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Evaluation of Drugs Use Habits of University Students During the Covıd-19 Pandemic Period

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Abstract

This study was conducted as a cross-sectional survey to evaluate the knowledge, attitudes, and behaviors of university students regarding the rational use of medicines during the COVID-19 pandemic.

Data were collected from 401 students (239 (59.6%) females and 162 (40.4%) males) at Çukurova University in Adana, Turkey, using face-to-face interviews at various locations on campus. The 24-questions survey covered demographic information, attitudes towards COVID-19, and the use of medications, including vitamins, minerals, herbal remedies, antibiotics, and antidepressants. The sample size of 381 was calculated using the Raosoft® calculator, with a 5% margin of error and a 95% confidence level. The data were analyzed using variance, frequency, percentage, mean, standard deviation, and median analysis in SPSS Software.

According to the findings, 117 (29.2%) students were studying medicine, 99 (24.7%) engineering, and 185 (46.1%) literature. 378 (94.3%) participants received the COVID-19 vaccine and 23 (5.7%) had not, with 244 (64.5%) received two doses, 123 (32.5%) three doses, and 11 (2.9%) one dose. Regarding the use of vitamins and herbal supplements, 335 (83.5%) students did not use them, while 66 (16.5%) did to protect against COVID-19. Regarding antibiotic use, 381 (95%) students did not take them and 20 (5%) used antibiotics. Regarding antidepressant usage, 389 (97%) students did not use them and 12 (3%) did.

The study concluded that students at Çukurova University exhibited a high level of knowledge, positive attitudes, and appropriate behaviors regarding rational drug use during the pandemic.

Keywords: Rational Drug Use; COVID-19; Pandemic; Coronavirus; Pharmacology

Introduction

Rational drug use (RDU) as defined by the World Health Organization (WHO); is the ability of individuals to obtain the appropriate drug, with the appropriate time and dose, at the lowest price to them and to the community, according to their clinical findings and individual characteristics [1].

Irrational drug usage (IDU) is a global issue. According to the WHO, over half of all drugs are prescribed, delivered, or sold incorrectly, and half of patients do not use them properly. Misuse—through overuse, underuse, or inappropriate use—wastes resources and jeopardizes health. Polypharmacy (Use of too many medicines per patient), misuse of antimicrobials for non-bacterial infections, overuse of injections instead of oral medications, failure to follow clinical guidelines, inappropriate self-medication, and non-adherence to dosing regimens are examples of IDU [1,2].

A coronavirus identified in 2019, SARS-CoV-2, has caused a pandemic of respiratory illness, called COVID-19 [3].

The first SARS-CoV-2 infection was identified in Wuhan, China [4], but its exact origin remains unclear [5]. The rapid spread prompted the World Health Organization (WHO) to classify it as a global emergency, later declaring it a pandemic [6,7].

The COVID-19 pandemic has significantly altered lifestyles worldwide. To reduce SARS-CoV-2 transmission, many countries implemented measures like social distancing, curfews, online teaching, mandatory vaccinations, and testing [7-9]. Additionally, widespread confusion and misinformation about the pandemic, disease, and medications emerged during this time [10,11].

The COVID-19 pandemic has underscored the critical importance of rational drug use. During this period, inappropriate medication practices significantly increased the risks of adverse effects, drug interactions, and antimicrobial resistance. The pandemic particularly highlighted the need for evidence-based pharmacotherapy, as the widespread and irrational use of antibiotics, antivirals, and unproven treatments posed serious risks to both individual and public health. Adherence to rational drug use principles helped optimize therapeutic outcomes while minimizing unnecessary polypharmacy practices and drug-related complications, especially among COVID-19 patients with comorbidities. In this context, the implementation of effective pharmacovigilance systems and rational drug use policies played a vital role in safeguarding public health during the pandemic period.

The study aim is to evaluate the knowledge, attitudes and behaviors of university students regarding rational drug use during the Covid-19 pandemic.

Materials and Methods

This cross-sectional study was conducted between February and April 2022 at Çukurova University Campus with students enrolled in the faculties of medicine, engineering, and literature. In order to address participants' limited digital access and enhance data reliability, a face-to-face survey method was preferred, with appropriate precautions taken in accordance with pandemic conditions. Ethical approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of Çukurova University Faculty of Medicine, and informed consent was obtained from all participants.

