International Journal of Biology and Life Sciences
ISSN: 2957-9511 | Vol. 4, No. 1, 2023

Study on Blood Donation Willingness and Influencing Factors of College Students in a Medical College

Maoying Yang, Jingyi Cai *, Jinli Bi, Kewei Chen, Yuchun Guo, Hengming Ye

School of Medical Technology, Guangdong Medical University, Dongguan, 523808, China

*** Corresponding author:** Jingyi Cai (Email: caijignyi@gdmu.edu.cn)

Abstract: Objective The study is to explore the willingness of medical college students to donate blood and its influencing factors, to provide scientific basis for improving the rate of unpaid blood donation. Methods The electronic questionnaire was distributed by random sampling, and its influence on blood donation willingness was investigated from four aspects: external promoting factors, internal promoting factors, external hindering factors and internal hindering factors. The differences and influencing factors among college students with different willingness to donate blood were analyzed. Results A total of 1047 valid questionnaires were collected. There were more male volunteers with blood donation willingness than girls (67.6% vs 61.5% $P < 0.05$), and there were differences among lower, middle and higher grades (68.1%, 66.2% and 58.8%). Willing college students whose family members had more blood donation experience than those with no blood donation desire (55.0% vs 72.7% $P < 0.01$). Positive factors of willingness to donate blood include family members who have the experience of blood donation, thinking that blood donation is pleasant, thinking that blood donation is the duty and responsibility of citizens, the support of family and friends. Negative factors of willingness to donate blood are grade and fear of pain during blood donation ($P < 0.05$). Conclusion According to the characteristics and needs of college students, we should carry out voluntary blood donation education, promote college students to actively participate in unpaid blood donation, and promote the sustainable and healthy development of unpaid blood donation career.

Keywords: College Student; Voluntary Blood Donation; Willingness of Blood Donation; Influencing Factors.

1. Introduction

Unpaid blood donation refers to the voluntary selfless dedication of one's own blood to social welfare undertakings in order to save the lives of others, while blood donors do not receive any remuneration from blood collection units and blood donor units. It is a public welfare cause to save human lives and protect people's health [1]. Since the implementation of the unpaid blood donation policy in 1998, the blood donation rate has increased from 4.8 %to 12 %, but there is still a gap with some middle-and high-income countries, and the blood donation rate in high-income countries can reach 31.5 %. And with the implementation of the Healthy China strategy, the release of medical demand and the extension of per capita life expectancy, the demand for clinical blood use in China is also further increasing, and the blood donation team still needs to continue growing. College students are the main force in the cause of blood donation, with the characteristics of age advantage, high cultural quality, and the blood qualified rate is higher than that of other blood donors, so they are ideal low-risk blood donors and important recruitment targets for unpaid blood donation in our country [2] [3]. Strengthening the propaganda and education of blood donation for volunteers who are willing to donate blood may be an effective way to promote blood supply. Therefore, this study takes the college students of a university in Guangdong as the research object, and investigates the characteristics, knowledge and influencing factors of different willingness college students to donate blood, defining the specific ways of recruiting blood donators, targeted education on blood donation, expanding and stabilizing the blood donation team of college students, and provide a theoretical basis for the organization and implementation of unpaid blood donation activities of college students in Dongguan.

2. Objects and Methods

2.1. Objects of Investigation

From April 2022 to July 2022, taking the students of a medical college in Guangdong as the research object, using the method of random sampling, 1053 questionnaires were randomly distributed in the school, and a total of 1047 valid questionnaires were collected, with an effective recovery rate of 99.4%.

