ СРЕДИ ШКОЛЬНИКОВ**  
**В СЕЛЬСКИХ РАЙОНАХ ИНДИИ**

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**PREVALENCE AND CONSEQUENCES OF RECURRENT ACUTE**  
**RESPIRATORY TRACT INFECTION AMONG SCHOOL CHILDREN**  
**IN RURAL PARTS OF INDIA**

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**Резюме.** Это исследование проливает свет на многогранные факторы, способствующие распространенности острых рецидивирующих инфекций среди детей школьного возраста, и подчеркивает необходимость целенаправленных вмешательств в уязвимых группах населения.

**Ключевые слова:** рецидивирующие инфекции, острые респираторные инфекции, часто и длительно болеющие, психосоциальный стресс, факторы окружающей среды.

**Resume.** This research sheds light on the multifaceted contributors to recurrent acute respiratory infection among school-aged children and emphasizes the need for targeted interventions in vulnerable populations.

**Keywords:** recurrent infection, upper respiratory tract infection, frequently and long-term ill, psychosocial stress, environmental factors.

**Relevance.** Childhood acute respiratory infection (ARI) is a significant public health problem especially in developing countries. Robust epidemiological data is not available on its incidence in India. As per World Health Organization estimates, ARI causes 3.9 million deaths throughout the world every year.

**Aim:** the purpose of this study was aimed to assess the prevalence and certain risk factors associated with recurrent ARI among school children.

**Task:**

1. Psychological portrait: Several dimensions of psychosocial stress, including exposure to stressful experiences, stress-prone personality traits, and signs of emotional disturbance were elevated in children with a history of recurrent colds and flu, findings are consistent with the view that psychosocial stress depletes local immune protection against viral invasion or bacterial colonization of the upper respiratory tract.

2. Explore the Role of Environmental Factors: Environmental factors such as overcrowding coupled with poor ventilation at homes and work places may make the health effects of indoor air pollution more pronounced. Exposure is particularly high among women and children, who spend most time near the domestic hearth.

3. Investigate the Underlying Pathogenesis: The occurrence of ARI is determined by the exposure to various risk factors. Air pollution is a risk factor for both acute and chronic

respiratory disease. Exposure to high concentrations of solid fuel smoke that are produced by inefficient open fires, mainly in the rural areas of developing countries, exposure to second hand smoke. Solid fuel smoke possesses the majority of the toxins found in tobacco smoke and has also been associated with a variety of diseases (fig.1).

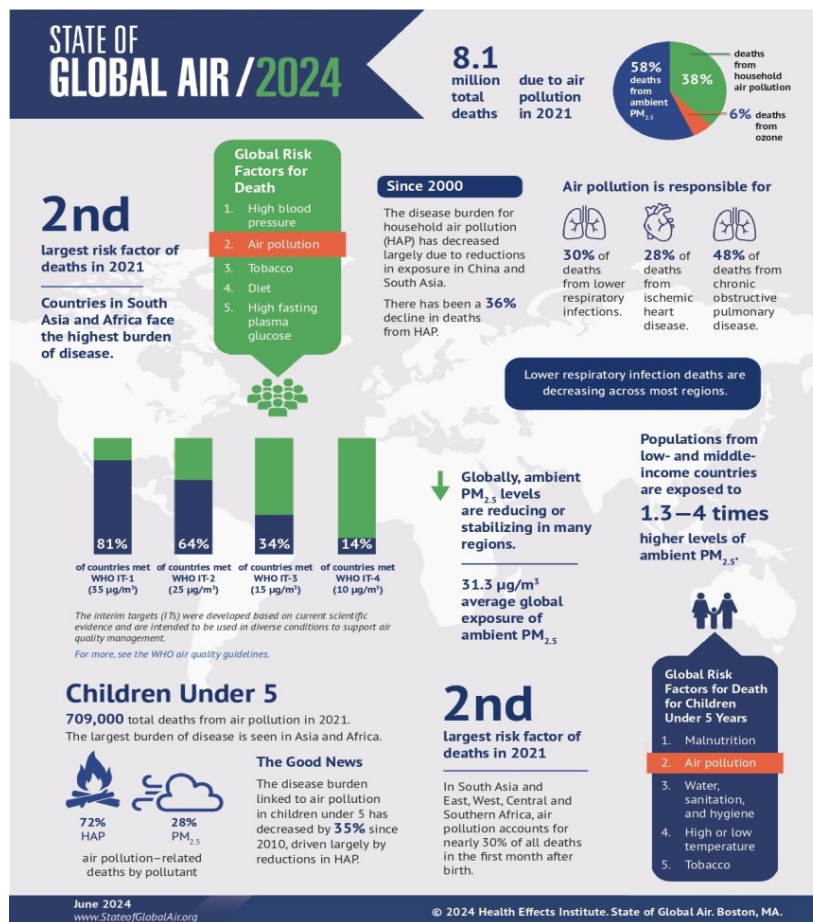


Fig. 1 – State of Global air [6]

**Materials and methods.** The reviewed article comprises of current research conducted among 397 school children age group of 5-14 years in the seven schools of rural Puducherry, India. **Source of Support:** The present study was supported by Indian Association of Preventive and Social Medicine (IAPSM) Epidemiological grant for the year 2011. ([pmc.ncbi.nlm.nih.gov/articles/PMC4147429/#sec1-2](https://pubmed.ncbi.nlm.nih.gov/articles/PMC4147429/#sec1-2))

**Data on socio-demographic characteristics and associated risk factors of ARI was analyzed** by univariate and multiple logistic regression analysis done by the Pubmed databases.

