Evaluation of Knowledge and Attitudes of Rational Antibiotic Usage of Patients Applying to the University Hospital

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Abstract – As health professionals and pharmaceutical companies have various responsibilities in rational antibiotic use (RAU), individuals also have great responsibilities. As a matter of fact, although it seems like an individual responsibility for the patient to comply with the principles of rational antibiotic use, it is actually an issue that concerns the general society in terms of its consequences. This research was carried out to evaluate the knowledge and attitudes of individuals about RAU. The research is carried out in Konya Necmettin Erbakan University Meram Medical Faculty Hospital between June and October 2021 in 461 patients aged 18-65 years. The data was obtained using the survey method. It was observed that, 52.5% of the participants were male, 62.7% were in the 18-40 age group, 58.1% were high school graduates or more, 64.6% had a large family and the income of 57% was equal to their expenses. 66.4% of the individuals stated that they do not have knowledge about RAU. The mean knowledge and attitude scores of the participants about RAU were determined as 13.11 ± 2.36 and 44.82 ± 3.19, respectively. The difference between educational status and income status variables and mean knowledge score, and between education status and family type variables and attitude score averages were found to be significant ($p < 0,05$). There was no increase in the knowledge and attitude scores of the individuals who had previously received information about the rational use of antibiotics. We found a weak positive correlation ($r = 0,154$) between knowledge and attitude scores of rational antibiotic use. It was found that a small number of the participants had previously received information about RAU, but there was no increase in the knowledge and attitude scores of these individuals. In line with these results, it was concluded that policies on RAU be disseminated to include the society and that these programs should be accessible especially for individuals with low education and income levels.

Keywords – Attitude, Education level, Knowledge, Rational antibiotic use (RAU).

1. Introduction

Antibiotics are exclusive adjuncts in the treatment of infections. Increasing microbial resistance to antibiotics; however, is a well-documented and serious global health concern. Appropriate use of antibiotics is essential to ensure treatment efficacy as well as to prevent resistance. Inappropriate use results from various factors and causes adverse effects including the emergence of resistance, adverse reactions, treatment failure, and waste of resources [1]. A major cause of antibiotic resistance is inappropriate use of these drugs. Moreover, a quite big number of the population worldwide are unaware of the bacterial resistance towards antibiotics, one of the most common misbelieves among many communities specially in developing and middle east countries believes on antibiotics can be used for viral infections (such as common cold) medication, this wrong practice of antibiotic misuse may lead to over dose and in long run to bacterial resistant.

Irrational antibiotic usage leads to increased antibiotics resistance, a global problem and a major public health concern, causes increased hospital stay. Antibiotics resistance is one of the major threats to human health system. Antibiotic resistance is the resistance of microorganisms to antimicrobial substance that happens when microorganism changes to defend itself from antibiotics. The incongruous treatment with antibiotics and the overuse of antimicrobial agents led to emergence of antibacterial resistance. A drastic increase in antimicrobial resistance (AMR), the severity of disease, the duration of the disease, complication risk, mortality rate, and health care cost was observed due to

unorthodox use of antibiotics. Among all, AMR is of immense concern. A number of mutated and antibiotic resistant strains are becoming dominant around the world, and developing countries are contributing to strength in resistance [2]. Rational antibiotic use can reduce selective pressure for the development of resistance to antibiotics [3].

Based on the World Health Organization (WHO) data, irrational use of all medicines are more than 50% resulting many problems including antibiotic resistance [4]. Antibiotic resistance is becoming a serious threat throughout the world. Antimicrobial resistance (AMR) is an issue that concerns all countries, irrespective of their level of development and income. Therefore, the WHO described AMR as a main "global security threat" which could send medicine to a "post-antibiotic era" [5].

Unfortunately, Türkiye is among the leading countries in antibiotic consumption [6,7]. While Türkiye was the country with the highest antibiotic consumption among Organisation for Economic Co-operation and Development (OECD) countries by a significant magrin in 2013, it was able to decelerate to the second place in 2018 [8]. Irrational drug use is one of the serious health problems in Türkiye and "Rational Drug Use National Action Plan" was started by the Turkish Ministry of Health [9]. As a result of the 4-year National Action Plan for Rational Drug Use, antibiotic prescriptions had declined from 34.9% in 2011 to 24.6% in 2018 [10].

