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ORIGINAL ARTICLE

Investigation of knowledge and attitude levels regarding irrational antibiotic use among students in the faculty of health sciences

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Abstract

Objective: This study was conducted to examine the drug use status of students at the Faculty of Health Sciences (FHS) and the factors influencing it, to determine their behavior regarding the use of rational antibiotics, their knowledge and attitude levels regarding antibiotic use, as well as their subjective norms and intentions.

Methods: This cross-sectional descriptive research was conducted between January and March 2020 with students enrolled in the FHS Nursing, Physiotherapy and Rehabilitation, and Nutrition and Dietetics Departments at a foundation university in Gaziantep. The research population is 865 students, and the sample size is 581. A questionnaire consisting of 58 items was used to collect data AUS (Antibiotic Use Scale).

Results: It was determined that 57.8% of students used analgesic without seeking professional help, 64.5% did not take antibiotics without consulting a physician, and 75.6% discontinued taking antibiotics once they felt better. It was discovered that more than half of the students (63.9%) retained their unused medicines at home, and that 66.4% of them continued to do so after they had not taken all of the pills. It was discovered that the students who received antibiotics while they were unwell and used antibiotics without consulting a physician had this mentality, were influenced by the people around them, and were committed to this problem ($p<0.05$).

Conclusion: It was discovered that half of the students lacked awareness regarding rational antibiotic usage and did not demonstrate rational antibiotic usage habits.

Keywords: Usage of Irrational Antibiotic, Knowledge and Attitude, Faculty of Health Sciences, Students

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INTRODUCTION

As a result of the advancements in 21st-century medicine, the number of medications used to treat patients has increased. When medications misused, it takes on a dimension that can delay healing and endanger human life.[1] When a person notices anything wrong with themselves, he contacts a doctor, who, after a series of examinations or analyses, prescribes a medication that is appropriate for their illness and notifies the patient. Indicated by "Rational Use of Medicines (RUM)" is the procedure of taking the patient-supplied pharmaceuticals at the appropriate time and dose.[2,3] Numerous drug-related blunders (not taking the drugs on time and in the correct dose, discontinuing drugs when patient recover, etc.) have been committed "Inappropriate Medication Use" (IMU). IMU may result in patients not cooperating with therapy, drug interactions, antibiotic resistance owing to incorrect usage, failure to heal and return of illnesses, and an increase in treatment expenses.[1] IMU behaviors in our country include taking drugs without consulting the physician, using the drugs at home without asking the physician and recommending them to others or taking drugs with the advice of others, not using the drugs in the recommended dose, interrupting treatment after recovery, and insisting on prescribing drugs unnecessarily.[4,5] Adults who participated in the study by Artantaş et al. (2015) defined "Rational Antibiotic Use (RAU)" as follows: "It is harmful not to use antibiotics unless necessary, to use antibiotics when necessary, to use them according to the doctor's advice and at the dose and time recommended by the doctor, and to use antibiotics frequently." In the same survey, nearly all participants (91,4%) reported that they had never heard of an RAU-related concept.[6]

Antibiotics are medications that kill bacteria without causing harm to people and also inhibit the growth of microbes. [7] Antibiotic resistance increases as a result of irrational antibiotic use (utilizing without a prescription, utilizing on the advice of friends, discontinuing when healed, etc.). As a result, the treatment process cannot advance in a healthy manner, deaths occur, and treatment expenditures rise excessively.[8,9] The unintentional use of antibiotics by humans has negative effects on both users and society. The Ministry of Health implemented an antibiotic restriction policy in April 2003 to prevent the unnecessary and uncontrolled use of antibiotics; it has been explained that "antibiotics must be sold with a prescription, and they are obtained from pharmacies with prescriptions issued by public/private health institutions and organizations, recorded in printed, e-prescription or electronic media, or by prescriptions written by private doctors."[10] In addition, with the "Rational Use of Medicines National Action Plan 2014-2017" and RUM campaigns, the Ministry of Health has ensured the prohibition of antibiotics as a priority in the sale of the over drugs in pharmacies and raised public awareness that viral diseases cannot be treated with antibiotics.[11]

