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Public Opinion Concerning Corneal Donation and Transplant: A Survey From Izmir, Turkey

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Abstract

Objectives: **As the deceased-donor organ shortage has become a common problem, we sought to investigate the attitudes of people in İzmir, Turkey, concerning corneal donation and transplant.**

Materials and Methods: **A questionnaire designed to collect demographic data and determine attitudes concerning corneal donation and transplant, based on 9 questions, was prepared and administered to 1000 people that presented to our outpatient clinics in 2009.**

Results: **Among the respondents, 54.7% were willing to donate their corneas, while 84.3% were willing to receive corneas, and 15.4% were opposed corneal transplant. Attitudes toward corneal donation were significantly more positive in those with more education than in those with less education. Among participants, the ratio of a positive attitude toward donation significantly increased with decreasing age (*P* < .001), with a maximum of 66.7% among participants aged 18-24 years and 46.2% among those aged > 65 years. The positive attitude increased with increasing level of education. The donor parameters reported to be of the most importance were religion, nationality, country, ethnicity, and sex (31.3%, 25.1%, 23.5%, 22.8%, and 20.8%).**

Conclusions: **The primary factor associated with negative attitudes toward organ/tissue donation and receipt is low education. This result suggests that educating and motivating the public might help increase the rate of consent for organ and tissue donation and transplant.**

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Corneal transplant not only provides an opportunity for improved vision in patients with poor visual function, but it also assures symptomatic relief of bullous keratopathy, therapeutic benefit for refractory keratitis, and tectonic effect for descemetocele and penetrating injuries. Unlike organ donation, corneas can be obtained from deceased donors up to 24 hours after death. Even though the potential pool of corneal donors is far greater than that of solid organ donors, there remains a critical shortage of donor corneal tissue. In many European countries, the number of patients on waiting lists is far greater than the number of transplants that can be performed.[1] The Ege University eye bank waiting list currently includes 450 patients and almost 200 new patients per year are added. Although our eye bank is one of the largest in Turkey, we can provide only approximately 100 corneal tissue transplants every year. This disproportion between the number of donors and those waiting for transplant is indicative of the corneal tissue shortage in Turkey.

Individual opinion about organ donation is reported to be affected by age, religion, culture, and beliefs concerning death and mortality.[2-4] In France, 25% of corneal tissues are provided from abroad.[1] The issue of donation may be further complicated by religious or cultural barriers in a predominately Muslim population. To our knowledge, this is the first study from Turkey to analyze willingness to donate and receive corneas and public opinion concerning donor demographics in case they receive a transplant, which especially might be important in terms of imported tissues. The objectives of this study were to assess public opinion concerning corneal donation and transplant, to identify social and demographic differences associated with the

willingness to donate corneas, and to determine the source of negative attitudes toward corneal transplant.

Materials and Methods

Data for this study were obtained via random sampling of individuals that presented to Ege University Hospital's outpatient clinics. Ege University Medical School is located in Izmir, the third most populous city and province in Turkey. The minimum sample size was calculated as 1065, using n=483 908 (yearly total number of outpatients at Ege University Hospital in 2006), 50% prevalence, 3% error, and a 95% confidence interval. A questionnaire was administered to 1000 participants between February and May 2009. Nobody refused to participate, maybe because they were all in the waiting room, not busy with any other work, and because a white-coated doctor asked them to do so. The questionnaire included 9 close-ended questions concerning opinions/attitudes toward corneal transplant, and sex, age, birthplace, and level of education as sociodemographic variables (Figure 1). Place of birth was classified according to the 7 official geographic regions of Turkey. The questionnaires were administered by the same investigator (O.S.) face-to-face. Brief definitions of the cornea, corneal transplant, and indications for corneal transplant were included in the introduction of the questionnaire.

In case you need to receive corneal transplant, which factors of the donor are important for you?

Sex (male / female)	☐ Important	☐ Not important
Race	☐ Important	☐ Not important
Nationality	☐ Important	☐ Not important
Country	☐ Important	☐ Not important
Religion (Muslim/non-Muslim)	☐ Important	☐ Not important
Socioeconomic status	☐ Important	☐ Not important
Educational status	☐ Important	☐ Not important
Do you wish to donate your organs	☐ Yes	☐ No
In case it is needed, do you accept to go under corneal transplant	☐ Yes	☐ No

Figure 1. The questionnaire.

