



# Analysis on the Influencing Factors of Blood Donation Willingness of College Students in Beijing from the Perspective of Public Management

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## ABSTRACT:

China implements a system of voluntary blood donation, mobilizing citizens to donate blood actively, maintaining blood bank inventory, and ensuring the normal operation of the medical system is an important part of the government's public management. College students, as the main force of the blood donation team, it is of practical significance to explore the influencing factors of their blood donation willingness. Based on the survey data of 349 college students in Beijing, the ordered Probit model was used to study the influence of knowledge and altruism on blood donation willingness from two aspects: knowledge level and altruistic tendency. At the same time, the individual's evaluation of various blood donation incentives was investigated, and the effects of different incentives were discussed. Based on the analysis, this paper puts forward the countermeasures and suggestions for the government to improve the level of public management and improve the willingness of college students to donate blood.

**Keywords:** *Public Management; Willingness to Donate Blood; Knowledge Level; Altruistic Tendency; Ordered Probit Model*

## 1. INTRODUCTION

Blood is a special public resource, scarce and universally needed. In recent years, the implementation of the "two-child" policy has led to a substantial increase in the number of elderly mothers, and the society is also accompanied by various emergencies and disasters. Therefore, there is often a shortage of blood supply. At the beginning of 2020, the new crown pneumonia epidemic was rampant, the medical system was operating under tension, the need for clinical blood has increased significantly, and blood shortages have occurred in many areas. The "Notice of Safeguarding Work" requires strengthening publicity and mobilization, focusing on publicizing the importance of blood safeguards during epidemic prevention and control, and making every effort to ensure clinical medical treatment. It can be seen that the work of unpaid blood donation relies on a long-term and well-prepared adequate supply, and also requires the active participation of the public.

Article 2 of the "Law of the People's Republic of China on Blood Donation" passed in 1997 stipulates: "The state implements a voluntary blood donation system, and advocates voluntary blood donation by healthy citizens between the ages of 18 and 55." Pay attention and actively advocate, the national unpaid blood donation rate has increased year by year, and the number of unpaid blood donations in 2017 increased by 44.6 times compared with 1998. However, looking at the world, according to the statistics of the World Health Organization in 2016, the unpaid blood donation rate in developed countries is 33.1%, and the unpaid blood donation rate in middle-income countries is 11.7%, while my country is only 10.5%, which proves that my country is in the development of unpaid blood donation. There is still a long way to go.

College students in my country are the main force of voluntary blood donation. According to statistics in 2016, the voluntary blood donation rate of college students has reached 78%, which is higher than that of civil servants, soldiers, and other groups. Therefore, the exemplary role played by college students in voluntary

blood donation cannot be ignored, and policy incentives for this group have also become a major focus in blood donation work.

Regarding incentives for voluntary blood donation, the "Blood Donation Law" stipulates: "For blood donors, a voluntary blood donation certificate made by the health administrative department of the State Council shall be issued, and relevant units may give appropriate subsidies." Blood donors, their spouses, and immediate family members can enjoy certain discounts for free blood use when they use blood clinically." For college students, the Beijing Municipal Health Bureau specifically proposed in 2012: "All colleges and universities should include unpaid blood donation work in schools. Various departments, social organizations, and individual teachers and students will be evaluated and evaluated." Therefore, various colleges and universities have begun to use various methods such as compensation funds ranging from 200 to 800, nutritional meal coupons, and comprehensive evaluation points to encourage their students to actively participate in blood donation. However, the incentive policies of each school are different. Can these measures have a significant effect on the enthusiasm of college students? Is the payment of compensation reasonable? From the nature of blood donation, altruistic motivation should be the purest starting point. Under the current policy background, to what extent will college students be motivated by altruistic personalities to donate blood? There is still a lack of strong empirical research on this issue in China. On the other hand, the willingness of college students to donate blood should be closely related to their knowledge of blood donation. Therefore, this study hopes to carry out investigations from three aspects: blood donation knowledge, policy incentives, and altruistic personality by combining questionnaires and interviews, starting from the influencing factors of students' willingness to donate blood in Beijing colleges and universities and to provide valuable suggestions for college students' blood donation work.

