

Knowledge, Attitude and Practice of Family Physicians on Antimicrobial Therapy for Acute Respiratory Tract Infections - A Study from Istanbul, Turkey

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ABSTRACT

Aim: We aimed to investigate the knowledge, attitude, practice of family physicians regarding antimicrobial therapy in acute respiratory tract infections.

Methods: After receiving the ethics committee approval, the data were collected by online questionnaire from a phone application with 304 physicians. Questions about socio-demographic features and knowledge, attitude, and practices on antibiotics use were asked. Using SPSS, we did the statistical analyses with appropriate procedures.

Results: Among the participants, 127 (41.8%) were specialists, and 177 (58.2%) were general practitioners. The specialists gave correct answers about tonsillopharyngitis and bronchiolitis significantly more often than the general practitioners did. The antibiotic choices for acute otitis media were not in compliance with the guidelines of the Centers for Disease Control, and between the groups, there was no significant difference in terms of initial antibiotic choice. The self-reported antibiotic prescription rate was 25%. In 10%, the most common perceived reason for inappropriate antibiotic prescription was pressure from patients.

Conclusion: There remains considerable misuse of antibiotics by primary care physicians for acute respiratory tract infections. Education of physicians and patients regarding acute respiratory tract infections may be needed to lower the rate of inappropriate antibiotic prescriptions.

Keywords: public health practice, practice patterns, primary healthcare

Date of submission: 03.07.2020 / **Date of acceptance:** 16.06.2021

How to cite: Ozturk GZ, Toprak DT, Sagsoz O, Ardic C. Knowledge, attitude and practice of family physicians on antimicrobial therapy for acute respiratory tract infections - a study from Istanbul, Turkey. Euras J Fam Med 2021;10(2):49-55. doi:10.33880/ejfm.2021100202.

Conflict of interest: No conflict of interest was declared by the authors.

Financial disclosure: No financial disclosure was declared by the authors.

Introduction

Antimicrobial resistance (AMR) is an ongoing problem for the world and a hindrance to infectious disease treatments. At the 68th World Health Assembly in May 2015, the World Health Organization bolstered a global movement to deal with AMR, including antibiotic resistance and the most pressing drug resistance trend (1). An important cause for AMR is inappropriate antibiotic use.

In the primary care setting, the highest percentages of antibiotic prescriptions for systemic use are for acute respiratory tract infections (ARTIs) (2). In Turkey, the Prescription Information System reported that 55.51% of patients with pharyngitis were prescribed antibiotics; moreover, the Turkey Antibacterial Drug Consumption Surveillance in 2013 showed that the total antibiotic prescription rate was 40.8% (3). A study in New Delhi, India showed that in patients with uncomplicated ARTI, 45% (746/1646) and 57% (259/457) were prescribed at least one antibiotic at public and private facilities, respectively (4). In the United States, nearly half of the antibiotics given for ARTIs in the outpatient setting were estimated to be unneeded (5).

Besides AMR, antibiotic overuse is linked with adverse drug effects and increased healthcare costs (6). Inarguably, most patients with ARTIs are treated in primary care facilities. We aimed to investigate the knowledge, attitude, and practice of family physicians on antimicrobial therapy for ARTIs.

Methods

We conducted this cross-sectional study with a self-designed 20-item questionnaire on family physicians between October-December 2017. In this period there were 4300 family physicians in Istanbul and the sample size of the study was 304, with a 95% confidence interval of 5.42. We received the ethics committee approval (No:1703) on 03/10/2017. We collected the data by online questionnaire from a phone application with 304 physicians. A voluntary consent form was added to the beginning of the questionnaire and if approved, the survey was included in the study. Aside from the socio-demographic

features, questions about the knowledge (most common agents), attitude (first-line therapy), and practices (case questions were asked) on antibiotic use were enquired. After completion of the questionnaires, we compared the answers according to the education level and years of work experience of the participants. Physicians were grouped into young (≤ 5 years of experience) and old (> 5 years of experience). Data analysis was performed using the SPSS program and p values of < 0.05 were considered significant. Categorical variables were examined using Pearson's chi-square test. The statistical relationship between continuous and discrete numerical variables was investigated using Spearman's correlation test.

