Respiratory Viral Test Results in Children

Çocuklarda Respiratuvar Viral Test Sonuçları

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Abstract

Objective: Acute respiratory system infections (ARI) are thought to be associated with respiratory viruses characterized by similar symptoms. Therefore, the diagnosis of a viral infection must include a thorough assessment of both the clinical and epidemiologic features of respiratory viruses. The aim of this study to evaluate of similar complaints of children viral test results.

Methods: We retrospectively investigated a total of 312 respiratory viral test (RVT) results of children with acute respiratory system infection or related conditions between February 2012 and February 2014.

Results: Of the 312 RVT results, 155 were positive (49.6%); 135 (43.2%) of these detected only one virus and 20 (6.4%) detected two viruses. One hundred and fifty (48.0%) of the cases resulted in hospital admission, while 162 (51.2%) did not. Thirty (9.6%) of the positive results were treated in the observation unit. Of the positive RVT tests, 29 (9.2%) detected RSV, 18 (5.79%) detected adenovirus (all types), 11 (3.53%) detected coronavirus, 10 (3.2%) detected parainfluenza (all types), and 7 (2.2%) detected metapneumovirus.

Conclusion: Epidemiological features related to age, season, time of year, year to year, geographic location, and population affect respiratory viral infections. Therefore, we suggest that epidemiological surveys of ARIs, both longitudinally and locally, should be performed. *(J Pediatr Inf 2016; 10: 119-27)*

Keywords: Viral, test, children

Özet

Amaç: Akut solunum yolları enfeksiyonları benzer semptomlarla karakterize respiratuvar viruslerle ilişkilidir. Bundan dolayı, viral enfeksiyonun tanısı respiratuvar virusun hem klinik hem de epidemiyolojik özellikleri ile konulur. Bu çalışmada, çocuklarda benzer şikayetlerle alınan viral test sonuçlarının incelenmesi planlanmıştır.

Yöntemler: Şubat 2012 - Şubat 2014 tarihleri arasında Acıbadem Maslak Hastanesinde akut solunum yolu enfeksiyonu tanısı ya da ilişkili durumlarda respiratuvar viral test (RVT) alınmış 312 çocuğun test sonucunu retrospektif olarak inceledik.

Bulgular: RVT'lerin 155 (%49.6) pozitif; 135' inde (%43,2) sadece tek virus tespit edilirken 20 (%6,4) inde iki virus tespit edilmiştir. RVT pozitif olanlarda, 29 (%9,2) RSV, 18 (%5.79) adenovirus, 11 (%3,53) inde coronavirus, 10 (%3,2) inde parainfluenza ve 7 (%2,2) inde metapnömovirus tespit edilmiştir.

Sonuç: Solunum yolları viral enfeksiyon epidemiyolojisi, toplumlara, coğrafik konuma, yıllara, yılın belirli zamanlarına, mevsimlere ve yaş gibi birçok değişkenden etkilenmektedir. Lokal bir hastanede, ülkemizde çocuk yaş grubunda, akut solunum yolu enfeksiyonu ya da benzer durumlarda alınan RVT sonuçlarını inceledik. Bu epidemiyolojik sonuçların bilinmesi, yıllık enfeksiyon önleme; gerekli tedbirlerin alınması; uygulamalar için önemlidir. *(J Pediatr Inf 2016; 10: 119-27)*

Anahtar kelimeler: Viral, test, çocuk

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Introduction

Acute respiratory viral infection is a public health issue that is a great burden to both individual families and the whole society. Worldwide, the most common viral causes of acute respiratory tract infection (ARTI) include respiratory syncytial virus (RSV), parainfluenza viruses (PIVs), influenza viruses (IFVs), enteroviruses (EVs), adenoviruses (ADVs), human rhinoviruses (HRVs), human metapneumovirus (hMPV), and human coronaviruses (HCoVs, 229E, OC43, NL63 and HKU1) (1). The pattern of ARTI is variable and is related to epidemiological factors that include region, season, and year (2, 3).

