

# Rational use of drugs in healthcare services: a sample of tertiary hospital

N.M. ACIMIS<sup>1</sup>, I. YILMAZ<sup>2</sup>, M.A. TEKINDAL<sup>3</sup>, R. KILIC<sup>4</sup>

<sup>1</sup>Pamukkale University School of Medicine, Denizli, Turkey

<sup>2</sup>Department of Pharmacology and Clinical Katip Celebi University School of Medicine, Izmir, Turkey

<sup>3</sup>Biostatistics and Information Technologies Department, Katip Celebi University School of Medicine, Izmir, Turkey

<sup>4</sup>Denizli Provincial Health Directorate, Denizli, Turkey

**Abstract. – OBJECTIVE:** This study aimed at evaluating physicians' attitudes towards the rational use of drugs (RUD) at a training and research hospital.

**SUBJECTS AND METHODS:** This cross-sectional study was conducted in a training and research hospital affiliated with the Ministry of Health between December 2014 and April 2015. All 424 active-duty physicians were asked to participate in the survey study. Of these physicians, 193 (45.5%) volunteered to respond to a 64-item survey. A total of 193 (45.5%) physicians volunteered to participate in the study. The chi-squared test, ANOVA, and multiple logistic regression analysis were used for the evaluation of the study data.

**RESULTS:** Of the physicians who participated in the study, 58.0% were male. Prescriptions were dispensed for 52.73% ( $\pm 27.44$ ) of the patients, with a mean of  $2.67 \pm 0.98$  items per prescription. The rational use of drugs was defined as prescribing an effective drug for the patient (85.4%), prescribing an appropriate drug for the patient (84.9%), and prescribing a safe drug for the patient (77.2%). Compared to residents, the prescription preferences of specialists were affected 2-fold by follow-up visit ( $p=0.010$ ,  $\beta$  0.694, CI 1.180 3.396), 1-fold by patient examination percentage ( $p=0.002$ ,  $\beta$  0.022, CI 1.008 1.037), and 3.5-fold by prescribing iron supplements ( $p=0.001$ ,  $\beta$  1.274, CI 1.644 7.774) (R<sup>2</sup> 0.259,  $p=0.001$ ).

**CONCLUSIONS:** The results of the study showed that tertiary hospital specialists and residents have similar attitudes towards patients, their prescribing preferences and RUD knowledge level.

This study provides comprehensive information on physicians' attitudes towards RUD.

*Key Words:*

Prescription, Rational use of drugs, Physician, Public health.

## Introduction

Developing countries are negatively affected by pharmacoeconomic problems, problems in accessing drugs, unconscious and unnecessary consumption of drugs, and relevant health hazards. The reports of WHO show that more than 50% of all medicines are prescribed, dispensed, or sold inappropriately<sup>1</sup>. The primary reason is often considered physician failure. Drugs have special importance in terms of production, consumption stages, and supply and demand obligations<sup>2</sup>. A report of WHO (2011) recommends that national programs be prepared in all member countries, focusing on Rational Use of Drugs (RUD) training. In this context, the "Rational Drug Use National Action Plan" was issued by the Ministry of Health between 2014-2017<sup>3,4</sup>. This study aimed at determining the RUD and prescription preferences of physicians working in a training and research hospital affiliated to the Ministry of Health.

## Subjects and Methods

This cross-sectional study was conducted between December 2014 and April 2015. Physicians who agreed to participate in the study were reached through a survey.

### Survey Form

Data was collected using a survey form that was developed by reviewing relevant literature and standardized by conducting a preliminary study in another health institution. The surveys consisted of a total of 64 items, including multiple-choice and

some open-ended questions about physicians' sociodemographic characteristics, prescription preferences, prescription characteristics, influences on their prescriptions, antibiogram preference, and knowledge of RUD. Official permissions and ethical approval were obtained for the study.

#### ***Inclusion Criteria***

Participation in the study was voluntary. It was specifically aimed to ensure that the participants were active-duty physicians in the hospital.

#### ***Physician Consent***

There was an informative remark regarding the context of the study on the top of the survey.

#### ***Administrative Consent***

Legal permission was obtained to conduct the study.

#### ***Ethical Approval***

The study was approved by the Clinical Research Ethics Committee of the University of Health Sciences Izmir Bozyaka Training and Research Hospital.

#### ***Tertiary Hospital Study***

As of 2015, the number of specialists (n=174), residents (n=198), and academic members/chief residents (n=52) was 424.

