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Factors Associated with Blood Donation Behavior Among Medical Students: A Cross-Sectional Study

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ABSTRACT

Ensuring a safe and sustainable blood supply is a critical public health challenge globally. Although medical students are generally expected to possess adequate knowledge and positive attitudes toward blood donation, actual donation rates often fall short of expectations. This study aims to evaluate blood donation behavior, knowledge, attitudes, and associated factors among medical students.

This cross-sectional study was conducted among medical students at Adıyaman University. Data were collected using a structured questionnaire covering sociodemographic characteristics, blood donation behavior, and knowledge-related items, along with a 24-item Likert-type Blood Donation Attitude Scale. A total of 249 students participated in the study. Knowledge levels were assessed via a 20-item questionnaire, and attitude scores were calculated from the scale. Descriptive statistics, chi-square tests, independent-samples t-tests, Pearson correlation, and multivariate regression analyses (linear and logistic) were performed.

Among the participants, 37.8% had previously donated blood. Male gender (OR=3.49; p<0.001), encouraging others to donate (OR=2.50; p=0.016), and perceiving oneself as healthy enough to donate (OR=35.07; p<0.001) were identified as independent predictors of blood donation behavior. The mean knowledge score was 13.76±2.73, and the mean attitude score was 84.55±9.54. No significant correlation was found between knowledge and attitude scores (r=0.034; p=0.594), nor between these variables and actual blood donation behavior (p>0.05).

Blood donation behavior among medical students is more strongly associated with individual health perception and social influence than with knowledge or attitudes. Interventions aimed at increasing blood donation should focus on enhancing perceived health suitability and strengthening social encouragement rather than solely improving knowledge levels.

Keywords: Blood donation behavior, Medical students, Perceived health status, Public health.

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INTRODUCTION

Blood is widely recognized as a fundamental symbol of health and life and as a unique therapeutic resource of human origin, for which no alternative source exists [1]. Blood transfusion constitutes a life-saving intervention in cases of acute blood loss, major surgical procedures, and hematological diseases. Increasing the number of donors and ensuring a sustainable supply of safe blood products represent critical public health challenges [2–5].

Globally, of the 118.5 million blood donations collected, 40% are obtained from high-income countries, which host only 16% of the world's population. The donation rate per 1,000 population is 31.5 in high-income countries, 16.4 in middle-income countries, and 5.0 in low-income countries [6].

Under appropriate clinical conditions, the transfusion of blood and blood products is life-saving [7]. However, many patients in need of transfusion cannot access safe blood in a timely manner, despite its well-established role in improving health outcomes and reducing premature mortality [8]. While transfusions in high-income countries are predominantly used to support cardiovascular surgery, organ transplantation, trauma management, and malignancy treatment in individuals aged 60–65 years and older, in low- and middle-income countries, they are primarily indicated for obstetric hemorrhage and severe childhood anemia [3,4,6,9]. This disparity contributes to preventable maternal and child mortality, particularly in regions such as sub-Saharan Africa, where access to safe blood remains limited [4,9].

Voluntary, non-remunerated, and regular blood donors are considered the most reliable source for maintaining a safe and sustainable blood supply, as they carry a lower risk of transfusion-transmissible infections and enable continuous stock management [10–12]. Nevertheless, misconceptions, lack of knowledge about the donation process and eligibility criteria, fear of infection or physical weakness, needle phobia, and time constraints constitute major barriers to blood donation [13–15]. Therefore, improving knowledge and attitudes toward blood donation—especially among young adults—represents a key public health priority for ensuring a safe blood supply [10,11,16].

Blood donation rates largely depend on individuals' and communities' willingness to donate. To ensure continuous access to safe blood, it is essential to recruit more donors. While family or replacement donors typically donate in response to an immediate need of a relative or acquaintance, voluntary and repeat donors donate based on intrinsic motivation [7].

Young and healthy populations constitute the most sustainable pool of future blood donors; within this group, medical students are particularly important due to both their age and their future roles as healthcare professionals [3,16]. Studies conducted in various countries indicate that although medical students generally exhibit positive attitudes toward blood donation, they often lack sufficient knowledge of donation criteria and procedures, resulting in donation rates lower than their attitudes and knowledge suggest [3,10,12].

