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Research Article

Rational drug use and associated factors in pulmonology outpatients: a cross-sectional study

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ABSTRACT

Objective: Rational drug use (RDU) refers to administering medications that are appropriate to patients' clinical needs, in doses that meet their individual needs for a sufficient duration, and at the lowest possible cost. Despite the clinical importance of RDU, irrational drug use remains prevalent, particularly in pulmonology patients. In this context, the objective of this study is to evaluate RDU knowledge and identify associated sociodemographic and clinical factors in pulmonology outpatients.

Methods: The sample of this cross-sectional, single-center study consisted of 317 outpatients aged 18 years or older who presented to a secondary chest diseases hospital between February and May 2023. The patients were assessed using a structured questionnaire containing items on their sociodemographic and general health characteristics and the validated 21-item Rational Drug Use Scale (RDUS). The collected data were analyzed using parametric and chi-square tests, as well as correlation and logistic regression analyses.

Results: The mean age of the study sample, 59.6% of which were females, was 50.0 ± 13.0 years. Of the 317 patients, 78.9% had chronic diseases, and 38.8% were taking ≥5 medications (polypharmacy). The mean RDUS score of the sample was 29.78±4.77, indicating insufficient knowledge. The mean RDUS score of the patients aged ≤45 years was significantly higher than that of those aged >45 years (p=0.007). The mean RDUS score of the patients living in urban areas was significantly higher than that of those living in rural areas (p=0.031). A strong correlation was found between patients' education level and RDUS score. Accordingly, the mean RDUS score of patients with higher education was significantly higher than that of patients with other education levels (p=0.001). Multivariate analysis revealed higher education levels ([Odds Ratio (OR)=3.45, p=0.005], living in urban areas [OR=2.46, p=0.031], and young age [<45 years] [OR=0.958 per year, p=0.001]) as independent predictors of having sufficient RDU knowledge.

Conclusion: In conclusion, we found that outpatient pulmonology patients' RDU knowledge was independently associated with age, education level, and place of residence. In light of these findings, targeted educational interventions to improve medication adherence, reduce adverse events, and optimize treatment outcomes should be primarily focused on patients who are elderly, have low educational levels, reside in rural areas, and have respiratory diseases.

Keywords: rational drug use, pulmonology, health literacy, polypharmacy, patient education

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Introduction

Rational drug use (RDU) refers to using the right drug, in the right dose, for the right duration, and at the lowest cost.[1] RDU aims to reduce adverse drug reactions, drug interactions, and unnecessary healthcare costs and increase drug efficacy.[2] Unnecessary and inappropriate drug use is a widespread problem both globally and nationally. In particular, over-the-counter use of antibiotics, unconscious use of analgesics, and polypharmacy constitute major public health problems.[3,4]

Many factors affect RDU, including health literacy, socioeconomic status, the presence of chronic diseases, access to healthcare services, and the ability to communicate effectively with healthcare providers.[5] Patients are expected to use the medications prescribed specifically for them by physicians in the recommended doses and durations. However, patients often discontinue treatment early as soon as they feel better, which can negatively affect the efficacy of the drug and lead to serious consequences such as drug resistance, disease recurrence, and increased risk of complications.[6] The structure of the healthcare system, primary and secondary healthcare practices, and physicians' prescribing habits also directly affect drug use patterns.[7]

It is, therefore, crucial to identify and implement strategies to promote RDU. Outpatient clinics, especially those where chronic conditions such as respiratory diseases are treated, are critical venues for understanding and improving medication use, as they involve frequent, long-term prescribing. Therefore, identifying gaps in outpatients' RDU knowledge and drug use patterns may help tailor effective interventions. In this context, this study was carried out to evaluate RDU knowledge and identify associated sociodemographic and clinical factors in pulmonology outpatients.