Due to better detection techniques and more efficient ways of transmitting information, emerging pathogens are continuously reported in the literature (4). One recent example is the rapidity with which information was transmitted

regarding the pandemic influenza A/H1N1 when it was recognized as a new pathogen. Many of articles have identified that this virus puts children at high risk for infection and severe disease (5, 6). Recently, the other viruses have played an important role in pediatric infectious diseases. HMPV, was discovered 2001, and was quickly recognized as one of the main players in RSV-negative respiratory tract infections in young children worldwide. It typically affects children between 2 and 3 years of age, and can be associated with coryza, cough, or severe respiratory disease (7). HMPV is present year round, but it is most frequently detected 1-2 months after RSV season. The second virus, HCoV was recently brought to worldwide attention as SARS was identified in 2004 as a frequent cause of upper and lower respiratory tract infections in children (8). HCoV-NL63 typically affects children younger than one year of age, but older children can be infected as well; it is known to cause croup and febrile convulsions. Kaiser et al. (9) showed that 16% of children (median age: 5.7 months) with lower respiratory tract symptoms tested positive for coronavirus were identified mostly during the cold months (winter) (9). Other studies have shown that HCoV-NL63 is one of the most frequently found viruses in nasal aspirates of symptomatic children (10).

The inability to correctly recognize respiratory viral illnesses may cause excess use of diagnostic testing and antibiotics. For infectious diseases with person-to-person spread, such as influenza, the individual's likelihood of infection and the performance of rapid tests designed to detect infection depends on the local incidence of disease (11). The timely dissemination of information regarding the incidence of circulating seasonal viruses to clinicians has the potential to improve their awareness about ongoing outbreaks. This in turn may then improve diagnostic precision, and ultimately, patient management (12).

We suggest that there should be an increase in the awareness of clinicians regarding the epidemiology of circulating respiratory viruses in a timely and clinically useful manner. When an acute viral respiratory infection is suspected, information about the seasonal incidence of virus infections may help the physician to determine whether the use of an antiviral agent is indicated. In the current study, we analyzed the records of children with respiratory infections who were diagnosed at a private hospital and viral diagnostic testing is performed on children with fever and/or respiratory symptoms.

Materials and Methods

A total of 312 nasal swabs were obtained from children (age <16 years old) Acıbadem Maslak Hospital (Istanbul, Turkey) outpatient clinic between February 2012 and February 2014 with acute respiratory tract infection or related conditions, including cough, coryza, sore throat, earache, breathing difficulty, stridor, wheezing, and fever (≥38°C) and had no chronic illness (astma, bronchiolitis...etc.) also normally healthy children.

Samples were taken to the laboratory, processed, and screened for the presence of 12 respiratory viruses using multiplex polymerase chain reaction assay (RV12-ACE, Seegene, South Korea) for common respiratory viruses including; human adenovirus, human coronavirus 229E/NL63, human coronavirus OC43/HKU1, human metapneumovirus, human parainfluenza virus 1, human parainfluenza virus 2, human parainfluenza virus 3, human respiratory syncytial virus A, human respiratory syncytial virus B, human rhinovirus A/B, influenza A virus and influenza B virus.

Number Cruncher Statistical System (NCSS) 2007 Statistical Software (Utah, USA) package program were used. Independent t tests were used for examination of binary groups and chi-square test and Fisher's exact test for qualitative datas. Results were examined $p<0.05$ significance level.

Data collection was approved by the Ethics Committee of Acıbadem University.

