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RESEARCHING THE LEVELS OF RATIONAL DRUG USE OF INDIVIDUALS*

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ABSTRACT

The aim of this study is to determine the rational drug use levels of the members of the society, which are important components of rational drug use, and the factors affecting the level of rational drug use. The research was designed as a cross-sectional type of field research. The population of the study consists of adults aged 18 and over living in Turkey. The research was conducted with 441 volunteer data. The research data were collected with a questionnaire form consisting of questions about the descriptive characteristics of the participants and the Rational Drug Use Scale. In the analysis of the data, descriptive statistics, Mann-Whitney U test, and Kruskal Wallis tests were used. 65.53% of the participants were female, 63.27% were single, and the mean age was 33.04±13.417. 88.21% of the participants received a scale score of 35 and above, and the average score was 38.08±3.554. The mean scores obtained from the scale, differ significantly according to the employment and income status of the participants, the presence of chronic diseases, and health education. It has been concluded that it is possible to increase the rational drug use level of the society with macroeconomic policies. Increasing employment rates and income levels; It is expected that providing education throughout the society, especially for patients, mothers/women and school-age children, will increase the level of rational drug use.

Keywords: Rational drug use, Rational drug use scale, drug users, Turkey.

1.INTRODUCTION

Medications are the main component of the treatment of many acute and chronic diseases (Ryan & Hill, 2016) and they play a critical role in treating patients and saving lives (Angamo et al., 2011). With the increase in the diversity of diseases and population, there is an increase in the use of drugs for the treatment, prophylaxis and diagnosis of diseases (Ryan & Hill, 2016). Purposes such as treatment or prevention of diseases, relieving symptoms and relieving pain can be achieved when drugs are used correctly (AL Qamariat, 2021). Proper prescription of drugs, which are very important for individual and public health, by physicians (Duta, 2019) and is expected to be used appropriately by patients. However, World Health Organization (WHO) reports and independent study findings show that there are significant problems in this regard (Dutta, 2019; Mekonnen et al., 2021; Ryan & Hill, 2016; World Health Organization, 2024). The WHO states that more than half of all medicines are improperly prescribed, dispensed or sold, and half of patients do not use medicines correctly (World Health Organization-WHO, 2024).

* The ethics committee permission was obtained from İzmir Bakırçay University Non-Interventional Clinical Research Ethics Committee dated 08.05.2024 and numbered 1582 decision.

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Problems related to drugs are defined within the framework of rational drug use. Instead of the concept of rational drug use; Expressions such as responsible use of medicines and prescribing efficiently are also used synonymously (Kshirsagar, 2016). WHO defines rational drug use as "Patients receiving medicines appropriate to their clinical needs, at doses that meet their individual needs, for an adequate period of time, and at the lowest cost for themselves and their communities" (World Health Organization, 2002). According to this definition; the right drugs with quality, safety and effectiveness; It should be accessible, affordable and marketed correctly, and the infrastructure should be suitable for the individual and society (Kshirsagar, 2016). More general explanations of the elements of rational drug use include: 1) appropriate indication based on accurate medical evaluation; 2) appropriate medication, based on efficacy, safety, affordability, and suitability for the patient; 3) Proper dosage, duration of administration and treatment; 4) proper selection of patients on the basis of the absence of contraindications and minimal likelihood of side effects; 5) appropriate drug information for patients, and 6) patient adherence to treatment (Poudel & Nissen, 2018). The main goal of rational drug use is to minimize the cost of drug therapy, prevent preventable adverse drug reactions and drug interactions, and improve the quality of treatment while promoting patient compliance (Mekonnen et al., 2021).

Irrational drug use, which is the opposite of rational drug use, can be defined as the use of drugs in a way that does not comply with the rational use rules defined above (World Health Organization, 2002). Common types of irrational use include failure to prescribe, dispense, and use medications in accordance with guidelines, using too many medications, inappropriate use of antibacterials (antibiotics), overuse where not needed, underuse where necessary, underuse for chronic diseases, overuse of injections, and use of expensive, low-potent, low-safety drugs (Kshirsagar, 2016), the use of too many drugs per patient (polypharmacy), patients taking prescription drugs on their own (self-medication) and using them inappropriately, and not adhering to dosage regimens (World Health Organization, 2024). In addition, irrational drug use has been defined as the use of a particular drug that carries more risk of harm than benefit, especially when safer and more effective options are available for the same condition (Poudel & Nissen, 2018; Spinewine et al., 2007).