This study utilized a survey method to collect data, with a total of 401 surveys gathered. The questionnaire comprised 24 questions covering demographic information (Questions 1-5), knowledge about COVID-19 and medication use attitudes (Questions 6-13), vitamins/minerals/herbal medicines (Questions 14-17), antibiotic use (Questions 18-21), and antidepressant knowledge and use (Questions 22-24).

Demographic information includes age, gender, study level, faculty, residence type (dormitory, family, hotel, or friends), and the number of people the participant lives with (1-5 or more).

The survey includes questions assessing participants' general knowledge and attitudes toward COVID-19, adherence to protective measures at university or home, COVID-19 infection history, vaccination status, and sources of medical information (doctor, national/internatio-

nal sources, medical school professors, etc.). It also inquiries about allergies, medication use without consulting a doctor (for headache, cold, flu, fever, menstrual pain, heartburn, etc.), actions taken when feeling sick (visiting a family doctor, using home medications, visiting a pharmacy, resting, or using herbal remedies), and vitamin/mineral supplement usage (yes or no, scored 1 or 2, respectively).

The survey also examines sources of consultation for Vitamins, Minerals, and Herbal medicines (doctor, pharmacist, friends/relatives, radio/TV/social media, internet, or others, scored 1 to 6, respectively). It assesses whether participants used herbal medicines and the participant's awareness about supplements' side-effects.

The study includes questions about participants' use of antibiotics for COVID-19. It assesses sources of advice on antibiotic use (doctor, pharmacist, university health center, friends/relatives, radio/TV/social media, internet, or others, scored 1 to 7). Participants were asked if they stopped their antibiotics before the treatment-course ends and if they knew that irrational antibiotic use could contribute to bacterial resistance.

The study includes questions about participants' use of antidepressants during the pandemic. It assesses sources of counseling on antidepressant use. Participants were also asked if they were aware that antidepressant use could cause undesirable effects.

The study primarily collected data through a 24-question survey conducted via face-to-face interviews with student from different faculties on Çukurova University Campus, including the dining hall, library, and cafeterias.

Then, the data of each survey was transferred to SPSS, where a database was created for statistical analysis. Descriptive statistics such as Frequency, Percentage, Mean, Standard Deviation and Median were used in data analysis.

A comparison was made between the descriptive statistics of the database created to evaluate the knowledge and attitude of university students on rational drug use during the COVID-19 pandemic.

Results

Table 1: Study participants' socio-demographic characteristics analysis

Variable		Frequency	Percent (%)	Mean	Variance	Std. Deviation
Gender	Female	239	59.6	1.40	0.241	0.491
	Male	162	40.4			
Study major	Medical	117	29.2	2.17	0.726	0.852
	Engineering	99	24.7			
	Humanities	185	46.1			
Place of living	Dorm	178	44.4	1.82	0.934	0.967
	With family	170	42.4			
	Hotel	1	0.2			
	With housemates	52	13.0			
Number of roommates	Alone	21	5.2	3.58	1.554	1.246
	Two	52	13.0			
	Three	121	30.2			
	Four	112	27.9			
	Five	69	17.2			
	More than five	26	6.5			

A total of 401 surveys were evaluated in this study.

Participants' demographic information (Questions 1 to 5) revealed that their ages ranged from 18 to 37, with a majority (86.9%) between 19-24 years and a mean age of 21.81.

Among the 401 university students who participated in the study, 239 were female, 117 were enrolled in the Faculty of Medicine, and 178 reported residing in university dormitories (Table 1).

The general information about the participants' medication use during the COVID-19 pandemic and the analysis of their attitudes toward the COVID-19 pandemic are presented in Table 2.

Table 2: Participants' medication uses and attitude analysis during the COVID-19 pandemic