Willingness to donate corneas and willingness to be a transplant recipient were the main outcomes. Participants who wished neither to donate nor to receive a transplant were classified as "opposers." Respondents who wished to receive a corneal transplant, but did not wish to donate corneas were classified as "self-interested"; these were also analyzed as outcomes. The effect of sociodemographic variables on the participants' attitudes was analyzed. The chi-square, chi-square for trend, and independent samples *t* tests were used for univariate analyses. Logistic regression was used to adjust for possible confounders. Statistical significance was accepted as $P < .05$.

The study was approved by the Ethics Committee for Human Experimentation or Institutional Review Board, and is in accordance with the Helsinki Declaration of 1975 (as revised in 1983).

Results

One thousand participants over the age of 18 years were administered the questionnaire. Women constituted 54.8% of the participants (n=548; mean age, 43.9 ± 16.5 years; age range, 18-86 years). Table 1 summarizes the distribution of the age, level of education, and birthplace of the participants. In total, 547 respondents (54.7%) expressed a willingness to donate their own corneas (Figure 2), and 843 (84.3%) expressed willingness to be a donation recipient, while 154 respondents (15.4%) were opposers. Two hundred ninety-nine respondents (29.9%) were self-interested; they would receive corneal transplant, but would not donate their corneas. Three respondents reported that they would donate corneas, but would

Table 1. Sociodemographic characteristics of the participants.

	Study group		Izmir 2009	Turkey 2009
Characteristic	n	%	%	%
Age (y)				
15-24	132	13.2	19.9	23.3
25-34	226	22.6	22.2	23.2
35-44	156	15.6	19.2	19.0
45-54	188	18.8	16.8	15.3
55-64	166	16.6	11.4	9.9
65+	132	13.2	10.4	9.4
Education				
University	251	25.1	12.3	9.3
High school	220	22.0	23.0	20.5
Middle school	117	11.7	17.2	18.0
Primary school	358	35.8	37.6	36.6
Literate	9	0.9	4.5	6.4
Illiterate	45	4.5	5.4	9.2
Birthplace*				
Aegean region	510	51.0	61.6	11.0
Central Anatolia	105	10.5	7.9	17.8
Marmara	68	6.8	4.2	15.2
Mediterranean	23	2.3	2.0	9.8
Black Sea region	71	7.1	4.9	17.8
Southeast Anatolia	50	5.0	5.7	13.5
East Anatolia	132	13.2	9.7	13.0
Abroad	41	4.1	4.0	1.9
Total	1000	100.0	100.0	100.0

* Birthplace data for Izmir and Turkey are from the last National Census carried out in 2000 (reference: Turkish Statistical Institute, http://www.turkstat.gov.tr/).

Figure 2. Participant opinions and attitudes concerning cornea donation and transplantation.

not accept a transplant. The willingness to donate corneas was 57.1% among men and 54.7% among women; the difference was not statistically significant.

The mean age of participants who were willing to donate their corneas was 41.8 ± 16.5 years, compared with 46.5 ± 16.1 years for those who would not; the difference was statistically significant (t = -4.622, $P < .001$). There also was a significant difference in terms of age; 66.7% of the participants aged 18-24 years would donate, 46.2% of those aged > 65 years would donate, and a gradual decrease among those aged 25-65 years (chi-square for trend = 20.42; $P < .0001$) who would donate; however, when adjusted for level of education, the difference between age groups became insignificant (Table 2).

Willingness to donate corneas and to receive corneas increased as the level of education increased. University and high school graduates were 5 times more willing to donate their corneas, middle school graduates were 3.5 times, and primary school graduates were 2 times more willing to donate their corneas than those that did not graduate from any school. University graduates were 4 times more willing to receive a transplant and high school graduates were 3 times more willing. There was not a significant difference in this attitude between middle school and primary school graduates and illiterates (Table 2). With regard to corneal donation and transplant, opposition and self-interest were negatively correlated with level of education. Compared with university graduates, primary school graduates were 3 times more likely to object to a transplant, and illiterates were 4 times more likely to object. Self-interest again was observed to a greater degree in these 2 less-educated groups (Table 2).

Although not statistically significant, some cultural differences were observed between the 7

Table 2. The effects of various sociodemographic variables on attitudes toward donation and transplant (reference categories for logistic regression depicted as OR = 1).

