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Determining the Practices and Opinions of University Students on Blood Donation in the COVID-19 Pandemic: Descriptive Study

COVID-19 Pandemisinde Üniversite Öğrencilerinin Kan Bağışına Yönelik Uygulama ve Görüşlerinin Belirlenmesi: Tanımlayıcı Çalışma

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This study was presented as an oral presentation at 7th International 18th National Nursing Congress, September 22-25, 2022, Konya, Türkiye.

ABSTRACT Objective: To determine the practices and opinions of university students regarding blood donation in the coronavirus disease-2019 (COVID-19) pandemic. **Material and Methods:** A descriptive research design was used. A total of 424 undergraduate students from Ankara and Kafkas Universities made up the sample of the research. Research data were collected online between November 15, 2021 and February 15, 2022 using the snowball method. Frequency and mean values, the Chi-Square (χ^2) and Mann-Whitney U tests were used in the statistical analysis of data. **Results:** The mean age of the students participating in the study was 20.8+2.28 (18-40). It was determined that 24.5% of university students and 58.3% of their family members had COVID-19. While the rate of students donating blood was 30.7% until the pandemic, it was found that it decreased significantly (16.7%) during the pandemic period ($p<0.001$). It was determined that 47.9% of the students who needed a blood transfusion during the pandemic period had difficulty in finding blood. During the pandemic process, donation rates of male students, those who were not worried about the safety of blood, and those who thought that blood donation was beneficial for health were significantly higher ($p<0.05$). It was determined that the most common causes of concern/fear experienced by the students were "I'm afraid of contracting COVID-19". **Conclusion:** It was found that the rate of students donating blood decreased during the pandemic period. In women, the rate of donating was significantly lower in those who were concerned about the safety of blood and thought that blood donation was harmful to health.

Keywords: Blood donation; COVID-19; university students

ÖZET Amaç: Bu çalışmanın amacı, koronavirüs hastalığı-2019 [coronavirus disease-2019 (COVID-19)] pandemisinde üniversite öğrencilerinin kan bağışına yönelik uygulama ve görüşlerinin belirlenmesidir. **Gereç ve Yöntemler:** Araştırma tanımlayıcı tipte yapıldı. Ankara ve Kafkas Üniversitesi'nde öğrenim gören 424 lisans öğrencisi araştırmanın örneklemini oluşturdu. Araştırma verileri 15 Kasım 2021-15 Şubat 2022 tarihleri arasında kartopu yöntemi ile online olarak toplandı. Verilerin istatistiksel analizinde frekans, ortalama, Ki-Kare(χ^2) ve Mann-Whitney U test kullanıldı. **Bulgular:** Çalışmaya katılan öğrencilerin yaş ortalaması 20,8+2,28 (18-40)'di. Öğrencilerin %40,6'sı Ankara Üniversitesi'nden, %59,4'ü Kafkas Üniversitesi'nden çalışmaya katıldı. Çalışmada üniversite öğrencilerinin %24,5'inin ve aile yakınlarının %58,3'ünün COVID-19 geçirdiği belirlendi. Öğrencilerin pandemi öncesinde kan bağışında bulunma oranları %30,7 iken pandemi sürecinde (%16,7) anlamlı olarak azaldığı saptandı ($p<0,001$). Pandemi döneminde kan transfüzyonuna gereksinimi olan öğrencilerin %47,9'unun kanı bulmakta zorlandığı belirlendi. Pandemi sürecinde erkek öğrencilerin, kanın güvenliğine yönelik endişe yaşamayanların ve kan bağışının sağlığa yararlı olduğunu düşünenlerin bağışta bulunma oranları anlamlı derecede yüksekti ($p<0,05$). Öğrencilerin pandemi sürecinde kan bağışına yönelik en sık yaşadığı endişe/korku nedeninin "COVID-19 bulaşmasından korkarım" olduğu belirlendi. **Sonuç:** Pandemi döneminde öğrencilerin kan bağışında bulunma oranları anlamlı düzeyde azaldı. Kadınlarda, kanın güvenliğine yönelik endişe yaşayan ve kan bağışının sağlığa zararlı olduğunu düşünlerde bağış yapma oranı anlamlı derecede düşüktü.