The general population can play an important role in reducing the inappropriate and excessive utilization of

antibiotic and it is necessary to understand their antibiotic use knowledge, attitudes, and behaviors and if any educational needs exist. This research was carried out to evaluate the knowledge and attitudes of individuals about rational antibiotic use.

2.   Materials and Methods

The study is a descriptive and cross-sectional study conducted to evaluate the knowledge and attitudes of individuals about RAU. The research was carried out in Konya Necmettin Erbakan University Meram Medical Faculty Hospital Polyclinics between June and October 2021. The population of the study consists of individuals between the ages of 18-65 who applied to the Necmettin Erbakan University Meram Medical Faculty Hospital Polyclinics serving in the Meram district of Konya. The sample was taken due to the large size of the universe and the lack of time and opportunity to reach the whole of it. In the determination of the sample size, starting from a previous study conducted in Konya and found to use 15.6% of antibiotics without consulting a doctor [11], G-power 3.1.9.2 with 95% confidence interval, 5% effect size, 5% deviation, and with a power of 80%, the sample size was calculated as 461.

The ethics committee approval of the study was obtained by the Necmettin Erbakan University Meram Medical Faculty Non-Pharmaceutical and Medical Device Research Ethics Committee with the decision numbered 2337 on 21.02.2020. Following the ethics committee approval, necessary permission was obtained from the Meram Medical Faculty Hospital Chief Physician.

The data were collected from patients over the age of 18 while waiting in line before the examination or after obtaining their consent after the examination. To research; Patients who were able to communicate verbally, were able to understand and respond to the questionnaire questions, and consented to participate in the study were included.

First of all, the researcher introduces herself, reads the informed consent section at the beginning of the questionnaire and informs the participants for about fifteen minutes, in order to explain the subject, purpose and importance of the research, and that no private information about the patient is questioned (name, address, telephone number, etc.).

After the survey was completed, a text containing important information about antibiotics was given to the participants in order to avoid missed opportunities. The questionnaire form used in the research was created as a result of literature review and pilot study and consists of three parts: In the first part, there are demographic information about the patients, in the second part, "Individuals' knowledge levels about RAU" and in the third part "Individuals' attitudes towards rational RAU" are included. In order to determine their level of knowledge, in the section consisting of 20 true or false statements, 10 statements were prepared as true and 10 as false statements. Correct answers given by individuals were evaluated as 1 point and incorrect answers as 0 points.

In order to determine the attitudes of individuals about RAU; 3 points were evaluated as "correct", 2 points "sometimes" and 1 point "wrong" answer in the answers given to the section consisting of 20 statements that they could answer using the options "yes", "sometimes" and "no".

2.1. Statistical Analysis

Continuous variables were expressed as mean ± standard deviation, categorical data, number and percentage. One-way analysis of variance (Post-hoc:Bonferroni) was used for comparisons between three groups that were found to be normally distributed, T test was used for independent groups in analyzes between two groups, and Chi-square test was used for comparison of categorical data. The linear relationship (correlation) between RAU knowledge scores and attitude scores was tested with the Pearson Correlation test. Analyzes were performed with IBM SPSS version 26.0 (IBM Corporation, Armonk, NY, USA). Statistical significance level was accepted as $P<0.05$.

3.   Results and Discussion

219 female (47.5%) and 242 male (52.5%) patients participated in the study. 34.1% of the participants are between the ages of 31-40, 52.5% are male, 51.1% live in the city, 33.4% are high school graduates, 22.3% are housewives, 57% of them have equal income level, 64.6% have an joint family, 91.5% have social security, 56.6% are working, 30.6% have chronic diseases. Furthermore, 61.6% of the participants' the first medical institution he/she applied to when he/she got sick was determined as the state hospital.

Only 33.6% of the participants stated that they had received information about RAU before. 51.6% of those who received information stated that they received information from health personnel and 48.4% stated that they received information from mass comminication tools (Table 1).

While the participants' knowledge score average was 13.11±2.36 (the lowest value was 3, the highest value was 19), the average attitude score was 44.82±3.19 (the lowest value was 34, the highest value was 57) (Table 2).

When the knowledge scores of the participants were compared according to sociodemographic and clinical characteristics; the score of those with a bachelor's degree (14.11±2.24) was significantly higher (P<0.001) than illiterate (12.72±3.07), primary school graduates (12.66±2.14) and high school graduates (13.03±2.24).

