



Blood donors and factors impacting the blood donation decision: Motives for donating blood in Turkish sample



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ABSTRACT

Background: Donations in Turkey are insufficient to cover the high transfusion needs arising from large numbers of thalassemia and sickle cell anemia patients and increasing demands for blood due to advanced surgery and cancer treatment. The most acceptable means to get blood is voluntary blood donation and the blood donor system in Turkey mostly depends on a combination of voluntary and involuntary donors. The main aim of this study is to explore the motivations of Turkish voluntary blood donors toward blood donation and to determine predictors of blood donation motivation.

Materials and methods: A cross-sectional sample survey of active blood donors in Ankara, Turkey was conducted. The sample consisted of 189 male volunteer blood donor adults. Donors filled in a self-administered questionnaire including the measures of demographic information, empathetic concern, altruism, social responsibility and blood donation motivation questionnaire during donation.

Results: Factor analysis of Blood Donation Motivation Measure with varimax rotation revealed a three-factor solution named as “values and moral duty”, “positive feelings and esteem” and “self-benefit and external reasons”. The results with regression analyses showed that only social responsibility had a significant effect independent of age, income, and education on blood donation motivation.

Conclusion: These result reflects that blood donation motivation not only linked to a high degree of altruistic reasons, but also to a combination of some self-regarding motives. Additionally, feelings of empathy or altruism may be less strong at the time the decision to help, other factors may have a larger influence on helping decisions.

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1. Introduction

The requirement of blood and blood components is still high around the world at present. Although blood banks are charged with preparing adequate blood supplies, they have to contend with a permanent shortage of blood. The most acceptable means to get blood is voluntary blood

donation and donation in Turkiye (Turkey) are insufficient to cover the high transfusion needs arising from large numbers of thalassemia and sickle cell anemia patients and increasing demands for blood due to advanced surgery and cancer treatment.

Understanding the factors that motivate donors to donate will facilitate improvements in recruitment programmes. Blood donation decision making has been investigated worldwide for decades to understand the process better to increase donation efficiency, safety, retention and collection [12,14,15]. In their review article, Masser et al. [13] have identified a range of sociodemographic,

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organizational, physiological, and psychological factors that influence people's willingness to donate blood. Mathew et al. [14] stated that encouraging previous donors to return was important for to increasing collections of donated blood. Therefore, a growing number of studies have also highlighted the role of psychological factors in explaining, predicting and promoting blood donation [13]. Although blood donation is widely portrayed as an altruistic behavior, previous research also found that family and social influences [11], religious activity and institutional settings [10] were also significant. Importantly, Healy [10] emphasized that not only the individual identity factors (e.g., "altruistic identity"), but also institutional features were also important determinants of donor behavior. Bednall and Bove [3] also reviewed blood donation motivators and they verified that the motives behind blood donation differed among first-time, repeat, lapsed, apheresis, and eligible nondonors. They concluded that, among first-time and repeat donors, the most common motivators were convenience (e.g., blood drive nearby), prosocial motivation (e.g., altruism), and personal values (e.g., moral norm). They also identified several deterrents among which the most frequently mentioned barrier was low self-efficacy to donate (e.g., ability to overcome barriers such as lack of time).

Although many studies have emphasized that empathy and altruism are an important component of motivation to perform prosocial or helping behaviors in particular, these studies have argued whether truly altruistic behavior or empathy can exist for helping behavior [1,6,7,8,17]. Some previous research in other areas has also firmly revealed that empathetic emotion is often closely linked to altruistic behavior [2,4], therefore, it would be possible that there is a link between empathy and blood donation. However, while empathic concern played an important role in volunteer choices in Davis' et al. [6] study in a student sample, another study by Davis et al. [7] found no correlation between empathic concern and volunteering. Similarly, Einolf [8] revealed that empathic concern may not be an important motivator for planned helping decisions to help others who are not immediately present, such as volunteering and blood donation.