#### ***Sample Size of the Study***

The sample size of the study was aimed to reach the whole tertiary hospital. Participation in the study was voluntary. A total of 193 physicians (45.5%) agreed to participate in the study.

#### ***Place and Characteristics of the Study***

The research hospital where the study was conducted has 570 patient beds, 23 emergency beds, and 14 hemodialysis observation beds, 13 of which are provided for service purposes and 17 of which for clinical training.

#### ***Statistical Analysis of the Study Data***

Descriptive statistics were presented as number, percentage, mean, median, and standard deviation values. When assumptions for the use of parametric tests were provided, the independent samples *t*-test was used for comparison of independent group differences, when they were not provided, the Mann-Whitney U and Kruskal Wallis tests were used. The data were analyzed using the SPSS version 25.0 software (SPSS Inc., Ar-

monk, NY, USA). As statistics, the Chi-squared test was used for non-parametric data, and *t*-test and ANOVA were used for parametric data. Finally, multiple logistic regression analysis was performed.

#### ***Limitations of the Study***

The workload created by serving at the hospital with a high number of patient admissions may have negatively affected the interest and participation of physicians. It would be beneficial to use a valid and reliable scale for the Turkish sample in the study.

#### ***Strength of the Study***

The study is very remarkable in terms of demonstrating the knowledge and attitudes of physicians towards RUD in a training and research hospital with a high patient potential affiliated to the Ministry of Health.

## **Results**

#### ***Characteristics of the Physicians***

Of the physicians, 58.0% were male, with a mean age of  $36.89 \pm 10.34$  years (min: 25.0-max: 65.0), and 60% of the respondents were in a clinical branch. The mean total number of patients examined per day was  $56.34 \pm 34.58$  (min: 0.00-max: 300). It was  $58.36 \pm 4.91$  (min: 7-max: 120) for residents and  $56.23 \pm 2.83$  (min: 0-max: 300) for specialists. While the mean percentage of the total number of dispensed prescriptions was  $52.73 \pm 27.4$  (min: 0.0-max: 100), it was  $48.66 \pm 4.76$  (min: 0.0-max: 95) for residents and  $53.90 \pm 2.15$  for specialists (min: 0.0-max: 100). The mean total number of items per prescription was  $2.67 \pm 0.98$  (min: 0.0-max: 5.0), it was  $2.87 \pm 0.14$  (min: 1-max: 4) for residents and  $2.62 \pm 0.07$  (min: 0-max: 5) for specialists. The mean time allocated to a patient was  $7.49 \pm 0.66$  for residents and  $8.34 \pm 0.56$  for specialists, while residents desired it to be  $15.44 \pm 1.3$  and specialists desired it to be  $15.32 \pm 0.64$ .

#### ***Preferences for Drugs***

Of the physicians, 63.0% had a personal drug list for common diseases. Of the physicians, 31.6% attended the training program on drugs after graduation, 25.9% attended the training program or meetings organized by pharmaceutical companies. While 75.8% used any source of information when prescribing drugs, 67.3% used the Diagnosis and Treatment Guidelines of the Ministry of Health (Table I).

### Characteristics of Patient Prescriptions

The responses to the multiple-choice questions revealed that physicians considered 88.0% efficacy, 76.2% personal experience, and 74.6% reliability when prescribing drugs. Of the participants, 53.4% stated that they sometimes prescribed drugs based on the complaint without examining the patient, 64.8% stated that they sometimes prescribed the drugs that patients demanded, and 46.1% stated that they sometimes considered the social security status of patients.

In order of frequency, physicians took into account the age of the patient (93.3%), pregnancy and lactation status (90.1%), other chronic diseases and kidney diseases (89.6%) when prescribing.

In addition, 97.2% of the physicians informed the patients about the route of administration, 91.7% the daily dose and 90.2% the duration of treatment.

Of the participants, 52.6% considered the information of the prescriptions they dispense for their patients as sufficient for some drugs, while 69.6% considered explaining the use of the prescribed drugs to the patient as the duty of both the physician and the pharmacist (Table I).