Materials and Methods

Study design and setting

This study was designed as a cross-sectional, single-center study. The study protocol was approved by the Giresun University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee (Approval Date 25.12.2023, Approval Number: 25.12.2023/12) and the Provincial Health Directorate. The study was conducted between February 1st, 2023, and May 1st, 2023, at Dr. Ali Menekşe Pulmonology Hospital, a secondary chest diseases hospital, consisting only of internal medicine and pulmonology outpatient clinics, serving approximately 150 patients daily, including both scheduled and walk-in visits, per the ethical considerations outlined in the World Medical Association Declaration of Helsinki. A secondary chest diseases hospital provides a relevant setting for evaluating RDU, as chronic respiratory conditions often require long-term pharmacotherapy, including antibiotics, inhalers, and corticosteroids. Written informed consent was obtained from the participating patients prior to the conduct of the study.

Population and sample

The study population consisted of patients aged 18–80 years who visited the pulmonology outpatient clinics during the study period, voluntarily agreed to participate in the study, were fluent in Turkish, had no cognitive impairments, and had no psychiatric conditions affecting their ability to respond. The study sample was created using convenience sampling, that is, only patients who met the study's inclusion criteria and volunteered to participate in the study were included in the sample. Patients that are under 18 years, those who did not consent to participate in the study, those who could not communicate in written or verbal Turkish, and those who were diagnosed with psychiatric disorders that may affect cognitive

skills, such as schizophrenia, bipolar disorder, and psychosis, were excluded from the study. Power analysis revealed that the sample must comprise a minimum of 207 patients in order to achieve 95% reliability, 90% power, and an effect level of 0.25. In the end, the study sample consisted of 317 patients.

Data collection

The study data were collected through face-to-face interviews with patients using a structured questionnaire consisting of items assessing their sociodemographic and general health characteristics, as well as the validated 21-item Rational Drug Use Scale (RDUS), developed by the researchers based on relevant literature. A team of researchers conducted the interviews collaboratively. The questionnaire's first and second parts comprised items assessing patients' sociodemographic characteristics (age, gender, marital status, education level, and employment status) and general health characteristics (chronic diseases, medication use, number of medications used, and smoking status), respectively. RDUS consists of 21 (10 true and 11 false) statements that evaluate rational drug use. Participants were asked to assign one of the following answer choices to each statement: correct (2 pts), incorrect (0 pts), and not sure (1 pt). Accordingly, the highest and lowest scores that can be obtained from RDUS are 42 and 0 pts, respectively. Higher RDUS scores indicate higher RDU knowledge. RDUS' Turkish validity and reliability studies, i.e., psychometric assessments featuring Cronbach's alpha, structural validity, and item analysis, were conducted by Demirtaş et al., who reported RDUS' Cronbach's alpha as 0.78.[8] Accordingly, we deemed the patients who scored 35 pts and above in RDUS to have sufficient RDU knowledge.

The study's dependent variables were patients' RDUS scores and whether they had sufficient RDU knowledge (RDUS score ≥35 pts), and the independent variables were sociodemographic characteristics, including age, gender, education level, place of residence, and marital status, and general health characteristics, including smoking status, medication use, and chronic diseases.

Statistical analysis

SPSS 24.0 (Statistical Product and Service Solutions for Windows, Version 24.0, IBM Corp., Armonk, NY, U.S., 2016) software package was used to conduct the statistical analyses of the collected data. The results of the statistical analyses were expressed using descriptive statistics, i.e., means, medians, standard deviations, and standard errors in the case of continuous variables, and numbers (n) and percentage (%) values in the case of categorical variables. Kolmogorov-Smirnov test, histograms, skewness, and kurtosis values were used to assess the conformity of numerical variables to normal distribution. The independent samples t-test was used to compare variables between two groups, while the analysis of variance (ANOVA) test was used to compare variables between more than two groups. Patients were classified according to the pre-determined RDUS cut-off score and compared in terms of independent variables using the chi-squared test. Pearson's correlation analysis was used to assess the relationship between age and RDUS score. Backward stepwise logistic regression analysis was applied to variables found to be significantly related to RDU knowledge in one-way analyses. Probability (p) statistics of < 0.05 were deemed to indicate statistical significance.

