

The rational drug use of dentists in a university hospital

 Ozlem Terzi¹,  Fikret Yilmaz²

¹Department of Public Health, Faculty of Medicine, Ondokuz Mayıs University, Samsun, Turkey

²Department of Restorative Dentistry and Endodontology, Faculty of Medicine, Ondokuz Mayıs University, Samsun, Turkey

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Abstract

Aim: This study aimed to evaluate the status of receiving education on rational drug use, the criteria in medical drug selection, and the level of knowledge of dentists working in a dentistry faculty in Turkey.

Materials and Methods: This was a descriptive study based on a questionnaire. One hundred seventeen (74%) dentists volunteered to participate in the study. The questionnaire consisted of 20 questions investigating sociodemographic features and rational drug use.

Results: The mean age of the dentists was 30.8 ± 7.2 years, and 62.4% of them were men. The mean period of professional experience was 8.9 ± 7.1 years. The most frequently used resources of references while prescribing medicine were Vademecum (medical drug guide) (61.5%), the internet (59.0%), and colleagues (49.6%). According to the responses of the dentists about their level of knowledge of drugs, the most frequently reported condition described as 'good' was drug indications (43.6%). The dentists had a moderate level of information about posology and administration route (48.7%), pharmacologic features (48.7%) and contraindications (46.2%). The number of dentists who stated that they considered the cost while prescribing was low (always, 6%, and frequently, 15.4%). 23.9% of the dentists received education for rational drug use.

Conclusion: It was determined that dentists did not receive adequate and effective education on rational use of drugs. Regular and continuous education before and after graduation is a necessity for both dentists and their patients.

Keywords: Dentist; health economy; prescribe; rational drug use

INTRODUCTION

Medical drug treatment is the basic tool that physicians use to affect the health of their patients. These drugs may provide significant benefits for patients, but sometimes drugs may cause significant damage. There has been an increase in the numbers and diversity of drugs used in the treatment of the diseases in parallel with developments in medicine in the last century. Many factors such as the increased number of drugs, increased use of drugs, increased experience with the drugs, and the emergence of new treatment regimens necessitate the physicians and physician candidates to behave rationally about drugs use. The irrational or inappropriate use of drugs might give harm to patients, increase the use of unnecessary and/or expensive drugs, and might cause problems such as antibiotic resistance and ineffective treatments (1-4).

The World Health Organization (WHO) describes rational drug use (RDU) as "the use of drugs appropriate for the clinical requirements of the patients, in appropriate doses, for adequate time, with the lowest cost to the patient, and to the society" (1). The WHO organizes various activities

and makes recommendations for extending the practices of rational drug use. The establishment of an organization for controlling the policies of medical drug use, preparing lists of frequently used drugs, preparation of guidelines, the inclusion of additional courses in medical education on RDU, giving importance to continuous medical education, educating the public on the use of medical drugs, and controlling the expenses for drugs are the practices of the WHO (2).

Dentists prescribe various drugs specific for their area in addition to general medical drugs. In dentistry, antibiotics are typically prescribed as therapy for dental, oral, and maxillofacial infections, as prophylaxis against focal infections in patients at risk (endocarditis and joint prostheses), and as prophylaxis against local infection and systemic spread in oral surgery (5). Studies conducted in the United Kingdom (UK) reported that 9-10% of all antimicrobial drugs were prescribed by dentists (4). It was identified in many studies on prescribing medicine that the appropriate prescribing of antibiotics was a significant problem in dentistry facilities. It was stated that the most

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Corresponding Author: Ozlem Terzi, Department of Public Health, Faculty of Medicine, Ondokuz Mayıs University, Samsun, Turkey

E-mail: ozlem.terzi@omu.edu.tr

important reason for this problem generally derived from not complying with the current treatment guidelines (6). There was a tendency of prescribing analgesics in addition to antibiotics among dentists since the infection often caused pain (7-9).

In particular, choosing rational antibiotics and analgesics constitute two critical topics for dentists. There are a relatively high number of national and international resources on the rational use of antibiotics that might be beneficial for dentists (10). The necessity of appropriate education on RDU in medical treatment of patients, particularly in drug selection, and the continuity of such education were emphasized in many studies performed with dentists in various countries such as the UK, Sweden, Belgium, and Pakistan (9,11-13). In the present study, we aimed to evaluate the education status on the use of rational drugs, the selection criteria for drugs, and the level of knowledge of dentists working in a dentistry faculty in Turkey.