As a result, different people may become volunteer for the blood donation for different reasons and the same individual may donate because of more than one motive. Moreover, only a small percentage of the eligible population actually chooses to donate blood on a regular basis. Therefore, the first aim of the present study was to identify the factors that would motivate donors to donate and develop new strategies to gain new donors and transforming first-time donors to repeaters. Despite the considerable research into empathy and altruism in these fields, there has been little research into whether and how empathic reactions and personal predispositions to empathy predict helping behaviors in a real life helping behaviors. Thus, the second focus of this study is to see whether high empathy or altruistic conditions are more likely to induce prosocial behaviors in a real life helping behaviors (i.e., blood donation condition). Therefore, the specific research questions are: what are the factors, directly and indirectly affect the blood donation, and what are the predictors of the

blood donation of Turkish people? In addition, this study reports a questionnaire-based study of motivational and demographical characteristics of volunteer blood donors in a non-experimental settings.

2. Methods

2.1. Participants

The subjects of the study sample were 189 male adults who were volunteer blood donors. Participants ranged in age from 17 to 60 years, with a mean age of 32.97 (SD = 8.61) and the majority of the participants were married (Table 1). 73% of the whole sample was current donors and 27% of the sample had volunteer in the past but not given blood in the present (i.e., lapsed).

2.2. Procedure

Data for the study were collected through self-report Questionnaires from volunteer blood donors at Ufuk University Faculty of Medicine Blood Transfusion Centre in Ankara. The participants who enrolled in this study between January 2011 and December 2011. This analysis was restricted to blood donors who responded to the questionnaire survey. Before the study, informed consent were given to all participants and only volunteer people were gi-

Table 1
Descriptive of the study sample.

Blood donors (N = 189)	
Age	M = 32.97 (range:17–60)
25-years and younger	38/189 (20.1%)
26–35-years-old	83/189 (43.9%)
36–45-years-old	47/189 (24.9%)
46 years and older	21/189 (11.1%)
Education	M = 4.32 (range: 1–6)
Secondary (high school) or less	97/189 (51.3%)
University	79/189 (42.2%)
Master or doctoral degree	11/189 (5.8%)
Marital status	
Married	119/189 (63.0%)
Divorced or separated	6/189 (5.2%)
Single	60/189 (31.7%)
Perceived Ses	
Low	46/189 (26.0%)
Middle	95/189 (53.7%)
Middle-high	36/189 (20.3%)
Donor status	
Current donor	138 (73%)
Past donor	51 (27%)
Donation frequency	
Every 3 months	9/189 (4.8%)
Every 6–12 months	38/189 (20.1%)
Irregular	133/189 (70.4%)
Need for blood in the family	
Yes	96/189 (50.8%)
No	93/189 (49.2%)
Need for blood for himself in the past	
Yes	181/189 (95.8%)
No	8/189 (4.2%)

ven the questionnaires. There was no identifying information on the questionnaires, in order to ensure anonymity and confidentiality. The completed questionnaires were collected later.

2.3. Measures

Participants received multiple questionnaires included measures of altruistic behavior, empathetic concern scale, personal distress scale, social responsibility motivation scale, motives for donating and demographics. The original English version of the empathetic concern scale, personal distress scale, social responsibility motivation scale, and some items for motivation to donating were translated into Turkish and a back-translation was done. The accuracy of translation was evaluated by comparing the original and back-translated versions. Discrepancies in meaning were identified and resolved via discussion. Measures relevant to the current study are described below.

2.3.1. Measures of empathetic concern and personal distress scale

The empathetic concern scale is a seven item and personal distress scale is a seven item scale that assesses individual differences in empathy (what he calls empathic concern) and personal distress [5]. The empathetic concern and personal distress scale uses a 5-point response format [0 = extremely uncharacteristic (not at all like me), 4 = extremely characteristic (very much like me)]. People who score high on empathic concern are those who habitually feel warmth and compassion for unfortunate others, while those who score high on personal distress tend to become anxious and uneasy when seeing others in need of help. Cronbach's alphas for empathetic concern scale is .67, and for personal distress scale is .69.

2.3.2. Altruistic Behavior Scale

The Self-Report Altruism (SRA) scale was originally developed by Rushton et al. [16] to quantify the level of helping or altruistic personality traits based on the frequency of self-reported helping behaviors. Thirteen of the original 20 questions in the SRA scale were used before by Hablemitoğlu et al. in Turkey [9]. Thirteen factors explaining 32% of the variance. Alpha of the coefficient of the scale was .87 in this study. This version of the instrument was used in the present study. Respondents were asked to mark how often they had participated in the behavior from never (1) to very often (5). The responses were added to generate a total score. Cronbach's alphas for the scale is .86.