Results

The mean age of the study sample, 59.6% of which were females, was 50.0 ± 13.0 years. The mean RDUS scores of the subgroups created based on patients' sociodemographic and health characteristics are given in Table 1. Of the 317 patients, 78.9% had at least one chronic disease. While 20.8% were not taking any medications, 38.8% were using five or more medications, indicating a high rate

Table 1. Mean scores on the Rational Drug Use Scale according to sociodemographic variables

Variables		n (%)	Mean ± SD	Statistics
Gender	Female	189 (59.6)	30.03 ± 4.82	t=-1.147 df=315 p=0.252
	Male	128 (40.4)	29.41 ± 4.69	
Age groups	≤45 years	103 (32.5)	30.98 ± 4.80	F=4.986 **p=0.007**
	46-55 years	65 (20.5)	29.29 ± 5.00	
	≥65 years	149 (47.0)	29.16 ± 4.51	
Marital status	Married	199 (62.8)	29.71 ± 4.76	F=3.033 **p=0.050**
	Single	64 (20.2)	30.87 ± 4.81	
	Widowed	54 (17.0)	28.74 ± 4.55	
Cigarette smoking	Smoker	211 (66.6)	29.75 ± 4.72	t=-0.160 df=315 p=0.873
	Non-smoker	106 (33.4)	29.84 ± 4.89	
Residence status	Province	144 (45.4)	30.76 ± 4.86	F=7.032 **p=0.001**
	District	84 (26.5)	29.52 ± 4.49	
	Village	89 (28.1)	28.43 ± 4.55	
Education level	Literate	90 (28.4)	28.09 ± 4.22	F=9.045 **p=0.001**
	Primary School	92 (29.0)	29.24 ± 4.93	
	Middle School	29 (9.1)	29.83 ± 3.87	
	High School	79 (24.9)	31.15 ± 4.24	
	University	27 (8.5)	33.19 ± 5.60	
Employment status	Working	143 (45.1)	30.55 ± 4.68	F=3.741 **p=0.025**
	Not working	82 (25.9)	29.45 ± 5.01	
	Retired	92 (29.0)	28.88 ± 4.54	
Number of medications	No medication	66 (20.8)	30.38 ± 4.74	F=0.904 p=0.406
	1-4 medications	128 (40.4)	29.83 ± 5.06	
	≥5 medications	123 (38.8)	29.41 ± 4.46	
Medication use status	Non-user	66 (20.8)	30.38 ± 4.74	t=-1.149 df=315 p=0.251
	User	251 (79.2)	29.62 ± 4.77	
Number of diseases	0	68 (21.5)	30.35 ± 4.90	F=0.845 p=0.498
	1	95 (30.0)	30.15 ± 4.86	
	2	115 (36.3)	29.40 ± 4.60	
	3	36 (11.4)	29.06 ± 4.90	
	4	3 (0.9)	28.33 ± 3.06	
Chronic disease status	Yes	250 (78.9)	29.59 ± 4.75	t=-1.381 df=315 p=0.168
	No	67 (21.1)	30.49 ± 4.80	
Chest disease	Yes	142 (44.8)	28.86 ± 4.63	t=-3.138 df=315 **p=0.002**
	No	175 (55.2)	30.53 ± 4.76	
Coronary artery disease	Yes	102 (32.2)	29.50 ± 4.38	t=-0.718 df=315 p=0.473
	No	215 (67.8)	29.91 ± 4.95	
Endocrine diseases	Yes	81 (25.6)	29.88 ± 4.50	t=0.213 df=315 p=0.832
	No	236 (74.4)	29.75 ± 4.83	
Psychiatric illness	Yes	19 (6.0)	30.16 ± 4.31	t=0.357 df=315 p=0.722
	No	298 (94.0)	29.76 ± 4.80	
Malignancy	Yes	14 (4.4)	29.00 ± 4.96	t=-0.625 df=315 p=0.532
	No	303 (95.6)	29.82 ± 4.76	
Total		317 (100.0)	29.78 ± 4.77	

Bold p-values indicate statistical significance (p≤0.05).
SD: Standard deviation; df: Degrees of freedom.