Despite occasional drops in antibiotic use over the years, our nation remains the OECD (Organization for Economic Co-operation and Development) country with the greatest consumption of antibiotics, as a result of initiatives implemented to restrict antibiotic use.[12] In the systematic review research by Bozdemir and Filiz (2021), it was determined that while there were no studies demonstrating

an adequate degree of knowledge on RUM among the general population, students had a good level of understanding despite having shortcomings.[13] According to research conducted in our country on the use of medications and antibiotics by university students, the rate of antibiotic or drug use varies between 80.2% and 35.2%, depending on the physician's advice.[2,6,7,14–21] As a result of these studies, it is seen that university students' knowledge about drug or antibiotic use is insufficient, wrong or incomplete and irrational medicine/antibiotic use. In similar studies conducted in the world on this subject, it was found that the rate of antibiotic use of students studying in health-related schools ranged between 97.2% and 45.6%.[22–27] As key members of the health sector, faculty of health sciences (FHS) students are expected to pay attention to incorrect, inaccurate, and unnecessary drug usage and serve as role models in this regard. It is believed that the research undertaken to examine the irrational use of medicines and antibiotics and the variables influencing this scenario among university students would serve as the foundation for efforts to prevent these by identifying the reasons of this situation among university students. This study was conducted to assess the drug use status of FHS students and the factors influencing it, as well as to determine their behavior about "Rational Antibiotic Use (RAU)," as well as their knowledge, attitude, subjective norms, and goals towards antibiotic use.

METHOD

Type of Research, Universe and Sample Size

Between January 2020 and March 2020, 865 students from the Nursing, Physiotherapy and Rehabilitation, and Nutrition and Dietetics Departments of a foundation university in Gaziantep participated in this cross-sectional descriptive study. Students who did not want to voluntarily participate in the research, did not take the exam, or did not attend classes were eliminated, leaving a study sample of 581 (67%) students.

Data Collection Tools and Data Collection Method

Students were administered a questionnaire with 58 items and the Antibiotic Use Scale (AUS) under supervision and with authorization from the responsible lecturer/staff during one class hour. It includes general information such as students' age, social security number, family income, antibiotic use without a physician's consultation, drug use in the event of illness, where they store drugs, antibiotic usage information, the type of drug used in general, and the issue to be considered in antibiotic use.

AUS consists of 19 items and was designed by Atik and Dogan (2019) to examine the effect of persons on antibiotic use behavior. Strongly Agree = 5 points, Agree = 4 points, Partially Agree = 3 points, Disagree = 2 points, and Strongly Disagree = 1 point, in the form of a five-point Likert scale. The maximum score on the scale is 95, and the minimum is 19. AUS includes three components: "Attitude," "Subjective Norm," and "Intention". The sub-dimension of "Attitude" for Factor 1 consists of 11 components as follows: 1, 2, 3, 4, 7, 8, 9, 12, 13, 15, 19. The "Subjective norm" sub-dimension of Factor 2 comprises five items: 5, 10, 14, 16, 18. The "Intention" sub-dimension of Factor 3 consists of three items: 6, 11, and 17. The scale's Cronbach Alpha coefficient was discovered to be 0.94. In this investigation, the scale's Cronbach Alpha coefficient was

determined to be 0.95. The average of the sub-dimension 'Attitude' in the AUS can be regarded as a favorable attitude toward antibiotic use. Likewise, the same holds true for various subdimensions.[9]

Attitude; In this dimension, which aims to measure the attitudes of persons regarding antibiotic usage, statements are included in which the participants' evaluations of the outcomes of antibiotic use and their potential implications are expressed. *Subjective norm*; There are statements regarding the impact of the opinions of individuals whom the participants deem to be influential on the usage of antibiotics. High overall scores on this category indicate that their antibiotic use is impacted by their environment. *Intention*; the individuals' intention to use antibiotics is the greatest predictor of their antibiotic usage behavior. In other words, when the intention scores of two persons are compared, the individual with a high average of the overall intention items is more likely to use antibiotics.

Aspects of Research Ethics

The Non-Interventional Research Ethics Committee of the Faculty of Health Sciences at a foundation university in Gaziantep approved the research with the decision number 2019/127, and written approval was acquired from the university where the research was done. The goal of the study was described to the students, and their verbal consent to participate in the research was obtained. By e-mail, permission to use was secured from the writers who created the AUS.

