

## Impact of an educational meeting on knowledge and awareness of general practitioners on upper respiratory tract infections

*Pratisyen hekimlerin üst solunum yolu enfeksiyonları hakkında bilgi ve davranışları üzerine eğitim seminerinin etkileri*

Salih Hoşoğlu<sup>1</sup>, Fatma Bozkurt<sup>2</sup>, Recep Tekin<sup>1</sup>, Celal Ayaz<sup>1</sup>, Mehmet Faruk Geyik<sup>3</sup>

<sup>1</sup> Department of Infectious Diseases and Clinical Microbiology, Dicle University, Diyarbakır, Turkey.

<sup>2</sup> Dept. Infectious Diseases and Clinical Microbiology, Education and Research Hospital, Diyarbakır, Turkey.

<sup>3</sup> Department of Infectious Diseases and Clinical Microbiology, Duzce University, Duzce, Turkey.

Geliş Tarihi / Received: 08.12.2011, Kabul Tarihi / Accepted: 13.01.2012

### ABSTRACT

**Objectives:** This study aimed to evaluate knowledge of primary care physicians regarding the use of antibiotics for the upper respiratory tract infections (URTIs) and the specific outcomes of a health educational meeting in two cities using a self-administered questionnaire.

**Materials and methods:** A standard questionnaire was filled by the participants before and after the meeting. The questionnaire had seven questions about definition, epidemiology, diagnosis and treatment of URTIs. The knowledge and approaches of practitioners concern about diagnosis and antibiotic use in URTIs were evaluated. The proportion of overall satisfied answers before and after the meeting was compared.

**Results:** Totally 110 primary care physicians joined into the study. Before the educational meeting, more than 30% of participants stated that the at least 50% of the causative agents of the URTIs are bacteria. Eighty-eight percent declared that anaerobes or Neisseria are not the plausible causative agents in URTIs. Only 14% of them indicated that procaine penicillin is the primary agent for the treatment of *Streptococcus pyogenes*. On the other hand, 95% of survey participants considered that penicillin is the first choice for URTI with Beta-hemolytic *Streptococcus*. After the educational meeting, most of participants' knowledge showed a significant improvement in knowledge. There were a significantly more correct answers to all questions after the educational meeting compared to before the meeting. (27.7% of doctors before vs.92.7% after,  $p<0.001$ ).

**Conclusion:** As a conclusion, attending the educational meetings helps primary care physicians' to increase their knowledge and it provides to gain a standard approach in their professional life.

**Key words:** Primary care physicians, respiratory tract infections, use of antibiotics, education

### ÖZET

**Amaç:** Bu çalışmayla, iki ilimizde çalışan pratisyen hekimlerin üst solunum yolu enfeksiyonlarında (ÜSYE) antibiyotik kullanım farkındalığı ve sağlık ile ilgili eğitim seminerlerinin etkileri, özel olarak hazırlanan bir anket yardımıyla değerlendirmek amaçlandı.

**Gereç ve yöntem:** Düzenlenen eğitim semineri önce ve sonrasında, pratisyen hekimlere ÜSYE'nu epidemiyoloji, etyoloji, tanı ve tedavisi hakkında yedi soruyu içeren standart bir anket uygulanarak bilgi ve tutumları değerlendirildi ve cevap oranları karşılaştırıldı.

**Bulgular:** Toplamda 110 pratisyen hekim çalışmaya katıldı. Seminer öncesi katılımcıların %30'undan fazlası ÜSYE'larının etyolojisinin en az %50'sini bakterilerin oluşturduğu ve %88'i anaerop ve Neisseriaların etyolojide yer almadığını düşünürken, katılımcıların yalnız %14'ü *Streptococcus pyogenes* suşunun prokain penisiline tam duyarlı olduğunu, başka bir deyişle % 95'i Beta-hemolytic - *Streptococcus*'un etken olduğu ÜSYE'ununun tedavisinde penesilinin ilk seçenek olduğu cevabını verdi. Seminer sonrası katılan hekimlerin bilgilerinde önemli bir ilerleme görüldü. Doğru cevap oranlarında (seminer öncesi %27.7 ve sonrası %92.7) anlamlı bir fark vardı ( $p<0.001$ ).