While the rational use of drugs increases the quality of health services, irrational use leads to significant problems (World Health Organization, 2006). Irrational drug use is harmful at both individual and societal levels. It leads to unsafe and ineffective treatment, prolongs the duration of the disease, poses a danger to the patient increases treatment costs, and causes the worsening of the disease (Mekonnen et al., 2021). Increased drug side effects can have significant negative effects on patient confidence due to decreased quality of treatment, increased morbidity and mortality, and poor health outcomes (Poudel & Nissen, 2018).

The irrational use of drugs causes a huge financial burden for the patient, the community and the overall health system. In addition to not providing the expected benefit from the expenditures on drugs, additional expenditures may be needed for the treatment of negative health outcomes. In addition, other non-essential medicines such as multivitamins, tonics and cough syrups, which have limited health effects, are prescribed in excessive amounts in developing countries (Garg et al., 2014). Excessive spending on these products is based on essential medicines, which are defined as medicines that meet the priority health care needs of the community (World Health Organization, 2006) and reducing the resources that can be allocated to vaccines and the consumption expenditures of households. It is reported that more than half of the total drug expenditure in Nepal is due to irrational drug use. In India, it was reported that 69.2% of drug expenditures in the private sector and 55.4% of waste in the public sector were due to irrational drug use (Poudel & Nissen, 2018).

In addition to the problems caused by the irrational use of drugs, the inappropriate use of antibiotics causes antibiotic resistance, which is an important public health problem (Chokshi et al., 2019). The Indian study found that more than 60% of prescriptions were inappropriately prescribed antibiotics. Inappropriate prescribing practices include prescribing in cases of viral diarrhoea where simple fluid replacement works better, long-term use of postoperative antibiotics, and the use of broad-spectrum, next-generation antibiotics in cases where simpler forms are sufficient. In addition, the inadequacy of the doses and duration of antibiotics or the tendency of patients to stop taking the drug shortly after providing relief causes an increase in antibiotic resistance (Garg et al., 2014). On the other hand, in most developing countries, there is little regulation on the retail sale of medicines. The easy availability of antibiotics is probably one of the biggest contributors to antibiotic resistance. Antibiotics are often available without a doctor's prescription, which contributes to the overuse of antibiotics due to self-medication and prescription by unqualified health workers (Chokshi et al., 2019).

2.FACTORS AFFECTING THE RATIONAL USE OF DRUGS

There are many factors that contribute to the rational or irrational use of drugs, and these factors affect various stages of the drug management process (Poudel & Nissen, 2018). The main factors affecting the rational or irrational use of drugs; It can be categorized as those caused by patients, prescribers, the supply system including pharmaceutical industry effects, legal regulations, whether information about drugs is correct or incorrect, and combinations of these factors (Chauhan et al., 2018).

The pharmaceutical industry, which provides the production and distribution of drugs, can play an important role in the irrational use of drugs. Pharmaceutical companies, which are heavily campaigning to increase sales volume, can put pressure on physicians to prescribe their own drugs and more drugs by providing support for research and other activities (Sahoo et al., 2010). There are cases where physician groups receive consulting fees and speaking fees from pharmaceutical companies (Garg et al., 2014). Pharmacists, who are important suppliers in the delivery of drugs to patients, can ensure that patients use drugs safely and contribute to the understanding of rational drug use based on patient needs in the selection of drug therapy (Ariea & Scriptures, 2019).