Table 2. Distribution of rational drug use knowledge according to sociodemographic and health variables

Variables		No knowledge of rational drug use (<35 points)	Knowledge of rational drug use (≥35 points)	Statistics
Gender	Female	147 (77.8)	42 (22.2)	χ^2=1.201 df=1 p=0.273
	Male	106 (82.8)	22 (17.2)	
Age groups	≤45 years	72 (69.9)	31 (30.1)	χ^2=11.464 df=2 **p=0.003**
	46-55 years	51 (78.5)	14 (21.5)	
	≥65 years	130 (87.2)	19 (12.8)	
Marital status	Married	160 (80.4)	39 (19.6)	χ^2=11.847 df=2 **p=0.003**
	Single	43 (67.2)	21 (32.8)	
	Widowed	50 (92.6)	4 (7.4)	
Smoking	Active smoker	171 (81.0)	40 (19.0)	χ^2=0.594 df=1 p=0.441
	Never	82 (77.4)	24 (22.6)	
Residence status	Province	103 (71.5)	41 (28.5)	χ^2=13.344 df=2 **p=0.001**
	District	69 (82.1)	15 (17.9)	
	Village	81 (91.0)	8 (9.0)	
Education level	Literate	82 (91.1)	8 (8.9)	χ^2=29.434 df=4 **p=0.001**
	Primary School	77 (83.7)	15 (16.3)	
	Middle School	25 (86.2)	4 (13.8)	
	High School	56 (70.9)	23 (29.1)	
	University	13 (48.1)	14 (51.9)	
Employment status	Working	107 (74.8)	36 (25.2)	χ^2=4.485 df=2 p=0.106
	Not working	67 (81.7)	15 (18.3)	
	Retired	79 (85.9)	13 (14.1)	
Groups by number of medicines	No medication	49 (74.2)	17 (25.8)	χ^2=3.212 df=2 p=0.201
	1-4 medications	100 (78.1)	28 (21.9)	
	≥5 medications	104 (84.6)	19 (15.4)	
Medication use status	No	49 (74.2)	17 (25.8)	χ^2=1.604 df=1 p=0.205
	Yes	204 (81.3)	47 (18.7)	
Number of diseases	0	50 (73.5)	18 (26.5)	χ^2=5.741 df=4 p=0.291
	1	72 (75.8)	23 (24.2)	
	2	98 (85.2)	17 (14.8)	
	3	30 (83.3)	6 (16.7)	
	4	3 (100.0)	0 (0.0)	
Chronic disease status	Yes	204 (81.6)	46 (18.4)	χ^2=2.350 df=1 p=0.125
	No	49 (73.1)	18 (26.9)	
Chest disease	Yes	123 (86.6)	19 (13.4)	χ^2=7.401 df=1 **p=0.007**
	No	130 (74.3)	45 (25.7)	
Coronary artery disease	Yes	86 (84.3)	16 (15.7)	χ^2=1.893 df=1 p=0.169
	No	167 (77.7)	48 (22.3)	
Endocrine diseases	Yes	68 (84.0)	13 (16.0)	χ^2=1.157 df=1 p=0.282
	No	185 (78.4)	51 (21.6)	
Psychiatric illness	Yes	16 (84.2)	3 (15.8)	χ^2=0.243 df=1 p=0.622
	No	237 (79.5)	61 (20.5)	
Malignancy	Yes	12 (85.7)	2 (14.3)	χ^2=0.317 df=1 p=0.574
	No	241 (79.5)	62 (20.5)	
Total		253 (79.8)	64 (20.2)	

Bold p-values indicate statistical significance (p≤0.05).
df: Degrees of freedom; χ^2: Chi-square.

of polypharmacy. The mean RDUS of patients aged 45 and under was significantly higher than that of patients aged 46-55 and those aged 65 and over (p=0.007) (Table 1). In parallel, the mean RDUS score of employed patients was found to be significantly higher than that of retired patients (p=0.025) (Table 1).