MATERIALS and METHODS

This was a descriptive study based on a questionnaire. A total of 158 individuals including research assistants (n:57), doctoral students (n:35), and academics (n:66) working in the Dentistry Faculty of Ondokuz Mayıs University were included in the study. Ethical approval for the study was obtained from Ondokuz Mayıs University Clinical Research Ethics Committee (OMU-KAEK 2016/152). There was no sample selection, as the study was conducted on voluntary basis. For the questionnaire used in this study, it was benefitted from the questions of the survey prepared by the Turkish Ministry of Health (The Evaluation Study on the Knowledge and Behaviors of Physicians Working in Hospitals in Turkey) created for rational drug use and open for general use. There were a total of 20 questions about sociodemographic features and the rational drug use. Dentists were visited in their working environment in the hospital and were informed about the study. Questionnaires were distributed to dentists who volunteered to participate in the study, and were collected within the same day. A total of 117 (74.0%) dentists consisting of 56 (47.9%) research assistants, 42 (35.9%) academics, and 19 (16.2%) doctoral students volunteered to participate in the study.

The results of the questionnaire were evaluated using the Statistical Package for the Social Sciences (SPSS) 22.0 package program. The descriptive statistics of the data were expressed as number (%) and the mean \pm standard deviation (SD). The Shapiro-Wilk test was used to investigate the appropriateness of measurable values to normal distribution in statistical comparisons. The Mann-Whitney U test was used to compare the means of the two groups, and the Chi-square test was used to compare the frequency of the data. Value of $p < 0.05$ was considered statistically significant for all tests.

RESULTS

The mean age of the dentists was 30.8 ± 7.2 years, and 44 (37.6%) of them were females. The mean period of professional experience was 8.9 ± 7.1 (min: 2, max: 30) years. The mean examination time of dentists for a patient was 34.7 ± 16.8 (Min: 10, max: 120) minutes and the mean number of medical drugs prescribed on a prescription was 2.1 ± 0.6 (min: 0, max: 3) (Table 1).

Table 1. Some features of the dentists

Variable	Value
Gender n(%)	
Female	44 (37.6)*
Male	73 (62.4)*
Position n(%)	
Asistans	56 (47.9)*
Doctoral students	19 (16.2)*
Academics	42 (35.9)*
Age (year)	30.8 ± 7.2
Working time (year)	
1-5	70 (59.9)
6-10	17 (14.5)
≥ 11	30 (25.6)
Examination time (per patient) (minute)	34.7 ± 16.8 (min:10- max:120)
The mean of prescribed drugs (per patient)	2.1 ± 0.6 (min:0-max:3)
* column percentage	

The most frequently used resources of references by dentists while prescribing medicine were Vademecum (medical drug guideline) (61.5%), colleagues (49.6%), the internet (59.0%), pharmacology books (13.7%), representatives of drug companies (10.3%), diagnosis and treatment guidelines (8.5%), Turkish Medical Treatment Guidelines (7.7%), and drug information software programs (e.g., RxMediaPharma, TEBRP) (1.7%) There were those who marked multiple options for resources. The rate of dentists who stated that "I do not use any information resource" was 11.1% (13 participants).

The evaluation of the responses of dentists to the question "What do you think about your level of knowledge of drugs?" showed that the most frequently responded condition as 'good' was for 'drug indications' (43.6%). Dentists most frequently responded as 'moderate' regarding for their level of knowledge of about 'posology and administration route' (48.7%), 'pharmacologic features' (48.7%), 'contraindications' (46.2%) and 'warnings, precautions' (44.4%). The number of dentists who stated that their level of knowledge of drugs on different areas as 'very good' or 'very bad' was significantly low (Table 2).

Table 2. The distribution of the responses of dentists to the question, 'What do you think about your level of knowledge of medical drugs.'