**Sonuç:** Pratisyen hekimlerin bilgi ve davranışlarının, eğitim seminerleriyle geliştirilebileceği sonucuna varıldı.

**Anahtar kelimeler:** Pratisyen hekimler, solunum yolu enfeksiyonları, antibiyotik kullanımı, eğitim.

## INTRODUCTION

Upper respiratory tract infections such as acute tonsillopharyngitis represent a significant portion of the patients in primary care.<sup>1</sup> Although the cause of acute tonsillopharyngitis in the majority of patients is viral, approximately 5% to 17% is caused by a bacterial infection, often group A Beta hemolytic streptococci (GABS).<sup>2</sup> Worldwide, antibiotics are the most commonly prescribed and abused drugs for upper respiratory tract infections (URTIs).<sup>3,4</sup> A significant force driving the occurrence and the spread of antibiotic resistance is the inappropriate use of antibiotics in primary care settings.<sup>5-9</sup> Most surveys regarding antibiotic resistance have focused on physicians' perceptions of antibiotic prescribing for respiratory tract infections in the outpatient setting.<sup>10-12</sup>

Antimicrobial resistance is a growing health-care problem with increased morbidity and mortality worldwide.<sup>13</sup> Between 20% and 50% of antibiotic use is either unnecessary due to misdiagnosis or inappropriate<sup>14,15</sup> and decreasing it is a necessary first step to curb antibiotic resistance. This knowledge has led to the development of national recommendations to improve antibiotic stewardship in countries such as the USA, France and Scotland.<sup>14,16</sup> The evidence suggests that a multifaceted approach is favored, aimed at improving the organization of the healthcare system and changing physicians' prescribing behaviors, knowledge and approaches.<sup>14-17</sup>

We surveyed primary care physicians before and after a health educational meeting in two cities (Konya and Diyarbakir) to assess their knowledge, approaches and perceptions concerning the use of antibiotics for the upper respiratory tract infections (URTIs). Our goal was to gain a better understanding of the specific outcomes of a health educational meeting, to enable the design and implementation of more effective antibiotic stewardship interventions.

## MATERIALS AND METHODS

We conducted a survey to primary care doctors in Konya and Diyarbakir, Turkey in 2006, using a self-administered questionnaire (Table 1). An educational meeting was held for general practitioners who work at primary care. The educational meeting provided information about the etiology, diagnosis, treatment and prevention of URTIs. The questionnaire was developed in consultation with a group of experts on questionnaire design and infectious diseases, and after searching the literature for comparable studies.<sup>18-20</sup> The questionnaire was submitted in a pilot test to ten primary care doctors to check the comprehension and clarity of the questions. The seven-item self-administered and multiple-choice questionnaire collected information on primary care doctors' knowledge and approaches about URTIs.

**Table 1.** The questionnaire of survey.

1-Which of them is not an URTI?

a- Acute tonsillopharyngitis, b- Acute bronchitis, c- Acute sinusitis, d- Acute otitis media, e- Acute laryngitis

**The correct answers: b**

2-What is the probability of bacterial causative agents in URTIs?

a- >90%, b- 60-75%, c- 50%, d- 25%, e- <15%

**The correct answers: d**

3-Which of them is not an indication for treatment of acute tonsillopharyngitis?

a-Prevention of ARF, b-Prevention of suppurative complications, c-Treatment of clinical symptoms and signs, d-Prevention of Group A Beta-hemolytic Streptococcus (GABS) with close contact, e- Prevention of GABS carriage

**The correct answers: e**

4-Which of them is not a causative bacterial agent for acute tonsillopharyngitis?

a- S. Pyogenes, b- C. Diphtheria, c- S. Pneumonia, d- Anaerobes, e- N. gonorrhoeae

**The correct answers: c**

5-Which of them is not the first line diagnostic method for acute tonsillopharyngitis?