Evaluation and analysis of data

SPSS (Statistical Package for the Social Sciences) 23.0 for Windows was used to create and analyze databases. The results were within the 95% confidence range, and a p-value of less than 0.05 was declared statistically significant. The number-percentage distribution, mean standard deviation, and minimum-maximum values of the data about the students' drug and antibiotic usage, as well as their introductory information, were analyzed. Using the Histogram, Q-Q Plot graph, skewness, and kurtosis values, conformity to normal distribution was determined. The outcome of the Kolmogorov-Smirnov test was not analyzed since it tends to yield significant results for large sample sizes.[28] For categorical variables with a normal distribution, the t-test was utilized for independent groups, one-way analysis of variance for variables with three or more groups, and the Kruskal Wallis H test for other values.

RESULTS

It was revealed that 62.6% of the research participants were between the ages of 21 and 23, with a mean age of 21.59 ± 1.84 years (Minimum 18 - Maximum 39). 72.6% of the students were determined to be female, 30.1% were in the second grade, and 19.6% were in the fourth grade. It was discovered that 40.8% of students were enrolled in the department of Physiotherapy and Rehabilitation. The moms and dads of the students had the greatest rates of primary/secondary school graduation (45.6% and 38.5%, respectively). It was discovered that 61.3% of the students lived with their families, 49.1% claimed that the family's income and costs were equal, 85.0% received social security, and 15.7% had a chronic ailment (Table 1).

Table 1. The sociodemographic characteristics of the students (n=581)

Sociodemographic Variables	Variable Groups	Distributions	
The average age	21.59±1.84 (18-39)	n	%
Age	18-20	158	27.2
	21-23	364	62.6
	24≤	59	10.2
Gender	Female	422	72.6
	Male	159	27.4
Academic year	1st grade	118	20.4
	2nd grade	175	30.1
	3rd grade	174	29.9
	4th grade	114	19.6
Area of study	Nursing	196	33.7
	Nutrition and Dietetics	148	25.5
	Physical therapy and rehabilitation	237	40.8
Mother's education degree	illiterate	46	8.0
	literate	42	7.2
	Primary / Secondary School graduate	265	45.6
	High school graduate	149	25.6
	College/University graduate	79	13.6
Father's education degree	illiterate	8	1.4
	literate	26	4.5
	Primary / Secondary School graduate	224	38.5
	High school graduate	177	30.5
	College/University graduate	146	25.1
Where he/she presently	With family	356	61.3
living	At home with a sibling/friend	47	8.1
	Home by yourself	39	6.7
	In the dormitory	139	23.9
Family's income level	Income less than expenses	70	12.0
	Income equals expense	285	49.1
	Income higher than expenses	226	38.9
Social insurance	Yes	494	85.0
	No	87	15.0
Existence of chronic	Yes	91	15.7
illness*	No	490	84.3

* Asthma, thalassemia, anemia, allergy, migraine, diabetes mellitus, eczema, epilepsy, gastritis/reflux, hashimoto thyroid, hypothyroid, hypertension, sinusitis etc

It was revealed that 57.8% of the students in the research utilized analgesic without consulting a physician, and 19.0% used antibiotics without consulting a physician. It was shown that 73.5% of the students took analgesic on a regular basis, 78.8% declaring that every household should provide medicine, and 41.5% stored their medicines in the refrigerator and 27.0% in the medicine cabinet. It was established that more than half of the students (63.9%) retained their unused medicines at home, and that 66.4% of those students continued to keep the medicines at home after not using them all. It was discovered that 35.5% of students always have antibiotic in reserve at home, and

that 79.3% of students do not let the price of antibiotics impact their use. It was shown that 62.7% of students followed the doctor's advice about the use of antibiotics, whereas 11.5% of students insisted that the doctor prescribe antibiotics (Table 2).

