

The Level of Knowledge, Behaviors, and Attitudes on Rational Use of Drugs of Patients Who Applied to the Family Health Center in Istanbul, Türkiye: A Cross-Sectional Study

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Abstract

Background: This study, it was aimed to determine the level of knowledge, attitudes, and behaviors of patients who applied to a family health center about the rational use of drugs. Irrational use of drugs is a major problem worldwide. WHO reports that half of the patients do not use their drugs correctly. **Methods:** This cross-sectional study was conducted between 1 October 2017 and 30 November 2018 at Istanbul Fatih Family Health Center No 7. The sample size was determined as 301 people selected by systematic sampling method from patients aged 18 and older. **Results:** The mean age of the participants was 53.8% ± 16.8%, 59.8% were female, 62.5% were married, and 52.5% were primary school graduates. 63.9% of the participants knew the names of the drugs they used, and 79.9% of them knew the indication for use. 89% of individuals check the expiry date of the drugs before using them, and 83.1% read the drug prospectus. 84% of the participants support the prohibition of using over-the-counter drugs. **Conclusion:** The level of knowledge of the participants about the rational use of drugs is above the societal average. However, some issues need more awareness. The high level of rational use of drugs awareness of physicians and pharmacists will also strengthen the rational use of drugs and indirectly increase the awareness of the public.

Keywords

Rational Use of Drugs, Irrational Use of Drugs, Family Health Center, Over-The-Counter Drugs

1. Introduction

The rational use of drugs (RUD) was defined for the first time by the World Health Organization (WHO) at a meeting held in Nairobi in 1985. The definition was “patients use medications appropriate for their clinical needs in doses that meet their personal needs, for an adequate period, at the lowest cost to themselves and society”. The term RUD covers the entire process from drug production to waste disposal [1].

Irrational use of drugs (IUD) is a major problem worldwide. WHO reports that more than half of the drugs used are inappropriately prescribed, dispensed, or sold, and estimates that half of the patients do not use their medication correctly [2] [3]. Overusing, underusing, or misusing drugs causes a waste of limited resources and health problems. The increased medicine use, the inappropriate use of antimicrobials in the treatment of non-bacterial infections, the overuse of injections instead of oral formulations, prescribing without following clinical guidelines, self-medication, and not paying attention to doses of medications are the main examples of IUDs [4]. IUDs can cause drug resistance, a decrease in treatment success, an increase in treatment costs, an increase in side effects, a decrease in medicine stocks, and an increase in morbidity and mortality [5].

Pharmaceutical expenditures have an important share in health expenditures. In 2019, per capita, retail pharmaceutical expenditure in OECD countries averaged USD 571 [6]. According to 2017 data, the share of pharmaceutical expenditures in health expenditures in 33 OECD countries, including Türkiye, was 16.3% \pm 5.9%. The share of Türkiye’s pharmaceutical expenditures in health expenditures is 16%, which is close to the OECD average [7].

Our country is geographically located at the intersection of Europe, Asia, and the Middle East. Therefore, it shares many similarities in terms of socioeconomic and sociocultural aspects with many countries in this region. The latest studies on RUD have shown progress in raising awareness in Western countries. More research is needed on RUD in Middle East and Asian countries. We believe that our study will make a significant contribution by showing the stage at which Türkiye stands in terms of RUD.

In our country, family health centers are the first place where patients come into contact with the health system, therefore family health centers have an important role in RUD. Being aware of the mistakes that can be made by irrational drug use in advance is important in terms of preventing misuse. This study was conducted to evaluate the level of knowledge, attitudes, and behaviors about RUD of individuals who applied to a family health center (FHC) in Istanbul.

2. Methods

The population of this cross-sectional study consists of 11,012 patients registered in FHC No 7 in the Fatih District of Istanbul. The sample size was calculated as 274 patients who applied to the FHC with a 95% confidence interval (Type I error 0.05, power 0.80), with an error of \pm 5%, assuming that the RUD rate would

be 25%. Considering that there may be data loss, 301 patients were included. A systematic sampling method was used in sample selection. Among the people who registered to the FHC from the numerator, individuals whose registration numbers were five and multiples of five were included in the study. The study was carried out between 01.10.2017 and 30.11.2018.

The data were collected using a face-to-face interview technique and a questionnaire form. The survey questions were designed by the authors. A comprehensive relevant literature search on the subject was consulted when preparing the questions [8] [9] [10] [11] [12]. The validity and reliability of the survey have not been tested. The questionnaire form consists of 7 questions evaluating individuals' sociodemographic and socioeconomic status, and 20 questions examining drug use status.