### Factors Affecting Prescriptions

Despite the incomplete responses, physicians' prescription preferences were found to be affected by taking pharmacology lessons at school (77.2%), carefully following the prescriptions written by the professors to the patients during clinical internships (76.7%), receiving in-service training after graduation (62.7%), discussing prescriptions with their colleagues in the field to reach a conclusion (69.9%), learning practices from the promotion of pharmaceutical companies (65.3%), self-education (93.3%). According to the response status, the physicians were dispensing prescriptions based on the suitability of the pharmaceutical form (93.7%), efficacy (93.7%), reliability (96.3%), suitability (92.7%), bioavailability being richer than other drugs (87.6%), and price (73.5%). The physicians stated that they consider the drug price when the patient has no insurance (84.5%) in cases in which the number of similar drugs that can be used for the treatment is more than one (79.3%) and the bioavailability of the drugs is the same (78.7%) (Table I).

**Table I.** Drug prescription preferences of physicians.

<b>What are the criteria you consider when choosing a drug?</b> ( <i>Contains more than one response</i> )		
<b>Efficacy</b>	170	(88.0)
<b>Personal Experience</b>	147	(76.2)
<b>Safety</b>	144	(74.6)
<b>What are the sources you refer when prescribing drugs for your patient?</b> ( <i>Contains more than one response</i> )		
<b>Diagnostic and Treatment Guidelines</b>	130	(67.3)
<b>Vademecum</b>	111	(57.5)
<b>How often do you benefit from the following anamnesis information of your patient when prescribing drugs?</b>		
<b>Age</b>	180	(93.3)
<b>Pregnancy and lactation</b>	174	(90.1)
<b>Renal Disease</b>	173	(89.6)
<b>How often do you give your patient the following information about the drugs you prescribe?</b>		
<b>Route of administration</b>	179	(92.7)
<b>Daily dose</b>	177	(91.7)
<b>Duration of treatment</b>	174	(90.2)
<b>What are the reasons for ordering an antibiogram test before prescribing antibiotics for your patients?</b> ( <i>Includes only yes responses</i> )		
<b>Preventing antimicrobial resistance</b>	123	(63.7)
<b>Limiting the unnecessary use of antibiotics</b>	118	(61.1)
<b>Ensuring that patients properly benefit from antimicrobial therapy</b>	105	(54.4)

### Antibiogram Preferences

Of the physicians, 53.9% were sometimes ordering an antibiogram test before prescribing antibiotics. The most common reasons for ordering an antibiogram were preventing antimicrobial resistance (63.7%), limiting the unnecessary use of antibiotics (61.1%), and ensuring that patients benefit from antimicrobial therapy appropriately (54.4%) (Table I).

### Knowledge of RUD

Physicians, according to frequency, stated rational drug use as: prescribing effective medicine for the patient (85.4%), prescribing appropriate medicine for the patient (84.9%), prescribing safe medicine for the patient (77.2%), and using medicine for the appropriate time (75.6%).

Although not all answered, 84.4% of the participants were willing to receive training on rational drug use, and 66.7% preferred that this training be given by the Ministry of Health.

Of the participants, 46.6% responded “no” to the question “Have you ever received training on the rational use of drugs?”, while 45.1% stated that they were not aware of the studies of the Ministry of Health on the rational use of drugs (Table II).

### Chi-Squared Statistical Analysis

There was no statistically significant difference between the residents and specialist physicians (complaint, control, report, etc.) in terms of the frequency of visits of the patients for whom they wrote a prescription.

However, patients most frequently visited (18.1%) specialists for drug prescription ( $p=0.068$ ) (Table III).

There was no significant difference between the residents and specialist physicians in terms of the reasons for prescribing drugs (prescribing different drugs that they decided to be correct, prescribing the drugs that the patient used regularly according to the report, etc.) ( $p>0.05$ ).

**Table II.** Physicians’ knowledge of rational use of drugs.

<b>What is the rational use of drugs? (Contains multiple responses)</b>		
<b>Prescribing an effective drug for the patient</b>	165	(85.4)
<b>Prescribing an appropriate drug for the patient</b>	164	(84.9)
<b>Prescribing a safe drug for the patient</b>	149	(77.2)
<b>Use of the drug for an appropriate period of time</b>	146	(75.6)
<b>Prescribing an appropriate dose of drug</b>	144	(74.6)
<b>Have you ever received training on the rational use of drugs? (Information of 19 participants are missing)</b>		
<b>Yes</b>	83	(43.0)
<b>Where did you receive the training on the rational use of drugs?? (Contains one response)</b>		
<b>Faculty of Medicine</b>	53	(27.5)
<b>Ministry of Health</b>	26	(13.4)
<b>Professional chamber</b>	12	(6.2)
<b>Pharmaceutical company</b>	11	(5.7)
<b>Other</b>	13	(6.7)
<b>Would you like to receive training on the rational use of drugs? (11 individuals are missing)</b>		
<b>Yes</b>	163	(84.4)
<b>By which institutions would you prefer the training on the rational use of drugs to be provided? (Contains one response)</b>		
<b>Ministry of Health</b>	131	(67.8)
<b>Professional chamber</b>	61	(31.6)
<b>Pharmaceutical company</b>	16	(8.2)
<b>Written or visual media</b>	34	(17.6)
<b>Are you aware of the activities of the Ministry of Health on the rational use of drugs? (Information of 48 participants are missing)</b>		
<b>Yes</b>	58	(30.1)