Results

Among the total of 312 of RVT, 155 (49.6%) of them was found positive and negative in 157 (50.3%). The patients were grouped by age as follows: <2 years old, 13 (4.17%); 2-5 years old, 147 (47.1%); and ≥6 years old, 152 (48.7%). There were 126 (40.3%) girls and 186 (59.6%) boys. Of the positive RVT tests, 135 (43.2%) detected only one virus and 20 (6.4%) detected two viruses. One hundred fifty of the patients were admitted (48.0%) and 162 (51.2%) were followed up in an outpatient setting. Thirty patients were treated in the observation unit (9.6%). We detected the following viruses as follows: Adenovirus 18 (5.7%); Adenovirus+RSV B 1 (0.32%); Coronavirus 11(3.5%); Coronavirus+RSV A 5 (1.6%); Influenza A 13 (4.1%); Influenza A+Rhinovirus A/B 1 (0.32%); Influenza B 28 (8.9%); Influenza B+RSV A 1(0.32%); Influenza B+Rhinovirus A/B 1 (0.32%); Metapneumovirus 5 (1.6%); Metapneumovirus+RSV A 1(0.32%); Metapneumovirus +Rhinovirus A/B 1 (0.32%); Parainfluenza (type 2) 2 (0.64%); Parainfluenza (type 2)+Adenovirus 1(0.32%); Parainfluenza (type 3) 1 (0.32%); Parainfluenza (type 3)+Rhinovirus A/B 1 (0.32%); Parainfluenza (type 1) 3(0.96%); Parainfluenza (type 2) 4 (1.28%); RSV A 11 (3.53%); RSV A+Influenza A 1 (0.32%); RSV B 18 (5.77%); RSV B+Influenza A 1 (0.32%); Rhinovirus A/B 21 (6.73%); Rhinovirus A/B+Metapneumovirus 1 (0.32%); Rhinovirus A/

Table 1. Demographic features of the RVT (+) and RVT (-) groups

		Respiratory Viral Test (-) n=157		Respiratory Viral Test (+) n=155		p
Mean Age		7.66±3.81		5.86±3.50		<0.001+
Age	<2y	4	2.55%	9	5.81%	0.247
	2-5y	57	36.31%	90	58.06%	0.002
	≥6y	96	61.15%	56	36.13%	<0.001
Sex	Girl	65	41.40%	61	39.35%	0.713
	Boy	92	58.60%	94	60.65%	
Months	January	16	10.19%	29	18.71%	0.048
	February	12	7.64%	11	7.10%	0.835
	March	44	28.03%	25	16.13%	0.016
	April	32	20.38%	18	11.61%	0.049
	May	7	4.46%	12	7.74%	0.329*
	June	6	3.82%	8	5.16%	0.765*
	July	1	0.64%	4	2.58%	0.359*
	August	7	4.46%	4	2.58%	0.553*
	September	5	3.18%	4	2.58%	0.749*
	October	4	2.55%	3	1.94%	0.715*
	November	4	2.55%	7	4.52%	0.525*
	December	19	12.10%	30	19.35%	0,108
Fever		111	70.70%	110	70.97%	0.959
Cough		75	47.77%	95	61.29%	0.016
Sore Throat		12	7.64%	13	8.39%	0.809
Runny Nose		12	7.64%	15	9.68%	0.523
Wheezing		5	3.18%	7	4.52%	0.541*
Nausea-Vomiting		7	4.46%	7	4.52%	0.981*
Rash		5	3.18%	2	1.29%	0.259*
Hospital Admission		59	37.58%	91	58.71%	<0.001
Observation Unit		12	7.64%	18	11.61%	0.234

Chi-square test+Independent t test; *Fisher's exact test

B+Coronavirus, 1 (0.32%); Rhinovirus A/B+RSV A 1 (0.32%); Rhinovirus A/B+RSV B 2(0.64%). A more general breakdown is as follows: Influenza virus - all types, 40 (12.8%), Rhinovirus - all types, 21(6.73%); RSV - all types, 29 (9.2%); Adenovirus - all types, 18 (5.7%), Coronavirus, 11 (3.53%); Parainfluenza - all types, 10 (3.2%); and Metapneumovirus 7 (2.2%). The mean age of the RVT (+) group was lower than that of the RVT (-) group (p=0.0001). RVT (+) was significantly lower in patients aged >6 years old. Coughing was higher in the RVT (+) group. There were no differences between fever, sore throat, runny nose, nausea, vomiting, and eruption in the RVT (+) and RVT (-) groups (Table 1).

