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ORIGINAL ARTICLE

Assessment of antibiotic prescribing at different hospitals and primary health care facilities

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Abstract In this study, it was aimed to investigate the utilization of antibiotics at various health care facilities. Photocopies of 1250 prescriptions which were containing antibiotics and written out in primary health care facilities (PHCFs), public hospitals (PHs), private hospitals and university hospitals in 10 provinces across Turkey, were evaluated by some drug use indicators. The number of drugs per prescription was 3.23 ± 0.92 and it was highest in PHCFs (3.34 ± 0.84), ($p < 0.05$). The cost per prescription was 33.3 $, being highest in PHs while being lowest in PHCFs (38.6 $ and 28.2 $ respectively). Antibiotic cost per prescription was 16.7 $ and it was also highest and lowest in PHs and PHCFs respectively ($p < 0.05$). The most commonly prescribed group of antibiotics was "beta-lactam antibacterials, penicillins" (29.2%) while amoxicillin/clavulanic acid was the most commonly prescribed antibiotic (18.1%). Sixty-one percent of the antibiotics prescribed for acute infections was generics; among facilities being highest in PHCFs (66.5%) and among diagnosis being highest in acute pharyngitis. In general, the duration of antibiotic therapy was approximately 7 days for acute infections. Although much more drugs were prescribed in PHCFs than others, it was found to be in an inverse proportion with both the total cost of prescriptions and the cost of antibiotics. Broad-spectrum antibiotics, beta-lactamase combinations in particular, were considered to be more preferable in all health care facilities is also notable. These results do serve as a guide to achieve the rational use of antibiotics on the basis of health care facilities and indications.

1. Introduction

Antibiotics are the agents which are commonly used in the treatment of bacterial infections. In spite of their advantages in treatment, the problems that occur from the irrational use of antibiotics (IUA) have put them in the health agendas of the countries as a common issue of consideration (Holloway and van Dijk, 2011; WHO, 2001; European Parliament

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Directorate General for Internal Policies of the Union, 2006; Gould and van der Meer, 2005). The use of antibiotics for viral infections, unnecessarily prescribing broad-spectrums, use of inappropriate doses and durations, patients' self-treatments, etc. can be given as the examples of IUA which lead to antibiotic resistance, ineffective treatment and increased health expenditures (WHO, 2001; European Parliament Directorate General for Internal Policies of the Union, 2006; Ochoa et al., 2000; Llor et al., 2009; Colgan and Powers, 2001).

Countries have taken some initiatives at national and international levels in order to promote the rational use of antibiotics (WHO, 2001; Gould and van der Meer, 2005; Shah and Shah, 2008; Mölstad and Cars, 1999; Goossens et al., 2006). In spite of these initiatives, IUA still remains as a problem which can be caused by physicians or many other factors such as patients, physical working environments of medical practice, etc. (Colgan and Powers, 2001; Kotwani et al., 2010; Niederman, 2005; Ozgenç et al., 2011). Physicians are the health professionals who are primarily responsible for treatment and to know about their prescribing practices can contribute to the achievement of initiatives and regulations relevant to IUA (WHO, 2002, 2003; Natsch, 2005). With the "Health Transformation Program" launched in 2003, the Turkish Ministry of Health (MoH) identified a number of strategies aiming to prevent the irrational use of drugs in Turkey. Conducting field surveys and providing scientific evidences are among these strategies (Akdağ, 2011). Most of the studies examining the prescribing attitudes of physicians in the literature are usually, specific to a particular health care facility, a region, an indication or an age group (Aydın et al., 2005; Lundborg et al., 2002; Pathak et al., 2011; Akici et al., 2004; Rossignoli et al., 2007; Ceyhan et al., 2010; Bjerrum et al., 2004; Baktygul et al., 2011; Peláez-Ballestas et al., 2003; Avci et al., 2006; Sharma et al., 2009; Kumar et al., 2010; Vojvodić, 2010; Vaccheri et al., 2002). Nonetheless, it is needed to carry out comprehensive researches that make an assessment of the use of antibiotics by various health care facilities. In this study, it was aimed to analyze the contents of the antibiotic prescribed scripts which were written out in various health care facilities in various provinces across Turkey.