Characteristic	Would donate		Would receive transplant		Opposer		Self-interested*	
	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)
Sex***								
Male	57.1	1.07 (0.83-1.39)	86.5	1.23 (0.86-1.76)	13.1	1	34.4	1
Female	52.7	1	82.5	1	17.3	1.26 (0.88-1.80)	36.2	1.01 (0.76-1.36)
Age (y)***								
15-24	66.7	1.16 (0.67-2.01)	93.2	1.99 (0.86-4.64)	6.8	1	28.5	1
25-34	63.7	1.24 (0.78-1.99)	89.4	1.54 (0.82-2.88)	9.7	0.54 (0.23-1.27)	29.4	1.05 (0.57-1.92)
35-44	52.6	0.90 (0.55-1.47)	85.3	1.25 (0.67-2.35)	14.7	0.63 (0.33-1.20)	38.3	0.94 (0.55-1.59)
45-54	47.3	0.80 (0.50-1.28)	80.9	0.99 (9.56-1.75)	19.1	0.86 (0.46-1.62)	41.4	1.25 (0.72-2.17)
55-64	50.0	1.05 (0.65-1.68)	78.3	0.94 (0.53-1.65)	21.7	1.08 (0.60-1.92)	36.2	1.36 (0.79-2.32)
65+	46.2	1	78.0	1	21.2	1.12 (0.64-1.98)	41.3	0.91 (0.53-1.58)
Education****								
University	67.2	5.03 (2.54-9.96)**	92.4	3.88 (1.76-8.57)**	7.6	1	27.3	1
High school	67.0	5.19 (2.60-10.37)**	90.0	2.98 (1.37-6.51)**	9.0	1.16 (0.60-2.25)	26.4	0.91 (0.59-1.40)
Middle school	57.3	3.57 (1.74-7.32)**	85.5	2.13 (0.95-4.75)	13.7	1.69 (0.82-3.46)	33.7	1.30 (0.77-2.18)
Primary school	41.6	1.93 (1.02-3.69)**	76.8	1.31 (0.68-2.53)	23.2	2.94 (1.69-5.14)**	45.8	2.18 (1.46-3.26)**
Literate/illiterate	27.8	1	70.4	1	29.6	3.90 (1.77-8.62)**	60.5	4.25 (2.01-8.97)**
Birth place***								
Aegean region	54.5	1.22 (0.82-1.82)	85.9	1.84 (0.90-2.44)	14.1	1	36.5	1
Central Anatolia	54.3	1.20 (0.70-2.05)	81.0	1.00 (0.52-1.93)	18.1	1.38 (0.78-2.45)	33.7	0.90 (0.54-1.48)
Marmara	57.4	1.40 (0.75-2.58)	83.8	1.23 (0.56-2.70)	14.7	1.06 (0.51-2.21)	32.8	0.85 (0.47-1.54)
Mediterranean	60.9	1.36 (0.53-3.49)	82.6	0.94 (0.28-3.10)	17.4	1.58 (0.50-4.97)	26.3	0.65 (0.23-1.90)
Black Sea region	54.9	1.22 (0.67-2.22)	84.5	1.29 (0.59-2.83)	14.1	1.02 (0.49-2.11)	36.1	1.03 (0.58-1.83)
Southeast Anatolia	62.0	1.72 (0.86-3.44)	90.0	2.18 (0.77-6.14)	10.0	0.67 (0.25-1.80)	31.1	0.77 (0.39-1.53)
East Anatolia	47.0	1	78.8	1	21.2	1.47 (0.89-2.43)	40.4	1.08 (0.69-1.69)
Abroad	65.9	1.75 (0.82-3.71)	85.4	1.20 (0.45-3.21)	14.6	1.24 (0.49-3.11)	22.9	0.55 (0.24-1.26)

*Participants who were opposed to transplant were excluded from this analysis.
**$P < .05$.
***Adjusted for education.
****Adjusted for age.

different geographic regions, with people from the southeast region having a more positive and people from the eastern region having a more negative attitude (Table 2). When opposer and self-interested participants were compared, there were no differences observed according to sex or birthplace. The number of opposer and self-interested participants increased as age increased and level of education decreased ($P < .05$). To the best of our knowledge, this is the first study to investigate the influence of donor demographic factors on the willingness to receive corneal tissue. Differences in willingness to receive corneal tissue were statistically associated with the respondents' sex, age, and level of education. The reported importance of donor demographics is shown in Figure 3; the most important was the donor's religion (31.3%), and the least important was the donor's socioeconomic level (9.0%).