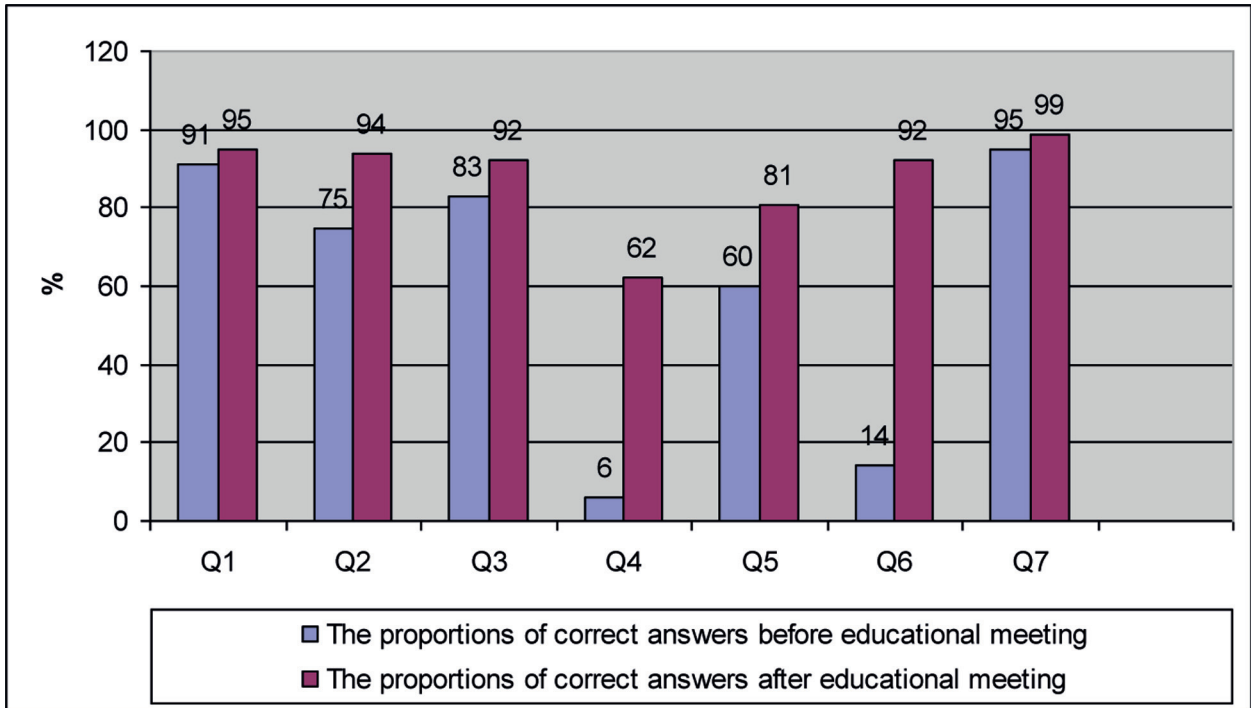
a-Anamnesis, b-Physical examination, c-Throat culture, d-Rapid antigen detection test, e-Blood culture

**The correct answers: e**

6-What is the ratio of resistance against among AGBS in Turkey?

a-0%, b-10%, c-25%, d-50%, e->70%

**The correct answers: a**



**Figure 1.** The proportions of correct answers of primary care physicians about URTIs before and after educational meeting. **Q1-7:** The proportions of correct answers of the questions

On the overall assessing the questionnaires, five or more correct answers were accepted as satisfied correct answer for each physician. To assess the knowledge of etiology in URTIs, the doctors were asked to estimate the probability of bacterial causative agents in URTIs. To assess knowledge of the prevalence of antibiotic resistance, the doctors were asked to estimate the ratio of resistance against AGBS in Turkey and the first choice antibiotic in their treatment.

### Statistical methods

Percentages were calculated for the categorical data. An univariate Chi-square test was used for comparing the results. A p value less than 0.05 was considered significant.