Results

Of our participants (mean age, 31.05 ± 7.26 years), 127 (41.8%) were specialists and 177 (58.2%) were general practitioners; 177 (58.2%) were women and 127 (41.8%) were men. The participants' self-reported mean antibiotic prescription rate was 25%; in 10%, the most common perceived reason for prescribing inappropriate or unnecessary antibiotics was pressure from patients. The association between the socio-demographic features and antibiotic prescription rate of our participants is shown in Table 1. Only the participants' work experience and age were correlated with antibiotic prescription rates; with older age and longer work experience, the antibiotic prescription rates decreased. Of the participants, 214 (74%) attended an educational program about rational drug use and 76 (25%) received their education from the Ministry of Health.

Table 1. Socio-demographic features of the participants and the association with antibiotic prescription rate

		n	%	Antibiotics prescription rate (mean)	p
Gender	Women	177	58.2	25.76	0.216
	Men	127	41.8	23.83	
Age groups	≤ 30	194	63.8	27.05	0.007
	> 30	110	36.2	21.26	
Type of doctors	General practitioners	177	58.2	24.06	0.616
	Specialists	127	41.8	26.20	
Working years	≤ 5	107	35.2	26.84	0.013
	> 6	197	64.8	21.48	

Knowledge of the most common agent of ARTIs:

As shown in Table 2, both groups were knowledgeable about the common agents that cause common cold in adults and children and acute otitis media (AOM) and bronchiolitis in children; however, general practitioners did not know the causative microorganisms of tonsillopharyngitis in adults and children. Regarding tonsillopharyngitis and bronchiolitis, the specialists gave correct answers significantly more often than the general practitioners did. Concerning work experience, as shown in Table 3, young doctors gave significantly more incorrect answers about AOM in children (p=0.005) and tonsillopharyngitis in adults (p=0.017), compared with the old doctors. Notably, 60% of the young doctors and 53% of the old doctors were general practitioners.

Table 2. The most common etiologic agent of acute respiratory tract infection in adults and children

			Specialist		General practitioner		p	
			n	%	n	%		
Common cold	Adults	Viral	115	90.6	167	94.4	0.409	
		Bacterial	4	3.1	5	2.8		
		Mixed	8	6.3	5	2.8		
	Children	Viral	126	99.2	170	96		0.202
		Bacterial	0	0	3	1.7		
		Mixed	1	0.8	4	2.3		
Tonsillopharyngitis	Adults	Viral	59	46.5	53	29.8	0.014	
		Bacterial	57	44.9	105	59		
		Mixed	11	8.7	19	11.2		
	Children	Viral	68	53.5	49	27.5		0.000
		Bacterial	50	39.4	108	60.7		
		Mixed	9	7.1	20	11.8		
Acute otitis media	Children	Viral	43	33.9	41	23.2	0.226	
		Bacterial	74	58.3	120	67.8		
		Mixed	10	7.9	16	9.1		
Bronchiolitis	Children	Viral	113	89	137	77	0.020	
		Bacterial	9	7.1	20	11.8		
		Mixed	5	3.9	20	11.2		

Table 3. Relationship between working years and knowledge of the common etiologic agent

	≤5 years of work experience				≥6 years of work experience				p
	True		False		True		False		
	n	%	n	%	n	%	n	%	
Colds in children	191	97	6	3	105	98.1	2	1.9	0.571
Colds in adults	181	91.9	16	8.1	101	94.4	6	5.6	0.419
Tonsillopharyngitis in children	75	38.1	122	61.9	42	39.3	65	60.7	0.840
Tonsillopharyngitis in adults	63	32	134	68	49	45.8	58	54.2	0.017
Acute otitis media in children	43	22.3	153	77.7	40	37.4	67	62.6	0.005
Acute otitis media in adults	42	21.3	155	79.7	33	30.8	74	69.2	0.066
Bronchiolitis in children	160	81.2	37	18.8	89	83.2	18	16.8	0.672