	Very good n (%)	Good n (%)	Average n (%)	Bad n (%)	Very bad n (%)
Indications	8 (6.8)	51 (43.6)	45 (38.5)	10 (8.5)	3 (2.6)
Posology and method of drug application	3 (2.6)	29 (24.8)	57 (48.7)	23 (19.7)	5 (4.2)
Pharmacological properties	1 (0.9)	22 (18.8)	57 (48.7)	29 (24.8)	8 (6.8)
Contraindications	3 (2.6)	32 (27.4)	54 (46.2)	23 (19.7)	5 (4.2)
Side effects	1 (0.9)	24 (20.5)	48 (41.0)	39 (33.3)	5 (4.2)
Drug Interactions (another drug/food)	0 (0.0)	16 (13.7)	47 (40.2)	47 (40.2)	7 (5.9)
Warnings, Precautions	1 (0.9)	34 (29.1)	52 (44.4)	22 (18.8)	8 (6.8)
Exceptions (pregnancy, child ie.)	6 (5.1)	40 (34.2)	49 (41.9)	18 (15.4)	4 (3.4)
Bioequivalence	0 (0.0)	12 (10.3)	50 (42.7)	45 (38.5)	8 (6.8)
row percentage					

According to the responses of dentists to the question for "Which criteria do you consider while selecting drugs in prescriptions?"; safety (68.4%), efficacy (62.4%), and appropriateness (60.7%) were determined as the criteria that they 'always' considered in drug selection. However, the most striking finding was that 40.2% of the dentists stated that they 'sometimes' and 38.4% of them 'never' considered the cost of drug. (Table 3).

Table 3. Distribution of criteria that dentists take into account in drug selection*

	Always n (%)	Often n (%)	Sometimes n (%)	Never/seldom n (%)
Efficacy	73 (62.4)	38 (32.4)	3 (2.6)	3 (2.6)
Safety	80 (68.3)	31 (26.5)	3 (2.6)	3 (2.6)
Appropriateness	71 (60.7)	36 (29.9)	5 (4.3)	5 (4.3)
Cost	7 (6.0)	18 (15.4)	47 (40.2)	45 (38.4)
row percentage				

Twenty-eight (23.9%) of the participants reported that they received education on RDU during their dentistry education. The mean age and professional experience of dentists who received this education were 29.2±5.7 years

and 6.5±5.1 years, respectively. The mean examination time of the same group was 36.6±23.5 min/per patient, and the mean number of prescribed drugs was 2.1±0.65 (per patient). There was no statistically significant difference in terms of age, professional experience, examination time, and the mean number of prescribed drugs between dentists who received education on RDU and those who did not. In addition, the comparison of the 'level of knowledge about drugs' and 'the criteria considered in selecting the drug' of dentists with or without education on RDU showed no statistically significant difference ($p>0.05$).

DISCUSSION

Dental prescriptions provide short-term treatment or treatment specifically for surgical procedures; nevertheless, dentists require knowledge about drugs and must follow the international rules for prescribing. There is evidence in studies that dentists generally lacked appropriate pharmacologic information, and therefore they sometimes made prescription errors (7, 14-15). In addition to the pharmacologic information they acquired during their education at the faculty of dentistry, the sources of information they used while prescribing drugs in professional life play a significant role in the selection of drugs (16). Although there are small number of studies on the sources of information that dentists used while prescribing drugs, a wide range of information resources (e.g., Vademecum, the internet, colleagues) were identified in the comparisons in our study. However, it was determined that the use of resources recommended for in the selection of rational drugs such as 'Guidelines for Diagnosis and Treatment' and the 'Turkish Medical Treatment Guidelines' (7.7%) was inadequate. In addition, it should be kept in mind that the accuracy and reliability of drug information obtained from the internet and colleagues must be approached with suspicion. It was reported that the students of dentistry who benefited from their professors at university as the source of information in Mexico and India had a frequency of 44% and 36%, respectively. The use of the "WHO Guide to Good Prescribing" of these students was reported to be 30% in Mexico, and only 9% in India (7-8). In the study of Sharma (17), it was demonstrated that the most frequently used information resources of dentists were the Monthly Index of Medical Specialties (MIMS) (32%), medical representatives (MRs) (28%), and the internet (19%). Dentists should be careful in using MRs as a source of information. The frequency of using MRs of dental drug companies as a source of information was 51% in one study, and 40% among general physicians in another study, both of which were higher compared with the dentists in our study (10%) (18-19). Rational drug prescription is described as the use of the minimum drug to obtain the best possible effect in the shortest period with a reasonable cost (8). However, studies have shown that MRs of drug companies were frequently used as information resources when prescribing drugs, and this resulted with polypharmacy, reduced the quality

of prescriptions, and greatly increased the cost of the treatment (20-21).