2.2. Questionnaire Survey

2.2.1. Design of the Questionnaire

This survey focuses on the characteristics of students with different blood donation intentions and the research topics of blood donation promotion and hindering factors in medical colleges and universities. It reads a large number of literature design questionnaires and preliminarily compiled questionnaires. The content of the questionnaire includes six aspects: basic information, blood donation situation, willingness to donate blood, blood donation knowledge, blood donation promotion factors, and blood donation hindering factors. Among them, promotion factors are divided into external promotion factors and internal promotion factors, while external promotion factors include blood donation, which can alleviate the shortage of clinical blood use; blood donation souvenirs or certificates can be obtained, enjoying preferential policies for using blood, encouraged, and supported by family and friends, geting free physical examination, and geting school credit rewards. Six internal promotion factors include blood donation, which can save lives, donating dedicate love, considering that blood donation is meaningful; reckoning that blood donation is good, and thinking that blood donation is pleasant and beneficial to

health; thinking that is a citizen's responsibility and obligation. External hindering factors include the unsatisfactory feelings of blood donation souvenirs, the opposition of friends and family members, the location of blood donation; the physical condition is not suitable; the location of blood donation is not convenient, and there is no time to donate blood. Internal obstacles include fear of blood trafficking, fear of blocking the blood use policy; the donated blood is missing; fear of blood and pain during blood donation, and fear of nervousness during blood donation. It is divided into single-choice questions and multiple-choice questions. Among them, the single-choice questions are presented in the form of the Likert summated rating scale. The A-E option items are very agreeable, agreeable, unclear, disagree and very disagreed

2.2.2. Quality Control and Survey Implementation of Questionnaires

This questionnaire uses the "WJX" (a professional online questionnaire survey, examination, evaluation and voting platform)to make an electronic questionnaire. At the same time, it is set up without missing items and omissions in the background of the system to ensure the completeness and reliability of the survey results, ensure the quality of the survey, and design posters and distribute them to the respondents. Before distribution, we train the members of the research group to unify the guidance language; when distributing the questionnaire, it is necessary to emphasize to the subjects of the investigation that the purpose of this survey is only for academic research. The whole process is in an anonymous form, the information is confidential, and the options are not good or bad.

2.3. Statistical Methods

We convert the counting data in the questionnaire into measurement data, and assign the five options of blood donation knowledge, promotion factors and hindering factors respectively (A-5, B-4, C-3, D-2, E-1), so that the higher the blood donation knowledge score, the higher the knowledge of blood donation knowledge, and the higher the promotion factor score, the stronger the progressive effect, the higher the score of the hindering factor, and the stronger the hindering effect. SPSS 27.0 statistical software is used to analyze the data, and the counting data is expressed by frequency and percentage; the measurement data is expressed by average ± standard deviation ($\bar{x} \pm S$). The comparative differences between groups are expressed by independent Independent-Sample T Test and Chi-Squared Test, and the influencing factors are analyzed by Logistic Regression. $P<0.05$ is statistically significant.

3. Results

3.1. Demographic Characteristics

The valid survey object included 1047 people, including 484 (46.2%) men and 563 (53.8%) women; 574 (54.8%) rural residents, 473 (45.2%) urban residents; 603 (57.6%) majored in medical specialties, and 444 (42.4%) majored in non-medical specialties; 317 (30.3%) in lower (freshman and sophomore), 373 (35.6%) in middle (junior), and 357 (34.1%) in senior; 277 (26.5%) had donated blood and 770 (73.5%) had not. There were 673 (64.3%) willing to donate blood and 374 (35.7%) without intention.

3.2. Survey of the Willingness to Donate Blood

The proportion of men willing to donate blood was higher than women, with a statistically significant difference ($P<0.05$). By grade, the lower grade had the highest proportion, while the highest grade had the least proportion, with a statistically significant difference ($P<0.05$). Families who had donated blood experience will be more willing to donate blood, with a statistically significant difference ($P<0.05$). Household registration and specialty had no influence on the willingness to donate blood, with no statistically significant difference ($P>0.05$). (Table 1)

Table 1. Investigation of college students' willingness to donate blood(n%)

Grouping	Classification	Total	Willing to donate blood (n=673)	Not willing to donate blood (n=374)	X^2	P
Gender	**Male**	484	327(67.6)	157 (32.4)	4.225	<0.05
	Female	563	346(61.5)	217 (38.5)		
Household registration	**Rural**	574	373(65.0)	201(35.0)	0.274	0.601
	Urban	473	300(63.4)	173(36.6)		
Specialty	**Medical specialties**	603	390(64.7)	213(35.3)	0.098	0.754
	Non-medical specialties	444	283(63.7)	161(36.3)		
Grade	**Lower**	317	216(68.1)	101(31.9)	7.296	<0.05
	Middle	373	247(66.2)	126(33.8)		
	Senior	357	210(58.8)	147(41.2)		
Families who have donated blood experience	**Yes**	498	399(72.7)	150(27.3)	35.459	<0.01
	no	549	274(55.0)	224(45.0)		