The aim of this study is to evaluate the knowledge levels, attitudes, and factors associated with voluntary blood donation among medical students. The findings are expected to help correct misconceptions, enhance awareness, and ultimately promote the development of regular, voluntary blood donors among this population.

METHODS

Study Design and Participants

This study was conducted among medical students at Adıyaman University Faculty of Medicine. Participation was voluntary, and written informed consent was obtained from all participants after they received appropriate information. A structured questionnaire, developed based on an extensive literature review, was administered.

Ethical approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of Adıyaman University Faculty of Medicine (Date: May 24, 2022; Decision No: 2022/5-11).

The study population consisted of all medical students enrolled at Adıyaman University Faculty of Medicine. Based on a previously reported blood donation prevalence of 32.5%, the minimum required sample size was calculated as 234 using the formula.

$n = Z^2 \times p \times (1-p) / d^2$, with a 95% confidence level and a 6% margin of error [3]. Considering potential missing data and non-response, a total of 249 participants were included in the study.

Data Collection Tools

The first section of the questionnaire included items assessing participants' sociodemographic characteristics (grade level, gender, parental education level), blood donation behaviors (previous donation status, frequency, and donation site), knowledge about blood donation, and reasons for non-donation. Multiple-choice and multiple-response questions were used.

To assess knowledge levels, questions were included on blood donation eligibility criteria, donation frequency and volume, donor characteristics, and blood safety.

The second section of the questionnaire evaluated participants' attitudes toward blood donation using the Blood Donation Attitude Scale, a 24-item, 5-point Likert-type scale (1 = strongly disagree, 5 = strongly agree) developed by Çelik and Güven [17]. Higher total scores indicate a more positive attitude toward blood donation.

The original scale demonstrated good internal consistency (Cronbach's alpha = 0.84). In the present study, Cronbach's alpha was 0.739. The scale consists of three subdimensions: Social and societal responsibility, Anxiety, Social perception, and understanding.

Knowledge level was assessed by summing correct responses to yield a total knowledge score, while attitude level was evaluated using the total scale score.

Statistical Analysis

The collected data were entered into a statistical software package for analysis. Data cleaning, tabulation, and statistical analyses were performed using this software.

Descriptive statistics were expressed as frequency and percentage for categorical variables, and as mean ± standard deviation for continuous variables.

For comparisons between continuous variables, independent-samples t-tests and one-way ANOVA were used for normally distributed data; Mann–Whitney U and Kruskal–Wallis H tests were used for non-normally distributed data; and Pearson correlation analysis was used to assess relationships between continuous variables.

To identify predictors of blood donation attitude scores, multiple linear regression analysis was performed. Variables with p-values < 0.25 in univariate analyses were included in the model using the enter method. Multicollinearity was assessed using correlation coefficients, Variance Inflation Factor (VIF), and tolerance values. Variables with correlation coefficients ≥0.80, VIF >10, or tolerance <0.20 were excluded from the model.

Logistic regression analysis was conducted to determine factors associated with blood donation behavior. Model fit was assessed using the Hosmer–Lemeshow goodness-of-fit test; $p > 0.05$ indicated acceptable fit.

All results were evaluated at a 95% confidence interval, and $p < 0.05$ was considered statistically significant.

Assessment of Knowledge Level

Participants' knowledge regarding blood donation was evaluated using a 20-item questionnaire covering: Eligibility criteria for blood donation, Donation frequency and volume, Minimum hemoglobin levels, Age and weight requirements, Blood group distribution in Türkiye, Screening tests applied to donated blood (Anti-HIV, Anti-HCV, HBsAg, syphilis, and blood typing), Donor eligibility conditions, Blood donation system, Possible post-donation effects.

The items were developed based on the Turkish Red Crescent blood donation criteria and World Health Organization (WHO) guidelines on blood donor selection [18,19]. Each correct response was scored as 1 point, while incorrect or unanswered items were scored as 0. The total knowledge score ranged from 0 to 20, with higher scores indicating greater knowledge. Knowledge levels were categorized as follows: 0–10 points: Low knowledge, 11–15 points: Moderate knowledge, 16–20 points: High knowledge.