After the informed consent form was read to the participants, written consent was obtained and a survey was conducted. Ethics committee approval (Date: 23.08.2017 Decision No: 914) was received from the Istanbul University Faculty of Medicine Clinical Research Ethics Committee.

IBM SPSS Statistics 21.0 package program licensed by Istanbul University was used in statistical analysis. Descriptive statistics are shown as numbers (n) percentages (%). The conformity of the data to the normal distribution was evaluated with the Kolmogorov-Smirnov test. The Mann-Whitney U test was used for the statistical comparison of the obtained data, and Chi-Square and Fisher Exact tests were used for categorical $p < 0.05$ was considered significant at the 95% Confidence Interval for statistical significance.

3. Results

Out of the 301 participants included in our study, 180 are female and 121 are male. The mean age of the participants is 53.8 ± 16.8 . 188 are married, while 113 are single. The majority have an elementary school education (158 patients, 52.5%). Of the participants, 109 are housewives and 105 are retired. 78.7% of the participants (237 patients) have a monthly income in the range of 400 - 1400 USD. The demographic and socioeconomic characteristics of the participants are shown in **Table 1**.

72.8% of the individuals (219 patients) who applied to the FHC have at least one drug that they must take regularly. Out of these 219 individuals, 140 know the names of all the drugs they use, while 10 of them know the names of some of the drugs. 175 patients (79.9%) know the indications of all the drugs they use. Among the 209 individuals who have unnecessary drugs at home, 183 have obtained these drugs with a prescription, stating that they are leftover from previous treatments. 115 patients store leftover drugs for later use, while 80 say they would dispose of them. 226 patients stated that they would seek medical help as the first step when they get sick. Out of the 97 patients who discontinued treatment prematurely, 83 cited "recovery" as the reason. Among the 112 patients who use over-the-counter (OTC) drugs, 70 mentioned they use them because they have worked before. The majority of participants indicated that they seek

information about medications from physicians or pharmacists and they also mentioned that they would consult a healthcare institution or physician if they experience medication-related side effects. 268 patients mentioned that they check the expiration date when using medication and 250 patients stated that they read the prospectus. The rate of regular use of drugs increases as the level of education increases ($\chi^2 = 19.951$, $df = 3$, $p < 0.001$). The mean age of the individuals in the group of regular use of the drug was higher than the group of irregular use of the drug (Mann Whitney U = 3103.5 $p < 0.001$). Drug use status, level of knowledge, behaviors, and attitudes of the patients are shown in **Table 2**.

Table 1. Demographic and socioeconomic characteristics of the patients (n = 301).

Variable	Frequency (n)	Percentage (%)
Sex		
Female	180	59.8
Male	121	40.2
Age (years)		
25 and younger	21	7.0
25 - 34	30	10.0
35 - 44	35	11.6
45 - 54	51	16.9
55 - 64	71	23.6
65 and older	93	30.9
Marital status		
Married	188	62.5
Single	113	37.5
Level of education		
Illiterate	10	3.3
Literate	12	4.0
Primary school	158	52.5
Secondary school	61	20.3
College and above	60	19.9
Profession		
Housewife	109	36.2
Retired	105	34.9
Laborer	34	11.3
Unemployed	19	6.3
Self-employed	17	5.6
Student	11	3.7
Civil servant	6	2.0
Monthly Income (USD)		
400 and below	51	16.9
400 - 1400	237	78.7
1400 and above	13	4.3

Table 2. Drug use status, level of knowledge, behaviors, and attitudes of the patients (n = 301).

Variables	n (%)
The presence of routine drug usage	
Yes/No	219 (72.8)/82 (27.2)
Awareness of trade names of drugs	
Yes/No/Some of them	140 (63.9)/69 (31.5)/10 (4.6)
Knowing the indication of drugs prescribed	
Yes/No/Some of them	175 (79.9)/31 (14.2)/13 (5.9)
Storage of unnecessary drugs at home	
Yes/No	209 (69.4)/92 (30.6)
Types of unnecessary drugs*	
Analgesics	188 (90.0)
Decongestants and cold	112 (53.6)
Dyspeptic	66 (31.6)
Antipyretics	49 (23.4)
Topical	13 (13.9)
Vitamin supplies	27 (12.9)
Antibiotics	25 (12.0)
Cough syrup	22 (10.5)
Others	29 (6.2)
Ways of supply of unnecessary medications*	
By prescription	183 (87.6)
Consulting the pharmacist	58 (28.8)
Remaining from previous treatment	10 (4.8)
Methods of keeping the medications*	
In a drawer	112 (37.2)
In a refrigerator	84 (27.9)
In a special box	67 (22.3)
In a medicine cabinet	41 (13.6)
In a bag	37 (12.3)
Others	4 (1.3)
Methods of management of remaining drugs*	
I save it for later use	115 (38.2)
I throw it in the trash	80 (26.6)
No leftover drugs	55 (18.3)
I return it to the pharmacist	48 (15.9)
I give it to the health institution	35 (11.6)
I give it to my relatives	8 (2.7)
Others	9 (3.0)