It was determined that the knowledge scores of the participants with equal income level (13.33±2.30) were statistically significantly higher than the participants with low income level (12.82±2.40) (P=0.040). No significant differences were found between the knowledge scores according to age, gender, occupation, place of residence, family type, social security, employment status, presence of chronic disease, the first health institution asked for treatment when got sick and the status of obtaining information about RAU (P>0.05) (Table 3).

When the attitude scores were compared according to some sociodemographic and clinical characteristics (Table 4), it was determined that the scores of those with a bachelor's degree (45.54±3.98) were significantly higher than those of the illiterate (43.74±2.97) (P=0.033).

Those with joint families had significantly higher attitude scores (45.25±3.27) than those with nuclear families (44.03±2.87) (P<0.001). On the other hand, it was

determined that there were no significant differences between the attitude scores according to occupation, income level, social security, working status, presence of chronic disease, the first medical institution he/she applied to when he/she got sick and getting information about RAU (P>0.05).

It was determined that there was a weak positive correlation between knowledge scores and attitude scores (r=0.154, P<0.001) (Table 5, Figure 1).

Figure 1: Correlation Graph Between Rational Antibiotic Knowledge Scores and Attitude Scores
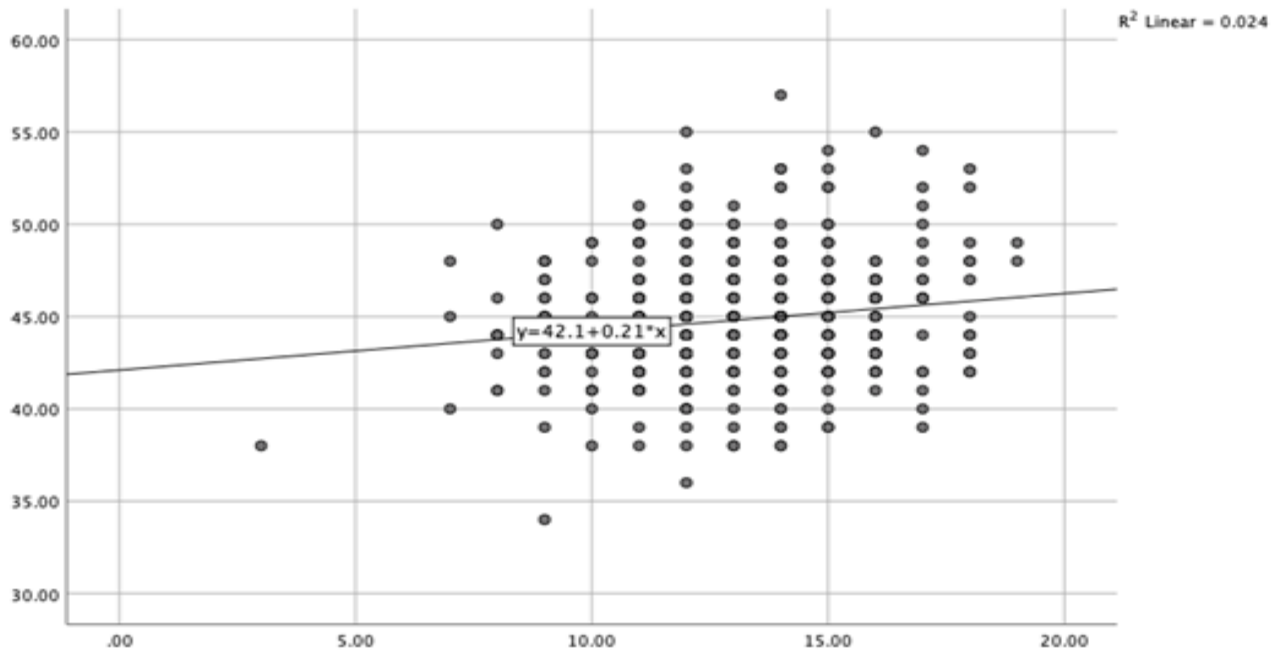
Table 1. Sociodemographic and Clinical Characteristics of the Participants

