

VIRAL ETIOLOGY OF ACUTE RESPIRATORY TRACT INFECTIONS DURING THE 2012/2013, 2013/2014 AND 2014/2015 WINTER SEASONS IN BULGARIA

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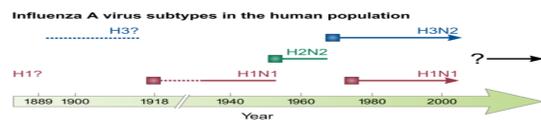
Introduction

Influenza viruses, respiratory-syncytial virus (RSV), metapneumovirus (HMPV), parainfluenza viruses (hPIV) type 1, 2 and 3 are leading causes of acute respiratory tract infections (ARTI) in infants and young children. The aim of this study was to determine the contribution of these viruses in medically attended ARTI among children aged <4 years during the 2012/13, 2013/14 and 2014/2015 winter seasons in Bulgaria.

Viruses that can cause respiratory tract diseases

Influenza viruses (type A, B and C)

(Family Orthomyxoviridae)



Human metapneumovirus (HMPV)

(Family Paramyxoviridae)



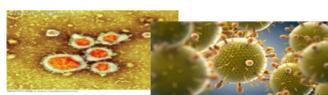
Human parainfluenza viruses (HPIV)

(Family Paramyxoviridae)



Respiratory-syncytial virus (RSV)

(Family Paramyxoviridae)



Methods

➤ A total of 555 nasopharyngeal swabs of children under the age of 5 were tested. Children were either outpatient, or hospitalized for influenza-like illness or acute respiratory diseases in different regions of the country.

➤ During the 2012/2013 season 143 children were tested, 2013/2014 season - 203, during 2014/2015 season - 209; 183 (33%) among them were outpatient, and 372 (67%) - hospitalized.

➤ The age of the patients varied from 30 days to 60 months (average 21,53 ± 12,54 months).

➤ 305 (55%) were boys, and 250 (45%) - girls.

➤ Most of the patients (58%) were without complications. The rest were complicated with bronchiolitis, pneumonia, febrile seizures, cerebral oedema, meningitis, encephalopathy, encephalitis, etc.

➤ Real Time RT-PCR was used for detection and typing/subtyping of different viruses.

Results

Virus infections were laboratory confirmed 331 (59,6%) patients samples.

- ✓ Monoinfections were identified in 316 (57%) patients.
- ✓ 15 (2,7%) patients were co-infected with two viruses.
- ✓ In 152 (27%) of patients samples were detected influenza viruses.
- ✓ All of the 403 influenza virus negative patients were tested for Paramyxoviruses.

Confirmed Influenzaviruses

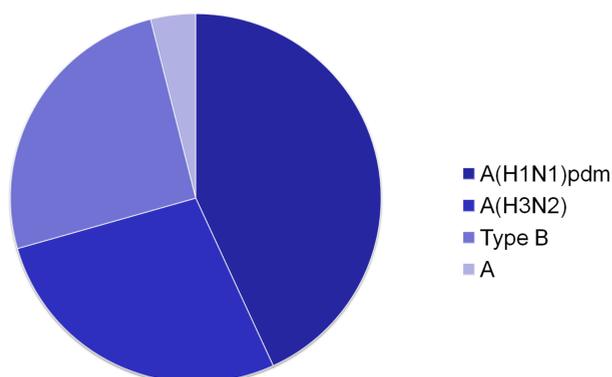


Table 2. Distribution of detected influenza viruses according to clinical diagnosis of the patients

	Clinical Diagnosis			
	Bronchiolitis (n=49)	Pneumonia (n=63)	CNS complications (n=71)	ARI (n=372)
♀ / ♂	26 / 23	33 / 30	37 / 34	206 / 166
A (H1N1) pdm09	10 (20,4%)	14 (22,2%)	7 (10%)	34 (9,1%)
A (H3N2)	1 (2%)	5 (8%)	8 (11,2%)	28 (7,5%)
B	3 (6,1%)	5 (8%)	3 (4,2%)	28 (7,5%)
A / unsubtypeable			1 (1,4%)	5 (1,3%)
A(H1N1)pdm09 + A(H3N2)		1 (1,6%)	-	-
Total (n=152)	13 (26,5%)	25 (39,6%)	19 (26,7%)	95 (25,5%)

Table 1. Distribution of detected respiratory viruses by seasons and in outpatients/inpatients

	Number of detected respiratory viruses								
	Orthomyxoviruses				Paramyxoviruses				
	A(H1N1) pdm	A (H3N2)	Type B	A	RSV	HMPV	PIV1	PIV2	PIV3
2012/2013	12 (8,4%)	1 (0,6%)	34 (24%)	0	24 (16,8)	11 (8%)	17 (12%)	3 (2%)	9 (6,2%)
2013/2014	44 (21,7%)	15 (7,4%)	0	6 (3%)	16 (11,6%)	17 (12,3%)	6 (4,3%)	2 (1,4%)	5 (3%)
2014/2015	10 (4,8%)	26 (12,4%)	5 (2,4%)	0	46 (25,1%)	1 (0,6%)	0	2 (1,2%)	6 (3%)
Outpatient	16 (8,7%)	15 (8,1%)	8 (4,4%)	3 (1,6%)	15 (8,2%)	13 (7,1%)	5 (2,7%)	1 (0,5%)	6 (3,3%)
Hospitalized	50 (13,4%)	27 (7,2%)	31 (8,3%)	3 (0,8%)	71 (19,1%)	16 (4,3%)	18 (4,8%)	6 (1,6%)	14 (3,8%)

Table 3. Distribution of detected paramyxoviruses according to clinical diagnosis of the patients

	Clinical diagnosis			
	Bronchiolitis (n=40)	Pneumonia (n=51)	CNS complications (n=58)	ARI (n=254)
♀ / ♂	19 / 21	25 / 26	25 / 33	118 / 136
RSV	16 (40%)	16 (31,4%)	5 (11%)	48 (18,9%)
HMPV	5 (12,5%)	4 (7,8%)	2 (2,1%)	17 (6,7%)
HPIV1	3 (7,5%)	5 (9,8%)	1 (2,1%)	11 (4,3%)
HPIV2	1 (3,7%)	-	1 (2,1%)	5 (2%)
HPIV3	2 (5%)	4 (7,8%)	1 (2,1%)	13 (5,1%)
Total (n=165)	27 (67,%)	29 (56,8%)	15 (25,9%)	94 (37%)
RSV+HMPV	1	-	-	2
RSV+HPIV1	-	2	1	1
RSV+HPIV3	-	-	-	2
HMPV+HPIV1	-	-	-	1
HMPV+HPIV3	-	-	-	1
HPIV1+HPIV2	-	-	-	1
HPIV1+HPIV3	-	2	-	-
Total (n=14)	1 (2,5%)	4 (7,8%)	1 (1,7%)	8 (3,1%)

Conclusion

The present study is the first in Bulgaria which simultaneously analyzes the participation of influenza viruses, RSV, HMPV, HPIV type 1, 2 and 3 in the etiology of acute respiratory diseases among children below the age of 4 years. The study showed the leading role of influenza viruses and RSV in the development of serious respiratory diseases in early childhood.