3.3. The Influence of Blood Donation Knowledge Score on the Willingness to Donate Blood

The score of blood donation knowledge of students with willingness to donate blood is higher than that of students without willingness to donate blood, with a statistically significant difference ($P<0.01$). (Table 2)

Table 2. Comparison of the blood donation knowledge scores among college students（n, % or $\bar{x}$±SD）

	Willing to donate blood	Not willing to donate blood	X^2	*P*
Blood donation knowledge score	41.65±4.478	40. 11±4.730	5.224	<0.01

3.4. Analysis of the Promoting Factors of College Students 'Willingness to Donate Blood

The total scores of internal and external promoting factors of volunteers with blood donation were higher than those without willingness to donate blood, the difference has statistical significance (P<0.05). (Table 3)

In internal promoting factors, people who are willing to donate blood think "Blood donation can save lives and dedicated love"; "Blood donation is meaningful";" Blood donation is good "; " Blood donation is pleasant"; "Blood donation is beneficial to health"; "Blood donation is the responsibility and obligation of citizens", their scores are higher than those who are not willing to donate blood, the difference has statistical significance (P<0.05).

In external promoting factors, people who are willing to donate blood think "Blood donation can alleviate the shortage of clinical use"; "Blood donation can obtain blood donation souvenirs or certificates"; "Blood donation can enjoy preferential policies"; "Friends and family encourage and support blood donation"; "Blood donation can get free physical examination"; "blood donation can obtain school credit rewards", their scores are higher than those who are not willing to donate blood, the difference has statistical significance (P<0.05).

Table 3. Analysis of the promoting factors of college students' willingness to donate blood (n, % or $\bar{x}$±SD)

Classification	Willing to donate blood	Not willing to donate blood	t	P
Internal promoting factors	26.77±3.015	24.96±3.674	8.113	<0.001
Blood donation can save lives and dedicated love	4.59±0.501	4.45±0.559	4.169	<0.001
Blood donation is meaningful	4.55±0.575	4.38±0.671	4.202	<0.001
Blood donation is good	4.51±0.537	4.28±0.681	5.740	<0.001
Blood donation is pleasant	4.47±0.585	4. 13±0.779	7.396	<0.001
Blood donation is beneficial to health	4.35±0.739	3.94±0.915	7.509	<0.001
Blood donation is the responsibility and obligation of citizens	4.29±0.825	3.79±1.049	7.921	<0.001
External promoting factors	26.03±3.142	24.20±3.413	8.752	<0.001
Blood donation can alleviate the shortage of clinical use	4.53±0.534	4.37±0.551	4.680	<0.001
Blood donation can obtain blood donation souvenir or certificate	4.38±0.645	4. 18±0.658	4.604	<0.001
Blood donation can enjoy preferential policies	4.32±0.750	4.01±0.840	6.031	<0.001
Friends and family encourage and support blood donation	4.29±0.764	3.71±0.933	10.208	<0.001
Can get free physical examination	4.26±0.884	3.91±0.821	6.829	<0.001
Can obtain school credit reward	4.26±0.770	4.01±0.823	4.809	<0.001

3.5. Analysis of the Hindering Factors of College Students' Willingness to Donate Blood

The total score of internal obstruction of students without willingness to donate blood was higher than that of students with willingness to donate blood. and the difference is statistically significant (P<0.05). (Table 4) In terms of "Fear of blood ", "Fear of pain during blood donation" and " Worry about nervousness during blood donation ", those who were not willing to donate blood had higher scores than those who wanted to donate blood, which was more obstacles to the willingness to donate blood, and the difference was statistically significant (P<0.05). (Table 4)

However, there was no obvious difference in the scores of the two groups in " The donated blood is missing ", " Fear of blood trafficking " and " Fear of blocking the blood use preferential policy ", the difference was not statistically significant (P>0.05).