### RESULTS

Totally 110 primary care physicians joined to the survey. While the physicians' 71% (78/110) were less the duration of the service than 10 years, 29% (32/110) were 10 years and over. Before the educational meeting, in the first step of the questionnaire, more than 30% of participants stated that at least 50% of the causative agents of the URTIs are bacte-

ria. Eighty-eight percent declared that anaerobes or Neisseria are not possible causative agents in URTIs. Only 14% of them acknowledged that *Streptococcus pyogenes* strains were fully susceptible to penicillin. On the other hand, 95% of the participants considered that penicillin is the first choice for URTI with Beta-hemolytic *Streptococcus*.

After the educational meeting, less than 10% of participants marked that at least 50% of the plausible causative agents of the URTIs are bacteria. On the other hand, 28% declared that anaerobes or Neisseria are not possible causative agents in URTIs. Only 92% of them indicated that *Streptococcus pyogenes* strains are fully susceptible to penicillins. In contrast, 99% of the participants considered that penicillin is the first choice for URTI with Beta-hemolytic *Streptococcus* (Figure 1).

After the educational meeting, the knowledge level of most participants showed a significant improvement about the diagnosis and treatment of URTIs. Before the educational meeting the mean value of correct answer per physician was  $3.4 \pm 1.1$  whereas this ratio was  $6.3 \pm 0.9$  after the meeting. There was a significant increase in the correct re-

sponse rate after the meeting when compared before the meeting ( $p < 0.001$ ).

## DISCUSSION

Acute tonsillopharyngitis is one of the most frequent reasons in the admission to outpatient clinics. The symptoms and clinical features of this phenomenon are not specific. In many situations, the clinical features of bacterial infections could not be distinguished easily from viral infections.<sup>21</sup> As known, the clinical entity is common and one of the leading reasons of irrational antibiotic use in the community.<sup>24</sup> Although the viral agents compose majority of acute tonsillopharyngitis etiology, many doctors prescribe antimicrobials to treat these patients. Antibiotic prescription without determination of causative agents increases in the cost of treatment and antimicrobial resistance in the community.<sup>22,23</sup>

Antimicrobial use in primary care settings consist of the largest proportion of overall antimicrobial use in Turkey. After the reorganization of Turkish healthcare system, family physicians became key persons on the antimicrobial prescription. A study from Duzce, the pilot city for family physician system in Turkey, reported that there is still an excessive use of antibiotics at the primary care settings, especially for the respiratory tract infections.<sup>24</sup> The antimicrobial prescription tendency among physicians is quite strong despite many studies demonstrating no clinical benefits in viral URTIs.<sup>25</sup> A study performed by Leblebicioglu showed that antibiotics are frequently used for respiratory tract infections at the primary care settings in Turkey.<sup>23</sup>

In general, the behavioral changes on antimicrobial prescriptions are not easy for physicians. However, some studies showed us the efficacy of different interventions on the physicians' approaches. Different interventions including educational meetings on antibiotic use could be helpful improving the quality of antimicrobial prescriptions. Bojalil et al. from Mexico reported a successful educational intervention about diagnosis and decision on antimicrobial treatment in primary care setting. Their intervention was an in-service training program during five days. They observed that after the educational intervention the quality of diagnosis and treatment of acute respiratory infections was improved.<sup>26</sup> Sung et al. reported of the 65 GPs interviewed at both periods (before and after a education

campaign) the number agreeing that most patients who consult for URTIs expect antibiotics decreased from 82% to 57% and use of amoxicillin clavulanate reduced from 21% to 4%.<sup>27</sup> Razon et al studied effect of educational intervention on antibiotic prescription practices for upper respiratory infections in children: a multicentre study. They found that For URTI, the prescription rate decreased significantly, from 13.8% to 11.5% and for Tonsillopharyngitis, Penicillin was prescribed in 30% of cases before the intervention compared with 41% after, whereas amoxicillin prescription decreased from 61% to 50%.<sup>28</sup>

In our study, the educational meeting effected on the knowledge of participants but this study did not include an assessment of physicians' prescriptions after the meeting.