RESULTS

Among the participants, 44.6% were male and 55.4% were female. Regarding paternal education level, the largest group (47.0%) had a bachelor's degree or higher, whereas for maternal education, the largest group (33.3%) was primary school graduates. The vast majority of participants (96.8%) reported knowing their blood group, and 69.9% stated that they encouraged others to donate blood (**Table 1**).

A total of 63.1% of participants reported concerns about the transmission of infectious diseases due to insufficient testing of donated blood. While 37.8% of participants had previously donated blood, 62.2% had never donated. Among those who had donated blood, the mean number of donations was 1.45 ± 1.33. Of these donors, 79.8% had donated only once, whereas 20.2% had donated two or more times (**Table 1**).

The most commonly reported reason for not donating blood was not feeling sufficiently healthy to donate (30.5%), followed by never having considered donation (10.8%) and never having been asked to donate (7.6%). The majority of participants (85.1%) believed that blood donation has no side effects. Among donors, the most frequently preferred donation site was the Turkish Red Crescent (57.4%), followed by mobile blood donation units (35.1%) (**Table 1**).

Analysis of responses to knowledge-related questions showed that the proportion of participants who correctly identified the appropriate donation interval was 61.4% among males and 58.2% among females. Overall, 64.3% correctly identified the amount of blood donated per session, and 70.7% correctly reported the eligible age range for blood donation. The proportion of participants who correctly identified the minimum weight criterion was 59.4%. Among screening tests applied to donated blood, the most correctly identified test was blood group typing (88.0%), whereas t he least correctly

Table 1. Frequency distribution of selected parameters related to blood donation

	N	%
Gender		
Male	111	44.6
Female	138	55.4
Paternal Education Level		
Illiterate	2	0.8
Literate	3	1.2
Primary school	50	20.1
Secondary school	30	12.0
High school	47	18.9
Bachelor's degree or higher	117	47.0
Maternal Education Level		
Illiterate	14	5.6
Literate	8	3.2
Primary school	83	33.3
Secondary school	36	14.5
High school	54	21.7
Bachelor's degree or higher	54	21.7
Knowledge of Blood Group		
Yes	241	96.8
No	8	3.2
Encouraging Others to Donate Blood		
Yes	174	69.9
No	75	30.1
Concern About the Transmission of Infectious Diseases Due to Inadequate Testing of Blood		
Yes	157	63.1
No	35	14.1
Not considered before	57	22.9
History of Blood Donation		
Yes	94	37.8
No	155	62.2
Mean Number of Blood Donations Among Donors (n = 94)	1.45±1.33	1 (1-11)
Number of Blood Donations (n = 94)		
1	75	79.8
≥2	19	20.2
Perceived Side Effects of Blood Donation		
Yes	13	5.2
No	212	85.1
No idea	24	9.6
Place of Blood Donation (n = 94)		
Turkish Red Crescent	54	57.4
Hospital blood bank	7	7.4
Mobile blood donation unit	33	35.1
Reasons for Not Donating Blood		
Not feeling sufficiently healthy to donate	76	30.5
Never considered donating before	27	10.8
Never been asked to donate	19	7.6
Use of medication	14	5.6
Lack of trust in healthcare personnel	8	3.2
Fear of needles	7	2.8
Concern about infectious diseases	7	2.8
Religious reasons	0	0.0
Lack of family approval	0	0.0
Other	38	15.3