		N	%
Age (years)	**18-30**	132	28,6
	31-40	157	34,1
	41-50	82	17,8
	51-65	90	19,5
Gender	**Male**	242	52,5
	Female	219	47,5
Place of residence	**City**	235	51,1
	Town	162	35,1
	Village	64	13,9
Educational level	**Illiterate**	43	9,3
	Primary school	150	32,5
	High school	154	33,4
	Bachelor degree	87	18,9
	Graduate degree	19	4,1
	PhD degree	8	1,8
Occupation	**Housewife**	103	22,3
	Civil servant	78	16,9
	Health employee	16	3,5
	Worker	83	18,0

	Self-employment	72	15,6
	Retired	51	11,1
	Student	58	12,6
Income rate	Low	136	29,5
	Equal	263	57,0
	High	62	13,4
Family type	Nuclear family	163	35,4
	Joint family	298	64,6
Social security	Available	422	91,5
	Absent	39	8,5
Employment status	Employed	261	56,6
	Unemployed	200	43,4
Chronic disease	Present	141	30,6
	Absent	320	69,4
The first medical institution he/she applied to when he/she got sick	Family doctor	99	21,5
	State hospital	284	61,6
	Medical faculty hospital	63	13,7
	Private hospital/Clinic	15	3,3
Has he/she received any information about the rational use of antibiotics?	Yes	155	33,6
	No	306	66,4
If he/she received information from who or where did he/she get information?	Health personnel	80	51,6
	Mass communication tools	75	48,4
	Total	155	100,0
General Total		461	100,0

Table 2. The Average Scores for the Propositions Prepared about the Rational Use of Antibiotics

	Minimum	Maximum	Mean±SD
Rational Antibiotic Use Knowledge Score	3	19	13,11±2,36
Rational Antibiotic Use Attitude Score	34	57	44,82±3,19

Table 3. Comparison of Rational Antibiotic Use Knowledge Scores According to Sociodemographic and Clinical Characteristics

		Knowledge Score (Mean±SD)	P
Age (years)	**18-30**	13,10±2,53	0.772*
	31-40	13,15±2,38	
	41-50	13,26±2,33	
	51-65	12,90±2,12	
Gender	**Male**	13,05±2,32	0.561**
	Female	13,17±2,41	
Place of residence	**City**	13,01±2,41	0.365*
	Town	13,32±2,32	
	Village	12,93±2,31	
Educational level	**Illiterate**	12,72±3,07 [a]	**<0.001***
	Primary school	12,66±2,14 [a]	
	High school	13,03±2,24 [a]	
	Bachelor degree	14,11±2,24 [a]	
	Graduate degree	13,42±2,71	
	PhD degree	13,37±2,06	
Occupation	**Housewife**	12,71±2,31	0.507*
	Civil servant	13,25±2,42	
	Health employee	13,75±2,59	
	Worker	13,12±2,36	
	Self employment	13,33±2,40	
	Retired	12,98±2,13	
	Student	13,25±2,50	
Income rate	**Low**	12,82±2,40	**0.040***
	Equal	13,33±2,30	
Family type	**Nuclear family**	13,25±2,25	0.325**
	Joint family	13,03±2,42	
Social Security	**Present**	13,12±2,34	0.761**
	Absent	13,00±2,62	
Employment status	**Employed**	13,10±2,41	0.972**

	Unemployed	13,11±2,31	
Chronic disease	Present	13,21±2,22	0.539**
	Absent	13,06±2,43	
The first medical institution he/she applied to when he/she got sick	Family doctor	13,03±2,47	0.634*
	State hospital	13,20±2,39	
	Medical faculty hospital	12,79±2,17	
	Private hospital/Clinic	13,26±1,86	
Has he/she received any information about the rational use of antibiotics?	Yes	13,22±2,24	0.484**
	No	13,06±2,42	
If he/she received information from who or where did he/she get information?	Health personnel	13,17±2,37	0.635**
	Mass communication tools	13,34±2,09	

* One-Way Analysis of Variance ([a]Post hoc:Bonferroni)

** T-Test in Independent Groups

Table 4. Comparison of Rational Antibiotic Use Attitude Scores According to Sociodemographic and Clinical Characteristics