In terms of the external differential total score, the difference is not statistically significant (P>0.05). In terms of "No time to donate blood", "The location of blood donation is not convenient " and "The location of the blood donation is unclear", those who are willing to donate blood had higher scores than those who are unwilling to donate blood and statistically significant (P <0.05). However, in the terms of "Friends and family opposition" and " The physical condition is not suitable ", those who are unwilling to donate blood scored higher than those willing to donate blood, with a statistically significant difference (P <0.05).

Table 4. Analysis of the hindering factors of college students' willingness to donate blood（n, % or $\bar{x}$±SD）

Classification	Willing to donate blood	Not willing to donate blood	t	P
Internal hindering factors	17. 15±5.473	17.89±4.301	-2.411	<0.05
The donated blood is missing	3.07±1.247	3.07±1.150	0.078	0.938
Fear of blood trafficking	2.32±1.231	2.23±1.043	1.304	0.193
Fear of blocking the blood use preferential policy	2.54±1.222	2.57±1.081	-0.392	0.695
Fear of blood	2.77±1.269	2.99±1.134	-4.217	<0.001
Fear of pain during blood donation	3.09±1.250	3.40±1.078	-4.217	<0.001
Worry about nervousness during blood donation	3.36±1.220	3.63±1.000	-3.947	<0.001
External hindering factors	18.43±4.687	18. 16±3.646	1.014	0.311
No time to donate blood	3.73±1.039	3.32±0.970	6.262	<0.001
The location of blood donation is not convenient	3.51±1.171	3.31±1.073	2.695	<0.05
The location of the blood donation is unclear	2.82±1.235	2.58±1.065	3.317	<0.001
Unsatisfactory feelings of blood donation souvenirs	2.46±1.172	2.43±0.971	0.407	0.769
Friends and family opposition	2.60±1.201	2.90±1.049	-4.255	<0.001
The physical condition is not suitable	3.31±1.302	3.62±1.111	-4.043	<0.001

3.6. Logistic Regression Analysis of Factors Influencing Willingness to Donate Blood

Whether people have the willingness to donate blood is the dependent variable, no willingness = 0, willingness = 1, and the factors with statistical differences in Tables 1, 2, 3, and 4 were selected as independent variables to construct the logistic regression equation. After analysis, six influencing factors entered the regression equation, which were: grade, family blood donation experience, blood donation is pleasant; blood donation is the responsibility and obligation of citizens; supported by family and friends, and fear of pain during blood donation. Family blood donation experience, blood donation is pleasant; blood donation is the responsibility and obligation of citizens, and having the support from family and friends, while grade and Fear of pain during blood donation were negatively associated with willingness to donate blood. The overall accuracy of the model in predicting the willingness of university students to donate blood was 71.9%.

Table 5. Logistic regression analysis of factors influencing willingness to donate blood

Classification	B	BE	Wals	Exp(B)	95%CI	P
Families who have donated blood experience	0.580	0.141	17.000	1.787	1.356-2.354	<0.001
Blood donation is pleasant	0.276	0.124	4.934	1.318	1.033-1.681	<0.05
Blood donation is the responsibility and obligation of citizens	0.199	0.092	4.691	1.220	1.019-1.461	<0.05
Supported by family and friends	0.528	0.094	31.585	1.696	1.411-2.039	<0.001
Fear of pain during blood donation	-0.169	0.061	7.539	0.845	0.749-0.953	<0.05
Grade	-0.160	0.077	4.287	0.852	0.732-0.991	<0.05
Constant	-2.927	0.549	28.437	0.054		<0.001

4. Discussion

This study shows that the blood donation rate of college students in this university is 26.5%, which is higher than the rate of 20.86% of college students in Nanchang City who donate blood without compensation [4], and lower than the rate of 30.98% of college students in Beijing City who donate blood without compensation [5]. The college students in this university have the intention to donate blood accounted for 64.3%, while the college students in Jinan City have the intention to participate in gratuitous blood donation accounted for 80.88% [6], and the college students in Nanchang City have the intention to participate in gratuitous blood donation accounted for 80% [4]. The lower percentage of students with the intention to donate blood in this university may be related to the fact that the data collection period was during the closed management period of the epidemic, and students could not enter and exit freely, thus making the willingness to donate blood slightly lower than in other periods.