2.3.3. Social responsibility motivation measure

Four items related to motivating factors with giving blood were used as a measure for social responsibility measure by Steele et al. [17]. The measure is a Likert type with 5-point response formats (1 = not at all important to 5 = very important). Scores ranged from 4 to 20 depending on how each donor rated the influence of that factor on their decision. A higher score indicated that a donor was more motivated to give blood by social responsibility factors. Cronbach's alphas for the measure is .84.

2.3.4. Blood Donation Motivation Measure

On the base of previous literatures [15,19] and donation experience 28 item measure was developed to measure motivation factors for regular donors. After back-translation Blood Donation Motivation Measure was measured by using a 5-point scale (1 = strongly disagree, 5 = strongly agree). As Misje et al. [15] used, four factors which are labeled as value, social, esteem and understanding, serve as motives for individuals to volunteer. "Value" motives refer to altruistic and empathic reasons for volunteering; "Social" reasons refer to normative influence of friends, family, or a social group; "Esteem" reflect reasons for volunteering in order to feel better about oneself; and "Understanding" refers to positive experiences associated with volunteering. Cronbach's alphas for the whole measure is .91.

2.4. Data analyses

First, descriptive analyses were conducted to gather information about the means, standard deviations, and reliability coefficients of the variables. Second, factor analysis was performed in order to see the structure of the blood donation motivation scale. Only items with factor loadings of at least .32 are considered to be part of a factor [18]. Lastly, hierarchical regression analyses was conducted to see which variables (i.e., empathy, altruism, and social responsibility) predicts significantly the blood donation motivation.

3. Results

3.1. Preliminary analysis

Preliminary examinations (i.e., means, range, and alpha (α) values) of the data were conducted in order to describe the data. All donors were male and more likely to have higher education (see Table 1). Approximately 93% of the sample reporting a history of blood donation. Although altruism reported was a common motivation for first blood donation, need for family and relatives was an another important motivation for blood donors (Table 2). Furthermore, some volunteer donors (21%) believed that donation was beneficial to their health (see Table 2). Additionally, all blood donors were asked number of their blood donations in the past. As shown in Table 3, the largest percentage of donors had given 3 to 9 times (43.3%) and the smallest percentage had given only once (11.6%).

Table 2
Reasons for donating blood for the first time (N = 189).

To help people	100 (47.4%)
Thinking of saving life	91 (43.1%)
Need for family/relatives	77 (36.5%)
Hearing blood need from social environment	74 (35.1%)
For health	21 (10%)
Suggestion of friend	14 (6.6%)
Suggestion of blood center employees	10 (4.7%)
Media	10 (4.7%)
Curiosity	10 (4.7%)
Checking for some illness (AIDS, etc.)	7 (3.3%)
Need in natural disaster (earthquake, etc.)	7 (3.3%)

Table 3Percentage of donors by number of donations in the past years^a and by donor status and demographics.

Number of donations	1	2	3–9	More than 10
All donors	11.6	18.0	43.4	19.0
<i>Donor status</i>				
Current	10.9	15.9	43.5	21.7
Past (lapsed)	13.7	23.5	43.1	11.8
<i>Age group (years)</i>				
≤25	26.3	36.8	10.5	7.9
26–35	9.6	15.7	49.4	19.3
35–45	6.4	4.3	61.7	25.5
≥46	4.8	23.8	38.1	23.8
<i>Education</i>				
High school graduate or less	10.3	18.6	50.5	12.4
University	15.2	15.2	35.4	29.1
Post graduate (e.g., master degree)	–	36.4	31.4	9.1

^a Excludes respondents with no data on number of prior donations.