Patients' access to qualified health care is an important factor that determines rational drug use. In situations where access to health services is limited, it is common for people to self-medicate (AL Qamariat, 2021). Again, even if the patient can meet with the physician, short interview times make it difficult to adequately examine the patient's condition and may lead to an increase in the number of prescribed drugs. In addition, the fact that short examination periods limit the opportunity to inform patients about drug use may increase irrational drug use (Sahoo et al., 2010). For example, study findings conducted in different regions of Ethiopia show that the regions with the shortest examination times have the highest number of drugs prescribed per capita. According to other findings of the same study, short examination times lead to treatment failure, low satisfaction of patients with health services, decrease in adherence to treatment and increase in drug side effects (Mekonnen et al., 2021).

Legal regulations regarding the distribution and sale of medicines are another factor affecting rational drug use. In most developing countries, the lack of adequate regulation on the retail sale of drugs spreads irrational drug use. The fact that drugs that should be sold on prescription, especially antibiotics, can be sold without a prescription can cause unconscious and excessive use of drugs (Chokshi et al., 2019). Taking the drug without a doctor's prescription, not having enough information about the drugs, and the drugs dispensed by pharmacists without a doctor's prescription are important determinants of irrational use of the drug (Chauhan et al., 2018).

Beliefs and behaviours of patients/consumers are an important determinant in the irrational use of drugs. There are many consumer-related factors that affect the irrational use of drugs (Porter & Grills, 2016). Some cultural practices and environmental beliefs, fear of drug addiction, lack of health literacy and indifference to health cause treatment non-compliance and irrational drug use (Chauhan et al., 2018). Among the patient-related factors, self-medication is a common problem. Self-medicating; It includes using patients' old prescriptions for their next illnesses, using unfinished medications for emerging health problems, and taking certain medications directly from the pharmacy (Porter & Grills, 2016). In addition, patients can demand the drugs of their choice, creating pressure and influencing the physician's decision (Garg et al., 2014). Sometimes, patients may consult a physician for minor ailments, thinking that there is a medicine for every disease, and they may expect a prescription at the end of each examination (Chauhan et al., 2018).

In this study, it was aimed to determine the rational drug use levels of the members of the society, which are important components of rational drug use, and the factors affecting the level of rational drug use.

3. MATERIALS AND METHODS

The research was designed as a cross-sectional field research from quantitative research methods. The research data were collected through a questionnaire form. The population of the study consists of adults aged 18 and over living in Turkey. In cases where the size of the universe is over 100,000 people, the sample size to represent the universe is 386. 452 individuals participated in the study. Since 11 of the participants were under the age of 18, they were not included in the analysis, and analyses were made with the data of 441 participants.

The research data were collected through a questionnaire form. The surveys were collected according to the preferences of the participants or the possibility of access, face-to-face and online questionnaires created on Google forms. The questionnaire consists of two parts: The first part consists of questions to determine the descriptive characteristics of the participants (age, gender, educational status, income level, presence of chronic disease diagnosed by the physician, regular use of medication, distance from the health institution of the place of residence) and the behaviours of using the drug in the appropriate form, amount and duration in the case of the disease. The second part consists of the Rational Drug Use Scale, which evaluates the level of knowledge about rational drug use.

Rational Drug Use Scale: This scale, which evaluates rational drug use and consists of 21 questions, was developed by Demirtaş et al. (2018). The scale consists of 10 true and 11 false propositions. Answers: yes, no, and I don't know. From the answers given to the scale; Correct answer: 2 points, I don't know: 1-point, wrong answer: 0 points. The total score that can be obtained from the scale is a low of 0 (zero) and a high of 42. The cut-off value for the scale is 34 points, and individuals who score 35 points or more are evaluated as having knowledge of rational drug use. The Crohnbach's alpha value of the original scale was determined as 0.78 (Demirtaş et al., 2018). All the questions in the scale consist of a single sub-dimension (correct and conscious use).

3.1. Statistical Method

The analysis of the data was done with SPSS-23 statistical package program. Descriptive statistics (mean, standard deviation, percentage) were used in the descriptive analysis of the data. The level of rational drug use of individuals was measured by the total score they received from the rational drug use scale. The normal distribution of the data was determined by Skewness (-1.77) and Kurtosis (4.56). In order to meet the normal distribution requirement, these values must be in the range of -1.5 and +1.5. According to the values found, the data do not provide a normal distribution (Tabachnick & Fidell, 2013). In the analysis of whether the level of rational drug use varies according to the

demographic characteristics of the individuals, the Mann-Whitney U test and Kruskal Wallis tests were used. The significance level was taken as $p<0.05$.