Anahtar Kelimeler: COVID-19; kan bağışı; üniversite öğrencileri

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The World Health Organization declared the coronavirus disease-2019 (COVID-19) outbreak, which affected the whole world in terms of human health and the economy, as a pandemic on March 11, 2020.[1] The need for blood decreased early in the pandemic as surgeries and medical treatments were delayed to increase bed capacity and for treatments specific to COVID-19.[2] Accordingly, 72.3% of planned surgeries were delayed worldwide due to COVID-19.[3] It is predicted that the need for blood donation will increase after COVID-19, as more blood will be needed when the postponed surgeries resume.[2,4]

The pandemic has led to a decrease in blood donations.[2,4,5] The International Blood Transfusion Association evaluated the experiences of blood banks and transfusion services during the COVID-19 pandemic. According to the results obtained from 42 countries in this study, it was determined that there was a decrease in blood donation in 70.6% of the blood collection facilities. Donors' fear and refusal of institutions to host blood transfusions were found to be effective in this decrease. In addition, it was determined that 76.8% of large hospitals where more than 10,000 red cell transplants are performed per year had blood shortages.[6] In a study on the impact of the COVID-19 pandemic on blood supply and transfusion services in the Eastern Mediterranean Region, it was reported that there was a decrease in blood flow ranging from 26-50% in most centers in 15 countries and that public fear contributed to the decrease in donation.[7]

During the COVID-19 pandemic, individuals feel less willing to donate as they are concerned that it will threaten their and others' health, and they may avoid donating even though they are healthy.[2] In addition, the imposition of lockdowns during the pandemic process has been one of the main reasons for the decrease in the number of donations.[8] Stating that blood is a constant need, not urgent, the Turkish Red Crescent Society declared that national blood stocks had decreased and there should have been more blood donations to meet the increased blood and plasma need due to the pandemic.[9] According to the data of a study obtained retrospectively between November 2019 and July 2020, it was determined that there was a 22% decrease in blood donation in Türkiye during the pandemic process.[10] First of all, stocks were used as a solution in the world and Türkiye, and then blood donation was tried to be increased through social media activities and campaigns and by sending short messages to people who had donated before to encourage donations.[8]

Little is known about how long-term donation behavior is affected by a pandemic like COVID-19.[2] Blood transfusion is a life-saving procedure for transfusion-dependent patients. Therefore, it is extremely important to maintain the flow of blood donation during and after the pandemic.[11] With the aging population and advances in medical treatment and procedures, there is a constant need for blood and blood components. It is thought that determining the practices and opinions of university students, who are a healthy group for blood donation, regarding blood donation during the pandemic process will guide the creation of incentive campaigns for blood donation. For this purpose, this study was conducted to determine the practices and opinions of university students regarding blood donation during the COVID-19 pandemic.

MATERIAL AND METHODS

RESEARCH DESIGN

The research was conducted between November 15, 2021 and February 15, 2022 in descriptive type. University students were reached through social media and communication platforms using the snowball sampling method.

SETTING AND FEATURES OF THE RESEARCH

The population of the research consists of undergraduate students studying at Kafkas and Ankara University (20.000+45.000). The reason for choosing these 2 state universities in the research; Türkiye has a mixed student population, each coming from both the west and the east. Students who volunteered to participate in the study, were aged 18 years or older, filled out the online questionnaire completely, and were studying at the undergraduate level were included in the study. On the other hand, students who did not volunteer to participate in the study and who

were studying at the associate and graduate levels were not included in the study.

POPULATION AND SAMPLE

The sample of the study was calculated using the sampling the known population method and it was determined that there were 382 undergraduate students. The total sample size was planned to be 420 subjects considering a 10% data loss. The study was completed with 424 volunteer students, as 15 of the 439 students who were accessed by the online survey link did not submit consent.

DATA COLLECTION TOOLS

A Student Information Form and a Form for Determining Practices and Opinions on Blood Donation were used to obtain study data.

STUDENT INFORMATION FORM

This form was prepared by the researchers following a review of the literature. It consists of 11 questions about students' age, gender, high school, income status, the province where their university was located, department, school year, the presence of health insurance, history of COVID-19, history of COVID-19 in the family, and the presence of health problems.[5,6,8,10]

FORM FOR DETERMINING PRACTICES AND OPINIONS ON BLOOD DONATION

This form consists of 20 questions about the evaluation of students' practices (knowledge of blood group, receiving education on blood donation, the status of donating blood before and during the pandemic, reasons for donating or not donating blood, the status of blood donation in the family, need for blood and difficulty in finding blood during the pandemic) and opinions on blood donation (concerns about the safety of blood when there is a need for blood, opinions about harms/benefits of blood donation to health, the importance of the place of donation, reasons for concerns about blood donation during the pandemic, and opinions on how to increase incentives for blood donation).[2,6,7,10,12,13]

IMPLEMENTATION OF THE STUDY

The researchers reached university students by sharing the online survey link on their social media accounts [Twitter (X Corp., ABD), Instagram (Meta Inc., ABD)] or by sending it via e-mail. Access to the online questionnaire was closed when the data collection phase of the study was concluded. The privacy and confidentiality of personal data were protected by encryption in Google Forms (Google Docs, ABD).