Seasonality of respiratory virus infection: In January, RVT (+) was higher than RVT (-) (p=0.048). RVT(+) was lower than RVT (-) in March and April (p=0.016, p=0.049, respectively) and there were no differences between RVT (+) and RVT (-) in February, May, June, July, August, September, October, November, and December (Table 1, Figure 1). In the summer months, Adenovirus (p=0.002), Parainfluenza (p=0.003), and Parainfluenza+adenovirus (p=0.022) were higher than they were during the other seasons (Table 2, Figure 2). In the winter months, Metapneumovirus (p=0.022), RSV (p=0.0001) and two virus co-infections (p=0.003) were higher than they were during the other

Table 2. Viral etiology and number according to seasons

		Winter		Spring		Summer		Autumn		
		n	%	n	%	n	%	n	%	p
Viral Etiology	Adenovirus	3	2.56%	6	4.35%	7	23.33%	2	7.41%	0.002
	Adenovirus, RSV	1	0.85%	0	0.00%	0	0.00%	0	0.00%	0.511
	Coronavirus	5	4.27%	4	2.90%	0	0.00%	2	7.41%	0.327
	Coronavirus, RSV	5	4.27%	1	0.72%	0	0.00%	0	0.00%	0.053
	Influenza	12	10.26%	27	19.57%	0	0.00%	1	3.70%	0.098
	Influenza, Rhinovirus	3	2.56%	1	0.72%	0	0.00%	0	0.00%	0.282
	Influenza, RSV	1	0.85%	1	0.72%	0	0.00%	0	0.00%	0.894
	Metapneumovirus	6	5.13%	1	0.72%	0	0.00%	0	0.00%	0.022
	Parainfluenza	2	1.71%	1	0.72%	5	16.67%	2	7.41%	0.003
	Parainfluenza, adenovirus	0	0.00%	0	0.00%	1	3.33%	0	0.00%	0.022
	Parainfluenza, Rhinovirus	0	0.00%	0	0.00%	0	0.00%	1	3.70%	0.015
	Rhinovirus	8	6.84%	8	5.80%	2	6.67%	3	11.11%	0.584
	Rhinovirus, metapneumovirus	0	0.00%	1	0.72%	0	0.00%	0	0.00%	0.828
	Rhinovirus, RSV	2	1.71%	0	0.00%	0	0.00%	1	3.70%	0.154
	RSV	22	18.80%	4	2.90%	1	3.33%	2	7.41%	<0.001
Virus Number	Single Virus	56	47.86%	52	37.68%	15	50.00%	12	44.44%	0.095
	Two Viruses	14	11.97%	3	2.17%	1	3.33%	2	7.41%	0.003

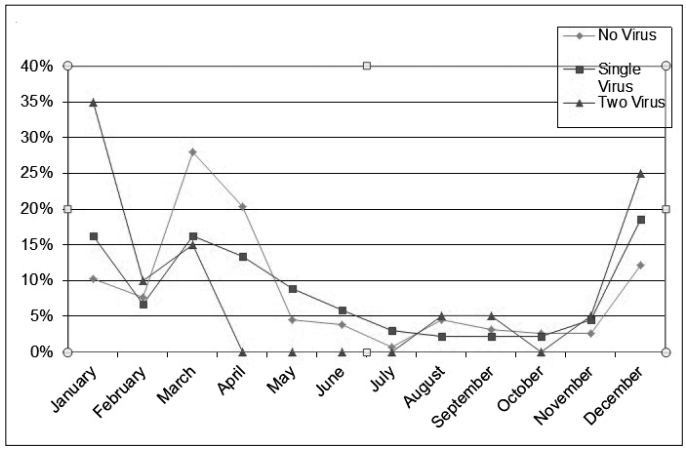

Figure 1. Virus distribution and co-infections by months

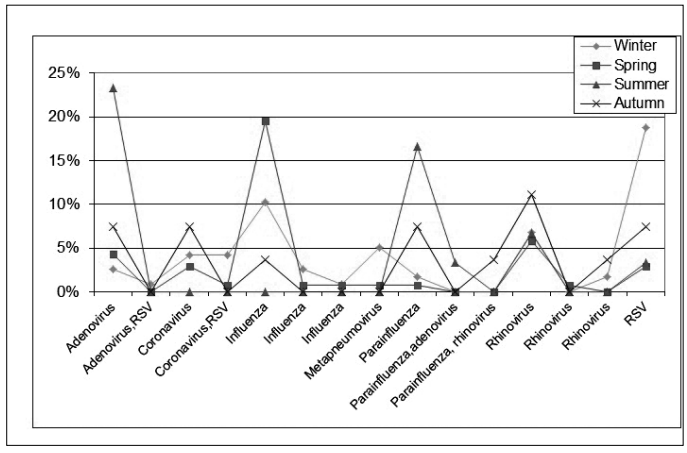

Figure 2. Virus prevalence according to seasons

seasons. In January, two virus co-infections were at their highest (p=0.009), and in April, two virus co-infections (p=0.034) were at their lowest. In the autumn months, parainfluenza+rhinovirus (p=0.015) were at their highest.