Table 1. Frequency distribution of selected parameters related to blood donation

Is the Need Greater for More Common Blood Groups?		
Yes	124	49.8
No	71	28.5
No idea	54	21.7
Who Is Not Eligible to Donate Blood?		
Individuals with any infectious disease	240	96.4
Individuals under 18 years of age	198	79.5
Individuals using medication	193	77.5
Individuals with diabetes	157	63.1
Individuals using aspirin	113	45.4
Individuals who have undergone any surgical procedure	60	24.1
Smokers	48	19.3
Individuals with disabilities	37	14.9
Other	15	6.0
Which of the Following May Occur in a Blood Donor?		
Fatigue	226	90.8
Increased appetite	83	33.3
Weight gain	30	12.0
Weight loss	26	10.4
Addiction to blood donation	12	4.8
How Many People Can Benefit from One Unit of Donated Blood?		
One person	48	19.3
More than one person	154	61.8
No idea	47	18.9
Do You Think the Amount of Blood Donation in Türkiye Is Sufficient?		
Yes	21	8.4
No	182	73.1
No idea	46	18.5
Are You Aware of Any Benefits of Blood Donation?		
Yes	155	62.2
No	12	4.8
No idea	82	32.9
In Your Opinion, What Is the Main Source of Blood and Blood Products in Our Country?		
Voluntary donors	73	29.3
Paid donation	4	1.6
Patient relatives	14	5.6
Turkish Red Crescent	158	63.5
What Should Be Done to Encourage Blood Donation?		
Ensuring hygienic conditions	132	53.0
Providing food/refreshments	113	45.4
Offering free blood tests	107	43.0
Reducing the number of questions in the donor assessment form	64	25.7
Providing financial incentives to donors	59	23.7
Is There an Alternative Medication That Can Be Used When Blood Is Not Available in Emergency Situations?		
Yes	25	10.0
No	106	42.6
No idea	118	47.4
Blood Donation Knowledge Level	13.76±2.73	14 (7-20)
≤10 (Low)	33	13.3
11–15 (Moderate)	151	60.6
16–20 (High)	65	26.1
Blood Donation Attitude Scale	84.55±9.54	84 (49-116)

identified was the syphilis test (57.0%) (Table 1).

A total of 96.4% of participants correctly stated that individuals with infectious diseases cannot donate blood. Additionally, 79.5% were aware that individuals under 18 years of age are not eligible to donate. However, the proportion of participants who believed that individuals with disabilities (14.9%) and smokers (19.3%) cannot donate blood was relatively low (Table 1).

Nearly half of the participants (49.8%) believed that more commonly occurring blood groups are in greater demand. Furthermore, 61.8% correctly stated that one unit of donated blood can benefit more than one recipient. The proportion of participants who believed that the current level of blood donation in Türkiye is insufficient was 73.1% (Table 1).

Participants' attitude scores did not differ significantly by gender, parental education level, knowledge of blood groups, or concern about infectious diseases related to blood donation ($p > 0.05$). The highest mean attitude score was observed among participants whose fathers had a primary school education or lower (86.60 ± 8.40), whereas the lowest was observed among those whose fathers had a secondary/high school education (83.62 ± 10.64).

Regarding maternal education, participants whose mothers had a bachelor's degree or higher had higher attitude scores (85.66 ± 10.13) than those in other groups. Participants who knew their blood group had higher attitude scores (84.73 ± 9.33) than those who did not (79.25 ± 14.38). Similarly, those expressing concern about infectious diseases related to blood donation had higher attitude scores (85.33 ± 9.87) than those in other groups (Table 3).

Participants who encouraged others to donate blood had significantly higher attitude scores (86.08 ± 9.42) compared to those who did not (81.00 ± 8.90).

No significant differences in attitude scores were observed according to blood donation status or the number of donations ($p > 0.05$). However, individuals who believed that blood donation has side effects had significantly higher attitude scores (87.46 ± 8.95) compared to those who believed it has no side effects (84.63 ± 9.03) (Table 3).