Continued

Ways of the first presentation in case of sickness*	
I am applying to a health institution	226 (75.1)
I apply complementary/traditional methods	80 (26.6)
I use medicines in hand	70 (23.3)
I don't need treatment	28 (9.3)
I consult my pharmacist	1 (0.3)
I consult my family or relatives	2 (0.7)
Others	7 (2.3)
Discontinuing the treatment	
Yes/No	97 (32.2)/204 (67.8)
Reasons for discontinuing the treatment*	
Recovery	83 (85.6)
Forgetting	8 (8.2)
Side effects	7 (7.2)
Others	1 (1.0)
Taking OTC drug	
Yes/No	112 (37.2)/189 (62.8)
Reasons for taking OTC drugs *	
It worked before	70 (62.5)
To avoid paying the inspection fee	17 (15.2)
I don't have enough time	14 (12.5)
Not covered by social insurance	5 (4.5)
Relatives recommendations	5 (4.5)
Overtime	4 (3.6)
Others	8 (7.1)
Classification of OTC drugs*	
Analgesics	74 (66.1)
Decongestants and cough	34 (30.4)
Cardiovascular	11 (9.8)
Topical	9 (8.0)
Dyspeptic	8 (7.1)
Vitamin supplies	6 (5.4)
Antipyretics	4 (3.6)
Others	14 (12.5)
Source of information on drugs used*	
Physician	191 (63.5)
Pharmacist	139 (46.2)

Continued

Prospectus	38 (12.6)
Relatives	15 (5.0)
Websites	7 (2.3)
Nobody	3 (1.0)
Nurse/Paramedic	2 (0.7)
Management of side effects*	
I am applying to a health service/physician	215 (71.4)
I stop using	54 (17.9)
Never seen	41 (13.6)
I consulted the pharmacist	20 (6.6)
I keep using	11 (3.7)
Others	8 (2.7)
Checking the expiration date	
Yes/No	268 (89.0)/33 (11.0)
Reading the prospectus	
Yes/No	250 (83.1)/51 (16.9)
Supporting the OTC drug ban	
Yes/No/Both yes and no	253 (84.0)/39 (13.0)/9 (3.0)

*More than one response has been received. OTC: Over-the-counter.

The awareness rate of the trade name of a routinely used drug in married people is higher than in single people ($\chi^2 = 4.928$, $df = 1$, $p = 0.026$). As the education level increases, the rate of awareness of the drug's trade name is higher ($\chi^2 = 27.201$, $df = 3$, $p < 0.001$). As the level of education increases, the rate of knowing the indications for using drugs also increases ($\chi^2 = 18.837$, $df = 3$, $p < 0.001$). The average age of the group who knew the trade name of the drugs they used was lower than the individuals who did not (Mann Whitney $U = 3226.5$ $p < 0.001$).

The rate of storage of unnecessary drugs at home in women is significantly higher than in men ($\chi^2 = 12.794$, $df = 1$, $p < 0.001$). As the level of education increases, the rate of storage of unnecessary drugs at home also increases ($\chi^2 = 5.118$, $df = 1$, $p = 0.024$). The average age of the individuals in the group who have unnecessary drugs at home is lower than those who do not (Mann Whitney $U = 7206$ $p = 0.001$).

87.6% of the participants supplied the drugs with a physician's prescription. The rate of obtaining these drugs with a physician's prescription is significantly higher in women than men ($\chi^2 = 7.807$, $df = 1$, $p = 0.005$). As the level of education increases, the rate of obtaining medication with a physician's prescription is low ($\chi^2 = 12.020$, $df = 1$, $p = 0.001$). The mean age of the individuals in the group that supplied drugs with a prescription was higher than the group that supplied OTC drugs (Mann Whitney $U = 1239.5$ $p < 0.001$). Individuals with a college

and above education level constitute the group with the highest tendency to obtain their drugs by consulting the pharmacist with a rate of 45.8% ($\chi^2 = 10.923$, $df = 3$, $p = 0.012$).

