

# Respiratory Viruses in Hospitalized Children with Acute Lower Respiratory Tract Infections, Mazandaran Province, Iran

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## ABSTRACT

*We conducted this study to determine the contribution of respiratory viruses in 202 hospitalized children (1mo-5 yr) with clinical evidence of acute lower respiratory tract illness (ALRI). Nasopharyngeal specimens were assayed for viruses detection by indirect immunofluorescent method. Viral agents were identified from 109 (54%) cases (9 cases had dual infection). The most commonly detected virus was parainfluenza virus 3 in 32 (15.8%) cases followed by respiratory syncytial virus 26 (12.9%); parainfluenza 1 and parainfluenza 2 each 13 (6.4%); influenza A 16 (7.4%), influenza B; 7(3.5%), and adenovirus 12 (5.9%). There were no demographic, clinical, radiologic or laboratory parameters except for recurrent wheeze (OR: 4.47; (95% CI: 1.98-10.73) and fever (OR: 3.27; (95% CI: 1.73-6.20), which could differentiate between patients with or without viral etiology.*

**Key words:** *Acute respiratory infections (ARI), Etiology, Iran, Virus.*

## INTRODUCTION

The etiology of acute lower respiratory illness (ALRI) is variable, depending on the age of the patients, geographic location, the time of the year, the epidemiological situation, and above all, the diagnostic methods used(1-3). Etiologic diagnosis is important in choosing the most appropriate treatment protocol(4,5).

We conducted this study to determine the relative contribution of different respiratory viruses in hospitalized young children with ALRI. Another objective was to identify the parameters on admission that may differentiate between a viral and non-viral ALRI episode.

## METHODS

The study was carried out in two phases: the first, from October 2001 to May 2002, and the second from June to November 2003. The study subjects consisted of children (1 mo-5 yr) hospitalized with clinical evidence of ALRI. An episode of ALRI was defined as presence of cough, difficulty in breathing,

and one or more of the following signs and symptoms: stridor, tachypnea, retraction, crackles and wheezing on lung auscultation. Informed consent was obtained from the parents. Baseline data were obtained for the demographic characteristics and medical history, physical examination, chest radiography, blood culture, CBC, ESR, antibacterial treatments, and hospital course. Two samples of nasopharyngeal secretions were collected from each child in the first 24 hours of admission and transported in viral transport medium. Respiratory syncytial virus (RSV), Parainfluenza viruses 1,2,3 (PI<sub>1</sub>, PI<sub>2</sub>, PI<sub>3</sub>), Influenza A and Influenza B, and adenovirus antigens in samples were investigated by VRK monoclonal antibody kit (Bartels Viral Respiratory Screening and Identification kit, B 1029-86-Bartels, USA) using an indirect fluorescent antibody method (IFA).

Based on the presence or absence of virus in samples, patients were categorized into two groups (virus positive vs negative). Odds ratio (95% CI) was computed to compare the demographic and clinical, radiological, and laboratory findings of the two groups.

**RESULTS**

Of 1339 children with ALRI, 202(15%) were hospitalized. One or two viruses were identified from 109 (54%) of them (9 cases dual infection). PI<sub>3</sub> was detected in 32 (15.8%) cases, followed by RSV, 26 (12.9%); Inf A, 15 (7.4%); PI<sub>1</sub>, and PI<sub>2</sub> each 13 (6.4%); adenovirus, 12 (5.9%) and Inf B, 7 (3.5%). **Table I** compares the demographic features, clinical, radiologic and laboratory findings, and antibiotic prescriptions of children with and without a detected viral agent. Children with viral etiology were more likely to have fever and history of recurrent wheezing.

**DISCUSSION**

In this study one or two viruses were identified from 109 out of 202 (54%) patients using viral agents detection method (IFA). Except for RSV activity, the patterns of occurrence were generally similar to other reports in temperate regions(1-3,6,7).

The result of previous studies has also suggested that viruses are the most common causes of

recurrent wheezing-associated ALRI occurring in young children(8). Thus, the preliminary diagnosis of a viral infection in absence of an obvious bacterial focus of infection coupled with recurrent wheeze should help contain indiscriminate use of antibiotic in patients with ALRI.

The most important limitations of this study were a relatively small sample size, inclusion of only hospitalized children, interrupted periods of study, and absence of highly sensitive diagnostic methods.

The findings expand our knowledge about the epidemiological features of respiratory viruses in hospitalized children with clinical evidences of ALRI in Mazandaran province, North of Iran.

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**TABLE I** DEMOGRAPHIC, CLINICAL, AND LABORATORY PROFILE OF CHILDREN WITH VIRAL AND NON-VIRAL ALRI

Variable	Virus positive (N=109)		Virus negative (N=93)		Odds ratio (95% CI)	P value
Mean age (SD), mo	20.2	(16.8)	19.2	(17.2)	0.65 (0.36-1.16)	
< 6 m (%)	35	(34.3%)	33	(35.3%)	0.41 (0.22-0.76)	
< 12 m (%)	64	(62.7%)	62	(66.6%)	0.97 (0.45-2.05)	
< 24 m (%)	91	(83.5%)	78	(83.8%)		
Gender M/F	69/40		59/34	(1.73)	0.81 (0.41-1.41)	
Fever	48	(42.6%)	18	(19.3%)	3.27 (1.73-6)	0.002
Wheeze	69	(64.7%)	61	(62.2%)	0.9 (0.5-1.61)	0.73
Rales and crackles	26	(24.6%)	21	(23.6%)	1.07 (0.55-2.06)	0.83
Recurrent wheeze	29	(26.2%)	7	(10.3%)	4.43 (1.84-10.73)	0.0004
Croup	4	(7.3%)	6	(7.5%)	1.3 (0.44-3.81)	0.62
Leukocytosis (≥15000)	25	(23%)	19	(20.7%)	1.59 (0.59-2.27)	0.67
Neutrophilia (≥10000)	10	(10.3%)	14	(15%)	0.29 (0.13-0.54)	0.001
CXR consolidation	20	(20.5%)	19	(21.7%)	0.87 (0.43-1.76)	0.71
Mean ESR (SD)	19.5	(9.3)	20.8	(15.1)	–	0.66
Antibiotic prescription	47	(42.7%)	41	(45.3%)	0.96 (0.55-1.67)	0.89

**WHAT THIS STUDY ADDS?**

- In Iran, viruses are responsible for more than 50% episodes of ALRI in young children; Parainfluenza, RSV, influenza and adenovirus were identified as causative agents.

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