The first page of the online survey was reserved for the consent page only. On the consent page, students were asked whether they approved to participate in the study.

DATA ANALYSIS

Data were analyzed on the IBM SPSS Statistics Version 20 software package (IBM Corp Armonk, NY). Continuous variables were analyzed using descriptive statistics (counts, frequency/percentage, mean, and standard deviation values). Chi-square (χ^2) and Fisher's exact analysis was used to determine whether there was a significant difference between dependent variables and independent variables. Since the mean age of the students did not show a normal distribution, nonparametric tests were used in the analyzes with dependent variables. For the interpretation of the results, 0.05 was accepted as the level of significance.

ETHICAL ASPECTS

The necessary written permission for the study was obtained within the scope of "COVID-19 Scientific Research Studies" of the Ministry of Health of the Republic of Türkiye. Ethics committee approval of the study was obtained from the Ethics Committee of the Kafkas University Faculty of Health Sciences on November 2, 2021 with registration number 81829502.903/256. Written permission was obtained from the Kafkas University and Ankara University for the implementation of the research. The study was conducted under the ethical standards and criteria of the Declaration of Helsinki. Consent of the students who volunteered to participate in the study was obtained on the first page of the online questionnaire.

RESULTS

The mean age of the students participating in the study was 20.8±2.28 (18-40), 72.2% were female,

and 61.8% had graduated from an Anatolian high school. In the study, 40.6% of the students participated from Ankara University and 59.4% from Kafkas University. Also, 86.5% of the university students were studying health sciences and 13.5% social sciences (Table 1).

The examination of the characteristics of students' health status indicated that 76.4% of them had health insurance, 24.5% were COVID-19 positive during the pandemic process, and that this rate was 58.5% in their families. It was determined that only 7.8% of the students had a chronic health problem and that the majority (93.9%) knew their blood group (Table 2).

The examination of students' practices for blood donation during the pandemic process indicated that while 30.7% of them had donated blood before the pandemic, their blood donation during the pandemic period decreased significantly (16.7%) (χ^2/p= 192.865/0.001). The reason for students to donate blood was mostly to help someone in need. It was determined that 27.6% of the students did not donate blood mostly because they had low hemogram, body weight below 50 kg, and had a certain disease or were receiving treatment. The rate of blood donation in students' families was 64.4%. Also, 95% of students stated that they were likely to donate blood to someone with a critical survival chance who they did not like. It was determined that 11.3% of students or their relatives needed blood during the pandemic and that 47.9% had difficulty in finding the necessary blood (Table 3).

When the opinions of according to the departments of the students on blood donation during the pandemic were evaluated; it was determined that the concern about the safety of blood was higher in health sciences, but there was no significant difference between the groups (χ^2/p=2.949/0.060). In social/natural sciences students, the proportion of those who thought that blood donation was harmful to the individual's health during the pandemic was significantly higher (χ^2/p=7.258/0.009). At the same time, the rate of those who thought that blood donation was beneficial to the individual's health was also significantly lower in this group (χ^2/p=22.078/0.001). It

TABLE 1: Descriptive characteristics of university students (n=424).

Descriptive characteristics	n	%
Mean age [$\bar{X}$+SD (minimum-maximum)]	20.8+2.28 (18-40)	
Gender		
Female	306	72.2
Male	118	27.8
High school		
Health vocational high school	33	7.8
General high school	26	6.1
Anatolian high school	262	61.8
Science high school	75	17.7
Vocational high school	11	2.6
Other*	17	4.0
University		
Ankara university	172	40.6
Kafkas university	252	59.4
Department		
Health sciences	367	86.5
Nutrition and dietetics	4	1.1
Child development	1	0.3
Social services	2	0.5
Healthcare management	8	2.2
Midwifery	17	4.6
Nursing	255	69.4
Veterinary medicine	16	4.4
Medicine	55	15.0
Physical therapy and rehabilitation	3	0.8
Dentistry	6	1.7
Social/natural sciences	57	13.5
Faculty of arts and sciences	4	7.0
Law	6	10.5
Economy	1	1.8
Communication	1	1.8
Theology	2	3.5
Elementary mathematics teaching	10	17.5
Molecular biology and genetics	8	14.0
Agricultural economics	2	3.5
Agriculture engineering	4	7.0
Biology	14	24.6
Pre-school teaching	3	5.3
Informatics management	2	3.5
School year		
1	88	20.8
2	178	42.0
3	98	23.1
4	48	11.3
5	2	0.5
6	10	2.4
Income level		
Income covers expenses	149	35.1
Income partially covers expenses	180	42.5
Income does not cover expenses	95	22.4