The use of complementary/traditional methods (CTM) is higher in women than in men ($\chi^2 = 10.471$, $df = 1$, $p = 0.001$). The mean age of the individuals in the group using CTM is higher than the individuals who do not (Mann Whitney $U = 7369$ $p = 0.027$). The rate of using the drugs in hand when they got sick was significantly higher in women than in men ($\chi^2 = 13.369$, $df = 1$, $p < 0.001$). As the income level increases, the rate of using the drugs in hand decreases ($\chi^2 = 4.840$, $df = 1$, $p = 0.028$).

The mean age of the individuals in the group who left the treatment early was higher than the individuals who did not (Mann Whitney $U = 7308$ $p < 0.001$). Among participants, in the retirees group, the habit of completing treatment is more pronounced compared to other groups ($\chi^2 = 19.854$ $df = 6$, $p = 0.003$). In the group of non-literate individuals, the tendency not to take OTC drugs is more pronounced compared to the other groups ($\chi^2 = 17.399$ $df = 63$ $p = 0.001$). The mean age of the individuals in the group taking OTC drugs was lower than the individuals who did not (Mann Whitney $U = 7642.5$ $p < 0.001$).

As the level of income increases, the rate of getting information about drugs from the pharmacist is getting higher ($\chi^2 = 7.537$, $df = 1$, $p = 0.006$) the rate of getting information from friend/neighbor is lower ($\chi^2 = 9.271$, $df = 1$, $p = 0.002$). The average age of the individuals in the group who received information from the websites was lower than the individuals who did not (Mann Whitney $U = 423.5$ $p = 0.008$).

As the education level increases, the rate of applying to a physician/health institution is higher ($\chi^2 = 4.385$, $df = 1$, $p = 0.036$). The mean age of the individuals in the group who applied to a physician/health institution is higher than the individuals who did not apply (Mann Whitney $U = 6826$ $p = 0.011$). Continuing to use the drug when side effects are seen is more common in men and married people ($\chi^2 = 4.959$, $df = 1$, $p = 0.026$) ($\chi^2 = 4.814$, $df = 1$, $p = 0.028$).

The rate of checking the expiration date is higher in women than in men ($\chi^2 = 8.469$, $df = 1$, $p = 0.004$). As in checking the expiry date of the drug, reading the prospectus is higher in women ($\chi^2 = 8.86$, $df = 1$, $p = 0.003$).

As the level of education increases, the rate of supporting the prohibition of taking OTC drugs is lower ($\chi^2 = 5.447$, $df = 1$, $p = 0.020$). As the level of income increases, the rate of supporting the prohibition of taking OTC drugs is higher ($\chi^2 = 5.613$, $df = 1$, $p = 0.013$). The mean age of the individuals in the group that supports the prohibition of taking OTC drugs is higher than the individuals who do not (Mann Whitney $U = 3679$ $p = 0.011$) (Table 3, Table 4).

Some individuals said they both supported and did not support it. The most common answer they give is “*Let high-risk drugs such as antibiotics and sedatives be under the physician’s control, but low-risk drugs such as analgesics or vitamins can be bought without a prescription*”.

Table 3. Relationship between drug usage status, knowledge level, attitude, and age averages with socio-demographic characteristics.

			n (%)		χ^2	df	p
			Yes	No			
Presence of continuous medication	Education	Illiterate	9 (90.0)	1 (10.0)	#####	3	<0.001
		Primary/Elementary school graduate	137 (80.6)	33 (19.4)			
		High school graduate	42 (68.9)	19 (31.1)			
		University/College graduate	31 (51.7)	29 (48.3)			
Knowledge of commercial name of medication	Marital status	Married	97 (72.4)	37 (27.6)	4.928	1	0.026
		Single	43 (57.3)	32 (42.7)			
	Education	Illiterate	2 (22.2)	7 (77.8)	#####	3	<0.001
		Primary/Elementary school graduate	79 (60.8)	51 (39.2)			
High school graduate		31 (75.6)	10 (24.4)				
To know the indication to use the medication	Education	University/College graduate	28 (96.6)	3.4 (29.0)	#####	3	<0.001
		Illiterate	4 (44.4)	5 (55.6)			
		Primary/Elementary school graduate	105 (82.7)	22 (17.3)			
		High school graduate	37 (90.2)	4 (9.8)			
Keeping extra medication at home	Gender	Female	139 (77.2)	41 (22.8)	#####	1	<0.001
		Male	70 (57.9)	51 (42.1)			
	Education	Illiterate	6 (60.0)	4 (40.0)	5.118	1	0.024
		Primary/Elementary school graduate	111 (65.3)	59 (34.7)			
		High school graduate	44 (72.1)	17 (27.9)			
	Occupation	University/College graduate	48 (80.0)	12 (20.0)	#####	6	0.004
		House-Wife	84 (77.1)	25 (22.9)			
		Worker	23 (67.6)	11 (32.4)			
		Officer	3 (50.0)	3 (50.0)			
		Student	10 (90.9)	1 (9.1)			
Requesting prescription from doctor	Education	Retired	59 (56.2)	46 (43.8)	7.807	1	0.005
		Unemployed	16 (84.2)	3 (15.8)			
		Self-employed	14 (82.4)	3 (17.6)			
		Female	128 (92.1)	11 (7.9)			
Requesting prescription from doctor	Education	Male	55 (78.6)	15 (21.4)	12.20	1	0.001
		Illiterate	6 (100.0)	0 (0.0)			
		Primary/Elementary school graduate	105 (94.6)	6 (5.4)			
		High school graduate	35 (79.5)	9 (20.5)			
Requesting prescription from doctor	Education	University/College graduate	37 (77.1)	11 (22.9)			