Table 2. The Distribution of Students' Medicine and Antibiotic Use Behaviors

Usage of Antibiotics Variables	Variable Groups	Distributions	
		n	%
Utilized analgesic without consulting a physician	Yes	336	57.8
	No	129	22.2
	Sometimes	116	20.0
Utilized antibiotics without consulting a physician	Yes	110	19.0
	No	375	64.5
	Sometimes	96	16.5
Medicine category regularly used	Analgesic	427	73.5
	Antibiotic	37	6.4
	Cold medicines	103	17.7
	Other*	14	2.4
Declaring that every household should provide medicine.	Yes**	458	78.8
	No	123	21.2
Location for medicine storage	Refrigerator	241	41.5
	Bag	25	4.3
	Drawer	158	27.2
	Medicine cabinet	157	27.0
Keeping unused medicines at home Evaluation when a medicine is not completely consumed.	Yes	371	63.9
	No	210	36.1
	Dispose.	143	24.6
	Home storage.	386	66.4
	Donate to someone	52	9.0
Declaring that bring medicine while traveling	Yes	332	57.1
	No	249	42.9
Always have antibiotic in reserve at home	Yes	206	35.5
	No	375	64.5
The price of antibiotics impacts their utilization	Impact	120	20.7
	Not impact	461	79.3
Consideration in the use of antibiotics	Physician recommendation	364	62.7
	Medicine use conditions	118	20.3
	Allergy/side effect	99	17.0
Insist on the physician to prescribe antibiotics	Yes	67	11.5
	No	514	88.5

* Antihistamines, muscle relaxants, asthma medicines, stomach protectors, antidepressants, iron medicines, and acne medications. ** Analgesics, antipyretics, cold medicines, muscle relaxants, antibiotics, cough syrup, and etc.

It was discovered that 56.8% of the students defined antibiotic as bactericidal and 54.0% were unaware of IAU. It was revealed that 36.7% of students learnt about IAU via health experts, whereas 27.0% learned about it from the internet. It was discovered that 61.6% of students were told about the method, duration, and dosage of medicine by their physician. It was established that 22.2% of students took pharmaceuticals without a physician's suggestion, 22.6% used drugs without a doctor's recommendation on occasion, 33.1% ceased taking the medication before the physician's advised period, and 75.6% stopped using antibiotics when they felt better (Table 3).

Table 3. The Distribution of Students' Attitudes About Rational Antibiotics and Medicines

Usage of Antibiotics Variables	Variable Groups	Distributions	
		n	%
Understanding the adverse effects of the used antibiotic	Yes	383	65.9
	No	198	34.1
Sorce of information about antibiotic usage	Physician	227	39.1
	Pharmacy	107	18.4
	Parent	45	7.7
	Reading prospectus	202	34.8
Defining the antibiotic's meaning	Antipyretic	30	5.2
	Analgesic	100	17.2
	Bactericide	330	56.8
	Virucidal	121	20.8
Status information regarding IAU	Yes	267	46.0
	No	314	54.0
Information source about IAU	Print media	35	13.1
	Television	48	18.0
	Internet	72	27.0
	Health personnel	98	36.7
	University education	14	5.2
Obtaining information from the physician on the dosage, type, and duration of a medicine	Yes	358	61.6
	No	129	22.2
	Sometimes	94	16.2
Using medicine without consulting a physician	Yes	129	22.2
	No	321	55.2
	Sometimes	131	22.6
Stop using the medicine before theperiod prescribed by the physician	Yes	193	33.1
	No	176	30.4
	Sometimes	212	36.5
Stop taking antibiotics after feel better	Yes	439	75.6
	No	142	24.4

Table 4 shows the average scores of students on the AUS and its sub-dimensions.

Table 4. The Antibiotic Use Scale and Its Subdimensions' Mean Scores

Scale and	Distributions of Scores		
Sub-Dimensions	Min.	Max.	Mean±SD
Attitude	11	55	25.15±10.08
Subjective Norm	5	25	11.66±4.71
Intention	3	15	7.70±3.17
AUS Total	19	95	44.52±16.71

Min.: lowest value, Max.: highest value

In Table 5, when the distribution of student behaviors related to their drug use status is compared with the mean scores of AUS and its sub-dimensions, a statistically significant difference was found between the use of drugs without a physician's recommendation and situations of stopping drug use before the time recommended by a physician and AUS and all sub-dimensions of the scale ($p<0.05$). There was a statistically significant difference ($p<0.05$) between the type of substance taken in general and AUS, as well as the subdimensions "Attitude" and "Subjective Norm" of the scale, when compared to AUS (Table 5). There was a statistically significant difference ($p<0.05$) between the use of analgesics without consulting a physician and the evaluation of the medication when not all of it was consumed, as well as the AUS and the "Intention" sub-dimension of the scale. There was a statistically significant difference between the presence of unused medications at home and the "Intention" subfactor of the scale ($p<0.05$) (Table 5).