Table 4. The initial antibiotic choices of the participants for bacterial acute respiratory tract infection

Initial therapy of choice	Agent	n	%	p
Bacterial tonsillitis	Specialist Penicillin	49	38.6	0.663
	General practitioner Penicillin	66	37.1	
Bacterial sinusitis	Specialist Amoxicillin+ Clavulanate	69	54.8	0.211
	General practitioner Amoxicillin+ Clavulanate	79	46.5	
Bacterial acute otitis media	Specialist Amoxicillin+ Clavulanate	64	53.3	0.486
	General practitioner Amoxicillin+ Clavulanate	84	49.7	

Attitude and behaviors on antibiotic choice:

As shown in Table 4, the antibiotic choices in AOM were not in compliance with the guidelines of the Centers for Disease Control (CDC), and between the groups, there was no significant difference in terms of initial antibiotic choice.

According to the answers about the attitudes and behaviors in some cases (Table 5), we can deduce that there remains considerable misuse of antibiotics for ARTIs by primary care physicians. The first six cases (items 1–6) were about the Centor criteria and the rapid antigen detection test (RADT), for which 9.65% of our participants answered “I have no idea”. Most of

them gave correct answers to the five questions, but the question on the starting age for RADT was answered incorrectly. Participants gave correct answers to two of the three cases (items 7–9) regarding AOM, they answered incorrectly the question about the significance of tympanic membrane bulging to

diagnose AOM; 17% of our participants stated “I have no idea”. In the last two cases (items 10–11) about bronchiolitis, the answers to the question about routine laboratory tests and radiology as diagnostic tools were incorrect; nearly 12% of our participants answered: “I have no idea”.

Table 5. Answers about the attitude and behaviors in some cases

	I agree		I have no idea		I disagree	
	n	%	n	%	n	%
1. I would consider RADT in a patient who presents with sore throat and fever but does not cough.	226	74.4	23	7.6	55	18
2. I would consider RADT in a 2-year-old patient who presents with a sore throat and fever.	165	54.2	27	8.9	112	36.9
3. I would consider RADT in a patient who presents with fever and swollen anterior cervical lymph nodes.	232	76.3	17	5.6	55	18.1
4. I would consider RADT in a 10-year-old patient who presents with sore throat and tonsillar exudates.	225	74.1	29	9.5	50	16.5
5. Antibiotics must be stopped in a 5-year-old child with positive RADT and negative culture.	125	41.1	38	12.5	141	46.4
6. Performing throat culture is useful in a symptomatic child with negative RADT.	165	54.3	42	13.8	97	31.9
7. Severe bulging of the tympanic membrane is sufficient to diagnose acute otitis media in a child.	158	52	46	15.1	100	32.9
8. I would consider prescribing antibiotic in a child who presents with fever, otalgia and erythema of the tympanic membrane.	262	86.2	20	6.6	22	7.2
9. Prophylactic antibiotics are recommended to reduce the frequency of recurrent AOM.	59	19.4	94	30.9	151	49.7
10. In every child <24 months old who presents with wheezing, routine laboratory tests and radiologic studies are recommended as a first step.	138	45.4	37	12.2	129	42.4
11. When treating bronchiolitis, antibiotics must be used with inhaler agents.	71	23.3	38	12.5	195	64.2

RADT: Rapid Antigen Detection Test; AOM: Acute Otitis Media

Discussion

AMR constitutes a global burden. Although the manifestation of resistant microorganisms can be expected on some levels, the misuse of antimicrobials has played a big part in the evolution of resistance. Several organizations, such as the CDC, provide continuing education on rational antibiotic use (7). Although 74% of our participants were educated about rational antibiotic use, mostly by the Ministry of Health, our study showed that in primary care these

educational interventions to improve antibiotic prescription seemed to have limited success; this was in agreement with the literature (8,9).