*6 students had graduated from private high schools; 2 from open education; 6 from imam hatip high schools, and 3 from high schools abroad; SD: Standard deviation.

TABLE 2: Students' health status (n=424).

Students' health status	n	%
Presence of health insurance		
Yes	324	76.4
No	100	23.6
History of COVID-19 infection during the pandemic process		
Yes	104	24.5
No	320	75.5
History of COVID-19 infection in the family during the pandemic process		
Yes	247	58.3
No	177	41.7
Presence of any health problems		
Yes	33	7.8
No	391	92.2
Knowledge of the blood group		
Yes	398	93.9
No	26	6.1

was determined that the students studying in both health and social/natural sciences thought that the place where they would donate blood was important and they wanted to donate more in both groups at the Red Crescent Blood Center (p>0.05). It was determined that 41.8% of the students in social/natural sciences and 34.4% of the students in health sciences experienced concern/fear about blood donation during the pandemic but the difference between the groups was not significant (χ^2/p=1.147/0.178). In both groups, the most common reason for this concern was "I am afraid of contracting COVID-19" (Table 4).

Although not shown in Table 4, when students were asked about how to increase incentives for blood donation during the pandemic, 54.5% of them thought it could be achieved through education of society on blood donation, 33.7% mentioned public spots to increase the reliability of blood donation in pandemic conditions, and 30.7% suggested increasing awareness of society on the subject via printed visuals (e.g. bags with blood donation visuals).

In the study, while the increase in the average age of the students significantly increased the blood donation rate before the pandemic (χ^2/p= -2.338/0.019), it was found that it did not affect it dur-

TABLE 3: Students' blood donation practices during the pandemic process (n=424).

Practices	n	%
Receiving education on blood donation		
Yes	108	25.5
No	316	74.5
Source of education on blood donation (n=108)		
Undergraduate courses	42	38.8
High school classes	28	25.9
Congresses/conferences	28	25.9
Newspaper/radio/TV	2	1.8
Literature review	4	3.8
Red crescent	4	3.8
Status of donating blood before the pandemic		
Yes	130	30.7
No	284	67.0
Never thought of donating blood	10	2.3
Reasons for donating blood (n=130)		
Helping someone in need	106	81.5
Raising prestige in society	1	0.8
Family/friends' need for blood	3	2.3
Announcements for blood donation	5	3.8
Donating blood periodically for health	14	10.8
It is a good deed	1	0.8
Is there a reason why you have not donated blood yet?		
Yes	117	27.6
No	307	72.4
Reasons for not donating blood (n=117)		
I do not have enough blood count to give blood	44	37.6
I have an infectious disease	3	2.6
My body weight is less than 50 kg	35	29.9
Medical treatment and/or disease process	11	9.4
Fear	7	6.0
Use of medicines	7	6.0
Other**	10	8.5
Presence of blood donor in the family		
Yes	273	64.4
No	151	35.6
Probability of donating blood to someone with critical survival chances who they did not like		
Yes	403	95.0
No	21	5.0
Status of donating blood during the pandemic process		
Yes	71	16.7
No	353	83.3
Need for blood transfusion for herself/himself or her/his relatives during the pandemic process		
Yes	48	11.3
No	376	88.7
Difficulty in finding the necessary blood for himself/herself/relatives in need of blood (n=48)		
Yes	23	47.9
No	25	52.1

**Feeling insecure (n=2), thinking his/her age was not suitable (n=4), having no time (n=1), having thin veins (n=1), and having piercings (n=1).

TABLE 4: Students' opinions on blood donation during the pandemic process according to their departments (n=424).