Table 5. Comparison of the Distribution of Students' Medicine Use Behaviors with the Mean Scores of the AUS and Sub-Dimensions.

Variables	n	Antibiotic Usage Scale			
		Attitude	**Subjective Norm**	**Intention**	**Total**
		Mean±SD	*Mean±SD*	*Mean±SD*	*Mean±SD*
Utilized medicine without consulting a physician					
Yes	129	27.1±9.6	12.5±4.6	8.5±2.9	48.2±15.5
No	321	24.3±10.4	11.3±4.9	7.17±3.19	42.8±17.4
Sometimes	131	25.3±9.7	11.7±4.3	8.19±3.10	45.2±15.6
Test (F)		**3.675**	**3.279**	**10.561**	**5.052**
p		**0.026**	**0.038**	**0.001**	**0.007**
Stop using the medicine before the period prescribed by the physician					
Yes	193	26.0±10.1	12.1±4.8	7.9±3.1	46.0±16.6
No	176	23.2±9.8	10.8±4.6	7.1±3.2	41.2±16.7
Sometimes	212	25.9±10.1	12.0±4.6	8.0±3.2	45.9±16.5
Test (F)		**4.565**	**4.275**	**4.377**	**5.157**
p		**0.011**	**0.014**	**0.013**	**0.006**
Utilized analgesic without consulting a physician					
Yes	336	25.7±10.2	11.9±4.7	8.0±3.20	45.8±16.9
No	129	23.4±10.1	10.8±4.7	6.9±3.1	41.2±16.6
Sometimes	116	25.3±9.6	11.6±4.5	7.6±3.1	44.5±15.9
Test (F)		2.492	2.701	**6.110**	**3.533**
p		0.084	0.068	**0.002**	**0.030**

Table 5. (Countinue) Comparison of the Distribution of Students' Medicine Use Behaviors with the Mean Scores of the AUS and Sub-Dimensions.

Medicine category regularly used					
Analgesic	427	25.2±9.8	11.8±4.7	7.7±3.2	44.6±16.4
Antibiotic	37	28.5±8.7	13.1±3.8	8.4±2.9	50.0±13.5
Cold medicines	103	24.7±11.2	11.2±5.1	7.7±3.3	43.6±18.2
Other*	14	17.9±9.5	8.3±4.2	6.8±3.4	33.1±15.6
Test (F)		**3.863**	**3.969**	0.995	**3.667**
p		**0.009**	**0.008**	0.395	**0.012**
Evaluation when a medicine isn't completely consumed.					
Dispose.	143	24.6±11.4	11.2±5.3	6.7±3.5	42.6±19.3
Home storage.	386	25.1±9.5	11.7±4.5	8.1±3.0	44.9±15.6
Donate to someone	52	27.2±10.1	12.4±4.7	7.4±3.0	47.0±16.9
Test (F, χ2)		1.261	1.129	**11.183**	**6.868***
p		0.284	0.324	**<0.001**	**0.032**
Keeping unused medicines at home					
Yes	371	25.5±9.9	11.8±4.6	8.1±3.1	45.5±16.2
No	210	24.5±10.3	11.3±4.9	6.9±3.1	42.8±17.4
Test (t)		1.127	1.309	**4.220**	1.844
p		0.260	0.191	**<0.001**	0.066

*F: One-Way Anova, t: Independent Samples t-test, χ2: Kruskal Wallis H test

In Table 6, when the distribution of students' antibiotic use behaviors and knowledge about rational antibiotics is compared with the mean scores of AUS and its sub-dimensions (using antibiotics when students get sick, using antibiotics without consulting your doctor, believing that they can get better without using antibiotics, stopping antibiotic use when they feel better), a statistically significant difference was found (p<0.05) between AUS and all sub-dimensions of AUS (Table 6). There was a statistically significant difference (p<0.05) between the subdimensions of AUS and "Attitude" and "Subjective Norm" of the scale and the students' knowledge of the side effects of the antibiotic they used, their ability to define the antibiotic, and their insistence that the physician prescribe antibiotics (Table 6).