3.2. Ethical Aspect of Research

The ethics committee permission was obtained from İzmir Bakırçay University Non-Interventional Clinical Research Ethics Committee dated 08.05.2024 and numbered 1582 decision. In addition, consent was obtained from each individual participating in the survey that they voluntarily participated in the research.

4.RESULTS

The descriptive characteristics of the 441 volunteers evaluated in the study are summarized in Table 1. 65.53% of the participants were female, 63.27% were single and 59.86% were between the ages of 18-29, with a mean age of 33.04±13.417. Students constitute the largest group of participants, and approximately 1/3 of them have received formal health education. Nearly one-third (34.92%) of individuals reported that their income did not cover their expenses. 78.46% of the participants did not have a chronic disease. It is thought that the predominance of young people in the research group has a role in this finding.

Table 1: Descriptive characteristics of respondents

Variable		**n**	**%**
Gender	Woman	289	65.53
	Male	152	34.47
Marital Status	Married	162	36.73
	Single	279	63.27
Age	Average		33.04±13.417
Employment status	Student	133	30.16
	Private sector employee	106	24.04
	Public employee	86	19.50
	Housewife	39	8.84
	Retired	34	7.71
	Unemployed	29	6.58
	Other	14	3.17
Chronic illness	No	95	21.54
	No	346	78.46
Health education	No	302	68.48
	Yes	139	31.52
Income level	My income is less than my expense	154	34.92
	My income is equal to my expense	193	43.76
	My income is more than my expense	94	21.32
Sum		441	100. 00

The drug and health institution usage characteristics of the participants are summarized in Table 2. Among these features, it was questioned whether he used a prescription or non-prescription drug, his regular use of prescription drugs, the status of the first health institution he applied to in case of need, and the distance of his residence address to any health institution. While 32.65% of the participants used a prescription drug, 31.29% reported using an over-the-counter drug. Those who do not regularly use prescription drugs account for more than a quarter of the total. About one-fifth of the respondents stated that they apply to third-level health institutions (education and research and university hospitals)

if they have a health problem, and only 5.22% reside more than 10 km away from any health institution.

Table 2: Drug and health institution usage characteristics of the participants

Variable		**n**	**%**
Use of prescription drugs	Yes	144	32.65
	No	297	67.35
Regular use of prescription drugs	Yes	324	73.47
	No	117	26.53
Use of medicines without a prescription	No	303	68.71
	Yes	138	31.29
The first health institution to apply	Family physician	186	42.18
	Public hospital	156	35.37
	Training and research hospital	51	11.56
	University hospital	25	5.67
	Other	23	5.22
Distance to the medical institution	Less than 1 km	198	44.90
	Between 1-10 km	220	49.89
	More than 10 km	23	5.22
Sum		441	100.00

The rational drug use levels of the participants are shown in Table 3. Most of the participants (88.21%) scored 35 and above, and it was determined that the level of rational drug use was high.

Table 3: Rational drug use level of participants

Rational drug use level	**n**	**%**
34 and under	52	11.79
35 and above	389	88.21
Sum	441	100.00

In Table 4, the average scores of the participants' answers to the statements in the rational drug use scale are given. Among the scale items, the most correctly answered statement is the 4th item, "Drugs may have negative effects as well as positive effects". Again, the 12th and 17th statements were answered correctly at a high rate and scored above 1.95. On the other hand, the statement "Herbal products can be used instead of medicines" in item 9 is the least correctly answered question. The statements "We can stop using medication when we feel well during treatment" (item 13) and "There is no harm in recommending medication to a relative with similar complaints" (item 2), which are the second lowest scores, reflect a very risky situation in terms of rational drug use and antibiotic resistance.

