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ORIGINAL ARTICLE

Measuring Medical Students' Awareness of Rational Drug Use and Assessing Associated Factors

Tıp Öğrencilerinin Akılcı İlaç Kullanımı Bilincinin Ölçülmesi ve İlgili Faktörlerin Değerlendirilmesi

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ABSTRACT

Aim: To measure Selcuk University Medical Faculty (SUMF) students' levels of awareness of rational drug use (RDU) in adults and to assess related factors.
Material and Methods: The data for this descriptive, cross-sectional study were derived from an online questionnaire completed by SUMF students; the questionnaire employed a sociodemographic survey and the Rational Drug Use Scale. Statistical analysis was conducted using the SPSS software, and a p-value of <.05 was considered statistically significant.
Results: Four hundred and forty-six students (51.1% women, 48.9% men) participated in this study. The results showed that awareness of correct drug use was higher in women than in men (p=.01) and that awareness of correct drugs (p=.007), correct use (p=.003), and RDU (p=.002) were higher in clinical students than in preclinical students. Awareness of correct information (p=.008), correct drugs (p=.03), correct use (p=.009), and RDU (p=.002) were higher in students who took RDU education than in those who did not. Awareness of correct information (p=.018), correct use (p=.002), and RDU (p=.015) were also higher in students who considered RDU education necessary than in those who did not.
Conclusion: The results of this research indicate that students' RDU awareness levels should be improved. Effective, formal and non-formal education opportunities should continue to be used and developed to create and spread awareness of RDU.

Keywords: rational drug use; awareness; medical education

ÖZ

Amaç: Bu çalışmada, Selçuk Üniversitesi Tıp Fakültesi (SÜTF) öğrencilerinin erişkinlerde akılcı ilaç kullanımı farkındalık bilgisinin ölçülmesi ve ilişkili faktörlerin değerlendirilmesi amaçlanmıştır.
Yöntem ve Gereçler: Tanımlayıcı ve kesitsel tipteki çalışmanın verileri; sosyo-demografik anket formu, Akılcı İlaç Kullanımı Ölçeği (AİK) kullanılarak oluşturulan anketle SÜTF öğrencileriyle çevrimiçi paylaşılarak toplanmıştır. Çalışmanın istatistiksel analizi SPSS programıyla yapılmış, p<0,05 değeri anlamlı kabul edilmiştir.
Bulgular: Anket çalışmasına 446 (%51,1 kadın, %48,9 erkek) öğrenci katılmıştır. Sonuçlarda, kadınlarda doğru kullanım şekli farkındalığının erkeklerden yüksek olduğu belirlenmiştir (p=,01). Doğru ilaç (p=,003), doğru kullanım şekli (p=,002), akılcı ilaç kullanımı farkındalıklarının (p=,007) klinik sonrası öğrencilerde klinik öncesindekilere göre daha yüksek olduğu görülmüştür. Doğru bilgilendirme (p=,008), doğru ilaç (p=,03), doğru kullanım şekli (p=,009), akılcı ilaç kullanımı farkındalıklarının (p=,002) AİK eğitimi alan öğrencilerde almayanlara göre daha yüksek olduğu belirlenmiştir. Doğru bilgilendirme (p=,018), doğru kullanım şekli (p=,002), akılcı ilaç kullanımı farkındalıklarının (p=,015) AİK eğitimini gerekli gören öğrencilerde görmeyenlere göre daha yüksek olduğu saptanmıştır.
Sonuç: Bu araştırmanın sonuçları, öğrencilerin AİK farkındalık düzeylerinin geliştirilmesi gerektiğini göstermektedir. Akılcı ilaç kullanımı bilincinin oluşturulması ve yaygınlaştırılması için etkin, örgün ve yaygın eğitim fırsatları kullanılmaya ve geliştirilmeye devam edilmelidir.