Table 6. Comparison of Students' Antibiotic Usage Behaviors and Antibiotic Knowledge Distribution Using AUS and Sub-Dimensional Mean Scores

Variables	**n**	**Antibiotic Usage Scale**			
		Attitude	**Subjective Norm**	**Intention**	**Total**
		Mean±SD	*Mean±SD*	*Mean±SD*	*Mean±SD*
Using antibiotics during illness					
Yes	314	27.02±8.79	12.23±4.28	8.18±2.96	47.43±14.46
No	267	22.95±11.02	10.99±5.11	7.14±3.33	41.09±18.47
Test (t)		**4.859**	**3.127**	**3.923**	**4.548**
p		**<0.001**	**0.002**	**<0.001**	**<0.001**

Table 6.(Countinue) Comparison of Students' Antibiotic Usage Behaviors and Antibiotic Knowledge Distribution Using AUS and Sub-Dimensional Mean Scores

Understanding the adverse effects of the used antibiotic					
Yes	383	24.39±9.50	11.33±4.46	7.57±3.15	43.30±15.91
No	198	26.63±10.98	12.30±5.12	7.95±3.21	46.88±17.97
Test (t)		**2.436**	**2.253**	1.357	**2.462**
p		**0.015**	**0.025**	0.175	**0.018**
Utilized antibiotic without consulting a physician					
Yes	110	27.91±9.80	13.00±4.67	8.47±3.02	49.39±16.28
No	375	23.85±10.57	11.01±4.85	7.19±3.27	42.06±17.43
Sometimes	96	27.05±7.09	12.66±3.66	8.83±2.46	48.55±11.68
Test (χ2)		**25.087**	**25.254**	**31.683**	**31.489**
p		**<0.001**	**<0.001**	**<0.001**	**<0.001**
Considering that recover without antibiotics					
Yes	103	24.09±9.96	11.31±4.67	7.56±3.27	42.97±16.64
No	14	28.91±9.63	12.90±4.69	8.18±2.77	50.00±15.84
Test (t)		**-4.870**	**-3.402**	**-2.132**	**-4.265**
p		**<0.001**	**0.001**	**0.034**	**<0.001**
Stop taking antibiotics after					
feel better					
Yes	439	25.70±10.04	11.96±4.66	7.97±3.12	45.64±16.45
No	142	23.45±23.45	10.73±4.79	6.88±3.21	41.06±17.09
Test (t)		**2.326**	**2.722**	**3.595**	**2.856**
p		**0.020**	**0.007**	**0.001**	**0.004**
Needing antibiotics for every illness					
Yes	56	29.26±10.14	13.19±4.72	8.26±2.93	50.73±16.24
No	525	24.71±9.98	11.50±4.69	7.64±3.20	43.86±16.64
Test (t)		**3.238**	**2.568**	1.393	**2.943**
p		**0.001**	**0.010**	0.164	**0.003**
Always have antibiotic in reserve at home					
Yes	206	27.05±8.91	12.55±4.47	8.48±2.85	48.09±14.93
No	375	24.11±10.53	11.17±4.78	7.27±3.26	42.56±17.32
Test (t)		**3.395**	**3.415**	**4.451**	**3.863**
p		**<0.001**	**<0.001**	**<0.001**	**<0.001**
Defining the antibiotic's meaning					
Antipyretic	30	25.90±7.81	12.56±3.93	7.93±2.62	46.40±13.01
Analgesic	100	28.05±8.85	12.98±4.12	8.10±2.63	49.13±14.59
Bactericide	330	24.33±10.09	11.22±4.72	7.61±3.23	43.16±16.65
Virucidal	121	24.82±11.10	11.54±5.14	7.57±3.56	43.95±18.69
Test (F, χ2)		**15.445**	**3.985**	2.168	**14.266**
p		**0.001**	**0.008**	0.538	**0.003**
Insist on the physician to prescribe antibiotics					
Yes	67	28.74±10.22	13.04±4.62	8.08±2.98	49.88±16.82
No	514	24.68±9.97	11.48±4.70	7.65±3.20	43.82±16.59
Test (t)		**3.123**	**2.557**	1.051	**2.805**
p		**0.002**	**0.011**	0.294	**0.005**
Offer antibiotics to.relatives with similar ailments					
Yes	104	28.32±8.91	13.03±4.20	8.32±2.90	49.69±14.53
No	477	24.46±10.19	11.36±4.77	7.57±3.22	43.39±16.95
Test (t)		**3.577**	**3.305**	**2.206**	**3.513**
p		**<0.001**	**0.001**	**0.028**	**0.001**