## 2. LITERATURE REVIEW AND RESEARCH HYPOTHESIS

### 2.1 Literature Review

At present, there are many domestic studies on the current situation of college students' blood donation. According to statistics, at present, the vast majority of college students in our country agree with the public welfare nature of voluntary blood donation, and about 35% of the college students have learned about voluntary blood donation during their school days [9]. From the perspective of blood donation rate, the unpaid blood donation rate of college students in Changchun is 31.8% [2], which is higher than that of Hangzhou (30.86%) [10], Xi'an (22.70%) [16], Changsha (21.94%)

[17], Shanxi University Town (17.00%) [1] and other places reported on the rate of unpaid blood donation among college students.

From the perspective of the factors that affect the willingness and behavior of college students to donate blood, there are mainly the following types of factors: psychological factors, parents' attitudes, knowledge of blood donation, publicity efforts in colleges and universities, and policy support such as free blood use. Among them, psychological factors have a universal impact on blood donation willingness, and women are more affected by this than men, such as fear of needles; fear; nervousness, etc [15]. In addition, the lack of voluntary blood donation knowledge will also affect the willingness of college students to donate blood, because some students think that voluntary blood donation will infect diseases or subjectively think that they are not eligible for blood donation [6]. The vigorous publicity and support of voluntary blood donation in colleges and universities can effectively promote the voluntary blood donation behavior of college students. Through mobile blood collection vehicles entering the campus and conducting voluntary blood donation lectures, students can increase their awareness of blood donation, facilitate students to donate blood [7], and then improve the Student blood donation rate.

It can be seen that the domestic research on the influencing factors of blood donation is mainly reflected in the investigation of demographic factors, blood donation experience, and other external factors, while the research on the intrinsic altruistic motivation of blood donors is relatively scarce. There is ample theoretical evidence that altruism and blood donation are inextricably linked. From a sociological point of view, Timothy's "gifting of life" theory holds that when people's motivation for donating blood is "gifting of life", people will take the initiative to donate blood when they think that blood is healthy. Donating blood, which can bring material rewards, violates this principle of giving and will lead to a decrease in blood supply [8]. From an economic point of view, altruism can be explained as the individual's pleasure in the increased utility of others. Pure altruism can help get out of the "prisoner's dilemma", play the role of income redistribution, and promote social welfare [3].

There has been a lot of research on altruism and blood donation in the West. As early as Dichter's (1972) study, he believed that the motivation for donating blood was not altruistic, but rather a sense of personal superiority [4]. Ribar et al. (2002), and Ferguson et al. (2008) also do not support the hypothesis of pure altruism, arguing that blood donors are motivated in part by self-interest [5] [14]. But Paulhus et al. (1977) study found that altruistic communication to volunteers before blood donation can improve the possibility of volunteers donating blood again, and it is believed that the

influence of altruism is more significant for multiple blood donors [12]. Aksel et al. (2005) used factor analysis to determine the psychological motivation of blood donors and also believed that the continuous participation in blood donation was mainly related to altruistic motivation [11]. Overall, most studies still show that altruism is the main reason for blood donation, but at the same time, there is some evidence that the presence of high external rewards will inhibit this motivation, thereby reducing blood donation motivation [13].

As can be seen from the above literature, previous research has achieved rich results. However, from the existing research, there is little research on the willingness to donate blood among college students in Beijing, and there is even less research in China that correlates altruistic behavior with the willingness to donate blood. Therefore, this paper takes Beijing university students as the research subject to explore the influence of blood donation knowledge, various incentives, and altruistic tendencies on individual blood donation willingness

## 2.2 Research Hypothesis

Based on previous studies, the following hypotheses are proposed:

Hypothesis 1: The higher the knowledge level, the stronger the willingness to donate blood.

Hypothesis 2: The greater the incentive, the stronger the willingness to donate blood.

Hypothesis 3: The more altruistic behavior, the stronger the willingness to donate blood.