Opinions	Department				
	Health sciences		Social/natural sciences		
	n	%	n	%	Analysis^
Concerns for the safety of blood when there is a need for blood transfusion					
Yes	245	66.4	30	54.5	2.949/0.060
No	124	33.6	25	45.5	
Donating blood during the pandemic process is harmful to the individual's health.					
Yes	54	14.6	16	29.1	7.258/0.009*
No	315	85.4	39	70.9	
Donating blood during the pandemic process is beneficial to the individual's health.					
Yes	290	78.6	27	49.1	22.078/0.001*
No	79	21.4	28	50.9	
Does the place where blood is donated matter?					
Yes	279	75.6	44	80	0.508/0.299
No	90	24.4	11	20	
If you were to donate blood, in which unit would you like to do it?**					
University hospitals	75	20.3	14	25.5	6.427/0.491
State hospitals	65	17.6	7	12.7	
Private hospitals/institutions	8	2.2	4	7.3	
Red Crescent Blood Center	207	56.1	28	50.9	
Mobile blood donation points	11	3	2	3.6	
Do you have any concerns/fears about donating blood during the pandemic period?					
Yes	127	34.4	23	41.8	1.147/0.178
No	242	65.6	32	58.2	
Reasons for concerns/fears about donating blood (n=150)					
I'm afraid of contracting COVID-19.	44	11.9	8	14.5	
I'm afraid that my immune system will weaken.	34	9.2	6	10.9	
I'm afraid of spreading COVID-19 to others.	22	6	3	5.5	6.365/0.498
I'm afraid of experiencing pain.	3	0.8	1	1.8	
I do not trust the healthcare team that will take my blood.	2	0.5	2	3.6	
I am afraid of the use of non-sterile instruments while my blood is being taken.	21	5.7	3	5.5	
I'm afraid that my blood will be sold for money.	1	0.3	-	-	

^Fisher's exact test; *p<0.05; **Two students answered "in all institutions" and one student "in an emergency department."

ing the pandemic period (Z/p=-0.675/0.499). When students' blood donation status by gender was examined, it was determined that the rates of blood donation before the pandemic (χ^2/p=31.341/0.001) and during the pandemic process (χ^2/p=28.024/0.001) among males were significantly higher than those of females. The rate of blood donation before the pandemic among students in Kafkas University was significantly higher than that of students in Ankara University (χ^2/p=5.303/0.021). However, it was determined that there was no difference between universities during the pandemic process (χ^2/p=3.246/0.085). It was determined that studying in health sciences and social/natural sciences did not affect the status of donating blood (p>0.05). In addition, the rate of blood donation before the pandemic among students who knew their blood group (χ^2/p=9.368/0.001), had received education on blood donation (χ^2/p=14.749/0.001) was found to be significantly higher. The donation rates of students who could not donate blood due to health problems (low blood count, under 50 kg, having a certain disease or medical treatment, etc.) both before and during the pandemic were significantly lower (p<0.001). It was determined that students who were concerned about the safety of blood when they needed blood transfusion made significantly fewer blood donations before and during the pandemic period (p<0.05). In the

TABLE 5: Status of donating blood according to some variables of students.

Variables	Status of donating blood before the pandemic		Status of donating blood during the pandemic	
	Yes	No	Yes	No
	n (%)	n (%)	n (%)	n (%)
Age	21.20+2.56	20.62+2.13	20.78+2.31	20.8+2.28
[$\bar{X}$+SD (minimum-maximum)]	(18-36)	(18-40)	(18-30)	(18-40)
Z^a/p	-2.338/0.019*		-0.675/0.499	
Gender				
Female	70 (22.9)	236 (77.1)	33 (10.8)	273 (89.2)
Male	60 (50.8)	58 (49.2)	38 (32.2)	80 (67.8)
χ^2/p	31.341/0.001*		28.024/0.001*	
University				
Ankara University	42 (24.4)	130 (75.6)	22 (12.8)	150 (87.2)
Kafkas University	88 (34.9)	164 (65.1)	49 (19.4)	203 (80.6)
χ^2/p	5.303/0.021*		3.246/0.085	
Department				
Health sciences	108 (29.3)	261 (70.7)	60 (16.3)	309 (83.7)
Social/natural sciences	22 (40)	33 (60)	11 (20)	44 (80)
χ^2/p	2.593/0.075		0.480/0.561	
Knowing the blood group				
Yes	129 (32.4)	269 (67.6)	70 (17.6)	328 (82.4)
No	1 (3.8)	25 (96.2)	1 (3.8)	25 (96.2)
χ^2/p	9.368/0.001*		3.306/0.099	
Status of having received education on blood donation				
Yes	49 (45.4)	59 (54.6)	25 (23.1)	83 (76.9)
No	81 (25.6)	235 (74.4)	46 (14.6)	270 (85.4)
χ^2/p	14.749/0.001*		4.261/0.051	
Is there a reason why you have not donated blood yet?				
Yes	13 (11.1)	104 (88.9)	7 (6)	110 (94)
No	117 (38.1)	190 (61.9)	64 (20.8)	243 (79.2)
χ^2/p	29.048/0.001*		13.425/0.001*	
Concerns for the safety of blood when blood transfusion is needed				
Yes	37 (24.7)	113 (75.3)	13 (8.7)	137 (91.3)
No	93 (33.9)	181 (66.1)	58 (21.2)	216 (78.8)
χ^2/p	3.922/0.030*		10.866/0.001*	
Does the place where blood is donated matter?				
Yes	100 (31)	223 (69)	53 (16.4)	270 (83.6)
No	30 (29.7)	71 (70.3)	18 (17.8)	83 (82.2)
χ^2/p	0.057/0.457		0.110/0.761	
Donating blood during the pandemic process is harmful to the individual's health				
Yes	37 (24.7)	113 (75.3)	3 (4.3)	67 (95.7)
No	93 (33.9)	181 (66.1)	68 (19.2)	286 (80.8)
χ^2/p	3.922/0.03*		9.336/0.001*	