*F: One-Way Anova, t: Independent Samples t-test, χ2: Kruskal Wallis H test

DISCUSSION

In our research, 57.8 percent of students utilized analgesic and 19.0 percent used antibiotics without contacting a physician (Table 2). It was revealed that almost half of the students utilized medications without a doctor's approval, and 33.1% of them ceased taking the medicine before the period prescribed by the physician (Table 3). In a number of published research, it was determined that our study's findings were comparable to those of these other investigations.[7,14,16,18–21,29] It was determined that 65.9% of the students knew the side effects of the antibiotics they used, that 55.2% of them did not use medicine without a physician's recommendation, that 39.1% of them obtained information about antibiotic use from a physician and that 34.8% obtained information by reading the prospectus. It was discovered that 61.6% of the students were told about the method, duration, and dosage of medicine by their physician (Table 3). According to the research, there were students who used medications[21,30,31] or antibiotics[7,32] on the doctor's advice, as well as others who did so without a prescription and without seeing a physician.[14,15] According to reports, between 52.4% and 83.6% of students read the medicine prospectus prior to usage.[15,21] In the research carried by Okyay and Erdogan (2017), analgesics (39.5%), antibiotics (36.9%), and flu medications (24%) were the most often used pharmaceuticals without a prescription.[17] In the research conducted by Soysal and Sahin (2020), it was revealed that students mostly acquired medicine-related information from physicians (48.6%) and pharmacies (47.6%).[31] Observably, some of the cited research' conclusions differ from those of our findings. Since they are in the field of health sciences, this finding shows that the students who participated in the study utilized medications and antibiotics in accordance with their education and practical experience.

According to a number of studies, students keep medicines in suitable circumstances.[7,20] Generally, medicines should be kept according to their labels' instructions.[33] When medications are improperly stored, such as at room temperature instead of in the refrigerator, they undergo chemical changes that reduce their therapeutic efficacy.[2] It was established that the results of certain other studies were comparable to those of our experience.[15,29,33] In our research, we concluded that more than two-thirds of the students (63.9%) retained their leftover medications at home, that 66.4% of them continued to keep the pills at home after they had not taken them all, and that 24.6% discarded them. It was found that 35.5% of kids always have an antibiotic at home (Table 2). Similar outcomes were reported in studies that confirmed our study's findings.[15,16] In Pınar's (2017) research, more over half of the students (65.3% of females and 54% of males) reported discarding expired medications.[29] Considered an IMU issue is the rise in the number of medications not used at home due to their concealment.[34] In our research, we discovered that students were determined to keep the medication, even if not all of it was used, and they were also determined to keep the unused medicines at home ($p<0.05$) (Table 5). In our study, we discovered that individuals who usually have extra antibiotics at home and those who offer antibiotics to family members who have similar concerns about their own disease have this attitude, are affected by others around them, and are adamant about this subject ($p<0.05$) (Table 5). This indicates

that when they become unwell again, they will be able to self-medicate or will offer antibiotics to family members with similar complaints.

The results of a survey indicate that 55.2% of midwifery students believe they have enough understanding of antibiotics. In the same research, 66.9% of the students said antibiotics should be prescribed for urinary tract infections, 57.2% for middle ear infections, 42.8% for fever, 39.3% for toothaches, and 37.2% for sore throats.[35] In the study of Okyay and Erdoğan (2017), 45.9% of the students stated that they had knowledge about RAU.[17] In the research conducted by Kocyigit et al. (2020), 53.8% of students in their first year of medical school had never heard of RAU.[14] According to Akman's (2021) report, 75.7% of students are aware that antibiotics are crucial in the fight against bacterial resistance. In the same report, 53.1% of students took antibiotics for colds and flu, 65.1% experienced sore throat, and 47.4% believed it to be useful against fever.[36] Almost half of the students (46%) had knowledge of RAU, which is consistent with the results of the literature and the findings of the research.