Table 2. Percentage distribution of correct responses to blood donation knowledge items among participants

Code	Knowledge Item	Correct Answer	%
K1	Blood donation interval in males	3 months	61.4
K2	Blood donation interval in females	4 months	58.2
K3	Volume of blood collected per donation	450 ml	64.3
K4	Rarest and most common blood groups in Türkiye	AB Rh− / A Rh+	33.7
K5	Minimum hemoglobin level (Female–Male)	12.5–13.5	55.0
K6	Eligible age range for blood donation	18–68 years	70.7
K7	Minimum weight requirement for blood donation	50 kg	59.4
K8	Number of recipients benefiting from one unit of blood	More than one	61.8
K9	Anti-HIV test is performed	Yes	82.3
K10	Anti-HCV test is performed	Yes	72.3
K11	HBsAg test is performed	Yes	66.3
K12	Syphilis test is performed	Yes	57.0
K13	Blood group typing is performed	Yes	88.0
K14	Individuals with infectious diseases cannot donate blood	Yes	96.4
K15	Individuals under 18 years of age cannot donate blood	Yes	79.5
K16	Individuals with disabilities cannot donate blood*	No	85.1
K17	Smokers cannot donate blood*	No	80.7
K18	Blood and blood products in Türkiye are primarily supplied by the Turkish Red Crescent	Kızılay	63.5
K19	There is a greater need for more common blood groups	Yes	49.8
K20	Possible condition observed after blood donation	Fatigue	90.8

The mean knowledge score was 13.76 ± 2.73, with 13.3% of participants classified as having low knowledge, 60.6% as moderate, and 26.1% as high. The mean attitude scale score was 84.55 ± 9.54. Although not statistically significant, the mean knowledge score was higher among females (14.05 ± 2.77) compared to males (13.39 ± 2.65) ($t = -1.907$; $p = 0.058$).

Among the knowledge items related to blood donation, the highest proportion of correct responses was observed for the item stating that individuals with infectious diseases are not eligible to donate blood (96.4%). In contrast, the lowest correct response rate was found for the item concerning the most common and rare blood groups in Türkiye (33.7%) (Table 2).

Table 3. Comparison of attitude scale scores according to selected parameters

	Mean±SD	Statistic
Gender		
Male	84.19±10.96	t= -0.527
Female	84,84±8,25	p=0.598
Paternal Education Level		
Primary school or below	86.60±8.40	F=1.719
Secondary school–high school	83.62±10.64	p=0.181
Bachelor's degree or higher	84.20±9.20	
Maternal Education Level		
Primary school or below	84.11±9.43	F=0.488
Secondary school–high school	84.40±9.35	p=0.614
Bachelor's degree or higher	85.66±10.13	
Knowledge of Blood Group		
Yes	84.73±9.33	U=744.500
No	79.25±14.38	p=0.273
Encouraging Others to Donate Blood		
Yes	86.08±9.42	**T=3.972**
No	81.00±8.90	**p<0.001**
Concern About Infectious Diseases Related to Blood Donation		
Yes	85.33±9.87	F=1.456
No	82.97±10.52	p=0.235
Not considered before	83.36±7.73	
History of Blood Donation		
Yes	84.21±9.45	t= -0.439
No	84.76±9.62	p=0.661
Number of Blood Donations (n = 94)		
1	83.96±9.62	U=706.500
≥2	85.21±8.89	p=0.955
Perceived Side Effects of Blood Donation		
Yes	87.46±8.95	**U=931.500**
No	84.63±9.03	**p=0.050**
Place of Blood Donation (n = 94)		
Turkish Red Crescent	83.63±10.79	X^2=0.551
Hospital blood bank	85.57±6.70	p=0.759
Mobile blood donation unit	84.88±7.53	
Not Feeling Sufficiently Healthy to Donate Blood		
Yes	86.11±8.30	t= -1.721
No	83.86±9.98	p=0.086
Is There an Alternative Medication That Can Be Used When Blood Is Not Available in Emergency Situations?		
Yes	85.52±8.45	X^2=1.950
No	85.67±8.44	p=0.377
No idea	83.35±10.56	
Awareness of the Benefits of Blood Donation		
Yes	85.23±8.38	**X^2=6.891**
No	76.33±17.97	**p=0.032**
No idea	84.49±5.18	
Perceived Adequacy of Blood Donation in Türkiye		
Yes	84.71±9.19	X^2=1.821
No	84.98±9.61	p=0.402
No idea	82.78±9.39	
Blood Donation Knowledge Level		
≤10 (Low)	83.94±8.03	F=0.200
11–15 (Moderate)	84.44±10.72	p=0.819
16–20 (High)	85.14±7.12	

Participants who reported not feeling sufficiently healthy to donate blood had higher attitude scores (86.11 ± 8.30) than those who felt healthy (83.86 ± 9.98); however, this difference was not statistically significant (p = 0.086).