**Table III.** Professional title status by some variables affecting physicians' prescriptions\*.

Responses	Professional title		P
	Assistant	Specialist	
<b>1. List the visiting reasons of patients you prescribed for in order of frequency, between 1 and 6. (1: most frequently, 6: most rarely)*</b>			
<b>Visit for prescription</b>			
Most frequently	6.1% (2)	18.1% (29)	
Intermediate	30.3% (10)	40.4% (64)	<b>0.068</b>
Rarely	48.5% (16)	35.6% (57)	
<b>* First visit for complaint, Visit for follow-up, Visit for report (health-incapacity report), Visit for referral, First visit for complaint, Visit for follow-up, Visit for prescription, Visit for report (health-incapacity report), Visit for referral these were statistically similar.</b>			
<b>What do you think about your level of knowledge of the following subjects related to drugs? (1: Very good 5: Very poor)**</b>			
<b>Indications</b>			
Good	27.3% (9)	38.1% (61)	
Intermediate	63.6% (21)	57.5% (92)	0.502
Poor	3.0% (1)	1.9% (3)	
<b>**Route of administration, Daily dose, Adverse effects, Contraindications, Bioequivalence, Availability on the market, Composition, Mechanism of action, Drug interactions (drug/food /smoking) Storage conditions (stability). These were statistically similar.</b>			
<b>In your experience, how often do patients make specific requests for the following drug groups? (1: Very frequently 5: Never)***</b>			
<b>Antibiotics</b>			
Most frequently	55.1% (17)	33.8% (54)	
Intermediate	39.4% (13)	58.8% (94)	0.174
Rarely	6.1% (2)	3.1% (5)	
<b>***Antihypertensive drugs, Antihyperlipidemic drugs, Cardiovascular drugs, Gastrointestinal drugs, Analgesic/Anti-rheumatic drugs, Common cold medicines, Asthma/COPD drugs, Vitamin, mineral supplements, Iron supplements. These were statistically similar</b>			

\*Includes combined groups.

The analysis of the frequency regarding all the visiting reasons (complaint, follow-up, report, etc.) for the patients examined showed no statistical difference between residents and specialists ( $p > 0.05$ ). The evaluation of the opinions of the physicians about the level of knowledge of the specified subjects by their score (storage conditions, drug interaction, mechanism of action, etc.) showed no statistically significant difference ( $p > 0.05$ ) (Table III). There was no statistically significant difference between physicians in terms of drug groups (antibiotic, antihypertensive, antihyperlipidemic, etc.) requested by patients. According to the daily number of patients examined by physicians, there was no difference between residents and special-

ists in terms of allocating/not allocating enough time to determine the effective, appropriate, safe, low-cost drugs. The multiple regression analysis of the variables of follow-up visit, visit for iron supplements, follow-up visit frequency, side effect, route of administration, visit for antihypertensive, gastrointestinal drugs, which were found to be significant in the simple regression analysis ( $R^2 0.566$ ,  $p = 0.005$ ), revealed that the prescription preferences of specialists were affected 2-fold by follow-up visit ( $p = 0.010$ ,  $\beta 0.694$ , CI 1.180 3.396), 1-fold by patient examination percentage ( $p = 0.002$ ,  $\beta 0.022$ , CI 1.008 1.037), and 3.5-fold by prescribing iron supplements ( $p = 0.001$ ,  $\beta 1.274$ , CI 1.644 7.774) ( $R 20.259$ ,  $p = 0.001$ ).



## Discussion

A prescription guideline has been prepared by WHO for physicians to help in the treatment process. According to this guideline, the RUD principles are categorized into four criteria: efficacy, safety, appropriateness, and cost-effectiveness<sup>1,4,6</sup>. The results of the present study demonstrated that residents and specialists had similar drug preferences, prescription characteristics, factors affecting prescriptions, antibiogram preferences, and level of knowledge of rational use of drugs.