This study found that there are more male students who have the intention to donate blood, which may be due to the special physiological and psychological characteristics of female students, who cannot donate blood during

menstruation and the three days before and after menstruation, and they are more prone to fear and anxiety, and they will have more worries before donating blood, which leads to low motivation to donate blood. Surprisingly, the number of blood donors in this school decreases with the increase of grade, which is different from the research results of some scholars in China [5] [7], and it may be related to the fact that learning pressure in medical schools are becoming more and more heavy with the increase of grade. This suggests that male students in the lower grades are more likely to be potential donors and may be easier to mobilize when recruiting. In the case of female students, it is necessary to increase publicity efforts and pay more attention to the physiological and psychological care of women, so as to eliminate their concerns about blood donation.

Those who have the intention to donate blood have a higher score of knowledge of blood donation than those who have no intention to donate blood, indicating that the more knowledge of blood donation, the stronger the willingness to donate blood, and that there is still a need to focus on the knowledge of blood donation when conducting publicity and education on blood donation.

In the survey of facilitating factors, it is found that those who are willing to donate blood have higher scores in the aspects of " Blood donation can save lives and dedicated love ", " Blood donation is the responsibility and obligation of citizens ", and " Blood donation can alleviate the shortage of clinical use ", indicating that those who are willing to donate blood have a stronger sense of social responsibility and humanitarian spirit. This indicates that those who are willing to donate blood have a stronger sense of social responsibility and humanitarian spirit. Some objective incentives, such as getting souvenirs or certificates for blood donation, enjoying preferential policies on blood use, getting free medical checkups, and getting school credits, have promoted blood donation, which is still a more effective way to stimulate college students to actively participate in blood donation.

In our study, both groups scored low and no significant difference in some deter factors of blood donation, namely "The donated blood is missing"," Fear of blood trafficking ", " Fear of blocking the blood use preferential policy ", which indicated that university students have sufficient trust the current healthcare environment. Furthermore, our study and some studies at home and abroad unanimously agree that " Fear of blood ", " Fear of pain during blood donation " and " Worry about nervousness during blood donation " are the main discouragements to college students who don't want to donate blood [8] [9]. Therefore, psychological comfort module can be appropriately added to the publicity content of voluntary blood donation, so as to alleviate the psychological pressure of students and strengthen their willingness to donate blood. Willing students have overcome the psychological barriers above, what bothered them the most were the lack of proper time to donate blood and the inconvenience of going to the place where to donate. It is advised that the university and the blood station coordinate to provide convenient blood donation time and locations, such as setting up blood donation branches near schools, and organizing more voluntary blood donation activities on campus, which can promote blood donation intentions into action.

The results of multivariate regression analysis in this study showed that the key factors affecting college students' willingness to donate blood were " Families who have donated blood ","Supported by family and friends", "Blood donation is pleasant", "Blood donation is the responsibility and obligation of citizens", "Fear of pain during blood donation"," Grade ", especially " Families who have donated blood " and " Supported by family and friends ".Social support theory hold that individuals maintain their social identity and receive emotional support, material assistance, services, and new social contacts by means of contacting with other individuals, their behavior and willingness are influenced by the social support system in which they live. For college students, family and friends are their vital social support system. The family is a small society with emotions, and there are deep and stable emotional and mutual aid relationships between family members. Peer support is also a critical part of the social support system [10]. Albert Bandura put forward the idea that the behavior and attitude of significant people around you, such as family, friends, classmates, teachers, and relatives, will have a strength, identification, imitation and example effect on individual behavior [11]. Peers are the objects for students to directly observe and learn, and due to the similarity of age, background, and learning experience, they can easily achieve emotional and social cognitive consistency. Hence, in order to improve the interest of undergraduates to donate blood, it is also necessary to take the blood donation education of their social support system—family and peers seriously , improving the social and family recognition of unpaid blood donation.