In our research, we discovered that students who took medications without a physician 's advice and quit taking the medication before the physician's advised period were affected by their friends and resolute about this matter. ($p<0.05$) (Table 5). We have discovered that individuals who take antibiotics while they are ill and those who use antibiotics without consulting a physician are influenced by others around them and are committed to addressing this issue. ($p<0.05$) (Table 6). Similar to previous research,[2,6,7,14–21] we find that university students have inadequate, inappropriate, and incomplete knowledge about the usage of medicines and antibiotics.

The majority of our students who participated in the research (75.6%) demonstrated IAU behavior when they stopped taking antibiotics when they felt better (Table 3). Similar studies conducted in our country and overseas indicated that fifty percent of university students stopped taking antibiotics because they believed they had healed.[14,15,17,23,27,29,30] It is one of the principles of RAU that students utilize antibiotics at the time and at the dosage prescribed by their physician. In the research evaluated by Bozdemir and Filiz (2021) for their systematic review, it has been noted that people take medications without visiting a physician or on the recommendation of a friend or family, and that they cease taking the medicine when their health concerns improve.[13] Mete and Ünal (2018) found that students of the Vocational School of Health Services who had been informed about RUM exhibited more reasonable behavior than those who had not. Mete and Ünal (2018) found that students of the Vocational School of Health Services who had been informed about RUM exhibited more reasonable behavior than those who had not.[2] According to Sahin et al. (2019), students outside of the faculty of pharmacy acted more in accordance with the RDA's principles.[16] Despite the fact that more than 64.5% of the students in our research (Table 2) believed that antibiotics should not be used without a prescription, they believed they had healed and ceased taking antibiotics, indicating that IAU continues. Antibiotic overuse is a significant risk factor for the development of bacterial resistance.[36] Students should be educated on the need of only taking antibiotics when required, considering the widespread development of antibiotic resistance in our nation and throughout the globe.

In our research, we discovered that antibiotics were the most common kind of medication taken by students, that they were influenced by the people around them, and that they were committed to addressing this issue. ($p<0.05$) (Table 5). In addition, we concluded that persons who believe they cannot recover without antibiotics and who need antibiotics for every ailment are influenced by the opinions of others around them and are committed to this attitude ($p<0.05$) (Table 6). It was also established that the students who demanded that the doctor prescribe antibiotics were influenced by their friend. ($p<0.05$) (Table 6). In the research of Koçyiğit et al. (2020), 89.3% of the students responded that the usage of antibiotics in our country is very intense.[14] Almost all (91.7%) of the college students who participated in Akman's (2021) research stated that people in our country overuse antibiotics. Antibiotic overuse is a significant risk factor for the development of bacterial resistance.[36] Students should be educated on the need of only taking antibiotics when required, considering the widespread development of antibiotic resistance in our country and throughout the globe.

CONCLUSION

It was discovered that fifty percent of students were unaware of IAU. We have observed that students who use antibiotics when they are ill and who use antibiotics without visiting a physician are influenced by their friends and are committed to their decision. We discovered that individuals who discontinued using antibiotics when the students began to feel better were affected by their friends and were committed to their decision. In our study, we discovered that individuals who always have extra antibiotics at home and those who offer antibiotics to family members with comparable concerns about their own ailments are influenced and committed to their decision. We concluded that the students who demanded that the physician prescribe antibiotics were influenced by their friends. Based on these findings, we may conclude that students demonstrate irrational antibiotic usage.

There are three primary pillars of responsible medicine usage. First, physicians, pharmacists, and the pharmaceutical industry serve as the supply pillar. The second demand pillars are customers, therefore society and patients. As the third pillar of regulatory and supervisory systems, the state, non-governmental organizations, and reimbursement institution comprise the third pillar. There are obligations in each of the stated pillar that fall on everyone.[4] It is not only the responsibility of physicians who prescribe medicines and inform patients about medicine use to raise awareness of RUM; it is also recommended that all health professionals be required to take a course on the topic as part of their education and that student symposiums and conferences be held on this topic. In addition, as knowledge in the field of health is always being updated, it is believed that it is essential for health professionals to reinforce these topics through in-service trainings in the institutions where they work after graduation.

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