## 3. RESEARCH DESIGN

### 3.1 Data Introduction

The data used in this research comes from an online questionnaire survey conducted by the research group in February 2020 among more than ten college students in Beijing. To ensure the rationality and validity of the questionnaire design, the research group conducted a pre-investigation before the official online survey and revised the questionnaire according to the results of the questionnaires. The questionnaire is divided into four parts: blood donation, blood donation knowledge, altruistic behavior, and personal information. The following is a detailed introduction of the four parts:

(1) Blood donation: This part mainly includes the respondents' blood donation experience (number of blood donations), blood donation willingness, blood donation channels, evaluation of different blood donation incentives (intrinsic motivation), and blood donation. recipients receive campus grants. At the same

time, we also investigated the willingness of the respondents to donate blood under different levels of blood donation subsidy and the willingness to donate blood during the epidemic.

(2) Blood donation knowledge: After previous study and understanding, the research group processed the more important relevant knowledge in the blood donation process into 7 positive and false statements for the respondents to judge by themselves. The propositions include the age range of voluntary blood donation advocated by the state, the amount of blood donation each time, and the necessary preparations before blood donation. It is stipulated that 1 point is awarded for each correct answer, and 0 point is awarded for wrong or uncertain answers. The group's understanding of blood donation-related knowledge can be obtained by counting the scores of the respondents.

(3) Altruistic behavior situation: This part is adapted from the widely used SAS questionnaire of Rushton (1981). Respondents made personal evaluations of "never/ rarely/ occasionally/ often/ always" on 8 kinds of altruistic behaviors, corresponding to 1-5 points respectively, so as to obtain the scores of individual altruistic behavior tendency. Altruistic behaviors in this section include volunteer work, giving directions to strangers, and voluntary donations.

(4) Personal information: This part asks about the respondents' gender, grade, and other information, which is used as the descriptive statistics of blood donation willingness grouping and control variables for model estimation.

The questionnaire survey involved 32 questions, and 370 questionnaires were returned. After the effective screening of the research group, 349 valid questionnaires were finally obtained, with an effective rate of 94.32%.

### 3.2 Model Settings and Variable Descriptions

In this study, the core explained variable of blood donation willingness is an ordered discrete variable with values of 1, 2, 3, 4, and 5, where "1" corresponds to no blood donation willingness, and "5" corresponds to a very strong blood donation willingness. The stronger the deputies' willingness to donate blood. Based on such data types, an ordered discrete choice model should be adopted in the econometric regression analysis. This paper adopts an ordered Probit regression model. In order to verify the research hypothesis, this paper constructs the following econometric model:

$$will_i = \alpha_0 + \beta_1 knowledge_i + \beta_2 altruism_i + \beta_3 X_i + \varepsilon_i \quad (1)$$

Among them,  $will_i$  indicates the willingness of individual  $i$  to donate blood, and the value range is [1,5].

The larger the value, the higher the willingness to donate blood;  $knowledge_i$  indicates the knowledge score of individual  $i$ , and the more correct the number of questions about blood donation knowledge The higher the multi-score value;  $altruism_i$  indicates the individual  $i$ 's altruistic behavior score, and the higher the score, the higher the altruistic behavior tendency;  $X_i$  indicates the control variable, including gender, grade, and blood donation behavior;  $\varepsilon_i$  obeys the standard normal distribution.

### 3.3 Descriptive Statistics

Table 1 presents the descriptive statistics for each variable. In this survey, male individuals accounted for 28.94%, and females accounted for 71.06%; the senior group accounted for 61.89%, and the junior group accounted for 38.11%; individuals who had blood donation experience accounted for 22.64% 77.36% of them have never donated blood, which is not much different from the survey results in other cities. In terms of willingness to donate blood, the mean value of willingness to donate blood is 3.47, which shows that the willingness to donate blood of college students in Beijing is still relatively high. In terms of blood donation knowledge score and altruistic behavior score, the mean value is also higher, which shows that Beijing college students have a good grasp of blood donation knowledge and a strong tendency to altruistic behavior.