		Attitude score (Mean±SD)	P
Age (year)	18-30	44,69±3,37	0.398*
	31-40	45,13±3,43	
	41-50	44,84±2,44	
	51-65	44,44±3,06	
Gender	Male	44,85±3,01	0.814**
	Female	44,78±3,37	
Place of residence	City	44,92±3,36	0.265*
	Town	44,91±3,04	
	Village	44,21±2,85	
Educational level	Illiterate	43,74±2,97 [a]	**0.033***
	Primary school	44,89±2,91	
	High school	44,80±3,07	
	Bachelor degree	45,54±3,98 [a]	
	Graduate degree	43,63±2,47	
	PhD degree	44,62±1,18	
Occupation	Housewife	44,80±3,47	0.134*
	Civil servant	45,37±3,04	
	Health employee	44,93±2,40	
	Worker	44,01±2,94	

	Self employment	44,75±3,30	
	Retired	43,72±3,20	
	Student	45,41±3,19	
Income rate	Low	44,55±3,08	0.154*
	Equal	45,03±3,22	
Family type	Nuclear family	44,03±2,87	**<0.001****
	Joint family	**45,25±3,27**	
Social security	Present	44,78±3,19	0.465**
	Absent	45,18±3,22	
Employment status	Employed	44,72±3,14	0.712**
	Unemployed	44,88±3,25	
Chronic disease	Present	44,49±3,05	0.137**
	Absent	44,96±3,25	
The first medical institution he/she applied to when he/she got sick	Family doctor	44,38±3,17	0.214*
	State hospital	45,01±3,09	
	Medical faculty hospital	44,47±3,23	
	Private hospital/Clinic	45,60±4,57	
Has He/she received any information about the rational use of antibiotics?	Yes	44,70±3,09	0.549**
	No	44,88±3,24	
If he/she received information from who or where did he/she get information?	Health personnel	44,62±3,12	0.747**
	Mass comminication tools	44,78±3,09	

* One-Way Analysis of Variance ([a]Post hoc:Bonferroni)

** T-Test in Independent Groups

Table 5. The Correlation between Decisional Antibiotic Knowledge Scores and Attitude Scores

		Rational Antibiotic Use Information Score
Rational Antibiotic Use Attitude Score	**r**	0.154[*]
	p	**<0.001**
	N	461
	* Pearson Correlation test	

While the participants' knowledge point average about RAU was 13.11±2.36, the attitude point average was 44.82±3.19, and no significant difference could be found between the participants' ages and their knowledge and attitude levels. It is thought that the level of knowledge of the older individuals may be close to each other due to the high level of education of the young people against the level of knowledge they have gained through experience.

In our study, it was determined that there was no significant difference between the genders of the participants and their knowledge and attitude levels. Similarly, Baydar-Artantaş et al [12] reported that the antibiotic use habits of individuals did not differ according to gender. Bayram et al [13] also determined that there was no significant difference between the attitudes of female or male parents towards antibiotic use. These finding support our results.

The difference between the participants' living places and their knowledge and attitude mean scores was found to be insignificant (p>0.05). On the other hand, Yu et al [14], evaluated the knowledge, attitudes and behaviors of parents in rural China regarding the use of antibiotics in their children, and reported that the knowledge of parents living in central districts was higher than those living in rural villages. Çelebi [15] found that the rational drug use attitudes of parents living in the city were high.

In our study, the reason why the participants living in the city had similar knowledge and attitude scores with those living in towns and villages may be due to the similar possibilities of reaching health institutions and obtaining information or considering that the state hospital is mostly preferred for health problems, it is thought that 13.9% of the people living in the village prefer the health institutions in the district and the province first. In addition, it can be said that the intensive national policy that our country has been carrying out in recent years on the rational use of antibiotics has reached many segments with the developing technology and increasing education level.

In our study, similar to the literature, it was determined that the knowledge scores of the patients have bachelor degree were higher than the illiterate, primary school graduates and high school graduates, and when the attitude scores of the bachelor graduates were compared, it was determined that the bachelor graduates were significantly higher than the illiterate (P<0.001 and P=0.033, respectively). In a study conducted by Vallin et al [16] in Sweden, it was found that as the level of education increases, the level of knowledge about antibiotics also increases.

Antibiotics are the most abused and demanded drugs from physicians, and increasing the level of education is one of the important tools that will reduce economic losses and resistance development problems by increasing rational use rates. Considering that the average knowledge score of the participants in our study was 13.11±2.36, it is seen that the knowledge score of the illiterate individuals (12.72±3.07) is not to be underestimated. It is pleasing that

this population, which makes up 9.3% of the participants, is aware of the fact that the use of antibiotics is an issue that should be considered.