χ^2: Chi-square test; *p<0.05; a: Mann Whitney U test (Z); SD: Standard deviation.

study, it was determined that the place of blood donation did not affect the blood donation rate (p>0.05) (Table 5).

No significant difference was found between the status of donating blood, income level, school year, the presence of health insurance, history of COVID-

19 infection, the presence of health problems, and the presence of blood donors in the family, which were not presented in the Table 5 (p>0.05).

DISCUSSION

The pandemic process has caused a decrease in the rate of individuals donating blood in the world and our country.[6,7,10] In a retrospective study, it was determined that while blood donations were delayed due to drugs and vaccination before the pandemic, they were delayed mostly due to the flu and similar symptoms during the pandemic period.[14] The periods of lockdowns due to the pandemic, the time required for blood donation, and the lack of trust have led to a decrease in blood donation.[15] In the study, it was determined that the rate of students donating blood decreased significantly before the pandemic. It was found that only 11.3% of students or their relatives needed a blood transfusion during the pandemic and that 47.9% of these people had difficulty in finding blood (Table 3). In a study evaluating the attitudes and practices of undergraduate health sciences students towards blood donation in India, it was determined that 73.5% of students had been willing to donate blood during the pandemic, but only 18% of them had donated blood after the start of the pandemic. It was determined that 28% of the students had not donated blood for fear of contracting COVID-19.[16]

In addition to the pandemic, gender and age can affect the blood donation behavior of individuals. In a study conducted in Nigeria, it was determined that 58.9% of donors (n=1638) were between the ages of 15-29 and that the majority of them were male.[5] In the study of Cantürk et al., 85.2% of donors were male.[17] In a study carried out with the participation of 424 donors in Saudi Arabia, blood donation was found to be significantly higher in the 18-28 age group and among those who were single.[18] In one study, it was found that older adults delayed blood donation mostly because of medical problems.[14] In the present study, the blood donation status of male students was found to be significantly higher (Table 5).

Constant and fair access to blood for transfusion is essential during the pandemic.[19] This concept can be a major concern about blood donation. In the study, it was not questioned whether the students were worried about fair access to blood, but it was determined that 64.9% of students would worry about the safety of blood when they needed it. Also, 34.4% of students in health sciences and 41.8% of students in social/natural sciences stated that they had concerns/fears about donating blood during the pandemic period (Table 4). It was found that the rate of donating blood among students experiencing anxiety decreased significantly during the pandemic. Individuals' moral norms are important drivers of donation intention.[2] It is stated that when potential donors perceive that their donations do not make a difference, they are less likely to donate.[2] A donor's expectation and evaluation of how effective his/her contribution will be affects his/her blood donation attitude.[2] In a study, it was determined that 56.9% of blood donors in Germany wanted to contribute to the fight against the pandemic by donating blood.[20]