Participants who believed that blood donation is beneficial demonstrated significantly higher attitude scores (85.23 ± 8.38) compared to other groups (p = 0.032) (**Table 3**).

No statistically significant differences were found in attitude scores according to preferred donation site, perceived health status, belief in the existence of alternatives to blood, adequacy of blood donation levels, or knowledge level (p > 0.05) (**Table 3**).

***Table 4**. Comparison of selected variables according to blood donation status*

	Blood Donation Status		Statistic
	Donors	**Non-donors**	
Gender	**N (%)**	**N (%)**	
Male	66 (59.5)	45 (40.5)	**X^2=40.164**
Female	28 (20.3)	110 (79.7)	**p<0.001**
Paternal Education Level			
Primary school or below	21 (38.2)	34 (61.8)	X^2=0.363
Secondary school–high school	27 (35.1)	50 (64.9)	p=0.834
Bachelor's degree or higher	46 (39.3)	71 (60.7)	
Maternal Education Level			
Primary school or below	37 (35.2)	68 (64.8)	X^2=0.506
Secondary school–high school	36 (40.0)	54 (60.0)	p=0.777
Bachelor's degree or higher	21 (38.9)	33 (61.1)	
Encouraging Others to Donate Blood			
Yes	74 (42.5)	100 (57.5)	**X^2=5,611**
No	20 (26.7)	55 (73.3)	**p=0,018**
Concern About Infectious Diseases Related to Blood Donation			
Yes [a]	51 (32.5)	106 (67.5)	**X^2=9.243**
No [b]	21 (60.0)	14 (40.0)	**p=0.010**
Not considered before [a]	22 (38.6)	35 (61.4)	
Not Feeling Sufficiently Healthy to Donate Blood			
Yes	2 (2.6)	74 (97.4)	**X^2=40.164**
No	92 (53.2)	81 (46.8)	**p<0.001**
Is There an Alternative Medication That Can Be Used When Blood Is Not Available in Emergency Situations?			
Yes	7 (28.0)	18 (72.0)	X^2=1.127
No	41 (38.7)	65 (61.3)	p=0.569
No idea	46 (39.0)	72 (61.0)	
Awareness of the Benefits of Blood Donation			
Yes [a, b]	61 (39.4)	94 (60.6)	**X^2=6.280**
No [b]	8 (66.7)	4 (33.3)	**p=0.043**
No idea [a]	25 (30.5)	57 (69.5)	
Perceived Adequacy of Blood Donation in Türkiye			
Yes	11 (52.4)	10 (47.6)	X^2=2.962
No	69 (37.9)	113 (62.1)	p=0.227
No idea	14 (30.4)	32 (69.6)	
Blood Donation Knowledge Level	13.93±2.76	13.65±2.71	t= 0.777 p=0.438
≤10 (Low)	14 (42.4)	19 (57.6)	X^2=1.797
11–15 (Moderate)	52 (34.4)	99 (65.6)	p=0.407
16–20 (High)	28 (43.1)	37 (56.9)	
Blood Donation Attitude Scale	84.21±9.45	84.76±9.62	t= -0.439 p=0.661

When the relationships between blood donation status and various variables were examined, it was found that males had a significantly higher rate of blood donation (59.5%) compared to females (20.3%) (p<0.001). Similarly, individuals who encouraged others to donate blood had a higher donation rate (42.5%) compared to those who did not (26.7%), and this difference was statistically significant (p = 0.018) (**Table 4**).

donation is not beneficial exhibited higher donation rates, and this difference was statistically significant (p = 0.043) (**Table 4**).