In our study, it was determined that there was no significant difference between the occupations of the participants and their knowledge and attitude levels. In different studies, it has been determined that especially civil servants have knowledge about rational drug use [17,18]. Most of the participants in our study were housewives and workers. Whereas the rate of civil servants was 16.9%.

In addition to cultural factors, economic factors also affect the rational use of a drug for the consumer. The patient may not be able to take the therapeutic dose of antibiotics because the intake power is not enough even though he/she should take it. In our study, although the knowledge scores of the participants with equal income level (13.33±2.30) were statistically higher than the participants with low income level (12.86±2.40) (P=0.040), the attitude scores were not change significantly with the income level (P=0.154). This may be due to old habits and/or environmental factors.

The behaviors of individuals when they encounter any health problem are shaped according to their health perceptions, health knowledge level, learning status, family structure, socioeconomic status and expectations from health institutions [19]. In our study, it was found that 64.6% of the participants lived in joint families, the difference in knowledge mean scores between these individuals and individuals living in nuclear families was insignificant (P=0.325), while attitude scores were higher in those living in joint families (P<0.001). Living in an joint family is expected to have positive results in terms of knowledge level, as it creates an environment that allows experiences to be shared, but it is also thought that these individuals resort to ineffective traditional treatment methods more for cultural reasons. This suggests that drug use and health-related practices may increase with social interaction in joint families.

In the study, it was found that 422 participants (91.5%) had social security, 39 (8.5%) did not, and there was no difference between social security and their knowledge and attitude levels. Individuals who do not have social security are reluctant to apply to health centers because they have to pay all of the health services themselves.

While 56.6% of the participants reported that they were employed, 43.4% reported that they were unemployed. When both the knowledge score and the attitude score were compared, no significant difference was found between these participants (P>0.05).

Chronic diseases are usually a group of diseases that require continuous treatment, in which the adaptation of the individual and the family may be difficult, and even require changes in lifestyle [20-22]. The fact that individuals with chronic diseases go to the hospital more frequently and use more drugs may be effective in gaining more knowledge about this issue. In the study, probably because the majority of the participants were young (62.7%), the incidence of chronic diseases was low (30.6%), and there was no significant difference in

knowledge and attitude scores between those with and without chronic diseases.

Maç and Öztürk [23] found that people go to family health centers most frequently (62.8%) when they get sick, followed by state hospitals (19.5%) and university hospitals (9.9%). In our study, it was determined that the first health institution that most of the participants applied to when they got sick was the state hospital. When the knowledge and attitude scores are examined, it is seen that the knowledge and attitude scores of the individuals who go to a private hospital/practice are higher, although it is not significant. This result may be related to the fact that the time allocated to the patient in a private hospital or practice is longer than in other medical institutions.

In our study, it was determined that most of the participants (66.4%) did not receive information about RAU before. 51.6% of the 155 participants who stated that they had information stated that they received this information from health personnel. The high share of health personnel may be an indication that this segment is very sensitive to RAU.

It was observed that 48.4% of the participants obtained information from mass media. Health news, which takes place more frequently in the content of mass media and whose importance is increasing day by day, brings the concept of health communication to the agenda. Health communication contributes to the development of individual and public health. This result shows that the messages conveyed through mass media are perceived positively by the audience.

In a study conducted with 186 patients and their relatives who applied to a university hospital in Düzce (another city of Türkiye), it was stated that only 3.8% of the participants knew about the concept of rational drug use, while 12.4% had heard about it but had no knowledge [24]. Our study was also conducted with patients admitted to a university hospital, and it was found that 33.6% of the participants received information about RAU.

In our study, a weak positive relationship was found between the level of knowledge and the level of attitude, and this relationship was found to be significant (r=0.154; P<0.001). In order for individuals to have knowledge about RAU and to use the information appropriately in practice, they need to have a positive attitude about it.

4. Conclusion

In conclusion, the present results demonstrated that the level of attitude increased as the level of knowledge increased. We think that with our study, we have created awareness even in a small part of the society about the correct use of antibiotics and we have provided awareness on this issue with the short information we gave to the participants after the survey. In line with the results obtained, considering the 66.4% share that does not have RAU knowledge, we think that policies towards RAU should be expanded to include the society and these programs should be accessible especially to individuals with low education and income levels.

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