Table 4. Participants' answers to the rational drug use level scale

Number	Expression	Mean ±SS
1	Only physicians can prescribe medication.	1.74±0.625
2	There is no harm in recommending medication to a relative with similar complaints.	1.68±0.639
3	When we get sick, the doctor determines whether we need medication.	1.95±0.289
4	Drugs can have negative effects as well as positive effects.	1.98±0.189
5	All drugs produce the same side effects.	1.89±0.412
6	It is not harmful to take the drug more often than the time intervals specified by the doctor	1.81±0.538
7	It can be learned from the instructions for use that the drugs should be taken on an empty or full stomach.	1.73±0.621
8	Failure to use the drug for the duration of treatment specified by the doctor may interfere with recovery.	1.83±0.533
9	Herbal products can be used as a substitute for medicines	1.29±0.859
10	There is no harm to health by consuming herbal products as much as desired.	1.76±0.527
11	When we see any undesirable effects while taking medication, we should consult our doctor.	1.95±0.293
12	While our physician is arranging our treatment, we should inform the drugs we are still using.	1.97±0.226
13	When we feel well during treatment, we can stop using medication.	1.57±0.751
14	We can ask our pharmacist where we should store our medicines at home.	1.84±0.501
15	The duration of treatment of each drug is equal to each other	1.92±0.328
16	Herbal products are completely harmless	1.75±0.525
17	Medicines can be used in the same amount in all age groups	1.96±0.209
18	Using a sufficient number of drugs, not using a large number of drugs, allows us to recover.	1.83±0.521
19	Drugs that are more expensive are more effective	1.88±0.373
20	Every drug can be used safely during pregnancy	1.93±0.277
21	Some drugs have addictive properties.	1.84±0.431
Sum		38.08±3.554

Whether there is a difference between the level of Rational Drug Use according to the descriptive characteristics was examined by Mann-Wihtney U and Kruskal Wallis analyses and given in Table 5. In the compared groups, the average level of rational drug use; It was found to be higher in women, married women and those with a graduate education level compared to their counterparts. However, this difference was not statistically significant. The difference between the mean levels of rational drug use in the groups of employment status, health education, presence of chronic diseases and income status was significant ($p<0.05$).

Table 5. Investigation of the difference between rational drug use levels according to descriptive characteristics

Variable		**n**	**Mean ±SS**	**Mean Rank**	**P Value**
Gender	Woman	289	38.16±3.392	221,893	0.838
	Male	152	37.92±3.851	219,303	
Marital Status	Married	162	38.22±3.659	37078,500	0.318
	Single	279	38.00±3.496	60382,500	
Employment status	Student	133	37.41±3.846	194,906	**0.046***
	Housewife	39	37.54±4.185	201,103	
	Public employee	86	38.71±3.528	251,436	
	Private sector employee	106	38.62±2.713	233,896	
	Retired	34	38.29±3.148	224,147	
	Unemployed	29	38.00±3.694	226,776	
	Other	14	37.57±4.450	220,107	
Education	Primary	28	38.11±3.304	216,714	0.139
	Secondary	19	36.68±5.132	188,026	
	High school	83	38.04±3.546	219,404	
	License	244	37.93±3.608	215,061	
	Graduate	67	39.04±2.722	255,746	
Health education	No	302	37.86±3.622	211,675	**0.022***
	Yes	139	38.55±3.367	241,259	
Chronic disease	Yes	95	38.77±2.853	244,732	**0.039***
	No	346	37.89±3.705	214,484	
Income	Income is less than expense	154	37.55±4.042	206,84	**0.006***
	Income equals expense	193	38.01±3.397	214,56	
	Income is more than expense	94	39.09±2,746	257,41	

*p<0.05, significant difference.

Tamhane test, one of the post-hoc tests, was used to examine the difference between the mean scores of rational drug use levels in the employment status and income status groups. It was found that the difference between income status groups was due to those whose income was more than expenditure. Although there was a significant difference between the mean scores of rational drug use level according to the study status, the difference between the groups could not be confirmed in the Tamhane test (p>0.05).