Distribution of patients' sociodemographic and general health characteristics by the RDU knowledge groups is shown in Table 2. Accordingly, factors such as young age, higher level of education, and living in urban areas were significantly associated with higher RDU knowledge. On the other hand, there was no significant relationship between RDUS scores and the presence of chronic diseases or medication use. On the other hand, the mean RDUS score of patients with chest diseases was significantly lower than that of patients without chest diseases (p=0.007) (Table 2).

The question that the patients answered correctly at the highest rate on RDUS was Question 11 (95.6%), followed by Question 12 (94.3%), Question 3 (90.9%), Question 14 (88.6%), and Question 8 (87.7%). On the other hand, the question that the patients answered correctly at the lowest rate on RDUS was Question 19 (20.5%), followed by Questions 15 and 16 (30.3%), Question 9 (31.5%), and Question 5 (37.2%) (Table 3).

Table 3. Distribution of responses to the rational drug use scale

Items	Correct answer	Wrong answer	I don't know
1. Only physicians can recommend medicines	206 (65.0)	0 (0.0)	111 (35.0)
2. Recommend medication to a relative with similar complaints; it's okay to be present	181 (57.1)	121 (38.2)	15 (4.7)
3. Whether we need medication when we get sick, the doctor determines that it is not	288 (90.9)	27 (8.5)	2 (0.6)
4. Medicines can have negative effects as well as positive ones	216 (68.1)	0 (0.0)	101 (31.9)
5. All medicines produce the same side effects	118 (37.2)	57 (18.0)	142 (44.8)
6. It is not harmful to take the medicine more often than the doctor prescribes	189 (59.6)	59 (18.6)	69 (21.8)
7. Using medicines should be taken on an empty or full stomach can be found in the instructions	191 (60.3)	43 (13.6)	83 (26.2)
8. Failure to take the medication for the duration of treatment prescribed by the doctor may impede recovery	278 (87.7)	4 (1.3)	35 (11.0)
9. Herbal products can be used instead of medicines	100 (31.5)	160 (50.5)	57 (18.0)
10. Consuming herbal products as much as desired has no health effects; there's no harm	136 (42.9)	95 (30.0)	86 (27.1)
11. Any adverse effects while taking medication; we should consult our doctor	303 (95.6)	0 (0.0)	14 (4.4)
12. Our physician is still using while organizing our treatment; we must	299 (94.3)	6 (1.9)	12 (3.8)
13. When we feel well during treatment, the medicine we can stop using it	146 (46.1)	141 (44.5)	30 (9.5)
14. We can ask our pharmacist where we should store our medicines at home	281 (88.6)	7 (2.2)	29 (9.1)
15. The duration of treatment for each medicine is the same	96 (30.3)	44 (13.9)	177 (55.8)
16. Herbal products are completely harmless	96 (30.3)	37 (11.7)	184 (58.0)
17. Medicines can be used in the same amount in all age groups	145 (45.7)	59 (18.6)	113 (35.6)
18. Not too many medicines but enough medicines using it helps us heal	211 (66.6)	33 (10.4)	73 (23.0)
19. More expensive medicines are more effective	65 (20.5)	78 (24.6)	174 (54.9)
20. Any medicine can be used safely during pregnancy	132 (41.6)	35 (11.0)	150 (47.3)
21. Some medicines are addictive	141 (44.5)	29 (9.1)	147 (46.4)

Data presented as n (%).