Variable		Frequency	Percent (%)	Mean	Variance	Std. Deviation
Covid-19 precautions	Yes	338	84.3	1.16	0.133	0.364
	No	63	15.7			
Previously infected with Covıd-19	Yes	141	35.2	1.65	0.229	0.478
	No	260	64.8			
Covid-19 vaccine	Yes	378	94.3	1.06	0.054	0.233
	No	23	5.7			
Number of vaccine doses	No vaccination	23	5.7	3.16	0.538	0.733
	One	11	2.7			
	Two	244	60.8			
	Three	123	30.7			
Source of information	Family doctor	174	43.4	2.04	1.746	1.321
	National/International Resources	151	37.7			
	Medical Faculty Infections Professors	18	4.5			
	Medical Faculty Chest Diseases Professors	3	0.7			
	Internet & Friends (ex: social media, Websites)	55	13.7			
Allergy	Yes	35	8.7	1.91	0.080	0.283
	No	366	91.3			
Allergy type	No allergy	366	91.3	1.29	1.330	1.153
	Spring allergy (pollen)	13	3.2			
	Mushroom allergy	1	0.2			
	Asthma	9	2.2			

	Hay fever (allergic rhinitis)	3	0.7			
	Lactose intolerance (dairy products)	1	0.2			
	Penicillin allergy	1	0.2			
	Dust allergy	6	1.5			
	Hairy animal allergy (cats)	1	0.2			
Medication use	Yes	55	13.7	1.86	0.119	0.344
	No	346	86.3			
Type of medication used	No Use	346	86.3	1.28	0.716	0.846
	Painkillers	32	8.0			
	Antibiotics	4	1.0			
	Supplements (Vitamins, Minerals)	5	1.2			
	Anti-Inflammation	14	3.4			
Situation where drug has been used	Headache	323	80.5	1.42	0.984	0.992
	Flu - Common Cold	36	9.0			
	Fever	7	1.7			
	Menstrual Pain	23	5.7			
	Heartburn	12	3.0			
Attitude when feeling sick	I go to my family doctor	204	50.9	2.21	2.049	1.431
	I use medications found at my home	50	12.5			
	I buy medicine from the pharmacy	33	8.2			
	I do not take medications. I rest	85	21.2			
	I use herbal medications	29	7.2			

In this study, individuals' preventive and treatment approaches during the COVID-19 pandemic were examined. According to the survey results, the vast majority of participants reported adopting various preventive measures during the pandemic, such as wearing masks, maintaining social distance, and adhering to hygiene protocols. A significant portion of the participants had been infected with COVID-19, and most had received up to two doses of the COVID-19 vaccine. It was also observed that the number of individuals who had received three or more doses was relatively low.

During the treatment process, it was found that most participants did not use any medication; instead, they preferred rest and natural methods to support their immune system. Among the small group who used medication, the majority reported taking vitamins and dietary supplements.

During the active phase of the illness, most participants preferred to receive healthcare services from family

physicians. This finding highlights the importance and widespread preference for primary healthcare services during the pandemic.

The analysis of survey participants' vitamin/mineral/herbal medicine knowledge and use during the Covid-19 pandemic is shown in Table 3.

Table 3: Participants' use of vitamins, minerals, and herbal medications and their knowledge during the COVID-19 pandemic

Variable		Frequency	Percent (%)	Mean	Variance	Std. Deviation
Vitamins/Minerals use	Yes	66	16.5	1.84	0.138	0.371
	No	336	83.5			
Type of vitamin/mineral used	No use	336	83.5	1.28	0.522	0.722
	Vitamins C	36	9.0			
	Vitamin D	16	4.0			
	Vitamin B12	12	3.0			
	Omega 3/6	2	0.5			
Type of consultancy when using vitamins/minerals/herbal products	Doctor	275	68.6	1.61	1.274	1.129
	Pharmacist	69	17.2			
	Friends/Relatives	24	6.0			
	Radio/TV/social media	5	1.2			
	Internet	28	7.0			
Herbal products use	Yes	37	9.2	1.91	0.084	0.290
	No	364	90.8			
Type of herbal product used	No use	364	90.8	1.09	0.084	0.290
	Herbal Tea	37	9.2			
Knowledge on side effects of vitamins/minerals/ herbal products use	Yes	366	91.3	1.09	0.080	0.283
	No	35	8.7			

Regarding the use of vitamins, minerals, and herbal remedies for protection against COVID-19, it was observed that the majority of participants did not use any vitamins. Among those who did, vitamin C was the most commonly preferred, followed by vitamin D and vitamin B12 (Table 3).

The analysis of survey participants' knowledge and use of antibiotic drugs during the Covid-19 pandemic is shown in Table 4.

It was observed that the majority of participants who were infected with COVID-19 did not use antibiotics. Among those who did, penicillin-group antibiotics were the most commonly used. Furthermore, the data suggest that participants were knowledgeable about antibiotic resistance and the importance of completing the full course of antibiotic treatment.