3.2. Factor analysis

Initial principal components analysis of the blood donating motivation behaviors revealed five factors. But, only one item loaded under one factor and only two items loaded under the other factor. Misje et al. [15] defined four factors (i.e., value, social, esteem and understanding) for motives for individuals to volunteer. Therefore, factor analysis repeated with varimax rotation and factors fixed to four factors firstly. However, factors were not clearly discriminated from each other. Lastly, factor analysis repeated with varimax rotation again and factors fixed to three factors. Results revealed that with Eigenvalues above one, which together account for 52.30% of the variance in the 28 items (Table 4). When the sum of squared of loadings were examined, it was seen that after the rotation, the total variance explained by the three factors was 52.30% , of which 19.71%, 17.74%, and 14.84% were explained by the first, second, and third factors respectively. Since one item (item 17) was crossloaded, and two items (items 1 and 15) factor loading were under .40, were excluded from the analysis.

The rotated component matrix showed that nine motivation items were included in component 1, called “self-benefit and external reasons” representing the positive experiences associated with volunteering, with the highest loading of 0.84 and with the lowest loading of 0.58. Other eight items placed under component two, “values and moral duty” motives which representing blood donation as a moral obligation and altruistic and empathic reasons for volunteering, with the highest loading of 0.77 and with the lowest loading of 0.43. Component 3 which was called “positive feelings and esteem” represents reasons for volunteering in order to feel better about oneself, with the highest loading of 0.69 and with the lowest loading of 0.46. Cronbach’s alphas for these factors were .87, .85 and .89 respectively. Cronbach’s alpha for the whole scale was .91. Thus, reliability test of the factors showed acceptable reliability for all factors.

Furthermore, in order to explore which motives were linked to donor endurance, differences between long-term and short-term donors for the three motives were calcu-

lated with the χ^2 test for independence. However, no statistically strong and significant difference was found between the long-term and short-term donors (the χ^2 -value for long-time and short-time donors’ for values and moral duty was $\chi^2 = 16.25$, degrees of freedom (df) = 20, $p = 0.701$; for positive feelings and self-esteem was $\chi^2 = 29.02$, degrees of freedom (df) = 29, $p = 0.464$; for self-benefit and external reasons $\chi^2 = 36.05$, degrees of freedom (df) = 34, $p = 0.372$).

3.3. Regression analysis for blood motivation

A multiple regression analysis was conducted to predict the participants’ motivation to blood from age, education, income, empathic concern, personal distress, altruistic behavior, and social responsibility. As can be seen in Table 5, age, education, and income were entered first and explained 5% of the total variance and only education had an independent effect ($t = -2.55$, $p < .05$). In the second step, empathic concern, personal distress, altruism and social responsibility was entered and explained additional 28% of the total variance. In this step, only social responsibility had an significant effect independent of age, income, and education ($t = 4.88$, $p < .01$). Empathic concern ($t = 1.75$, $p = .08$) and altruism ($t = 1.89$, $p = .06$) had a marginally significant effect on blood donation motivation. 31% of the total variance explained by the whole variables.

Hierarchical regression of the blood donation motivation show that the addition of variables empathic concern, personal distress, altruistic behavior, and social responsibility increases the predictive power of the model. However, the results implied that besides social responsibility, no other variables was a statistically significant predictor of blood donation motivation.

4. Discussion

The general goal of the current study is to explore the motives and predictors of blood donation motivation. In general, although the results of factor analysis of blood donation motivation did not exactly reflect the previous studies [15], some similarities were also exist. Specifically,

Table 4Summary of exploratory factor analysis of Blood Donation Motivation Measure using varimax rotation ($N = 189$).