Anahtar kelimeler: Akılcı ilaç kullanımı, farkındalık, tıp eğitimi

Introduction

Although protecting individuals from diseases is considered as the main goal of modern medicine, most health service provision takes the form of healing sick people with drugs; therefore, drugs play an important role in medical treatment (1). At a meeting in Nairobi in 1985, the World Health Organization (WHO) defined rational drug use (RDU) by indicating that in embraced cases in which "patients use drugs suitable for their clinical needs, in doses that meet their personal needs, for an adequate period time, at the least cost to themselves and society." The steps of RDU comprise making the correct diagnosis, determining the prognosis, establishing the treatment goals, choosing the appropriate treatment, writing the prescription correctly, and following up if drug treatment is necessary (2,3). The WHO has made various suggestions for the dissemination of RDU knowledge. These include establishing national multidisciplinary institutions for the coordination of drug use policies, preparing clinical guidelines, creating an essential drugs list, establishing drug committees in regions/hospitals, providing problem-based pharmacotherapy education in the undergraduate medical school curriculum, connecting the implementation of continuing medical education with administration and supervision and establishing a feedback system, providing unbiased information on drugs, educating the public about drugs, preventing inappropriate

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financial incentives, implementing an appropriate and enforced legal regulation, and making the necessary expenditures for the continuing availability of drugs and personnel (4).

The use of drugs that do not comply with the principles of RDU is an important health problem worldwide. According to WHO estimates, more than half of all medicines are improperly prescribed, dispensed, or sold. In addition, about half of all patients do not use drugs correctly, and one-third of the world's population lacks access to essential drugs (5). The situation in Turkiye is in line with these estimates (6). The consequences of the irrational use of drugs include a lack of benefit from treatment, an increase in unwanted drug effects, antibiotic resistance due to inappropriate antibiotic use, complications due to the excessive and non-sterile use of drugs in the form of injections, an increase in the risk of bloodborne diseases, difficulty in accessing drugs as a result of decreased drug stocks, and increased drug dependence and cost (7,8).

Physicians are the occupational group with the most important role in RDU because they are the primary authorities in the treatment of patients (9). Research on the subject indicates that the early training given to medical students, who are the physicians of the future, is more effective and productive than training given later in their careers, highlighting their critical position regarding RDU. In addition, every step (each year level) in medical education is important in terms of RDU principles and prescribing; preclinical students should evaluate the status of the subject, and their education should be shaped accordingly (10,11). Studies to determine preclinical medical students' knowledge, behaviors, and opinions regarding RDU are limited, highlighting the need for research on this subject (7,12,13). The training of preclinical medical students on RDU is also important because they will guide society when they begin serving as health professionals. Although some studies have been conducted on opinions and attitudes about RDU before and after graduation, measurement tools are needed to objectively evaluate the extent of their knowledge. We found no such tool in our literature search. This study aimed to measure Selcuk University Faculty of Medicine students' awareness (in the pre- and clinical periods) of RDU in adults and to evaluate the related factors.

Method

This descriptive and observational study was performed among approximately 1400 students (pre-clinical and clinical) studying at the Selcuk University Faculty of Medicine, in Turkiye. The study was approved by the ethics committee of the Faculty of Medicine (Decision number: 2022/40, Date: January 18, 2022).

The data were collected using a sociodemographic questionnaire and the Rational Drug Use Scale. An online questionnaire, which was created by the researchers with the help of https://www.google.com/intl/tr_tr/forms/about/, was shared with groups of medical school students and conducted online between January 28th, 2022, and March 23rd, 2022. Participation in the study was voluntary, and all completed questionnaires were included in the evaluation.

A sociodemographic form was used to determine the characteristics of the study's participants, including their sex; age; year in school; whether there was a healthcare worker in their family; whether they or their mother, father, or siblings had any chronic diseases; whether they examined package inserts and history before using a drug; and whether they had received RDU training. They were also asked if they considered pre-RDU training necessary.

The scale used was the Rational Drug Use Awareness Scale for Adults, developed by Aktaş et al. (14). The scale consists of 15 items, a single sub-dimension, and three components. The items in the first component were related to the proper dosage, adequate information, and awareness of not considering the drug recommendations of relatives. We collectively deemed this "correct information awareness." The items in the second component were related to the awareness that the right drug could not be found without the recommendation of a physician; we deemed this "awareness of the correct drug." The third component was related to the correct use and timing of drug use, which we called "correct drug use" and "awareness." The items in the fourth component were named "total rational drug use awareness," which consists of the awareness of correct information, the awareness of the correct drug, and the correct drug use values. Each item in the data form was scored using a 5-point Likert-type rating scale where 1 = "Strongly Disagree," 2 = "Disagree," 3 = "Undecided," 4 = "Agree," and 5 = "Strongly Agree" for positive statements; negative statements were scored with reverse coding. Items 3, 5, 6, 8, 10, 11, 14, and 15 were reverse-coded. The internal consistency coefficient for the overall scale was reported as α=0.83. The internal consistency coefficient for the overall scale was determined as α=0.87. The first component included items 3, 5, 6, 8, 10, 11, 14, and 15; the second component included items 1, 2, 4, and 7; the third component included items 9, 12, and 13. Possible scores ranged from 15 to 75; the higher the score, the higher the participant's level of RDU awareness.