In many cases, educational interventions could be helpful for improvement of physicians' knowledge but this improvement does not guarantee these physicians' behavioral improvement.<sup>29</sup> This study showed us that the educational meetings could improve the knowledge of primary care physicians in Turkey. This data needs additional studies about the physicians' behavioral changing.

There are some limitations in this study. The participating doctors of this study were attended from only two cities of Turkey. These participants are not representative for all Turkish doctors. The other limitation is about study characteristics. In this study, the physicians informed us about their prescription behaviors' but these statements were not confirmed with external observations.

In conclusion, in two Turkish cities, the knowledge of primary care physicians about antibiotic resistance and prescribing for URTIs was found poor before the educational meeting. The knowledge level was found significantly better after the educational meeting. Educational meeting is useful to improve knowledge on the etiology and treatment of URTI cases.

## REFERENCES

1. McCaig LF, Hughes JM. Trends in antimicrobial drug prescribing among office-based physicians in United States. *JAMA* 2002; 287(12):3096-102.
2. Linder JA, Stafford RS: Antibiotic treatment of adults with sore throat by community primary care physicians: a national survey, 1989-1999. *JAMA*.2001;286 (10):1181- 6.

3. Cantrell R, Young AF, Martin BC. Antibiotic prescribing in ambulatory care settings for adults with colds, upper respiratory tract infections, and bronchitis. *Clin Ther.* 2002; 24(1):170-82.
4. Trostle J. Inappropriate distribution of medicines by professionals in developing countries. *Soc Sci Med.* 1996; 42(8):1117-20.
5. Wolff MJ: Use and misuse of antibiotics in Latin America. *Clin Infect Dis* 1993; 17(Suppl 2):346- 51.
6. Acar JF: Resistance patterns of *Haemophilus influenzae*. *J Chemother* 1999; 11(Suppl 1):44-50.
7. Mathai D, Lewis MT, Kugler KC, Pfaller MA, Jones RN: Antibacterial activity of 41 antimicrobials tested against over 2773 bacterial isolates from hospitalized patients with pneumonia: I - results from the SENTRY Antimicrobial Surveillance Program (North America, 1998). *Diagn Microbiol Infect Dis* 2001;39 (2):105-16.
8. Jones RN, Croco MA, Kugler KC, Pfaller MA, Beach ML: Respiratory tract pathogens isolated from patients hospitalized with suspected pneumonia: frequency of occurrence and antimicrobial susceptibility patterns from the SENTRY Antimicrobial Surveillance Program (United States and Canada, 1997). *Diagn Microbiol Infect Dis* 2000;37 (2):115-25.
9. Gruneberg RN, Felmingham D: Results of the Alexander Project: a continuing, multicenter study of the antimicrobial susceptibility of community-acquired lower respiratory tract bacterial pathogens. *Diagn Microbiol Infect Dis* 1996;25(4):169-81.
10. Butler CC, Rollnick S, Pill R, Maggs-Rapport F, Stott N. Understanding the culture of prescribing: qualitative study of general practitioners' and patients' perceptions of antibiotics for sore throats. *BMJ* 1998; 317 (7159):637- 42.
11. Barden LS, Dowell SF, Schwartz B, Lackey C. Current attitudes regarding use of antimicrobial agents: results from physicians' and parents' focus group discussions. *Clin Pediatr (Phila)* 1998 ;37(11):665-71.
12. Paluck E, Katzenstein D, Frankish CJ, et al. Prescribing practices and attitudes toward giving children antibiotics. *Can Fam Physician* 2001; 47: 521- 7.