In contrast, no significant associations were found between blood donation status and paternal or maternal education level, perceptions regarding the adequacy of blood donation in Türkiye, beliefs about the availability of alternatives to blood in emergency situations, knowledge level, or attitude scores (p

Table 5. *Linear Regression Analysis of Factors Associated with Blood Donation Attitude Scale*

	β	SE	Standart β	t	p
Blood Donation Attitude Scale (R^2=0.114; F=4.444; p<0.001)					
Constant	73.384	3.471		21.140	<0.001
Maternal education level: bachelor's degree or higher	1.853	1.435	0.080	1.292	0.198
Paternal education level: primary school or below	3.073	1.437	0.134	2.139	**0.033**
Encouraging others to donate blood	4.805	1.273	0.232	3.776	**<0.001**
Knowledge of blood group	4.727	3.342	0.088	1.414	0.159
Concern about infectious diseases related to blood donation	2.118	1.204	0.107	1.760	0.080
Perceived side effects of blood donation	3.577	2.633	0.084	1.358	0.176
Not feeling sufficiently healthy to donate blood	2.077	1.276	0.100	1.628	0.105

Table 6*. Results of the logistic regression analysis for blood donation behavior*

	RR (95% CI) *	***Statistical test***
Male gender	3.49 (1.77-6.86)	**p<0.001**
Encouraging others to donate blood	2.50 (1.18-5.30)	**P=0.016**
Absence of concern about infectious diseases	1.82 (0.70-4.70)	p=0.218
Perceiving oneself as healthy enough to donate blood	35.07 (7.89-155.94)	**p<0.001**
Belief that blood donation is not beneficial	2.84 (0.48-16.69)	p=0.249
Perception that blood donation in Türkiye is sufficient	1.24 (0.40-3.82)	p=0.709
Knowledge score	1.05 (0.93-1.18)	p=0.426
Attitude score	1.01 (0.97-1.04)	**p=0.783**

** RR values are presented with 95% confidence intervals.*

***The Hosmer–Lemeshow test was used to assess model fit and was found to be non-significant (p=0.859, p>0.05).*

**** When the classification performance of the logistic regression model was evaluated, the overall accuracy (correct classification rate) of the model was found to be 75.9%.*

A significant association was observed between concern about infectious diseases and blood donation status (p = 0.010), with individuals who reported no such concern having a higher donation rate (60.0%) than those in other groups. In addition, individuals who did not feel sufficiently healthy to donate blood had significantly lower donation rates (p < 0.001) (**Table 4**).

Interestingly, participants who believed that blood

> 0.05) (**Table 4**).

The relationship between participants' knowledge scores and attitude scores regarding blood donation was examined using Pearson correlation analysis. The analysis revealed no statistically significant correlation between knowledge and attitude scores (r = 0.034, p = 0.594).

A multiple linear regression analysis was performed to identify the predictors of the blood donation attitude scale

score. The results indicated that having a father with a primary school education or lower (β = 3.073, p = 0.033) and encouraging others to donate blood (β = 4.805, p < 0.001) were significant predictors of higher attitude scores (**Table 5**).

Logistic regression analysis was performed to identify factors associated with blood donation behavior, and several variables were identified as independent predictors. Male gender was significantly associated with a higher likelihood of donating blood (OR = 3.49; 95% CI: 1.77–6.86; p < 0.001). Similarly, individuals who encouraged others to donate blood were more likely to donate (OR = 2.50; 95% CI: 1.18–5.30; p = 0.016).

Perceiving oneself as sufficiently healthy to donate blood was another strong predictor, significantly increasing the likelihood of blood donation (OR = 35.07; 95% CI: 7.89–155.94; p < 0.001) (**Table 6**).

In contrast, no statistically significant associations were found between blood donation behavior and lack of concern about infectious diseases (p = 0.218), believing that blood donation is not beneficial (p = 0.249), perceiving blood donation levels in Türkiye as sufficient (p = 0.709), knowledge score (p = 0.426), or attitude score (p = 0.783) (p > 0.05) (**Table 6**).

DISCUSSION

This study evaluated blood donation behavior among medical students in conjunction with knowledge levels and attitudes, employing a multidimensional analytical approach to identify determinants of donation behavior. The findings suggest that blood donation behavior is influenced more by individual perceptions and social factors than by knowledge and attitudes alone.