The study population, according to the sample size calculation; reaching 451 people for 1400 medical students at 99% confidence level with 5% margin of error and response distribution is planned as 50% of the calculated number (http://www.raosoft.com/samplesize.html).

The Statistical Package for the Social Sciences (SPSS, 21.0 SPSS FW, SPSS Inc., Chicago, IL., USA) program was used for statistical analysis of the data obtained in the study. The normality of the data was analyzed using the Shapiro-Wilk test. Parametric data were tested using the Student's t test and presented as mean and standard deviation. Non-parmetric data were tested with the Mann-Whitney U test.. A p-value of <.05 was considered statistically significant.

Results

A total of 446 people participated in the study. The results revealed that women's awareness of correct drug use (13.14 ± 1.90) was significantly higher than men's (12.64 ± 2.16) (p=0.1) (Table 1). There was no significant difference in the correct information awareness score of the participants according to their membership in the pre-clinical or clinical groups. A significant difference was observed in awareness of correct drug (p=.007), correct use (p=.003), and RDU (p=.002), and in these dimensions, clinical students' awareness (15.87 ± 3.15, 13.27 ± 1.94, and 61.82 ± 8.56, respectively) was higher than that of preclinical students (14.96 ± 3.08, 12.65 ± 2.08, and 59.68 ± 7.90, respectively) (Table 3). We found no significant difference in the awareness of RDU according to the presence of a healthcare worker in the family of the participant and the participant's or a family member's history of chronic disease. When we looked at the awareness of RDU according to the participants' RDU training status, the participants' awareness of correct information (p=.008), correct drugs (p=.03), correct use (p=.009), and RDU (p=.002), we found a significant difference in the mean scores of the students who received RDU training in all dimensions (33.48 ± 5.88, 15.93 ± 3.24, 13.37 ± 1.89, and 62.78 ± 9.13, respectively), compared with the students who had not received this training (31.99 ± 4.62, 15.15 ± 3.09, 12.76 ±. 2.07, and 59.90 ± 7.85, respectively) (Table 7). When the awareness of rational drug use was examined according to the participants' views of the necessity of RDU training, we found significant difference in the participants' correct information awareness (p=.018), correct drug use (p=0.02), and RDU (p=.015) scores, and in these dimensions, where a significant difference was determined, the awareness of students who considered RDU education necessary (32.52 ± 4.84, 12.98 ± 2.03, and 60.89 ± 8.08, respectively) was higher than among students who did not feel this way (30.84 ± 5.57, 12.29 ± 2.08, and 58.00 ± 8.87, respectively) (Table 8). We determined that the awareness of students who considered RDU education necessary was higher than that of those who did not.

Table 1. Sociodemographic characteristics of the participants

	n (%)
Gender, M / F	218 / 228 (48.9 / 51.1)
Preclinical/clinical student	269 / 177 (60.3 / 39.7)
Health Worker status in the family, Y / N	117 / 329 (26.2 / 73.8)
Chronic Disease Status in Participants, Y / N	30 / 416 (6.7 / 93.3)
Chronic Disease Status in the Family of the Participants, Y / N	159 / 287 (35.7 / 64.3)
Rational Drug Education Status, Y / N	98 / 348 (22 / 78)
The Necessity of Rational Drug Education, Y/N	391 / 55 (87.7 / 12.3)

Abbreviations: M = male, F = female, Y = yes, N = no
Data were presented as number of participants (n) and percentile (%)

Table 2. Comparison of Rational Drug Use Awareness scale and its sub-dimensions by gender

	Male (n=218)	Female (n=228)	*p-value*
Awareness of Correct Information	32.43 ± 4.79	32.20 ± 5.13	.634
Awareness of Correct Drug	15.32 ± 3.06	15.32 ± 3.21	.991
Correct Drug Use	13.14 ± 1.90	12.64 ± 2.16	**.010***
Total Awareness of Rational Drug Use	60.89 ± 7.84	60.16 ± 8.61	.352

Data were presented as mean ± standard deviation
*There is a statistical difference between the both group.