**Results and their discussion.** According to the above study, it was obtained that 51.1% (203) of the subjects had at least one symptom of ARI in the preceding 2 weeks. The manifestations of ARI included allergic rhinitis (183, 46.1%), dry cough (75, 18.9%), throat pain and fever (54, 13.6%), wheezing (39, 9.8%) and ear discharge (28, 7.1%). About half of the subjects with ARI (52.2%) belonged to 5-9-year age group and females (52.3%). Mother's education, family history of allergic disorder and asthma, absence of smoke outlet in kitchen and windows in sleeping room were found to be significantly associated with ARI

in univariate analysis ( $P < 0.05$ ). Review of Multiple logistic regression analysis showed that 5-9 years age group (odds ratio [OR] = 1.7), family history of allergic disorder (OR = 9.6) and asthma (OR = 5.2), presence of smoke outlet in kitchen (OR = 0.5), absence of windows in sleeping room (OR = 3.0) were found to have an independent association with the ARI. About 29.6% (60) of the subjects with ARI had accessed health care facility for treatment.

A reviewed study from South India reported the prevalence of allergic rhinitis among school children as 18.5% and similarly in Jaipur city among children aged 5-15 years found that recurrent cough was 16.4% and wheezing was 8.4% in last 12 months period and family history of allergy and asthma was present in 3.1% and 10.9% of the subjects respectively. The prevalence of ARI was similar in both sexes. It was comparatively more among younger age groups (tab.1).

Although the reviewed data found that prevalence of ARI is more among those who use firewood, they could not find any association with it. But, prevalence was found significantly more among those who live in houses without smoke outlets and windows in living rooms. Data showed that there was a significant association between the prevalence of wheezing and the presence of smokers in the family (tab.2). Haryana based study in India found that factors associated with presence of symptoms of asthma were passive smoking and pets at home. This difference may be due to non-quantification of types of pets and smoking behavior among the household members.

**Tbl. 1.** Manifestations of ARIs among the subjects

Symptoms	Number of subjects (%)
Allergic rhinitis	183(46.1)
Ear discharge	28(7.1)
Throat irritation/pain	54(13.6)
Dry cough	75(18.9)
Wheezing	39(9.8)
Fever	54(13.6)
Any of the above symptom	203(51.1)
ARI: Acute respiratory infection	

**Psychological aspect:** The association between psychosocial stress and susceptibility to upper respiratory tract infection was investigated in 45 children with a history of recurrent colds and flu, and in 45 healthy children of similar age and gender distribution. In addition, mucosal immune protection against upper respiratory tract infections was assessed by measuring the concentration of secretory immunoglobulin A (serum IgA) and its ratio to albumin in saliva. Several dimensions of psychosocial stress, including exposure to stressful experiences, stress-prone personality traits, and signs of emotional disturbance were elevated in children with a history of recurrent colds and flu. Furthermore, lower ratios in these children indicated a deficiency in local mucosal immunity. Thus, the findings are consistent with the view that psychosocial stress depletes local immune protection against

viral invasion or bacterial colonization of the upper respiratory tract; this depletion may increase susceptibility to colds and flu. Alternatively, psychological disturbances could develop in response to frequent illness., Increased psychosocial stress and decreased mucosal immunity in children with recurrent upper respiratory tract infections [8].

**Tbl. 2.** Associated risk factors of ARI

Associated Factors	Total Number of Subjects	Number of Subjects with ARI (%)	$\chi^2$ , P Value
<b>Age</b>			
5-9 Years	199	106 (53.3%)	0.726, 0.394
10-14 Years	198	97 (49.0%)	
<b>Sex</b>			
Male	194	95 (49.0%)	0.711, 0.399
Female	203	108 (53.2%)	
<b>Mother's Education</b>			
No Schooling	174	77 (44.3%)	5.869, 0.015*
1-12th Standard	223	126 (56.5%)	
<b>Father's Education</b>			
No Schooling	103	51 (49.5%)	0.146, 0.702
1-12th Standard	294	152 (51.7%)	
<b>Family History of Allergic Disorder</b>			
Yes	82	68 (82.9%)	41.807, 0.000*
No	315	135 (42.9%)	
<b>Smoking Among Family Members</b>			
Yes	92	54 (58.7%)	2.744, 0.098
No	305	149 (48.9%)	
<b>Predominant Fuel Used</b>			
LPG	236	121 (51.3%)	0.004, 0.947
Wood	161	82 (50.9%)	
<b>Smoke Outlet</b>			
Present	172	72 (41.9%)	10.444, 0.001*
Absent	225	131 (58.2%)	
<b>Family History of Asthma</b>			
Yes	19	15 (78.9%)	6.178, 0.013*
No	378	188 (49.7%)	
<b>Hay in the House</b>			
Yes	10	6 (60.0%)	0.323, 0.574
No	387	197 (50.9%)	

Continuation of table 1

<b>Pets in the House</b>			
Yes	120	62 (51.7%)	0.02, 0.889
No	277	141 (50.9%)	
<b>Windows in Living Room</b>			
Absent	125	81 (64.8%)	13.637, 0.000*
Present	272	122 (44.9%)	

**Conclusion.** ARI among school children is an important health problem in this area. This reviewed study gives valuable information on magnitude of the problem and certain risk factors, which can be utilized for preventive measures to be taken in future. Interventions like provision of smoke outlets and windows in sleeping room may help in reduction of burden of disease at community level.

### Literature

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