In the present study, perceiving oneself as sufficiently healthy to donate blood emerged as a strong determinant of blood donation behavior. Moreover, the fact that this was the most frequently reported reason for not donating underscores perceived health status as a primary determinant of donation behavior. Similarly, Brodersen et al. reported that being a blood donor, donor retention, and donation frequency were associated with better self-reported health status [20]. Zucoloto et al. found that poor or moderate perceived health was associated with non-donation [21]. In addition, Van den Hurk et al. demonstrated that donors who perceived their health as good had a 15% lower risk of discontinuing donation compared to those with poorer perceived health [22].

In our study, individuals who encouraged others to donate blood not only had higher attitude scores but also were more likely to donate blood, underscoring the significant role of social norms and peer influence. This finding supports the notion that blood donation is not merely an individual decision but also a behavior shaped by social interactions and normative influences. Indeed, a meta-analysis by Timothy C. Bednall et al. reported that convenience of donation location (80.5%) and social motivations (79.7%) were among the strongest determinants of donation behavior. Within social motivations, altruism (78.3%) emerged as a key factor, while collectivist values at both the community level (57.6%) and the level of close social networks (friends and family) (43.4%) were also identified as important influences [23].

The effect of gender on blood donation behavior was also notable. Consistent with the literature, males were significantly more likely to donate blood than females, whereas females demonstrated higher mean knowledge scores [24–28]. This disparity may be attributed to factors such as the higher prevalence of anemia among women, physiological differences, and concerns regarding eligibility criteria [24,25].

Multiple studies have demonstrated that, despite generally adequate knowledge and positive attitudes toward blood donation, actual donation rates remain low [8,25,29]. Consistent with these findings, the present study did not identify a significant association between knowledge level and blood donation behavior, nor between knowledge and attitude scores. These results indicate that knowledge and positive attitudes alone are insufficient to drive behavioral change. The observed gap between high attitude scores and low donation rates underscores the intention–behavior gap, suggesting that behavior is shaped by both cognitive and affective factors as well as environmental and situational barriers. This disconnect may be attributed to factors such as access limitations, fear, concerns about medical eligibility, and logistical constraints [25,30–32]. Consequently, interventions should address not only knowledge enhancement but also the reduction of tangible and emotional barriers.

Although concern about infectious diseases was present among a considerable proportion of participants, it was not identified as an independent predictor in the multivariable analysis. This finding suggests that risk perception alone may not be sufficient to determine behavior and should be evaluated alongside other factors. Nevertheless, increasing trust in the healthcare system may indirectly affect donation behavior. A study conducted in European countries demonstrated that higher levels of trust in the healthcare system at the country level were associated with a greater likelihood of blood donation [33]. Similarly, in China, individual trust in blood collection institutions was found to enhance positive attitudes toward voluntary blood donation,

which in turn increased donation intention [34].

Regarding knowledge levels, participants generally demonstrated moderate knowledge; however, notable deficiencies were identified in certain critical areas. In particular, limited knowledge regarding blood group distribution and donation criteria indicates the need for more targeted educational interventions. Furthermore, the lack of translation of knowledge into behavior suggests that educational programs should not only aim to increase knowledge but also to facilitate behavioral change.

CONCLUSION

In conclusion, this study demonstrates that blood donation behavior among medical students is primarily influenced by perceived health status and social influence, rather than by knowledge or attitudinal factors alone. Although participants exhibited moderate knowledge levels and generally positive attitudes, these cognitive components did not translate into actual donation behavior, highlighting a significant intention–behavior gap.

These findings indicate that traditional education-based interventions may be ineffective in increasing blood donation rates. Instead, strategies informed by behavioral science that enhance perceived eligibility, reduce psychological and logistical barriers, and leverage peer influence and social norms are likely to be more effective.

From a public health perspective, interventions targeting young adults, particularly future healthcare professionals, should prioritize socially embedded and perception-oriented approaches. University-based peer-led initiatives, norm-driven campaigns, and interventions to address misconceptions about donor suitability may constitute effective, scalable solutions.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper and that they have approved the final version.

Disclosure

The authors have reported no conflicts of interest in preparing and publishing this article.

Ethics committee approval

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