Table 3. Comparison of the Rational Drug Use Awareness scale and its sub-dimensions in pre-clinical and clinical students

	Preclinical student	Clinical student	*p-value*
Awareness of Correct Information	32.07 ± 4.57	32.69 ± 5.48	.198
Awareness of Correct Drug	14.96 ± 3.08	15.87 ± 3.15	**.003***
Correct Drug Use	12.65 ± 2.08	13.27 ± 1.94	**.002***
Total Awareness of Rational Drug Use	59.68 ± 7.90	61.82 ± 8.56	**.007***

Data were presented as mean ± standard deviation.
*There is a statistical difference between the both group.

Table 4. Comparison of the Rational Drug Use Awareness scale and its sub-dimensions according to the presence of a healthcare worker in the family

	Health Worker in the family, Yes	Health Worker in the family, No	*p-value*
Awareness of Correct Information	32.55 ± 5.08	32.23 ± 4.92	.558
Awareness of Correct Drug	15.22 ± 3.27	15.36 ± 3.09	.686
Correct Drug Use	13.08 ± 2.10	12.83 ± 2.02	.256
Total Awareness of Rational Drug Use	60.85 ± 8.43	60.42 ± 8.16	.630

Data were presented as mean ± standard deviation

Table 5. Comparison of the Rational Drug Use Awareness scale and its sub-dimensions according to the presence of chronic disease in the participants

	Chronic disease in the participants, Yes	Chronic disease in the participants, No	*p-value*
Awareness of Correct Information	32.63 ± 4.73	32.29 ± 4.98	.717
Awareness of Correct Drug	15.33 ± 3.08	15.32 ± 3.14	.985
Correct Drug Use	13.30 ± 1.58	12.86 ± 2.07	.258
Total Awareness of Rational Drug Use	61.27 ± 7.79	60.48 ± 8.26	.613

Data were presented as mean ± standard deviation

Table 6. Comparison of the Rational Drug Use Awareness scale and its sub-dimensions according to the presence of chronic disease in the family of the participants

	Chronic Disease Status in the Family of the Participants, Yes	Chronic Disease Status in the Family of the Participants, No	*p-value*
Awareness of Correct Information	32.53 ± 5.05	32.20 ± 4.91	.489
Awareness of Correct Drug	15.21 ± 3.42	15.39 ± 2.97	.564
Correct Drug Use	13.10 ± 1.97	12.78 ± 2.08	.109
Total Awareness of Rational Drug Use	60.84 ± 8.71	60.36 ± 7.95	.552

Data were presented as mean ± standard deviation

Table 7. Comparison of the Rational Drug Use Awareness scale and its sub-dimensions according to the rational drug education status

	Rational Drug Education Status, Yes	Rational Drug Education Status, No	*p-value*
Correct information awareness	33.48 ± 5.88	31.99 ± 4.62	**.008***
Right drug awareness	15.93 ± 3.24	15.15 ± 3.09	**.030***
Correct drug use	13.37 ± 1.89	12.76 ± 2.07	**.009***
Total Rational drug use awareness	62.78 ± 9.13	59.90 ± 7.85	**.002***

Data were presented as mean ± standard deviation.
*There is a statistical difference between the both group.

Table 8. Comparison of the Rational Drug Use Awareness scale and its sub-dimensions according to whether rational drug education is deemed necessary by the participants or not.

	The Necessity of Rational Drug Education, Yes	The Necessity of Rational Drug Education, No	*p-value*
Awareness of Correct Information	32.52 ± 4.84	30.84 ± 5.57	**.018***
Awareness of Correct Drug	15.39 ± 3.15	14.87 ± 2.99	.256
Correct Drug Use	12.98 ± 2.03	12.29 ± 2.08	**.020***
Total Awareness of Rational Drug Use	60.89 ± 8.08	58.00 ± 8.87	**.015***

Data were presented as mean ± standard deviation.
*There is a statistical difference between the both group.

Discussion

In the present study, awareness of RDU was higher in females, clinical students, and those who required RDU education and received such education.