5.DISCUSSION

Rational drug use is a very important issue in terms of its impact on individual and public health, and the effective use of resources allocated to health throughout the country. There are many factors that affect rational drug use, including the legal regulations on drugs in the country, the effects of the distribution channel and the pharmaceutical industry, the quality of health services, and the attitude of physicians and pharmacists. However, the correct use of outpatient and over-the-counter drugs depends on the rational drug use level of the patients/society receiving the drug. For this reason, it is thought that the level of knowledge and sensitivity of individuals in the society has a special place in the effective and efficient use of drugs. According to the findings of the research, the fact that the rate of over-the-counter drug use (31.29%) is close to prescription drug use (32.65%) shows that the level of knowledge of people is important.

As a result of the research, it was found that 88.21% of the participants had sufficient rational drug use level (35 points and above) and the average score was 38.08±3.554. In the Uçman and Uysal's study, it was found that the rational drug use level was 75.42% of the total and the average score was 37.19 ± 4.61 (Uçman & Uysal, 2021). In the original study in which the scale was developed, the average score was 33.6±6.2 (Demirtaş et al., 2018). In this study, the level of rational drug use is higher in terms of average score and percentage. Although there was no significant difference between the education levels and the rational drug use scale scores, it is thought that the majority (70%) of those who received undergraduate and graduate education may have a role in this result. As a matter of fact, the results of other studies in the literature have found that as the level of education increases, the level of rational drug use increases (Akyol Güner et al., 2020; Demirtaş et al., 2018; Macit et al., 2019; Uçman & Uysal, 2021).

As a result of the research, it was found statistically significant that individuals with chronic diseases had a higher level of rational drug use than those without it. Other studies also (Kan & Sevim, 2023; Özkan & Aca, 2020) has reached a similar conclusion. It is thought that the fact that those with chronic diseases are more likely to use drugs continuously and make more physician visits may have a role in this finding. On the other hand, in the study of Uçman and Uysal (2021), it was found that there was no difference between the rational drug use levels of those with and without chronic diseases.

Another variable with a significant difference in the study is whether or not to have received a health education. As expected, the level of rational drug use in health education areas was found to be higher. In the study conducted with the same scale (Uçman & Uysal, 2021) This finding has also been confirmed. From this point of view, it is possible to evaluate that general health education also contains sufficient information about rational drug use. In a study conducted by Akyol Güner et al. (2020) in diabetic patients, they found that the level of rational drug use was high in those who received diabetes education. This finding shows that apart from formal education, education on diseases can also contribute to rational drug use.

6.CONCLUSION

In the study, it was found that the level of rational drug use did not show a significant difference from the characteristics of the users according to the variables of age, gender and marital status. These factors are factors that cannot be changed. On the other hand, it is seen that the presence of chronic diseases, employment status, education, health education and income level affect the rational drug use levels of individuals. Although the presence of chronic disease is not a desirable feature, this variable has been associated with frequent physician visits and knowledge of medications.

Based on the findings of the study, it is possible to reach the conclusion that the rational drug use level of the society can be improved with macro policies. It seems possible to increase the rational drug use level of the society by increasing employment rates, income, general education and health education. WHO also calls for the need for training to increase the level of rational drug use "Public education on the appropriate use of medicines is necessary because without it, people lack the knowledge and skills needed to make informed decisions." It has been stated that these trainings should include the appropriate use of prescription or over-the-counter drugs, including non-drug treatments (World Health Organization, 2006). Pandey and Chaudhari (2017) conducted a randomized controlled experiment; It has been shown that the trainings given on generic drugs, drug use during pregnancy, breastfeeding and children, precautions in the use of drugs in kidney and liver disease, and the use of antibiotics provide a significant improvement in the correct level of knowledge of the public.

It has been proposed that the trainings be provided primarily to the three categories of people who can make a difference: patients who use medicines and thus improve compliance, women and mothers

who play an important role in the health care of the family, and finally, school children, who are future citizens who must have a correct perception of the use of medicines (Pandey & Chaudhari, 2017; World Health Organization, 2006). Training can be given through a wide range of films such as street plays, patient information brochures, seminars for the general public, posters, comics, radio/TV programs, newspaper and magazine articles, songs, and documentaries (World Health Organization, 2006).

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