Wording of motivational statements of the questionnaire	Factor 1 Self-benefit and external reasons	Factor 2 Values and moral duty	Factor 3 Positive feelings and esteem
27. I donate blood for the recompense of goodness to me	.846		
21. I donate blood because when I needed blood for myself before it was hard to find	.833		
26. Taking praise and support by the blood bank officials	.823		
25. I feel forced because of social pressures (e.g., supervisor, manager, wanted from acquaintances)	.750		
24. I donate blood because I know that my blood band is very scarce	.694		
20. I believe that one day I might also need a blood	.678		
18. An important reason for donation is that I get a health check for free	.668		
23. Religious reasons (to gain reward given by God, etc.)	.601		
28. The announcements, blood donation campaigns, educational publications, banners, posters causes to donate blood	.582		
22. By donating blood, I got the idea of saving a life		.773	
9. For me, blood donation is primarily a moral duty		.742	
8. I think blood donation benefits my own health		.730	
19. I think that blood donation is a task for each individual		.719	
10. I donate because I feel compassion towards the receivers of blood products		.679	
12. I donate blood because it is important to help other people		.668	
7. Donating blood makes me feel better about myself		.637	
11. My friends think it is important that I donate blood		.510	
17. My colleagues, and other people I know, place high value on volunteering as blood donor	.379	.430	.355
1. Blood donation is a cause that is important to me		.359	
5. Whenever I see the blood bank logo or an advertisement for blood donation I get a good feeling			.698
14. Donating blood makes me feel needed			.678
3. Blood donation is a way to make new friends			.670
2. Donating blood makes me feel important			.664
13. By donating blood I can explore my own strengths			.629
16. Blood donation is an important part of who I am			.585
4. My wife/husband think blood donation is an important activity			.567
6. I seldom think about blood donation, it is a habit			.460
15. If I do not contribute no-one else will	.372		.376
% Of variance explained	19.71	17.74	14.84
Eigenvalue	5.52	4.96	4.15
Alpha	.89	.87	.85

Factor loadings over .40 and items were not cross-loaded appear in bold.

in this study, seventeen of the 28 motivation-related items in the blood donation motivation questionnaire were directly adapted from the Misje et al. [15] study in which the statements on motives were primarily based on the volunteer functions inventory (VFI). They found weak internal reliability for several of the factors from the VFI measurement, and some covariances among the factors. In their study, Misje et al. [15] reported five factors for blood donation motivation (i.e., understanding, value, esteem, social, and moral duty) and found that donors were motivated by values (altruistic and empathic), social, and some slightly self-regarding reasons (esteem, and understanding). In the present study, it was found three factors (i.e., self-benefit and external reasons, values and moral duty, and positive feelings and esteem) were interpretable. However, not all items, but only some items under these factors similar to Misje's et al. study. Therefore, the results were not as clear-cut as expected. This result is to some extent can be explained by adaptation of the blood motivation scale to the Turkish culture, and therefore, the lack of compliance of some items in the questionnaire.

Empathy has been frequently identified as motivational factor for blood donors. Since previous research in other

Table 5

Summary of hierarchical regression analysis for variables predicting blood donation motivation.

Variable	B	SE B	β	R^2	ΔR^2
Step I				.06	.05
Age	-.19	.18	-.09		
Education	-3.94	1.54	-.20 [†]		
Income	-.80	1.77	-.04		
Step II				.31	.28
Age	-.13	.15	-.06		
Education	-1.85	1.37	-.09		
Income	-1.17	1.55	-.06		
Empathic concern	.61	.35	.15 [†]		
Personal distress	.42	.33	.11		
Altruism	.28	.15	.12 [†]		
Social responsibility	2.85	.58	.34 ^{**}		

* $p < .05$.** $p < .01$.† $p < .08$.

areas has firmly revealed that empathetic emotion is often closely linked to altruistic behavior [2,4,17], it would be possible that there is a link between empathy and blood donation. Although, it seems that empathetic or altruistic

values as a factor for blood donation, empathic concern or altruistic behavior had not effect as a predictor for blood donation motivation. In addition, we did not observe any significant differences in altruistic behavior scores between current and lapsed donors. Some other factors can influence whether a feeling of empathy ultimately results in a behavior such as blood donation. As Einolf [8] indicated, blood donation rarely involve direct contact with the recipient of help, therefore, it is possible that the strength of feeling empathy would be less in accordance with the situation in which the person helped is immediately present. Because, blood donation is a formal helping behavior which occur in a real life situation, so generally involve a planned decision and the person who will potentially receive the help is not present. In addition to the fact that feelings of empathy may be less strong at the time the decision to help, other factors may have a larger influence on helping decisions, and may override the effects of feelings of empathy. Furthermore, donors who experience blood donation as inconvenient or who feel physically poor after donating may ignore the empathetic or altruistic behavior as the primary motivational factors.

Notably, social responsibility appears to be the only important motivational predictor for blood donation. However, we did not found a significant association with age or blood donation status (i.e., current or lapsed). Similarly, although many previous studies also indicated altruistic behavior varied greatly by age, with older donors having progressively higher scores [17], we did not found any age differences. Probably, our sample size was not very huge to see the cohort differences. Furthermore, it could also possible that the scale we used does not accurately reflect the cultural and generational changes in altruistic or social responsibility behaviors.