Due to the problems caused by the use of incorrect, unnecessary, ineffective, and high-cost drugs worldwide, studying RDU is among the WHO's most important agenda topics. This study was conducted to measure the knowledge levels and attitudes of SUMF students concerning RDU. In line with this purpose, students studying at SUMF formed the study population. Pre-clinical and clinical students were included within its scope because the study also aimed to determine whether educational status at the university made a difference in terms of RDU. In total, 446 of the 1400 students at SUMF were surveyed.

Based on the results of this study, awareness of correct drug use was significantly higher among female participants. However, it was determined that awareness of correct information and awareness of correct medication did not differ between the sexes. Therefore, no significant difference was found in the total awareness of RDU between the female and male participants.

In this study, unlike other studies, the effect of studying at a medical school on RDU was measured by comparing the knowledge and awareness of pre-clinical and clinical students, which revealed that the education of students in the medical faculty contributed to them to be more careful when using drugs. Although the number of pre-clinical students participating in the study was higher (60.3%), the clinical students exhibited better total awareness of RDU than the pre-clinical students. In addition, it was determined that the clinical students' awareness of correct use and correct drugs were higher than the pre-clinical students. Although there was no difference between the students' awareness of correct information, the general awareness of the clinical students was undeniably higher. These findings indicate that the knowledge and experience gained through medical education help students to use drugs more consciously and accurately.

Another finding of the present study was that 6.7% of the students themselves had chronic diseases, and 35.6% had family members with chronic diseases. The presence of chronic disease in students themselves or their families made no significant difference in their awareness of RDU. Similar to this finding, in a study by Artantas et al., 65% of the adult participants who presented to the family medicine outpatient clinic stated that the person or persons living with them used at least one drug constantly, although no significant relationship was found between chronic drug use in the home and behaviours in accordance with RDU (15).

The education received by physicians about rational drug/antibiotic use both before and after graduation is limited. The rates associated with such education should approach 100%, especially before graduation. However, previous findings have shown that 52.5% of physicians received training on drug/antimicrobial use before graduation, 67.9% received such training after graduation, 63.1% received the training at university, and 60% wanted to receive such training (16). In their study, Heaton et al. reported that medical students (74%) stated that the amount of teaching in this area was "too little" or "far too little" (17).

In the present study, a significant portion of the participants (78%) stated that they had not received training on RDU. However, it was observed that the awareness of students who had received RDU training was higher in every sense than that of students who had not received training. Similarly, in a study conducted among general practitioners, 208 (54.7%) of 380 physicians stated that they could not meet their information needs regarding drugs. Also, when senior medical school students who had received RDU

training were compared with medical faculty seniors and general practitioners who had not received such training, the senior medical students were found more competent in terms of RDU (17).

In the large-scale study conducted by Çöplü et al. that evaluated the rational prescribing of antimicrobials among family physicians and specialists, it was revealed that 68% of physicians had received RDU training after graduation, and 60% wanted to receive such education at their medical faculty during the early stage of their medical career (18). Similarly, 87% of the participants in the present study considered RDU training necessary. According to the results of the study, the students who considered RDU training necessary exhibited higher awareness of correct information, correct use, and overall awareness of RDU, which represents the sum of the dimensions. In the study by Heaton et al. in which 2413 students and recent graduates from 25 medical faculties in the United Kingdom (UK) participated, 74% of the participants reported that the training regarding effective and safe drug use was not sufficient, and 56% reported that the assessments intended to measure their knowledge and skills within the scope of their courses were insufficient. Based on these data, the researchers concluded that medical education in the UK needed to be urgently reviewed (17).

It must be acknowledged that this study had some limitations. First, the study measured students' awareness of RDU at only one medical school. Therefore, the results of this systematic study may not be representative of students from all the regions of Turkiye. In addition, the entire targeted study population could not be reached in this study.

Conclusion

According to the results of this study, awareness of RDU was high in female students, clinical students, and those who required and received RDU education. Thus, it can be inferred that RDU awareness levels and behaviors should be developed in pre-clinical students of both sexes. Effective, formal, and non-formal education opportunities should continue to be used and improved to develop and spread the awareness of RDU.

Compliance with Ethics Guidelines

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

Information Availability

The information sets during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Disclosures

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Informed Consent

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