Through further grouping of descriptive statistics, the results showed that the average blood donation willingness of men was 3.51, which was higher than that of women, which was 3.45. This may be because men have better physical fitness and are less affected by fear

of pain. The average blood donation willingness of individuals with blood donation experience was 3.87, which was higher than the average blood donation willingness of individuals without blood donation experience of 3.35, which indicated that those who had blood donation experience were more willing to donate blood, and calling on more people to join the blood donation team would significantly increase the blood donation rate. Not only from the number of people but also from the number of blood donations per person. In addition, the average willingness to donate blood in the senior group was 3.38, which was lower than the average willingness to donate blood in the junior group, which was 3.62. This may be because the individuals in the junior group were more energetic and incentives from schools and other aspects were more effective.

In the survey on the knowledge of blood donation, it was found that the average score of blood donation knowledge of those with blood donation experience was 4.6 points, which was significantly higher than that of those without blood donation experience of 3.8 points. However, in general, among the six questions on blood donation knowledge, the correct rate of the judgment of two incorrect propositions, "the interval between two whole blood donations should be more than 4 months" and "special nutrition supplementation after blood donation" is only 15.5% and 31.5%, and the correct rate of all propositions is below 75%, which shows that the popularity of blood donation knowledge in college campuses needs to be improved. At the same time, the survey also showed that the average score of altruistic behavior of those with blood donation experience was 27.89 points, which was higher than the 26.47 points of those without blood donation experience.

Table 1: Descriptive statistics for the sample.

Variable	Variable meaning and Assignment	Avg.	Std. dev	Min	Max
Male	Male=1, female=0	0.289	0.454	0	1
Grade	Senior grades (Junior, Senior)=1, Primary level(Freshman, Sophomore)=0	0.619	0.486	0	1
Experience	Have blood donation experience=1, No blood donation experience=0	0.226	0.419	0	1

Will	Willingness to donate blood, the value range is 1-5, the higher the value, the stronger the willingness	3.470	1.161	1	5
knowledge	Blood donation knowledge	3.980	1.573	0	7
Altruism	altruistic behavior	26.794	4.718	16	40

#### 4. EMPIRICAL ANALYSIS

##### 4.1 Benchmark Regression Results

In Table 2, model (1) and model (3) are models without control variables, and models (2) and (4) are models with control variables for regression. Four models reported the effect of knowledge score and altruistic behavior score on blood donation willingness. Among them, model (1) and model (2) are the regression results obtained by using the ordered Probit model; model (3) and model (4) are the regression results obtained by using the Probit model.

First, from the regression results of model (1) and model (2), it can be found that whether or not control variables are added, knowledge level and altruistic tendency have significant positive effects on blood donation willingness, indicating that the higher the knowledge level score and altruistic behavior score, the higher the higher the level, the stronger the willingness to donate blood. This verifies Hypothesis 1 and Hypothesis 3.

Secondly, from the control variables of the model (2): blood donation experience has a positive effect on individual blood donation willingness, and the effect is

significant. It shows that individuals who have blood donation experience will have a higher willingness to donate blood. In terms of gender, men's willingness to donate blood is lower than that of women, but it is not significant. In terms of grade, the willingness to donate blood in the senior group was lower than that in the junior group. Except for the gender grouping, the results of other groups are consistent with the descriptive statistical results obtained earlier.

Finally, model (3) and model (4) are robustness tests. Those with a willingness to donate blood of 1-2 are classified as the "unwilling to donate blood" group, and those with a willingness to donate blood of 3-5 are classified as "willing to donate blood" "Group. A binary variable was set, in which the value of the "unwilling to donate blood" group was 0, and the value of the "willing to donate blood" group was 1, and the Probit estimation method was used for regression. As shown in the last two columns of Table 2, the estimation results show that the knowledge level score and altruistic behavior score are both positive at the 1% significance level, which further verifies the conclusion that knowledge level and altruism have a positive impact on individual blood donation willingness. Except for gender, the sign and significance of other control variables remained largely robust.

Table 2: Data Regression.