A variety of viruses can be the cause of the common cold (10). The current treatment regimens aim to relieve symptoms, but some review studies suggested that the most frequently used treatments' effectiveness is limited (11,12). This ineffectiveness can increase the inappropriate use of antimicrobials for the common cold. A previous study found that 18% of

common cold cases were prescribed antibiotics (13). In our study, over 90% of our participants were aware that in both children and adults, viruses were the most seen agents in the common cold; therefore the antibiotic prescription percentage for the common cold was anticipated to be less than 10%.

Viral agents are the most common causes of tonsillopharyngitis and Group A beta-hemolytic Streptococcus (GABS) constitute only 5% to 10% of the cases (14). Our participants incorrectly thought that the most common agents in tonsillopharyngitis were bacteria. Nonetheless, a majority chose penicillin as first-line treatment, under the guidelines, with the specialists' choices being correct more often than the general practitioners' choices. In a review study, the first-line choice for bacterial tonsillopharyngitis treatment remained to be penicillin, this may be caused by β -lactam antibiotic resistance being not reported (15,16). Most of our participants gave correct answers to the relevant case questions, with the notable exception of the starting age for RADT. In general, GABS rarely causes pharyngitis and rheumatic fever; therefore in children <3 years of age there is no need to perform RADT (17).

In childhood, antibiotics are most frequently prescribed for AOM; notably, 4% to 10% of children experience adverse effects after being treated with antibiotics for AOM (18). Viruses are the most common causes of AOM; however, in up to 96% of AOM cases, viruses and/or bacteria can be found in the middle ear fluid (19). In AOM the three most common bacterial pathogens are *Streptococcus pneumoniae*, non-typeable *Haemophilus influenzae*, and *Moraxella catarrhalis* (20). After pneumococcal vaccination in the first year of life, *H. Influenza* becomes the most frequently isolated middle ear pathogen (21). As *S. pneumoniae* being the most important cause in AOM, amoxicillin remains to be the recommended first-line agent (18). In this present study, the initial antibiotic choice was amoxicillin/clavulanate. As recommended by the CDC, if the patient has taken amoxicillin within the past 30 days, if there is a case of concurrent purulent conjunctivitis, or if the patient has a history of repeating AOM unresponsive to amoxicillin,

amoxicillin/clavulanate can be used (17). Among the ARTIs for which the participants answered: "I have no idea" to the relevant case questions, AOM accounted for the majority (17.3%) of answers. Apart from the question regarding the importance of tympanic membrane bulging for AOM diagnosis, participants answered most of the relevant case questions correctly. Similar to the other case questions, the tendency of the specialists outperforming the general practitioners was apparent. These findings indicated that further education can be instrumental in curtailing inappropriate antibiotic use in the primary care setting.

According to a Cochrane study, bronchiolitis is mainly a viral infection for which antibiotic treatment is not indicated, especially in acute uncomplicated cases (22). In another study, in 40% of bronchiolitis episodes in children, general practitioners prescribed antibiotics (23). Our results showed that 82% (the majority were specialists) correctly identified viruses as the most frequent pathogens in bronchiolitis, which met our expectation of less than 18% antibiotic prescription rate.

The participants estimated their total antibiotic prescription rate at approximately 25% and pinned down patient pressure as the most common reason for the inappropriate prescription (10%). A study found that the idea, in common cold or influenza, antibiotics are effective, they can facilitate the recovery of their illness and prevent symptoms from worsening are the top reasons for patients to expect antibiotic prescriptions (24). These results implied that education ought to be provided not only to physicians but to patients as well.

Conclusion

Older age and longer work experience were the primary factors that determined the decrease in the rate of antibiotic prescription. The greater knowledge on ARTIs of specialists than of general practitioners suggested that if the number of specialists in primary care increases, the rate of inappropriate antibiotic prescription may decline. Finally, it is clear that patients, as well as healthcare providers, would benefit highly from educational programs on ARTIs.

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