Table 4. Logistic regression analysis of primary variables associated with rational drug use knowledge

Variable	B	S.E.	Wald	df	p	OR	95% Confidence Interval
Residing in rural areas vs urban areas	0.898	0.416	4.664	1	0.031	2.46	1.09 - 5.55
Higher education vs other (lower) education	1.237	0.444	7.762	1	0.005	3.45	1.44 - 8.23
Age	-0.043	0.011	14.767	1	0.001	0.96	0.94 – 0.98

The primary variables included in the logistic regression analysis model to analyze their relationship with RDU knowledge were age, being single, living in urban areas, i.e., cities or counties, being a university graduate, and not having chest diseases. Patients living in urban areas had higher odds of having sufficient RDU knowledge than those living in rural areas ((Odds Ratio (OR) = 2.46, p = 0.031)). Similarly, patients who had graduated from a university exhibited better RDU knowledge compared to those with other education levels (OR = 3.45, p = 0.005). Frequency of RDU decreased by 4.2% with increasing age (OR=0.958, p=0.001) (Table 4).

Discussion

RDU is essential for maximizing therapeutic benefits, minimizing adverse effects, and ensuring the responsible use of healthcare resources. Despite its importance, inappropriate drug use, including non-adherence, polypharmacy, and misuse of common medications such as antibiotics and analgesics, remains a persistent challenge in clinical practice. In this context, we evaluated RDU knowledge among pulmonology outpatients presented to a secondary chest diseases hospital and identified key sociodemographic and clinical factors associated with sufficient RDU knowledge.

The mean RDUS score of our sample is lower than the mean RDUS scores reported in two other studies in the literature assessing RDU (29.78 ± 4.77 vs. 37.42 and 38.82).[9,10] Analysis of RDU scores with respect to gender revealed that the mean RDU score of female patients was higher than that of male patients, although not significantly. We found a significant relationship between marital status and RDUS scores, with single individuals having the highest scores and widowed individuals having the lowest scores. This finding may be attributed to the fact that individuals living alone reportedly have more time to spare and attach greater importance to health information.[11]

The subgroups of younger, employed, and more highly educated patients had higher mean RDUS scores than the others. Analysis of RDUS scores by age groups revealed that the mean RDUS score of patients aged 45 years and under was higher than that of older age groups. As a matter of fact, one other study also reported higher RDU levels in young patients than in elderly patients.[12] Our results indicate that younger age, higher education level, and living in urban areas are significantly associated with greater RDU knowledge. Our finding of patients living in rural areas having lower RDU knowledge is consistent with the findings of a recent study conducted in Turkey, highlighting significant disparities in medication use behaviors between urban and rural settings.[13] Along these lines, Yilmaz Kara et al. reported distinct variations in RDU behaviors among adult populations, further supporting the findings of our study.[14] These findings may be explained by the fact that younger individuals are likely to have higher health literacy and easier access to information through digital resources, compared to older individuals who live in rural areas and may not have sufficient access to various media tools.[12] Our finding that mean RDUS scores significantly increased with increasing education levels, with illiterate patients having the lowest mean RDUS score, emphasizes

the effect of health literacy on RDU.[15] Similarly, another study reported a significant difference between the RDUS scores of patients with different education levels, particularly those aged over 65 years.[12] We also found that employment status was significantly associated with RDUS scores, with employed patients having higher scores than retired patients. A study on health awareness and medication use habits reported similar findings.[11] These findings may be attributed to the fact that employed individuals are more exposed to health information and participate in regular health screenings more frequently than unemployed individuals.

45.5% of our sample have been living in urban areas, and we found living in urban areas to be one of the strong predictors of sufficient RDU knowledge. In parallel, another study found that living in urban areas was significantly associated with ease of access to healthcare services.[12] Similarly, other studies have reported that patients living in urban areas have higher RDUS scores than those living in rural areas, as they have easier access to healthcare services, higher opportunities to communicate with healthcare providers, and greater access to educational opportunities.[16] We believe that our hospital's proximity to the city center was a factor in facilitating patients' access to healthcare services.