	(1)	(2)	(3)	(4)
Knowledge	0.1130***	0.0893**	0.1557***	0.1391***
Altruism	(-0.036)	(-0.037)	(-0.049)	(-0.050)
Experience	0.0704***	0.0675***	0.0566***	0.0542***
Male	(-0.012)	(-0.013)	(-0.017)	(-0.017)
Senior grades		0.3835***		0.1507
Constant term		(-0.144)		(-0.206)
Number of samples		-0.0015		0.1318

Note: \*\*\*, \*\*, and \* indicate passing the 1%, 5%, and 10% significance tests, respectively, and the standard errors are in brackets, the same as in the table below.

## 4.2 Marginal Effects Analysis

Since the parameter meaning of the ordered Probit model intuitively provides limited information in terms of significance and parameter sign, we also need to estimate the marginal effects of knowledge score and altruistic behavior score on individuals' willingness to donate blood.

Table 3 reports the marginal effects of knowledge scores and altruistic behavior scores on individuals' willingness to donate blood. When all the explanatory variables take the mean value, for every 1 point increase

in the knowledge score, the probability of an individual's blood donation willingness to be "very willing" increases by 2.5%, the probability of "willing" increases by 1.06%, and the probability of "general" decreases by 1.17%, the probability of being unwilling dropped by 1.53%, and the probability of being "very unwilling" dropped by 0.86%. It shows that the higher the blood donation knowledge level, the higher the individual's willingness to donate blood. Similarly, the marginal effect of the altruistic behavior score further verifies that the higher the altruistic behavior score, the more likely the individual's blood donation willingness is "willing" than the probability of "unwilling".

Table 3: Marginal Effects.

	Knowledge	Altruism
strongly unwilling	-0.0086** (0.004)	-0.0065*** (0.002)
unwilling	-0.0153** (0.007)	-0.0115*** (0.003)
neutral	-0.0117** (0.005)	-0.0088*** (0.002)
willing	0.0106** (0.005)	0.0080*** (0.002)
strongly willing	0.0250** (0.011)	0.0189*** (0.004)

## 4.3 Incentive Effect

In the questionnaire, by designing the question "To what extent do you think the following incentives will motivate college students to donate blood, please rate the degree of incentive (1 means that the degree of incentive is very weak, 5 means that the degree of incentive is very strong, and so on)" The respondents' views on different incentives were analyzed, and the

results are shown in Table 4. It can be seen that these kinds of incentives have strong incentive effects, and the incentive effect of "guaranteeing with blood" is the strongest, followed by "helping others". In terms of grouping, the survey results of those who have donated blood and those without blood donation experience are slightly different. Overall, the results show that in the subjective perception of college students, the nature of blood donation is more immaterial and altruistic.

Table 4: Respondents' evaluation of various incentives.

incentives	value	Avg.	Std.dev	Min	Max
grant	349	3.544	1.163	1	5
Assure of blood donation	349	4.052	0.911	1	5
Helping others	349	4.040	0.940	1	5
self-realization	349	3.673	1.097	1	5
Health care	349	3.713	1.116	1	5

In addition, the survey further examines the incentive effects of different amounts of subsidy. Through the preliminary investigation, the amount of subsidies given by colleges and universities is mostly

200, 400, 800yuan, so the questionnaire designed "If in the future, every time you donate blood, you will receive a subsidy of 200/400/800 yuan, would you be willing to donate blood? , and the result is shown in Figure 1. It can be seen that when the subsidy is 200 yuan, most

individuals are unwilling to donate blood. With the increase in the subsidy, the number of people who said they would donate blood gradually increased, and the number of people who did not necessarily donate blood and who would not donate blood gradually decreased. When the subsidy was increased to 800 yuan, most individuals were willing to donate blood. This verifies that Hypothesis 2 is established, that is, the greater the incentive, the stronger the willingness to donate blood.

Among them, when the subsidy was increased from 200 yuan to 400 yuan, 16.6% of the people increased their willingness to donate blood (from "won't" to "not necessarily" or "will", from "not necessarily" to "will"); when the subsidy was increased from 400 yuan to 800 yuan, 34.2% of people increased their willingness to donate blood. This survey did not find that the willingness to donate blood was crowded out due to the excessively high subsidy amount. This shows that although the respondents think that the incentive effect of the subsidy is weak in many types of incentives, the increase of blood donation subsidy within the range of 200-800 yuan can significantly improve the willingness of college students to donate blood.