When evaluated the age distribution of respiratory virus profiles: In children aged ≥6 years old, the rate of Adenovirus+RSV was higher than that of the <2 year old and 2-5 years old age groups (p=0.001). The 2-5 years old age group had higher Coronavirus (p=0.011), Parainfluenza+Adenovirus (p=0.001), Parainfluenza+Rhinovirus (p=0.001), RSV (p=0.0001), and single virus isolation (p=0.002) than the other age groups. The <2 year old age group had higher Coronavirus+RSV (p=0.005), Metapneumovirus (p=0.004), Rhinovirus (p=0.002), Rhinovirus+RSV (p=0.002), and two viruses co-infections (p=0.0001) than the other age groups. Adenovirus, Influenza, Influenza+Rhinovirus, Influenza+RSV, Parainfluenza, and Rhinovirus+Metapneumovirus were no different between the three age groups (Table 3).

Table 3. Virus distribution according to age

	<2y (n=13) Age		2-5y (n=147) Age		≥6y (n=152) Age		p
Adenovirus	0	0.00%	8	5.44%	10	6.58%	0.661
Adenovirus, RSV	1	7.69%	0	0.00%	0	0.00%	0.001
Coronavirus	0	0.00%	9	6.12%	2	1.32%	0.011
Coronavirus, RSV	1	7.69%	5	3.40%	0	0.00%	0.005
Influenza	0	0.00%	10	6.80%	30	19.74%	0.205
Influenza, Rhinovirus	0	0.00%	2	1.36%	2	1.32%	0.827
Influenza, RSV	0	0.00%	2	1.36%	0	0.00%	0.181
Metapneumovirus	2	15.38%	4	2.72%	1	0.66%	0.004
Parainfluenza	0	0.00%	7	4.76%	3	1.97%	0.101
Parainfluenza,adenovirus	0	0.00%	1	0.68%	0	0.00%	0.001
Parainfluenza, rhinovirus	0	0.00%	1	0.68%	0	0.00%	0.001
Rhinovirus	3	23.08%	14	9.52%	4	2.63%	0.002
Rhinovirus, metapneumovirus	0	0.00%	1	0.68%	0	0.00%	0.421
Rhinovirus, RSV	1	7.69%	2	1.36%	0	0.00%	0.003
RSV	1	7.69%	24	16.33%	4	2.63%	<0.001
Single Virus	5	38.46%	76	51.70%	54	35.53%	0.002
Two Viruses	4	30.77%	14	9.52%	2	1.32%	<0.001

Admission distribution of respiratory virus profiles: The admission rate of the RVT (+) group was higher than that of the RVT (-) group. There was no difference in the rate of treatment in the observation unit between the RVT (+) and RVT (-) groups. The age of the admission group was lower than that of the no admission group. The admission rate of children ≥6 years old was lower than that of the other age groups. Fever was higher in the admission group than in no admission group. There were no differences between the admission group and the no admission group with respect to cough, sore throat, rhinorrhea, nausea, vomiting, eruption, and observation unit treatment. The admission group had higher levels of Adenovirus, coronavirus, rhinovirus and RSV than the no admission group. There were no differences between the admission and no admission groups with respect to Adenovirus+RSV, Coronavirus+RSV, Influenza, Influenza+ Rhinovirus, Influenza+RSV, Metapneumovirus, parainfluenza, parainfluenza+adenovirus, parainfluenza+ rhinovirus, Rhinovirus+metapneumovirus, and Rhinovirus+ RSV (Table 4).