78.9% of the patients in our sample had at least one chronic disease, indicating a high prevalence of chronic diseases. In contrast, a study conducted in a family medicine outpatient clinic in the city of Samsun, neighboring Giresun, where our hospital is located, reported that the rate of patients with at least one chronic disease constituted only 18% of their sample.[17] The high rate of patients with at least one chronic disease in our sample is expected, considering that our study was carried out in a secondary chest diseases hospital. Considering that chronic diseases can directly affect the frequency of medication use, the fact that 20.8% of the patients in our sample did not use any medication, when considered together with the fact that 78.9% of our patients were diagnosed with at least one chronic disease, suggests the medication adherence of patients diagnosed with chronic diseases. Similarly, in a study conducted with 387 patients, 39.5% of whom had a chronic disease, it was reported that 29.5% of the patients had been using medications regularly.[9] These findings may help develop strategies to reduce the overall incidence of complications associated with chronic diseases. On the other hand, our analyses of the relationships between RDUS scores and health status characteristics, i.e., presence of chronic diseases, coronary artery disease, endocrine diseases, psychiatric diseases, and malignancies, revealed no significant relationship, except for the presence of chest diseases. The RDUS scores of patients with chest diseases were significantly lower than those of other patients. As a matter of fact, a study reported that patients with chronic respiratory diseases may have low awareness of drug use and difficulties in using inhaler drugs and may, therefore, have a higher rate of irrational drug use and resort to alternative means.[18]

38.8% of the patients in our sample met the criteria for polypharmacy, which refers to the use of five or more medications. It has been reported in the literature that polypharmacy is common among patients with chronic diseases and increases the risk of drug interactions and side effects.[11,19] A study conducted with 1081 patients admitted to an internal medicine outpatient clinic found that 13.4% of the patients were using five or more medications.[20] The high rate of polypharmacy in our study may be attributed to the fact that 57.4% of our patients were illiterate or only had elementary school education, and 78.9% had at least one chronic disease. On the other hand, we did not find any significant relationship between the number of medications used and RDUS scores. Then again, patients who have not been using any medication had higher RDUS scores

compared to those who have been using five or more medications, suggesting that polypharmacy may be either related to lower health literacy or not related to health literacy at all. In line with the literature data, among patients under 65 years of age, the mean RDUS score of patients using 1 to 3 medications was higher than that of others.[21]

The study's single-center design, relatively small sample size, and the fact that it was conducted in a secondary healthcare facility consisting of only two departments limit the generalizability of its findings to other populations. Larger-scale, multicenter studies with broader patient profiles involving tertiary healthcare facilities are needed to increase the scope, validity, and reliability of this study's findings. In addition, face-to-face completion of the data collection tools may have led to response bias.

Conclusions

We found that factors such as young age, higher education, and living in urban areas were significantly associated with higher RDU awareness. However, we did not find any significant relationship between RDUS scores and the presence of chronic diseases and medication use status, suggesting that educational interventions, as well as awareness-raising programs aimed at increasing RDU, should primarily target elderly patients, patients with low education levels, and patients living in rural areas. Increased RDU awareness is likely to facilitate the management of chronic diseases, whereas increased health literacy is likely to prevent unnecessary or incorrect use of drugs and reduce the number of visits to healthcare facilities due to unwarranted side effects. Measures aimed at increasing patients' RDU knowledge and awareness should be organized across all levels of healthcare, particularly primary healthcare services, which are more likely to play a crucial role in promoting RDU and directly impact local variations in medication use.

Ethical approval

This study has been approved by the Giresun University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee (approval date 25.12.2023, number 12). Written informed consent was obtained from the participating patients prior to the conduct of the study.

Author contribution

The authors declare contribution to the paper as follows: Study conception and design: NGK; data collection: MK; analysis and interpretation of results: AO; draft manuscript preparation: NGK, MK. All authors reviewed the results and approved the final version of the article.

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Conflict of interest

The authors declare that there is no conflict of interest.

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