The analysis of survey participants' knowledge and use of antidepressant medications during the Covid-19 pandemic is shown in Table 5.

Table 4: Antibiotic use and knowledge among participants during the COVID-19 pandemic

Variable		Frequency	Percent (%)	Mean	Variance	Std. Deviation
Antibiotics use	Yes	20	5.0	1.95	0.048	0.218
	No	381	95.0			
Type of Antibiotics used	No use	381	95.0	1.07	0.098	0.313
	Penicillin	13	3.3			
	Cephalosporins	7	1.7			
Type of consultancy when using antibiotics	Doctor	363	90.5	1.26	0.850	0.922
	Pharmacist	8	2.0			
	Medical Center at the University	9	2.2			
	Friends/Relatives	12	3.1			
	Radio/TV/social media	1	0.2			
	Internet	8	2.0			
Stopping the course of antibiotic treatment when feeling well	Yes	132	32.9	1.67	0.221	0.471
	No	269	67.1			
Knowledge on bacterial resistance	Yes	351	87.5	1.12	0.109	0.331
	No	50	12.5			

Table 5: Antidepressant use and knowledge among participants during the COVID-19 pandemic

Variable		Frequency	Percent (%)	Mean	Variance	Std. Deviation
Antidepressants use	Yes	12	3	1.97	0.029	0.171
	No	389	97			
Type of Antidepressants used	No use	389	97	1.03	0.029	0.171
	Selective Serotonin Reuptake Inhibitors (SSRIs)	12	3			
Type of consultancy when using antidepressants	Doctor	392	97.8	1.09	0.355	0.596
	Friends/Relatives	5	1.2			
	Internet	4	1			
Knowledge on antidepressants use side effects	Yes	397	94.5	1.05	0.052	0.228
	No	22	5.5			

Findings from our study conducted during the COVID-19 pandemic indicate that a significant proportion of participants did not use antidepressant medications. Among those who used antidepressants, selective serotonin reuptake inhibitors (SSRIs) were most frequently prescribed. Furthermore, it was determined that participants using antidepressant medications did so under physician supervision and were knowledgeable about the potential side effects of these medications.

Discussion

The COVID-19 pandemic has significantly impacted global health, with crowded environments like classrooms, lecture halls, and laboratories increasing the risk of virus transmission.

415 participants were involved in this study. 14 surveys were excluded because of wrong/incomplete answers, or because they refused to join the study. In another study conducted in Nursing school in Vakif University in Turkey, the percentage of positively evaluated surveys was 91% [12]. Compared to conducted by Onur DEMİREL [13] where only 159 surveys from 242 were evaluated, 401 survey were qualified to be evaluated indicating the study has good and enough sample to construct a database considering the minimum sample size is 381 surveys.

The mean age of participants was 21.81 years, with 89.76% aged 19-24, suggesting most are undergraduate or Master/PhD students. Most live in dorms (44.4%) or with families (42.4%), while 13% live in shared flats, reflecting diverse cultures and living standards, enhancing study reliability.

Approximately 84.4% of participants follow COVID-19 precautions (hygiene, distancing, mask, vaccine) at home, similar to a Turkish study where 81.2% adhered to social isolation guidelines, while 18.8% did not due to work commitments [14]. 94.3% of participants received the COVID-19 vaccine: 60.8% had two doses, 30.7% three doses, and 2.7% one dose; 5.7% were unvaccinated. Most (81.1%) get medical information from doctors or trusted sources, similar to findings linking higher education to increased vaccination rates and COVID-19 awareness [15]. 91.3% of participants reported no allergies, while 8.7% had allergies, mostly pollen. Most (86.3%) avoid taking medication without a doctor's advice. Among those who do, 8% use painkillers, 3.4% anti-inflammatory meds, 1.2% supplements, and 1% antibiotics. Among medication takers, 80.5% took medication for headaches, 9% for flu/colds, 5.7% for menstrual pain, 3% for heartburn, and 1.7% for fever. About 50.9% of participants visit a family doctor when sick, 21.5% rest at home, 12.5% use available medications, and 7.2% use herbal Teas.

These results align with previous studies at Çukurova University, involving both medical [16] and non-medical [17] students, which showed similar attitudes toward pandemic measures. Our findings also match studies from China [18] and Pakistan [19], confirming a high vaccination rate among students, consistent with their willingness to get vaccinated [20].