For this reason, while preparing the discussion section, we preferred to evaluate the answers by considering the rational use of drugs as a whole.

In this study, physicians most frequently paid attention to the principle of efficacy (88.0%), followed by safety, appropriateness, and cost when prescribing drugs. Our study yielded similar results to the study of Akici et al<sup>7</sup> conducted in 12 different regions of Turkey and the study of Calikoglu et al<sup>8</sup> conducted in Erzurum. The physicians in our study group stated that they most considered the patient's age (93.3%), pregnancy and lactation status (90.1%), kidney diseases (89.6%), other chronic diseases (89.6%), drugs used (89.1%), drug allergy (88.6%), and liver diseases (87.5%) when prescribing drugs. Calikoglu et al<sup>8</sup> reported that the mean age of physicians was 34.7±7.9 and 70.7% of them were male, which is consistent with the results of our study results. Similar to this study, the study of Akici et al<sup>7</sup> found that both specialists and family physicians most frequently considered age, pregnancy, and lactation status, while social security and economic potential were the least frequently considered factors<sup>7</sup>. In terms of establishing rational use of drugs, it is necessary to consider rational prescribing, as well as the patient's compliance with this treatment in the most correct way. Informing the patient about the treatment should be considered the physician's duty and the basic right of patients. The present study showed that physicians paid attention to the route of administration, daily dose, and duration of treatment when informing patients but gave little information about the price of the drug and drug interactions. Providing the necessary information about the process and treatment of the patient will undoubtedly increase the confidence of the physician. Only 43.0% of the physicians in this study stated that they previously received training on RUD. Of the participants, 27.5% received this training in the faculty of medicine and 13.4% from the Ministry of Health. However, receiving this training in the faculty is remarkable considering the benefit that it will

add to public health. A study conducted in a training and research hospital in Istanbul<sup>7</sup> showed the least known characteristics of the drugs prescribed by physicians as the price (23.8%), as in this study. It is of note that the most preferred reference source is the Vademecum, and the element of self-study is among the effective elements for prescribing. In this study, the use of the Vademecum (57.5%) and personal experience (76.2%) ranked second<sup>9</sup>. A systematic review<sup>10</sup> (11,222 searches, 33 studies) identified a total of 33 factors affecting the prescribing decisions of physicians and reported physician characteristics, patient preference, the clinical status of the patient, pharmaceutical industry, and drug cost as the most common factors. The present study showed that drug cost (73%) and pharmaceutical company promotion (12.9%) were stated less for physician prescriptions. Many scholars<sup>11</sup> have emphasized the great importance of the time allocated by a physician to the patient in terms of physician and patient communication, reporting that this period should be sufficient for adequate informing of the patient. WHO recommends that an average of 20 minutes should be allocated to patients. Considering the examples from developed countries, the present study found a shorter time allocated by physicians for patient examination<sup>11</sup>. In addition to being frequently prescribed drugs, antibiotics are important in terms of the risks of resistance and increased cost. Studies<sup>12,13</sup> on the rational use of antibiotics have shown that clinicians consider antibiotic abuse an important problem and agree on the results of antibiotic sensitivity and the existence of a basic drug list.

In their study conducted in primary care, state, private, and university hospitals in 10 provinces, Mollahaliloglu et al<sup>14</sup> reported that the average number of drugs per prescription in our country was 2.83, with the most frequently prescribed drugs being common cold-cough medicines and antibiotics. The present study revealed that analgesic, anti-rheumatic, gastrointestinal, and antibiotics were the most frequently prescribed drugs by residents and specialists. In contrast, the prescription preferences of specialists were significantly affected by follow-up visit, patient examination percentage, and prescribing iron supplements ( $p=0.001$ ).

## Conclusions

The results of this study demonstrated that specialists and residents working in a tertiary care hospital had similar drug preferences, prescription characteristics, factors affecting the prescrip-

tion, antibiogram preferences, and level of knowledge of RUD. Although the participation in the study was low, it is of note that the responses of these physicians, who meet the health needs of the region and work in a training and research hospital affiliated to the ministry of health with a high patient potential, provide scientific and comprehensive information on RUD, which is our global health priority.

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#### Conflict of Interest

The Authors declare that they have no conflict of interests.

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#### Disclaimer

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