2. Material and methods

A comprehensive study assessing the prescriptions from various health care facilities was carried out in 2009 under the responsibility of the School of Public Health (TUSAK), with the permission given by Turkish MoH. In this manuscript, only antibiotic containing prescriptions which were collected within the scope of this study were analyzed. Photocopies of the prescriptions, which were written out in the primary health care facilities (PHCFs), public hospitals (PHs), private hospitals (PTE-Hs) and university hospitals (UHs) in November–December 2009, were collected by randomization during the patients' visits to the pharmacies. Of these prescriptions, a total of 1250 prescriptions containing antibiotics were analyzed retrospectively in this study.

Turkey has 81 provinces and the population was 72.561.312 as of 2009 (Turkish Statistical Institute, 2011). In this cross-sectional study, the prescriptions containing antibiotics, which were written out in PHCFs, PHs, PTE-Hs and UHs running in 10 provinces (Eskisehir, Denizli, Nigde, Nevsehir, Bartin, Karabuk, Gumushane, Bayburt, Cankiri and Kirsehir) that are located in various geographical regions of Turkey, were assessed in detail by drug utilization indicators. Data were collected by a member of the survey team and a health care professional who was practicing in that province. The prescriptions written out in PHCFs and PHs were collected in all of 10 provinces where the survey was conducted. The prescriptions written out in UHs were collected in Denizli and Eskisehir provinces since they have medical schools; except Gumushane and Bayburt provinces, since no private hospitals were available, the prescriptions written out in PTE-Hs were collected in all provinces. The provinces were selected randomly and in order to avoid from any bias, utmost significance was attached to selecting provinces where no pilot study was conducted before for the purpose of rational use of drugs (RUD).

The prescriptions were computerized into the databases that were specifically developed with the Excel and SPSS. They were assessed for number of drugs per prescription (NDPP), number of antibiotics per prescription (NAPP), cost per prescription (CPP), antibiotic cost per prescription (ACPP), main groups of all drugs written on the prescriptions, groups of antibiotics, the most frequently prescribed antibiotics, etc.

Some of the prescriptions included more than one diagnosis. Among the prescriptions, the ones with a diagnosis of a single infection ($n = 951$) were analyzed in detail in another study (Mollahaliloğlu et al., 2012). In the present study, among single-diagnosis prescriptions which were indicated "acute" ($n = 343$) were assessed in terms of the "average duration of antibiotic therapy" and "generic or original antibiotic prescribing". These assessments were also specifically reviewed for the most common first four indications. The antibiotic groups and generic antibiotics, which were preferred for these top four indications, were specifically examined for "acute indications". The information regarding the duration of antibiotic therapy was not available in the prescriptions. Therefore, the duration of antibiotic therapy was determined by prescribed total amount and instructions of antibiotics for acute indications. While considering the average duration of antibiotic therapy, the prescriptions, which did not indicate doses, and the pharmaceutical forms, which can be used externally, were not included in order to obtain quantitative data.

ANOVA, Tukey Hsd, Kruskal Wallis and Chi-Square tests were used in the statistical analyses. The comparisons were considered as statistically significant, if $p < 0.05$. Drugs were grouped by the ATC (Anatomic Therapeutic Chemical) classification. While calculating the prices of drugs, the values established by MoH at the date of data collection were taken into consideration. In this study, these prices were given in the US Dollars ($) by the foreign exchange rate that was effective on the date of the survey.

3. Results

In this study, 1250 prescriptions, which were written out by 535 physicians practicing in various health care facilities (including PHCFs, PHs, PTE-Hs and UHs) in 10 provinces were analyzed (prescription per physician $n = 2.3$). Of the 1250 prescriptions, 423 (33.8%) were written out in PHCFs, 382 in PTE-Hs (30.6%), 371 in PHs (29.7%) and 74 (5.9%) in UHs. The mean age of the patients was 35.68 ± 23.41