During the pandemic, the need for raising awareness of the general population about scientific measures for donor participation has increased.[7] In a study on the knowledge, attitudes, and practices of 503 blood donors towards donation, it was found that the environment around the blood donation area and travel to the blood donation area were considered as the 2 main sources of COVID-19 infection. It was determined that 50.7% of the participants thought that it was safe to donate blood during the pandemic. The first 3 motivation factors for blood donation were found as a direct patient request for donation (30%), family/friends' need for blood, and social media campaigns (26%).[12] In a study conducted in 2 different blood centers in Ankara (n=277), it was determined that the most common reason for donors to donate blood was relatives/acquaintances' need for blood (57%).[17] In the present study, students stated that their reasons for donating blood included "helping someone in need" and "donating blood at regular intervals for health." Reasons for not donating blood included "not enough hemogram to donate blood" and "body weight below 50 kg" (Table 3). The health of the individual is a factor that affects their blood donation status.[2] In a study with undergraduate health sciences students, it was determined that donating blood pre-

viously, getting a COVID-19 vaccine, and the absence of anemia positively affected the willingness of students to donate blood. It was determined that students without chronic comorbidities donated blood at a significantly higher rate.[16] In the study, it was determined that those who received education on blood donation and those who knew their blood group made more donations before the pandemic ($p<0.001$).

Various campaigns have been organized to prevent the decreasing blood donations all over the world during the pandemic process. In the study carried out with the participation of 424 donors in Saudi Arabia, participants suggested the establishment of a mobile blood transfusion organization in donors' homes, workplaces, and educational areas to eliminate the blood shortage experienced during the pandemic.[18] In another study, it was stated that blood donation was increased with mobile blood collection services.[21] Also, it was determined that blood donation rates were increased by reminding individuals who were rejected for blood donation for a short period by phone and messages.[22] When students were asked about how to increase incentives to donate blood during the pandemic, they stated it could be achieved via education for increasing the awareness of society (54.5%), public announcements (33.7%), and printed visuals (30.7%). Also, 24.8% of students stated that blood donation could be increased on a voluntary basis and 21.5% stated that incentives for donation can be increased by financial rewards after blood donation. In a study on the examination of 1,638 donors in Nigeria, it was determined that the majority of the donor pool consisted of commercial donors (61.7%) and new donors (30.6%) instead of family.[5] Financial reward after blood donation is an ethically controversial issue. Blood taken from people for money is also not considered appropriate because it increases the risk of commercial exploitation and insensitivity of individuals.[13]

Reliable centers for donating blood can be another factor affecting individuals' blood donation. The Turkish Red Crescent is an important and integral part of Türkiye's national health system, meeting 86% of the blood requirement in Türkiye. It meets the blood needs of 1,102 of 1,121 hospitals across Türkiye.[10] In one study, the percentage of those who voluntarily donated blood was found to be higher in centers affiliated to the Red Crescent Blood Center (93%) than in university hospitals (7.4%).[17] In our study, about half of students in both health sciences and social/natural sciences stated that they would like to donate blood at the Red Crescent Blood Center if they were to donate blood.

CONCLUSION

The study has several limitations. First, the results of the study were limited to the time when data were collected. The second, since the data was collected online, there were difficulties in accessing the students. Third, the results of the study can only be generalized to the population of the research.

In the study, it was determined that there was a decrease in students' status of donating blood during the pandemic. Although the need for blood is urgent, it is a constant need.[11] Considering the postponed surgeries and the management of chronic health problems during the pandemic, it is thought that the need for blood donation will gradually increase.[2,4,9] Considering the strength of healthy young adults in terms of blood donation, awareness of this age group can be increased and their solidarity and donor status can be improved.

In addition, although the effect of the pandemic has decreased, it still continues. The impact of the pandemic process on blood donation and the evaluation of donation trends require continuity. This study showed that donation rates were significantly lower in women, those who were concerned about the safety of blood, and students who thought that blood donation was harmful to health.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Ayşegül Öztürk Birge, Arzu Karabağ Aydın;* ***Design:*** *Ayşegül Öztürk Birge, Arzu Karabağ Aydın;* ***Control/Supervision:*** *Ayşegül Öztürk Birge;* ***Data Collection and/or Processing:*** *Ayşegül Öztürk Birge, Arzu Karabağ Aydın;* ***Analysis and/or Interpretation:*** *Ayşegül Öztürk Birge;* ***Literature Review:*** *Ayşegül Öztürk Birge, Arzu Karabağ Aydın;* ***Writing the Article:*** *Ayşegül Öztürk Birge, Arzu Karabağ Aydın;* ***Critical Review:*** *Ayşegül Öztürk Birge;* ***References and Fundings:*** *Ayşegül Öztürk Birge, Arzu Karabağ Aydın;* ***Materials:*** *Ayşegül Öztürk Birge, Arzu Karabağ Aydın.*