Our findings reveal that 9% of participants used vitamin C, 4% used vitamin D, and 3% used vitamin B12 supplements, while only 0.5% reported taking omega 3/6 supplements. These results are consistent with a study conducted in Gümüşhane, Turkey, which found that 90.3% of university students did not use dietary supplements during the COVID-19 pandemic, despite increased food consumption and purchases [21].

Regarding information-seeking behavior, the majority of participants (68.8%) preferred consulting physicians before using supplements, while 17.2% would seek advice from pharmacists. Other sources included the internet (7%), friends (6%), and television/radio/social media (1.2%). The study demonstrates high awareness among university students about potential side effects of supplements and herbal products, with 91.3% believing these products may cause adverse effects, compared to only 8.7% who thought dietary supplements were free from side effects.

Notably, only 9.2% of participants reported using herbal products during the pandemic, a finding that contrasts with another Turkish study [22] showing higher tendencies for supplement use to prevent COVID-19. This discrepancy may reflect regional or methodological differences in study populations. A broader multinational study across Asia, Europe, and Turkey [23] reported increased consumption of complementary products aimed at immune system

enhancement, while simultaneously demonstrating their ineffectiveness in preventing COVID-19 infection.

The discrepancy between our findings and those reported in the literature may be attributed to our study's focus on a homogeneous population of university students with similar age ranges, educational backgrounds, and geographic locations. In contrast, the comparative studies encompassed multiple regions and more heterogeneous demographic groups. Another study [24] supports our findings, showing that Vitamin C is the most used supplement. Vitamin C, a powerful antioxidant, removes reactive oxygen residues and is known to impact the immune system. Many studies highlight Vitamins C and D as commonly used for immune strengthening and COVID-19 protection [24,25].

The findings highlight a positive understanding of antibiotic use during the COVID-19 pandemic. A majority (95%) of participants reported not using antibiotics for COVID-19 treatment, while only 5% indicated that they did use antibiotics. Among the participants who used antibiotics for COVID-19, 3.3% used penicillin, and 1.7% used cephalosporins. This low antibiotic usage aligns with global reports indicating decreased antibiotic consumption in regions like the European Union [26] and North America [27]. Most participants (90.5%) preferred consulting a doctor before using antibiotics, while 2% would consult a pharmacist and 2.2% would visit the university's medical center. Additionally, 3.1% would seek advice from friends or relatives, 2% from the internet, and less than 0.2% from TV/radio/social media. When asked if they would stop taking antibiotics if they felt better, 32.9% said yes, while 67.1% would continue their treatment. Additionally, 87.5% of participants recognized that irrational antibiotic use contributes to rising bacterial resistance, indicating strong awareness of the issue. The high awareness of rational antibiotic use and bacterial resistance found in this study aligns with findings from two studies in Australia [28,29] and another involving university students in Malaysia [30], suggesting that higher education may enhance students' understanding of antibiotic use.

The study findings reveal a high level of awareness and knowledge about antidepressant use during the COVID-19 pandemic. The pandemic impacted not only physical health but also altered daily life for billions, potentially affecting mental health. Most participants (97%) in this study did not use antidepressants during the COVID-19 pandemic, while 3% reported using them. Among those who did, SSRIs (Selective Serotonin Reuptake Inhibitors) were the most commonly used type. Almost 97.8% of participants would consult a doctor about antidepressant use, while 1.2% would ask friends or relatives, and 1% would consult the internet. Additionally, 94.5% believe antidepressants may cause undesirable side effects, while 5.5% do not. The apparent contradiction between our findings and those of previous studies [31,32] reporting increased antidepressant use among Turkish university students during the pandemic may stem from key methodological differences in study populations. While the referenced studies exclusively examined medical students, our research encompassed a more diverse academic cohort including engineering and humanities students alongside medical students.

Our study shows that our participating university students have sufficient knowledge about the COVID-19 pandemic and the rational use of medicines during the pandemic period and that they implement the necessary precautions to prevent COVID-19. It is essential to establish awareness programs within the university to further enhance awareness of rational drug use. However, since our study has a cross-sectional design, causal relationships cannot be established. It is recommended that similar studies be repeated and expanded in detail at different universities.

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