The appropriate prescription of medication should "maximize efficacy and safety, minimize cost, and respect patient's preferences." Choosing the most appropriate medication for each patient in order to achieve desired therapeutic outcomes is a challenge for healthcare professionals in their daily practice (22). The 'WHO Guide to Good Prescribing' recommends the systematic evaluation of drugs for efficacy, safety, appropriateness, and cost in selecting drugs for specific conditions (23). This study reported that dentists 'always' or 'frequently' considered the other criteria; however, it was striking to observe the high rates of responses of 'sometimes' or 'never' in considering drug cost (40% and 38%, respectively). 'Efficacy' was considered as important in the selection of drug in a study by more than 90% of general practitioners; however, 'drug cost' was considered important by only 50% (19). Although drug selection is performed appropriately with the other criteria, the disregard of cost means 'irrational drug practice' and this is particularly observed in the selection of antibiotics among dentists (13,24). The selection of more expensive drugs rather than using cheaper generic drugs significantly increases treatment costs and causes an additional burden to the health economy and hence the national economy, which is unfortunately observed more frequently in developing countries (6, 25).

Dentists must be aware of the accurate doses and interactions of frequently used antibiotics, anti-inflammatory analgesics, and local anesthesia used in dental procedures, and they must be aware of any negative or toxic effects of the drugs (8). In the present study, the dentists reported having inadequate or moderate levels of knowledge on various topics, especially on posology, adverse effects, pharmacologic features, drug interactions, and bioequivalence when they were questioned on their level of knowledge on the features of drugs. In a study that investigated the prescription errors of the dentistry students, 74% of the students were found to have inadequate information on drug posology (7). The lack of information on these topics may give harm to patients as a consequence of irrational drug prescribing. In the last few years, it has been reported that the medication errors caused significant harm to patients in many countries. In the United States of America, it is estimated that 1-2% of hospital admissions resulted from medication errors. In Spain, medication errors were responsible for 4.7% of admissions to health services, with an average cost of 3000 EUR per patient (3,26-27). Although medical drug prescribing errors are well-documented in the literature, publications on the prescription errors of dentists are rare, and more studies are required. The primary causes of prescription errors of dentists were observed as unnecessary or multiple drug prescriptions due to

difficulties in defining the problem of the patient, lack of information about the current prescription drugs of the patient, and the limited education on RDU of dentists (15).

It was stated that education on RDU was given in approximately 70% of medical faculties in Turkey by academics in pharmacology departments as the education curriculum permitted (28). However, there is inadequate information about dentistry faculties where RDU education is provided in Turkey. We found that only 23.9% of dentists working in the university hospital as research assistants, doctoral students, and academics who graduated from different faculties in Turkey received education on RDU. The number of dentists who received such an education is suggested to be inadequate.

One of the limitations of the study is that the period of RDU education, the education content, and from where the dentists received the education was not questioned. However, the detection of no difference regarding the drug information, and other factors between the dentists who did and did not receive education suggests that the period and content of RDU education is inadequate. Heaton et al. reported in their questionnaire study with 25 students and new graduates of a medical faculty in the UK that only RDU education was inadequate for the effective and safe drug use in 74% of the participants. Conversely, the results of systematic reviews collections showed that the frequency of unnecessary antibiotic prescription decreased, and success was achieved in increasing adherence to national guidelines after the education for antibiotic prescription writing prescribing and RDU was provided for general practitioners and dentists (29-31). Similarly, an increase was detected in some skills such as drug prescription and informing the patient after RDU education in a study with dentists in Turkey (18).

CONCLUSION

We think that it is necessary to provide education for dentists especially on the rational use of drugs such as antibiotics, anti-inflammatory analgesics, and local anesthetics which they use frequently. Regular education before and after graduation, and continuity of this education will be beneficial for the permanency of the information. In addition, supporting this education with practice is suggested to increase the rate of treatment success by providing convenience in the daily professional lives of the dentists.

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