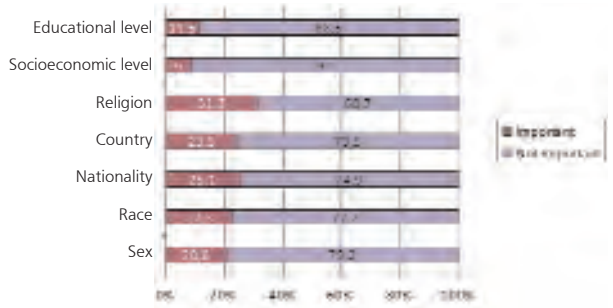

Figure 3. Participant opinions concerning the importance of some characteristics of organ donors.

Discussion

Although penetrating keratoplasty is the most widely practiced form of clinical allografting, the corneal tissue supply remains a problem in Turkey, as in other countries.[5] To help overcome the shortage in corneal donation, efforts should be directed toward improving the knowledge and attitudes of potential donors.

A questionnaire-based study by Sanner[6] conducted in Sweden reported that 61% of the respondents were positive about donating their own organs after death. Of those with a positive attitude toward organ donation, 10% made exceptions for special organs that they did not want to donate, mostly the heart, eyes, and brain.[6] Despite the high ratio of the Turkish population with a low level of education, 54.7% of participants in the present study that were willing to donate corneas was quite high and similar to the rate reported in the study from Sweden.

The shortage of corneal donations in Turkey might be associated with the large number of participants that were of the self-interested group (30%) and opposers (15%), which composed 45% of the study population. The present study included a large population (n=1000), and the single most important factor that affected attitudes toward corneal donation and transplant was level of education. The classification of self-interested people and opposers is an original contribution of this study, and the influence of level of education on both has been established.

In our study group, older participants tended to have a lower level of education, which explains the difference in attitude between the age groups based on univariate analyses. Although age was not significant after adjusting for level of education, a gradual decreasing trend was observed with aging for a willingness to receive donation and for confronting. As such, age still might have played a role in the participants' opinions concerning corneal donation and transplant.

Place of birth, which could be useful as a proxy variable for culture, has limitations because of considerable internal migration in Turkey, and large cultural and educational differences between regions. Nonetheless, place of birth is not a direct indicator of cultural background, as some people may have been born in a province owing to their parents' temporary job transfers or they might have acculturated to the place they might have migrated.

One limitation of the present study is the lack of some variables that influenced attitudes toward transplant, namely culture, and views on death and mortality; use of outpatient clinics for data collection limited the investigation of such variables, which are difficult to ask about directly and would require several more questions per variable. Turkey is a secular country, so the Turkish Statistical Institute does not conduct any research or provide data on the distribution of religions among the population. Officially, 99% of the population in Turkey is declared to be Muslim.[7] According to unofficial sources, the ratio of Muslims is a bit lower and according to a recent study on a country-scale sample of 1492 participants over 17 years, the ratio of atheists is 1.6%, but as these non-Muslim groups remain a small minority, the religion of the participants was

not questioned in our study because a statistical analysis could not be performed with such small numbers.[8]

Another limitation related to the outpatient clinic setting is that the study population may not have been representative of the general population, as those that presented to the clinics might have had poorer health and/or used the health care system to a greater degree than the general public. Nonetheless, considering that not all the participants were patients, but also healthy people accompanying them, this issue seems unlikely to have been a limitation.

The best way to increase the tissue supply for transplant is reported to be via mass media.[9-11] Ashraf and associates reported that 59.9% of outpatients were aware that organs can be donated after death and most had obtained their information via mass media.[10] Additionally, the level of outpatient knowledge and the tendency to donate their organs were related to their socioeconomic status and level of education.[10] Shaheen and Souqiyyeh[12] reported that religious beliefs, social attitude, governmental support, and establishment of organ procurement centers were the 4 major factors that increased organ donation and transplant. To the best of our knowledge, this study is the first to document attitudes concerning the demographic factors of organ donors. The consciousness of negligible demographic factors of the donor tissue might be achieved via cooperation with the mass media. This collaboration might increase the tendency of people toward donation. Consistent with the results of other studies, our results illustrate the importance of educating the elderly who are usually less educated than the younger population. Educational programming also should specifically target the self-interested and opposer groups. As far as tissue donation is concerned, 1 donor can give health to 50 different recipients; therefore, highlighting each individual for donation and transplant is precious.

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