Slightly less important influences on willingness to donate blood than " Families who have donated blood "and" Supported by family and friends "were " Blood donation is pleasant "and "Blood donation is the responsibility and obligation of citizens". Some research demonstrated that university students have the highest sense of social responsibility and profit perception namely the blood donation is pleasant compared with medical personnel, individual private operators, workers, and farmers [12]. Undergraduates have a relatively high level of education and a sense of identification with noble behaviors, so they are more prefer donating blood for social responsibility [2]. Blood donation education should not only publicize that the purposes of blood donation are contribution of a warm heart and saving lives, but also need to let citizens know that donating blood is our responsibility and obligation, especially emphasize college students are the main force of unpaid blood donation to promote donation rates.

The willing students are a potential major donor group, so it is significant to understand the factors that influence their willingness to donate. The blood donation education should be carried out in a targeted way based on the characteristics and needs of college students, and give them correct guidance, all of those are beneficial to enhance the enthusiasm of college students to donate blood and promote the sustainable and healthy development of voluntary blood donation career.

Acknowledgments

We thank University-Level College Student Innovation and Entrepreneurship Training Program (SYDC012), "Study on Blood donation willingness and influencing factors of College students in a Medical College"; and Dongguan Science and Technology of Social Development Program (General Program 20211800902162), "Survey on the quality of life and related influencing factors among unpaid blood donors in Dongguan". This study was supported by the funds.

References

[1] CHENG Jie, XU Ling-zhong. Survey on willingness of college students to participate in voluntary blood donation campaigns and affecting factors in Bengbu city[J]. Chinese Journal of General Practice, 2015, 13(2): 260–262.

[2] Lu Xiangjuan, TIAN Zhenhua. Analysis of knowledge awareness rate and influencing factors related to blood donation among unpaid blood donors[J]. Chinese Journal of Public Health Management, 2017, 33(6): 888–890.

[3] Wang Dan, Ni Shaokai. Investigation of medical students' unpaid blood donation status[J]. Guangdong Medical Journal, 2010, 31(10): 1336–1338.

[4] Liu Jinping, Han Ling, Yang Qiuhua, et al. Investigation and analysis of cognition and willingness of unpaid blood donation among college students in Nanchang City[J]. Experimental and Laboratory Medicine, 2018, 36(6): 990–993.

[5] SHI Kexiang, YOU Mei, CHEN Linyi, et al. Voluntary blood donation among undergraduates in Beijing: status and influencing factors of knowledge, attitude and practice[J]. Chinese Journal of Blood Transfusion, 2022, 35(4): 415–419.

[6] Wang Shurong, LI Peng, Han Jinghua, et al. Analysis on the knowledge, attitude and practice of voluntary blood donation among college students in Jinan, China and potential influencing factors[J]. Chinese Journal of Blood Transfusion, 2018, 31(7): 785–788.

[7] HAO Yu, HONG Qian, CAI Guang-ju, et al. Analysis of unpaid blood donation and its influencing factors among college students in Anhui province in China[J]. Modern Preventive Medicine, 2017, 44(12): 2218–2222.

[8] Duan Zhiqian, Ying Shangyun, Qiu LI, et al. Promote and deter factors of blood donation among street blood donors in Nanjing based on the theory of planned behavior[J]. Chinese Journal of Blood Transfusion, 2021, 34(9): 1017–1021.

[9] Abera B, Mohammed B, Betela W, et al. Knowledge, attitude, and practice towards blood donation among health care providers in hospitals at Bahir Dar City, Ethiopia[J]. Transfusion and Apheresis Science, 2017, 56(3): 434–438.

[10] LIU Wei, LI Yu-ling, HAN Qing-hua, et al. Construction of peer support education program for nursing students based on social learning theory[J]. Journal of Nursing, 2023, 30(3): 16–19.

[11] Bandura A. Social Learning Theory of Aggression[J]. Journal of Communication, 1978, 28(3): 12–29.

[12] Mao Wanjing. Study on the Influencing Factors of Voluntary Blood Donation Behavior of the Public in Kunming[D]. Yunnan University, 2019.