Since our samples represented only a limited part of the whole population, the findings may not be generalizable to the whole population. It is also important to note that this study included only male participants. This raises question of whether the pattern of findings that emerged can be generalized to females. Additionally, a selective bias can be suspected, because, participants who participated in the study were selected from only one center.

In conclusion, refining which type of motivational activity is more important reflecting the blood donation may require future studies. By this way, we can identify those specific activities which affect blood donation. Therefore, future research have also continue to explore the factors

of motivations in specific helping areas distinctively and its effect on blood donation.

References

- [1] Alessandrini M. Community volunteerism and blood donation: altruism as a lifestyle choice. *Transfus Med Rev* 2007;21(4):307–16.
- [2] Batson CD, Ahmad N, Yin J. Two threats to the common good: self-interested egotism and empathy-induced altruism. *Pers Soc Psychol Bull* 1999;25:3–16.
- [3] Bednall TC, Bove LL. Donating blood: a meta-analytic review of self-reported motivators and deterrents. *Transfus Med Rev* 2011;25:317–34.
- [4] Cialdini RB, Schaller M, Holihan D, Arps K, Fultz J, Beaman AL. Empathy-based helping: is it selflessly or selfishly motivated? *J Pers Soc Psychol* 1987;52:749–58.
- [5] Davis MH. A multidimensional approach to individual differences in empathy. *Psychol Doc* 1980;10:85.
- [6] Davis MH, Mitchell KV, Hall JA, Lothert J, Snapp T, Meyer M. Empathy, expectations, and situational preferences: personality influences on the decision to participate in volunteer helping behaviors. *J Pers* 1999;67:469–503.
- [7] Davis MH, Hall JA, Meyer M. The first year: influences on the satisfaction, involvement, and persistence of new community volunteers. *Pers Soc Psychol Bull* 2003;29:248–60.
- [8] Einolf CJ. Empathic concern and prosocial behaviors: a test of experimental results using survey data. *Soc Sci Res* 2008;37:1267–79.
- [9] Hablemitoğlu Ş, Özkan Y, Yıldırım F. Bir fedakarlık örneği olarak "kan bağı". *Aile ve Toplum* 2010;67–77.
- [10] Healy K. Embedded altruism: blood collection regimes and the European Union's donor population. *Am J Sociol* 2000;105:1633–58.
- [11] Hupfer MF, Taylor DW, Letwin JA. Understanding Canadian student motivations and beliefs about giving blood. *Transfusion* 2005;45:149–61.
- [12] Marantidou O, Loukopoulou L, Zervou E, Martinis G, Egglezou A, Fountouli P, et al. Factors that motivated and hinder blood donation in Greece. *Transfus Med* 2007;17:443–50.
- [13] Masser BM, White KM, Hyde MK, Terry DJ. The psychology of blood donation: current research and future directions. *Transfus Med Rev* 2008;22:215–33.
- [14] Mathew SM, King MR, Glyn SA, Dietz SK, Caswell SL, Schreiber GB. Opinions about donating blood among those who never gave and those who stopped: a focus group assessment. *Transfusion* 2007;47:729–35.
- [15] Misje AH, Bosnes V, Gasdal O, Heier HE. Motivation, recruitment and retention of voluntary non-remunerated blood donors: a survey-based questionnaire study 2005;89:236–44.
- [16] Rushton JP, Chrisjohn RD, Fekken GC. The altruistic personality and the self-report altruism scale. *Pers Individ Differ* 1981;2:293–302.
- [17] Steele WR, Schreiber GB, Guiltinan A, Nass C, Glynn SA, Wright DJ, et al. The role of altruistic behavior, empathetic concern, and social responsibility motivation in blood donation behavior. *Transfusion* 2008;48:43–54.
- [18] Tabachnick BG, Fidell LS. *Using multivariate statistics*. Boston: Allyn and Bacon; 2001.
- [19] Tison GH, Liu C, Ren F, Nelson K, Shan H. Influences of general and traditional Chinese beliefs on the decision to donate blood among employer-organized and volunteer donors in Beijing, China. *Transfusion* 2007;47:1871–9.