13. Council of the European Union. Conclusions on Antimicrobial Resistance (AMR). 2008. [http://www.consilium.europa.eu/uedocs/cms\\_Data/docs/pressdata/en/lsa/101035.pdf](http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/lsa/101035.pdf) (16 April 2010, date last accessed).
14. Dellit TH, Owens RC, McGowan JE Jr et al. Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship. *Clin Infect Dis* 2007; 44 (2): 159- 77.
15. Pulcini C, Cua E, Lieutier F, Landraud L, Dellamonica P, Roger PM. Antibiotic misuse: a prospective clinical audit in a French university hospital. *Eur J Clin Microbiol Infect Dis* 2007; 26(4):277-80.
16. Nathwani D. Antimicrobial prescribing policy and practice in Scotland: recommendations for good antimicrobial practice in acute hospitals. *J Antimicrob Chemother* 2006; 57 (6): 1189- 96.
17. Davey P, Brown E, Fenelon L et al. Interventions to improve antibiotic prescribing practices for hospital inpatients. *Cochrane Database Syst Rev.* 2005; 4:8-24.
18. Wester CW, Durairaj L, Evans AT, Schwartz DN, Husain S, Martinez E. Antibiotic resistance: a survey of physician perceptions. *Arch Intern Med* 2002; 162(19):2210-6.
19. Srinivasan A, Song X, Richards A, Sinkowitz-Cochran R, Cardo D, Rand C. A survey of knowledge, attitudes, and beliefs of house staff physicians from various specialties concerning antimicrobial use and resistance. *Arch Intern Med* 2004;164(13):1451-6
20. Guerra CM, Pereira CA, Neves Neto AR, Cardo DM, Correa L. Physicians' perceptions, beliefs, attitudes, and knowledge concerning antimicrobial resistance in a Brazilian teaching hospital. *Infect Control Hosp Epidemiol* 2007;28(12):1411-4.
21. M. Uygur, T. Kirazlı, C. Bilgen. Akut Tonsillofarenjit Hastalarında Rapid Strep A Testinin Güvenilirliği. *Turkish Archives Otolaryngology* 2002; 40(1): 36-40.
22. Mete.B, Akut Tonsillofarenjit I.Ü. Cerrahpaşa Tıp Fakültesi Sürekli Tıp Eğitimi Etkinlikleri Toplumda Edinilmiş Enfeksiyonlara Pratik Yaklaşımlar Sempozyum Dizisi 2008; 61:107- 16.
23. Leblebicioğlu H, Canbaz S, Peksen Y, Gunaydin M. Physicians' antibiotic prescribing habits for upper respiratory tract infections in Turkey. *J Chemother* 2002; 14(2):181- 4.
24. Karabay O, Özdemir D, Güçlü E. et al. Attitudes and behaviors of Family Physicians regarding use of antibiotics. *Journal Microbiology Infectious Diseases* 2011;1(2): 53- 7.
25. Lam TP, Ho PL, Lam KF, Choi K, Yung R. Use of antibiotics by primary care doctors in Hong Kong. *Asia Pacific Family Medicine* 2009; 8 (1):5. Doi:10.1186/1447-056X-8-5
26. Bojalil R, Guiscafré H, Espinosa. et al. A clinical training unit for diarrhoea and acute respiratory infections: an intervention for primary health care physicians in Mexico. *Bull World Health Organ* 1999; 77 (11): 936- 45.
27. Sung L, Arroll J, Arroll B, Goodyear-Smith F, Kerse N, Norris P. Antibiotic use for upper respiratory tract infections before and after a education campaign as reported by general practitioners in New Zealand. *Journal of the New Zealand Medical Association.* 2006; 119 (1233):1956-64.
28. Razon Y, Ashkenazi S, Cohen A et al. Effect of educational intervention on antibiotic prescription practices for upper respiratory infections in children: a multicentre study. *J Antimicrob Chemother* 2005; 56 (5): 937- 40. doi:10.1093/jac/dki339.
29. McCluskey A, Lovarini M. Providing education on evidence-based practice improved knowledge but did not change behaviour: a before and after study. *BMC Med Educ* 2005; 5: 40. <http://www.biomedcentral.com/1472-6920/5/40>. Doi: 10.1186/1472-6920-5-40.