Continued

Consulting a pharmacist for meds	Education	Illiterate	2 (33.3)	4 (66.7)	#####	3	0.012
		Primary/Elementary school graduate	22 (19.8)	89 (80.2)			
		High school graduate	12 (27.3)	32 (72.7)			
		University/College graduate	22 (45.8)	26 (54.2)			
Using herbal/Traditional methods	Gender	Female	60 (33.3)	120 (66.7)	#####	1	0.001
		Male	20 (16.5)	101 (83.5)			
Using medication at home when sick	Gender	Female	55 (30.6)	125 (69.4)	#####	1	<0.001
		Male	15 (12.4)	106 (87.6)			
	Monthly income	Minimum wage and below	17 (33.3)	34 (66.7)	4.840	1	0.028
		1405 - 4999 tl	52 (21.9)	185 (78.1)			
		5000 tl and above	1 (7.7)	12 (92.3)			
Discontinuing treatment early	Occupation	House-wife	32 (29.4)	77 (70.6)	#####	6	0.003
		Worker	15 (44.1)	19 (55.9)			
		Officer	2 (33.3)	4 (66.7)			
		Student	6 (54.5)	5 (65.5)			
		Retired	22 (21.0)	83 (79.0)			
		Unemployed	10 (52.6)	9 (47.4)			
		Self-employed	10 (58.8)	7 (41.2)			
Buying OTC medication	Education	Illiterate	2 (20.0)	8 (80.0)	#####	3	0.001
		Primary/Elementary school graduate	48 (28.2)	122 (71.8)			
		High school graduate	32 (52.5)	29 (47.5)			
		University/College graduate	30 (50.0)	30 (50.0)			
Seeking medication information from a pharmacist	Monthly income	Minimum wage and below	14 (27.5)	37 (72.5)	7.537	1	0.006
		1405 - 4999 tl	118 (49.8)	119 (50.2)			
		5000 tl and Above	7 (53.8)	6 (46.2)			
Seeking medication information from friends/Neighbors	Monthly income	Minimum wage and below	7 (13.7)	44 (86.3)	9.271	1	0.002
		1405 - 4999 tl	8 (3.4)	229 (96.6)			
		5000 tl and above	0 (0.0)	13 (100.0)			
Continuing to use the medication when side effects occur	Education	Illiterate	6 (60.0)	4 (40.0)	4.385	1	0.036
		Primary/Elementary school graduate	116 (68.2)	54 (31.8)			
		High school graduate	44 (72.1)	17 (27.9)			
		University/College graduate	49 (81.7)	11 (18.3)			
Seeking medical attention when side effects occur	Gender	Female	3 (1.7)	177 (98.3)	4.959	1	0.026
		Male	8 (6.6)	113 (93.4)			
	Marital status	Married	10 (5.3)	178 (94.7)	4.814	1	0.028
		Single	1 (0.9)	112 (99.1)			

Continued

Checking the expiration date	Gender	Female	168 (93.3)	12 (6.7)	8.469	1	0.004
		Male	100 (82.6)	21 (17.4)			
	Education	Illiterate	7 (70.0)	3 (30.0)	9.148	3	0.027
		Primary/Elementary school graduate	147 (86.5)	23 (13.5)			
		High school graduate	59 (96.7)	2 (3.3)			
		University/College graduate	55 (91.7)	5 (8.3)			
Reading the patient information leaflet (package insert)	Gender	Female	159 (88.3)	21 (11.7)	#####	1	0.003
		Male	91 (75.2)	30 (24.8)			
	Education	Illiterate	4 (40.0)	6 (60.0)	#####	3	0.013
		Primary/Elementary school graduate	142 (83.5)	28 (16.5)			
		High school graduate	54 (88.5)	61 (11.5)			
		University/College graduate	50 (83.3)	60 (16.5)			
Supporting ban on over-the-counter medication	Education	Illiterate	10 (100.0)	0 (0.0)	5.447	1	0.020
		Primary/Elementary school graduate	149 (89.8)	17 (10.2)			
		High school graduate	49 (81.7)	11 (18.3)			
		University/College graduate	45 (80.4)	11 (19.6)			
	Monthly income	Minimum wage and below	38 (77.6)	11 (22.4)	5.613	1	0.018
		1405 - 4999 tl	203 (87.9)	28 (12.1)			
		5000 tl above	12 (100.0)	0 (0.0)			

Table 4. Relationship between drug usage status, knowledge level, attitude, and age averages.