Discussion

Our findings shows that a wide range of respiratory viral pathogens are circulating in Turkey. There are approximately 200 well-recognized respiratory viruses, including influenza virus A and B, parainfluenza virus, human metapneumovirus, respiratory syncytial virus, adenovirus, coronavirus, and rhinovirus. Influenza viruses can cause recurrent epidemics affecting an estimated 5-15% of the population worldwide. Infected adults often present with acute respiratory infections, while 13% of children less than 5 years old present with lower respiratory tract infection (13). According to the World Health Organization (WHO), there are 3-5 million severe cases of influenza and 250,000-500,000 deaths due to influenza annually (14). Although it is clear that influenza is a worldwide problem, the overall etiologies of acute respiratory system infections and pneumonia are still largely unknown (15). Adenoviruses are responsible for approximately 7-8% of reported childhood viral respiratory infections, and they cause a board spectrum of clinical diseases, such as respiratory tract infections, pharyngoconjuctival fever, conjunctivitis, hemorrhagic cystitis, and gastroenteritis (14). RSV can cause severe infections in infants and young children, and it is the leading cause of bronchiolitis in children under one year of age in the United States (16-18). RSV outbreaks are responsible for a significant increase in hospital admissions during the winter season (19). In 2005, at least 3.4 million cases of severe RSV-associated acute respiratory system infection requir-

Table 4. Epidemiology of admission (-)/admission (+) groups

		Admission (-) n=162		Admission (+) n=150		p
Age		8.22±3.86		5.19±2.96		<0.001+
Age	<2y	7	4.32%	6	4.00%	0.887
	2-5y	42	25.93%	105	70.00%	0.0001
	≥6y	113	69.75%	39	26.00%	0.0001
Months	January	17	10.49%	28	18.67%	0.058
	February	7	4.32%	16	10.67%	0.054
	March	51	31.48%	18	12.00%	<0.001
	April	36	22.22%	14	9.33%	0.003
	May	6	3.70%	13	8.67%	0.111
	June	10	6.17%	4	2.67%	0.222*
	July	3	1.85%	2	1.33%	0.716*
	August	4	2.47%	7	4.67%	0.457*
	September	4	2.47%	5	3.33%	0.906*
	October	4	2.47%	3	2.00%	0.779*
	November	4	2.47%	7	4.67%	0.457*
	December	16	9.88%	33	22.00%	0.005
Fever		126	77.78%	95	63.33%	0.005
Cough		80	49.38%	90	60.00%	0.06
SoreThroat		15	9.26%	10	6.67%	0.399
Runny Nose		17	10.49%	10	6.67%	0.231
Nausea-Vomitting		8	4.94%	6	4.00%	0.689*
Rash		4	2.47%	3	2.00%	0.781*
Observation Room		13	8.02%	17	11.33%	0.322
RVT (+)		64	39.51%	91	60.67%	<0.001

Chi-square test+Independent t test; *Fisher's exact test

ing hospital admission occurred worldwide, and between 66,000-199,000 children younger than five years old died from RSV- associated acute respiratory system infection (20). Results of our current study indicate that RSV (14%) was the most common virus at hospital admission, followed by rhinovirus (10%), adenovirus (8.6%), influenza (8%), Coronavirus (5.3%), parainfluenza (3.3%), and metapneumovirus (2%), respectively. It has been reported that RSV is the dominant cause of respiratory tract infection in children less than five years of age (21, 22). Rhinovirus is known to be responsible for upper acute respiratory system infections as well as for some lower respiratory system infections in children (23, 24). Our current study revealed that single rhinovirus (23.0%) and rhinovirus+RSV co-infection (7.6%) were more common in children <2 y. As in our current study, the literature reveals that most rhinoviruses are commonly detected as a single infection (25). The most common co-infections with rhinovirus include the parainfluenza virus and RSV (26). The relationship between viral infections and age is another important epidemiological factor.

In our current study, we found that rhinovirus and parainfluenza co-infection (0.68%) was more common in children between 2-5 y, but rhinovirus and RSV co-infection (7.69%) was more common in children <2 y. The rate of influenza and rhinovirus co-infection (1.28%) in our study was similar to that of the rates of influenza A and rhinovirus co-infection (0.32%) and influenza B and rhinovirus co-infection (0.32%).