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Core	Academic Journal	1360-2276	**Tropical Medicine & International Health**	Wiley-Blackwell	01.01.2008					Y	
Core	Trade Publication	0041-3674	**Trustee**	Health Forum	01.01.2008						
Core	Magazine		**Try This: Best Practices in Nursing Care to Older Adults**	New York University, John A. Hartford Institute for Geriatric Nursing	08.01.1998		08.01.1998				Y
Core	Magazine		**Try This: Best Practices in Nursing Care to Older Adults with Dementia**	New York University, John A. Hartford Institute for Geriatric Nursing	03.01.2003		03.01.2003				Y
Core	Academic Journal	1388-7491	**TSG: Tijdschrift Voor Gezondheidswetenschappen**	Springer Nature	12.01.2022					Y	
Core	Academic Journal	0564-3783	**Tsitologiya i Genetika (Cytology & Genetics)**	Institute of Cell Biology & Genetic Engineering of the National Academy of Sciences of Ukraine	01.01.2017	11.30.2018				Y	
Priority	Academic Journal	0041-395X	**Tufts Health Science Review**	Tufts Health Science Review	09.01.1971	12.31.1974				Y	
Core	Magazine	0747-4105	**Tufts University Diet & Nutrition Letter**	Tufts University Health & Nutrition Letter	03.01.1992	01.31.1997	01.01.1994	01.31.1997			
Core	Magazine	1526-0143	**Tufts University Health & Nutrition Letter**	Tufts University Health & Nutrition Letter	02.01.1997						
Core	Academic Journal	1306-0015	**Türk Pediatri Arşivi**	Aves Yayincilik Ltd. STI	09.01.2008	10.31.2020				Y	
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Core	Academic Journal	1019-214X	**Turkish Archives of Dermatology & Venerology / Turkderm**	Galenos Yayinevi Tic. LTD. STI	01.01.2017	12.31.2019				Y	
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Core	Academic Journal	1301-2193	**Turkish Journal of Endocrinology & Metabolism**	Aves Yayincilik Ltd. STI	03.01.2009	12.31.2022				Y	
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Core	Academic Journal	1302-0234	**Turkish Journal of Physical Medicine & Rehabilitation / Turkiye Fiziksel Tip ve Rehabilitasyon Dergisi**	Turkish Society of Physical Medicine & Rehabilitation	04.02.2009	03.31.2017				Y	
Core	Academic Journal	1300-8757	**Turkish Journal of Physiotherapy Rehabilitation**	Turkish Journal of Physiotherapy & Rehabilitation	04.01.2000					Y	
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Core	Academic Journal	2149-2530	**Turkish Thoracic Journal / Turk Toraks Dergisi**	Aves Yayincilik Ltd. STI	03.01.2009	12.31.2022				Y	
Core	Academic Journal	1309-0119	**Turkiye Klinikleri Archives of Lung**	Turkiye Klinikleri	06.01.2010					Y	
Core	Academic Journal	1300-0292	**Turkiye Klinikleri Journal of Medical Sciences**	Turkiye Klinikleri	02.01.2005					Y	
Core	Academic Journal	1308-092X	**Turkiye Klinikleri Journal of Nursing Sciences**	Turkiye Klinikleri	06.01.2010					Y	
Core	Academic Journal	1308-0938	**Turkiye Klinikleri Journal of Sports Sciences**	Turkiye Klinikleri	06.01.2010					Y	
Core	Magazine	1209-4846	**Turning Points (12094846)**	Saskatchewan Registered Nurses Association	01.01.1997	03.31.1999	01.01.1997	03.31.1999			
Core	Academic Journal	1832-4274	**Twin Research & Human Genetics**	Cambridge University Press	02.01.2012					Y	
Core	Academic Journal	1683-1624	**Tzu Chi Nursing Journal**	Buddhist Tzu Chi General Hospital	03.01.2006					Y	
Priority	Magazine	0041-5537	**U.S. News & World Report**	US News & World Report, L.P.	11.23.1981	12.31.2010					
Core	Academic Journal	0104-3552	**UERJ Nursing Journal / Revista Enfermagem UERJ**	Universidade do Estado do Rio de Janeiro	01.01.2003					Y	
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Core	Academic Journal	2757-7074	**Ümraniye Pediatri Dergisi**	KARE Publishing	04.01.2022					Y	
Priority	Academic Journal	0162-7287	**UNA Communique (Utah Nurses Association)**	Utah Nurses' Association	03.01.1976	11.30.1978				Y	