	Mean \pm standard deviation		U	p
	Yes	No		
Presence of continuous medication	59.2 \pm 14.3	39.5 \pm 14.5	3103.3	<0.001
Knowledge of commercial name of medication	56.5 \pm 14.7	63.9 \pm 12.1	3226.5	<0.001
Keeping extra medication at home	51.6 \pm 17.2	58.8 \pm 14.8	7206	0.001
Requesting prescription from doctor	46.7 \pm 15.2	35.8 \pm 16.6	1239.5	<0.001
Consulting a pharmacist for meds	43.3 \pm 17.4	45.5 \pm 14.7	3383	0.011
Using herbal/Traditional methods	48.0 \pm 14.4	42.9 \pm 16.5	7369	0.027
Discontinuing treatment early	48.4 \pm 17.5	45.6 \pm 15.4	7308	<0.001
Buying over-the-counter medication	49.0 \pm 16.9	56.7 \pm 16.1	7642.5	<0.001
Seeking medication usage information online	37.4 \pm 10.4	54.2 \pm 16.8	423.5	0.008
Seeking medical help for side effects	53.7 \pm 15.1	41.1 \pm 15.1	6826	0.011
Supporting ban on over-the-counter medication	45.4 \pm 17.2	41.0 \pm 11.3	3679	0.011

4. Discussion

72.8% of the individuals in our study have at least one medicine they use routinely. Similarly, in the study carried out by Ertemur [11], it was reported that

80.5% of individuals have routine medication.

In our study, 31.5% of the individuals who use their medication routinely do not know the trade names of the drugs they use and 14.2% of them do not know for what indication they use the medication. In the study conducted by Gelayee and Mekonnen [13], it was stated that 51.2% of the patients correctly remembered the trade name of the medicine they used, and 54.2% knew the reasons for taking the medications.

In our study, 69.4% of individuals have at least one unnecessary drug at home. In the study conducted by Dağtekin *et al.* [14], the rate of individuals who have never used or leftover drugs in their homes is 81.1%. The rate of having unnecessary drugs at home is high among those with high educational status, young people, women, and housewives. This high rate of housewives may be because they spend more time at home.

87.6% of the people in our study supply their unnecessary drugs through a physician's prescription, and 28.8% through consultation with a pharmacist. In a study conducted by Mete and Unal [15], it was found that 67.5% of the participants supplied unnecessary drugs by prescription. In the study of Pujari *et al.* [16], similar to our study, it was reported that 61% of the patients use the medicine with the advice of a physician, 18% use it after consulting a pharmacist, and 15% use it according to the recommendation of friends/family. The fact that most of the drugs purchased in our country are subject to prescription may explain why patients supply drugs with such a high rate of prescription.

38.2% of the individuals in our study keep the drugs left after the treatment, and 26.6% throw them away. In a study conducted in Saudi Arabia, a significant proportion of the participants (79.15%) disposed of their leftover drugs with household waste, while a small proportion of the participants (1.7%) returned the drugs to a pharmacy [17]. This shows that the disposal methods of leftover drugs may vary according to geographical and cultural differences.

In our study, the rate of patients who applied to CTM was only 26.6%. In a study by Nahin *et al.* [18], on adults, the rate of those who preferred CTM was found to be 38.3%. We think that the number of those who applied for CTM treatment is below the general Turkish population average since our study was conducted in a region where medical treatment institutions are dense and access to health institutions is easier.

Not using the drugs in the right dose reduces the success rate of the treatment. To stop the treatment early may lead to other problems such as the need for disposal of drugs. 32.2% of the individuals in our study stated that they stopped the treatment early. When asked about the reasons for discontinuing the treatment, 85.6% of them answered it was because they got better. In the study conducted by Blom, Hugtenburg, and Kisoensingh [19] in the Netherlands, 21.4% side effects, 13.3% no need for treatment, and 13.3% ineffectiveness of the medicine were counted as the reasons for discontinuing the treatment. Those data reveal that society should be informed more about the appropriate use of drugs in our country.