However, we found that rhinovirus and metapneumovirus co-infection (0.32%), rhinovirus and RSV A co-infection (0.32%), rhinovirus and RSVB co-infection (0.64%). The signs and symptoms of HMPV infection are similar to those of RSV (27). The incidence of HMPV, as

reported in various regions throughout the world, ranges from 3.9-43% (28-31). In our current study, the incidence of HMPV in the <2 y group was 15.3%. Our data generally support the epidemiological features related to age and respiratory viral infections.

Laguna-Torres et al. (32) reported that RSV was the most common pathogen detected in children less than five years old in three countries. Further, RSV has a high prevalence, hospitalization, and mortality rates (33, 34). The prevalence of respiratory viruses varies considerably depending on the time of year and year to year variations. Viral respiratory pathogens among pediatric age group (n=178 patients) between December 2013 and April 2014 and found variations among age groups. In their study Influenza viruses (A and B) was found to be highest (50%) among their patients. RSV was the second leading agent in the 2-5 year age group (35).

Results of our current study were found to be similar with those of the literature, in that RSV was more common in the winter and spring (26). Adenovirus was detected as another single infection and only-one co-infection with RSV B (0.32%). Similar to the results of our current study, adenovirus was reported to be responsible for 5-10% of acute respiratory tract infection in children in the literature (36). In our current study, we found that seven patients had metapneumovirus; this low prevalence is in accordance with the results of previous studies (37, 38). Metapneumovirus was first recognized in the Netherlands in 2001 in nasopharyngeal aspirates collected from patients with acute respiratory tract infection who also had signs and symptoms similar to those of RSV infection (37).

In our current study, the most commonly reported symptoms included fever, cough, and runny nose. These symptoms are much more common in upper respiratory system infections than in lower respiratory system infections. Many respiratory viruses cause similar symptoms, and infected patients are often diagnosed with colds, pharyngitis, bronchitis, croup, bronchiolitis, and pneumonia (39). Thus, in cases of acute respiratory system infection, it is difficult to make a differential diagnosis with regards to the causative agent in a clinical setting (39). Making a clinical diagnosis while keeping in mind epidemiological considerations allows the clinician to make a better decision regarding the selection of the appropriate specimens and tests (39).

The seasonality of influenza virus in the tropics is variable, with studies demonstrating either year round disease or one or two clear annual peaks (40, 41). In our study, we more commonly detected adenovirus (23.3%) and parainfluenza virus (16.6%) in the summer months, while adenovirus-parainfluenza virus co-infection (3.3%) was less commonly detected. The seasonal variability of these viruses may be due to increased travel around the globe.

Two-virus co-infections (11.9%) were more commonly obtained in the winter, especially in January. In addition, metapneumovirus (5.1%) was more commonly seen in the winter. In the literature Waston and Eglin showed that RSV infections occurred more frequently in the winter, while Parainfluenza Type 3 infections occurred more often in the spring and summer between 1978 and 1987 in the United Kingdom (39, 42). In their study conducted in the United States, Iwane et al. (43) reported that RSV infections peaked in January 2001, Influenza peaked in February 2001, and parainfluenza peaked in March-May and August- September in 2002. This is in accordance with the data of our current study, in which we found that parainfluenza infections were the most common in spring (16.6%). Our results showed that RSV and metapneumovirus were more common in the winter and in the rainy season in Turkey, which is in accordance with other studies (44). The statistical correlation between respiratory viruses and the winter season may be due to several factors, including increased crowding indoors, leading to increased transmission of respiratory viruses. Our study did not reveal a high prevalence of influenza, which may be due to the influenza vaccine.

Conclusion

This study provides important information regarding respiratory viral etiology among healthy children, for guiding prevention and treatment strategies respiratory infections in children especially preventing unnecessary usage of antimicrobials as well as proper usage of vaccine prophylaxis.

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Informed Consent: Written informed consent was not received due to the retrospective nature of this study.

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Hasta Onamı: Çalışmanın retrospektif tasarımından dolayı hasta onamı alınmamıştır.

Hakem Değerlendirmesi: Dış bağımsız.

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