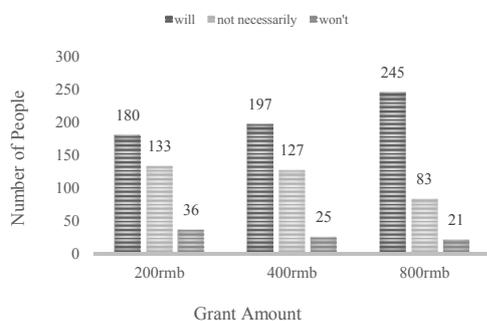


Figure 1: Individuals' willingness to donate blood under different subsidies.

Considering the particularity of the current epidemic situation, this study especially investigated the willingness of college students to donate blood if the public is required to donate blood for free during the epidemic (1 means no willingness to donate blood, 5 means strong willingness to donate blood, and so on). The results showed that the average score of college students' willingness to donate blood under the epidemic situation was 3.75 (3.47 in daily circumstances), and the average score of blood donation willingness of students who had voluntary blood donation experience before was 4.06 (3.87 in normal circumstances), and there was no voluntary blood donation experience. The average score of the students' willingness to donate blood was 3.66 (3.35 under normal circumstances). In general, the willingness to donate blood is significantly higher than that in daily situations, indicating that in the face of catastrophic emergencies, the sense of solidarity and mutual assistance, and humanitarian spirit of Chinese college students are more prominent.

## 5. CONCLUSION AND SUGGESTIONS

It can be seen from the survey results that, from the perspective of knowledge level, the higher the knowledge of blood donation, the stronger the willingness to donate blood, that is, the improvement of blood donation knowledge level strengthens the individual's willingness to donate blood; Blood security, helping others, realizing self-worth, detecting blood type and health all have strong incentives for college students to donate blood for free, among which blood security has the strongest incentive; Individuals with altruistic behavior are more willing to donate blood. In addition, the blood donation willingness of individuals with blood donation experience is higher than that of individuals without blood donation experience, that is, blood donation experience has a positive feedback effect on individual blood donation willingness.

Based on the research results, the following suggestions are made for the current blood donation policy:

### 1. Strengthen the popularization of blood donation

knowledge Blood collection and supply institutions and learning should be combined with the characteristics of college students, actively give correct guidance, and strengthen publicity and education on unpaid blood donation. In today's digital age, it is possible to make full use of modern media means to widely spread the knowledge of voluntary blood donation, improve college students' awareness of the safety of voluntary blood donation, improve their knowledge of voluntary blood donation, and improve their willingness to donate blood.

### 2. Improve and improve the incentive system

Incentive measures for appropriate material rewards are an effective way to increase the enthusiasm of college students to donate blood for free. Colleges and universities can consider appropriately increasing the amount of subsidy to effectively motivate college students to participate in blood donation work. However, considering the altruistic nature of blood donation, the material incentives of major universities should be controlled within a certain range. More importantly, it is important to emphasize that voluntary blood donation is a great cause that symbolizes the "gift of life", and to encourage and promote college students to donate blood from an altruistic perspective and should not be driven by material interests. Transform the measures into such as: weakening the publicity subsidy policy; not informing in advance and making appropriate compensation afterward; converting it into meal coupons, etc. At the same time, the government should effectively supervise systems such as blood use protection, so that the interests of blood donors can be fully guaranteed. Blood collection and supply

institutions should also further improve service quality and strive to improve the satisfaction of individuals who go to donate blood for free.

### 3. Create an atmosphere of value recognition

The self-value realization has a strong incentive to donate blood, and individuals with greater altruistic tendencies will also show a higher willingness to donate blood. Therefore, if the benefits of blood donation are actively promoted, and the blood donors are commended and publicized, more individuals can have a deeper sense of identity for blood donation, so that more individuals will participate in it.

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