37.2% of the individuals in our study provide OTC drugs. In the study of Ilhan *et al.* [9], similar to our study, the most common reasons for using OTC drugs did not need to go to the physician (55.3%), not wanting to pay inspection fees (21.5%), and not having time (21.2%).

In a meta-analysis conducted by Azami-Aghdash [20], in Iran, similar to our study, the most commonly used OTC drug groups were found to be analgesics, antibiotics, and cold medications, respectively.

In our study, when individuals were questioned about how they managed when they had problems like side effects while using drugs, 71.4% stated that they consulted a physician. In the study conducted by Dagtekin *et al.* [14] 56.5% of the individuals consulted the physician when an unexpected situation occurred while using the medication, and 35% kept using it. In the study conducted by Mete and Unal [15], it was found that 65% of the patients applied to the physician, 10.6% to the pharmacist, and 9.6% to the prospectus when they encountered an undesirable effect while using a drug.

89% of the individuals in our study check the expiration date of the drugs they use. The rate of checking the expiration date is highest in the group of high school and university graduates. In a study conducted by Kiyak [21], on the elderly, 67.3% of the elderly were found to check the expiration dates of drugs, and it was seen that the level of education was effective in checking.

It was found that 83.1% of the patients read the prospectus. Similarly, in the study of Mete and Unal [15] it was found that 78.3% of individuals read the prospectus before using the drug.

It was determined that 84% of the individuals in our study supported the prohibition of OTC drug supply. When we look at the reasons of supporters, it comes to the fore that they are uncomfortable with the excessive use of unconscious drugs and trust physicians. In terms of preventing the abuse of drugs, the supply of prescription drugs is a method that provides control. The primary reason for those who do not support is that they cannot re-supply the drug due to the inhibition of the pharmacist system when they lose the drug they use constantly for any reason. This situation can be interpreted as a deficit in the drug tracking system. At least, as in vaccines, the amount of drug given can be increased by calculating a loss amount. In a study conducted in Saudi Arabia, although some of the participants thought that strong regulatory mechanisms and law enforcement would help control the sale of OTC drugs, others emphasized that it is more important to educate the public about the negative consequences of OTC drug use [17].

5. Conclusions

Every individual has a responsibility in RUD and it is thought that it is significant to raise awareness of each individual about this issue. In line with the results obtained, it can be suggested that an educational mobilization, starting from primary school, should be taught regarding RUD. Thus, it will be possible

to ensure that the awareness of the subject will reach the level of primary school education. In addition, it is thought that creating public service announcements that will raise the awareness of the public about the harm caused by drugs, may also be beneficial to the economy. Public awareness of RUD can be raised through the use of communication tools such as newspapers, magazines, television, the internet, brochures, and posters.

We think that risky groups, especially elderly and uneducated individuals, should be regularly evaluated, trained, and monitored by healthcare professionals working in primary care, and caregivers should be informed about drug use intermittently.

Our study has some limitations such as it is a single-centered study, it does not include the patient population applied to the hospital and it does not include the rural area population.

Furthermore, despite being conducted 5 years ago, our study resumes to be a relevant topic. During the COVID-19 pandemic, the irrational use of antibiotics, in particular, highlights the need for increased awareness on this matter. The main reason for the delayed publication of our study is due to our focus and efforts being redirected towards the pandemic, as it has been the primary area of interest and research for us.

Ethics Committee Approval

(Date: 23.08.2017 Decision No: 914) was received from the Istanbul University Faculty of Medicine Clinical Research Ethics Committee. The research was undertaken with the appropriate informed consent of participants.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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A Data Availability Statement

The data used to generate the results in the paper is available.

The data that support this study are available (accessed on August 4, 2023) on the websites mentioned, and all of them are listed in the same order in the references:

- 1) <https://apps.who.int/iris/handle/10665/162006>.
- 2) Available at: <https://apps.who.int/iris/handle/10665/42682>.
- 3) Available at: <https://apps.who.int/iris/handle/10665/44371>.
- 4) Available at:
<https://www.who.int/activities/promoting-rational-use-of-medicines>.
- 5) Available at: <https://doi.org/10.1177/20503121211025146>.
- 6) Available at: <https://doi.org/10.1787/2493ee95-en>.
- 7) Available at: <https://dergipark.org.tr/tr/pub/usaysad/issue/62190/930550>.
- 8) Available at: <https://doi.org/10.5798/diclemedj.0921.2011.04.0066>.
- 9) Available at: <https://doi.org/10.20518/thsd.91650>.
- 10) Available at:
<http://acikerisimarsiv.selcuk.edu.tr:8080/xmlui/handle/123456789/8539>.
- 11) Available at: <https://search.trdizin.gov.tr/tr/yayin/detay/134349/>.
- 12) Available at: <https://dergipark.org.tr/tr/pub/cumj/issue/4200/55381>.
- 13) Available at: <https://doi.org/10.1155/2020/4392058>.
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<https://search.trdizin.gov.tr/tr/yayin/detay/247375/yasilarin-ilac-kullanimi-konusundaki-bilgileri-ve-etkileyen-faktorlerin-degerlendirilmesi>.

Participant Questionnaire for the Research

Evaluation of Rational Drug Use in Patients Applying to a Family Health Center in Istanbul

Dear Participant,

This research aims to evaluate the knowledge, attitudes, and behaviors related to rational drug use among individuals applying to a family health center. Par-

ticipation in this research is based on voluntary participation, and the personal information collected will be kept confidential and will not be used for purposes other than scientific publication.

Thank you for your participation.

1) Your Age:

2) Your Gender: a) Male b) Female

3) Marital Status: a) Single b) Married

4) Education Level: a) Cannot read or write b) Literate c) Elementary School
d) High School e) University/College

5) Your Occupation:

6) Employment Status: a) Homemaker b) Worker c) Civil Servant d) Student
e) Retired f) Unemployed

Other:

7) What is your total monthly income? a) Minimum wage or below b) 1405 - 4999 c) 5000 and above

8) Do you have any medications that you use regularly? a) Yes b) No
(Proceed to question 12)

9) Do you know the names of the medications you are taking? a) Yes b) No

10) Do you know what each medication is prescribed for? a) Yes b) No

11) If yes, what are the names of the medications?

12) Do you keep medications at home? a) Yes b) No (Proceed to question 15)

13) If yes, what are the groups of medications you have at home? (You can select multiple options)

a) Painkillers b) Fever reducers c) Cold medications d) Vitamins

e) Antibiotics f) Antacids g) Cough syrups h) Other:

14) How do you obtain the medications you have at home? (You can select multiple options)

a) Request a prescription from a doctor

b) Use leftover medications from previous treatments

c) Get them from a pharmacist

d) Obtain them from friends or acquaintances

e) Obtain and use them from friends or acquaintances

f) Other:

15) Where do you store your medications at home? (You can select multiple options)

a) Refrigerator b) Medicine cabinet c) Storage box d) Plastic bag e) Other:

16) What do you do with leftover medications after treatment? (You can select multiple options)

a) Keep them for future use

b) Return them to a healthcare facility

c) Give them to friends or acquaintances who need them

d) Give them back to the pharmacy

- e) Dispose of them in the toilet
- f) Throw them in the trash
- g) Other:

17) What are the first methods you turn to when you are unwell? (You can select multiple options)

- a) Consult a health care center
- b) Use herbal/traditional remedies
- c) Get advice from a pharmacist then get a related drug
- d) Get advice from my family or my close friends
- e) Use medications you have at home
- f) Do nothing
- g) Other:

18) Do you ever stop taking medication before the recommended duration? a) Yes b) No (Proceed to question 20)

19) If yes, what are your reasons for stopping medication early?

- a) I do not stop
- b) I stopped because I forgot/got bored
- c) I stopped because I got better
- d) I didn't get better
- e) I stopped because of side effects
- f) Other:

20) Do you buy medication without a prescription or doctor's recommendation?

a) Yes b) No (Proceed to question 23)

21) What are the reasons for using medication without a doctor's recommendation or prescription? (You can select multiple options)

- a) Because the Social Security Institution (SGK) doesn't cover it
- b) To avoid paying a co-payment for a doctor's visit
- c) I don't have time
- d) Because someone I know recommended it
- e) Because it worked for me in the past
- f) Other:

22) What types of medication do you buy without a prescription? (You can select multiple options)

- a) Painkillers c) Fever reducers e) Vitamins g) Topical ointments
- b) Cold medications d) Cough syrups f) Antacids h) Other:

23) From whom do you seek information about medication use? (You can select multiple options)

- a) Doctor b) Nurse/Health officer
- c) Pharmacist
- d) Friends/Neighbors
- e) Internet
- f) Other:

24) What do you do if you experience problems due to the medication you are using? (You can select multiple options)

- a) Consult a doctor/healthcare facility
- b) Continue using it in the hope that the issue will be resolved
- c) Stop taking it
- d) Other:

25) Do you check the expiration date of the medications you use? a) Yes b) No

26) Do you read the usage instructions for the medications you take? a) Yes b) No

27) Do you support the ban on over-the-counter medication purchases in the future?

- a) Yes, because:
- b) No, because: