



RESEARCH ARTICLE

The Impact of the Medical Education on Student's Knowledge, Opinion and Attitude to Organ/Tissue Donation-Transplantation

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Summary

Aim: The purpose of this study is to investigate the effect of medical education and training on medical student's knowledge, thoughts and attitudes to organ donation and transplantation, and also to draw attention to the subject.

Materials and method: Totally 323 first and sixth grade students were included in this study. A questionnaire consisting of four categories and 48 questions was used to collect data. SPSS 18.0 program was used for the data input and the analyses of the study. A p value smaller than 0.05 was accepted as significant for analyses.

Results: More than half of the participants are at first grade, 42.2% (135 students) of the participants are at sixth grade. 52.0% (168) of the students were female, 48.0% (157 students) were male. 10.2% of the students (33 students) took education for organ donation and 8.4% (27 students) for organ transplantation. The education rate of sixth grade students for organ donation and organ transplantation was significantly higher than the education rate of first grade students. 5.6% of students (18 students) have already donated their organs, 48.6% of students (157 students) were volunteer to donate. The rate of donating of organs and claiming to donate were higher in sixth grade students. There was not a significant difference between the grades for organ donation information scores ($p > 0.05$). For organ transplantation information score ($p < 0.001$) and organ donation attitude score ($p < 0.05$) it was significantly higher in sixth grade students. The organ donation attitude score was higher for the students already took an organ donation education.

Conclusion: Student's traineeship ratio for organ donation and transplantation was very low. The attitude of students for organ donation seemed to be positively affected by the medical education, but still most of the students were insensitive to organ donation and participation in many organ donation studies.

Keywords

Organ donation, Organ transplantation, Medical education, Knowledge, Attitude

Introduction

The facts that the patients who do not hope to survive have now the opportunity to recover with organ-tissue transplantations and that transplantation of most of the organs are medically possible these days, makes organ transplantation increasingly important. Despite significant improvement in organ transplantation, procurement of transplanted organ remains to be the most crucial problem we are facing. The inadequacy of donated organs is a globally increasing issue, and many people who are on list for organ transplantation pass away during this waiting period [1,2].

The only way to overcome inadequacy of organ donation is to increase the number of cadaveric donors. While cadaveric donors correspond to 80% in European countries, this ratio is only 20-25% in Turkey [3]. The number of cadaveric donors per million is far behind most European countries and the United States [4]. The problems (legal, religious, ethical, social, economic...) that exist in the provision of cadaveric organs in our country stand as the most important obstacles against organ transplantation [5]. According to recent data, about 25,000 patients are on the list for an organ transplant in Turkey. However, this figure is only an indication of the number of patients applying. The number of patients who need transplantation is much higher. The number of needed organs is increasing day by day, and

many of the patients who are on the list for transplantation pass away without finding the appropriate organ [6]. For this day, there are serious successes about organ transplantation and transplantation activities in our country. However, we have more ways to reach that.

Despite nationwide campaigns, transplantation rates have not been raised to the desired level. Besides these campaigns, people's thoughts and attitudes on this subject can be changed by informing and directing. In this context, education is one of the most important elements to provide information. Studies show that the rate of organ donation increases in parallel with the level of education [7-9].

Health professionals have a strategic position to increase organ donation levels because of their close relationship with patients and patient's relatives. Particularly, because of the close relationship of primary care physicians with the community, they can change the outcome of the procedure significantly by informing and guiding patients and relatives [10,11]. Standing at the center of organ donation and transplantation, physicians should be fully equipped and guided in this regard. This is only possible if students are provided knowledge about organ donation and transplantation during medical education. Data of future donor candidate's knowledge levels and views about transplantation and organ donation is important for better education and taking

over more efficient tasks in this area [7,8,12].

The aim of this study is to investigate the effects of becoming a physician on medical faculty student's knowledge levels, thoughts and attitudes about organ donation and transplantation, and also to draw attention to this subject. It is also a further objective of our study to investigate whether there are differences in the level of knowledge and attitudes of physician candidates after theoretical and practical training in organ donation and transplantation.

Materials and Methods

This cross-sectional study was planned to include all the students, who were willing to participate, in School of Medicine during 2016-2017 Academic Period. A questionnaire form was used for data collection, consisting of 4 sections, asking about student's sociodemographic characteristics, knowledge levels and thoughts on organ donation, knowledge levels on organ transplantation and attitudes on organ donation. Questionnaire form, created as a result of screening the relevant literature, was applied to a group of 25 residents; so it was re-edited taking into account the deficits and their criticism on the questionnaire. Between October 15, 2016 and November 30, 2016; students were reached on break times and in their own study environments; after information was given, face-to-face interviews

Table 1: Organ donation information questions.

<p>1-Do you think organ donation is legal? (1 point) <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No idea</p> <p>2-Which one(s) prevent an individual from the idea of donating an organ? (each selection 1 point) <input type="checkbox"/> Diseases like diabetes and hypertension <input type="checkbox"/> Presence of cancer <input type="checkbox"/> Presence of HBV, HCV, HIV infection <input type="checkbox"/> Being under 18-years-old <input type="checkbox"/> Presence of psychiatric disease <input type="checkbox"/> Drug addiction <input type="checkbox"/> Alcohol-tobacco use <input type="checkbox"/> Disapproval of relatives</p> <p>3-Once decided to donate, can a donator reverse this decision? (1 point) <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No idea</p> <p>4-Once decided to donate, where can an individual apply? (each selection 1 point) <input type="checkbox"/> Affiliated family physician center <input type="checkbox"/> Hospitals <input type="checkbox"/> Health Department <input type="checkbox"/> Police Department <input type="checkbox"/> Organ transplant centers <input type="checkbox"/> Foundations and associations</p> <p>5-Is it enough for an organ donator to state this claim verbally? (1 point) <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No idea</p> <p>6-Is it legal to donate organs for financial gain? (1 point) <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No idea</p>
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*Each correct answer is 1 point, totally 18 point.

were applied and students were asked to answer the questions thoroughly. A total of 380 students agreed to participate. 323 of them completed the questions and were included in the study (participation rate 85.0%). The data were analyzed using the SPSS 18.0 package program. The descriptive statistics of the quantitative variables were given as mean \pm standard deviation, minimum and maximum. The descriptive statistics of qualitative variables were given in numbers and per-

centages. The relationship between qualitative variables was determined by Chi-square test.

According to the responses to 6 questions about organ donation in the questionnaire, organ donation knowledge score was calculated for each student over 18 points (Table 1); according to the responses to 7 questions about organ transplantation in the questionnaire, organ transplantation knowledge level was calculated over 11 points (Table 2); and according to the respons-

Table 2: Organ transplant information questions.

1-Which organs/tissues are transplantable? (1 point)
 Liver Kidney Lung Intestines Skin Blood
 Heart Pancreas Heart Valve Cornea Bone marrow All

2-In which ways are the transported organs recruited in our country? (1 point)
 Live donor Cadaver
 Cadaver and live donor No idea

3-Is blood type and/or tissue compatibility required before organ transplantation? (1 point)
 Only blood type compatibility is enough
 Only tissue compatibility is enough
 Yes, both are required
 No, there is no need for compatibility

4-Could an organ be transplanted to any individual? (1 point)
 Yes No No idea

5-Do you think relationship is required for organ transplantation? (1 point)
 Yes No No idea

6-Does every organ require permission (consent) for transplantation? (1 point)
 Yes No No, some of the organs don't

7- Under what conditions could the organs of a non-donor individual be transplanted? (each selection 1 point)
 With the approval of two first degree relatives
 Evidence of brain death
 Dependency on the respiratory device
 Approval of the doctor
 Ongoing treatment in the intensive care unit

*Each correct answer is 1 point, totally 11 points.

Table 3: Organ donation attitude questions.

1-Would you like to donate an organ?
 Yes No Indecisive
 Donated these organs: Donated my body as a cadaver

2-Would you like to receive another individual's organ when you or your close relatives need it?
 Yes, because.. No, because.. Indecisive

3-Will you donate the organs of a close relative in case of his/her death?
 Yes, because... No, because... Indecisive

4-Would you like your relatives to donate your organs after your death?
 Yes, because No, because... Indecisive

5-Would you consider to donate your organ(s) in case a family member needs it/them?
 Yes, because... No, because... Indecisive

6-Would you like to participate in organ donation actions? What kind of an effort would you think to do?
 Yes..... No

*Positive responses 2 points, indecisive responses 1 point, negative responses 0 point, totally 12 points.

es to 6 questions about attitudes on organ donation, attitude score was calculated for each student over 12 points (Table 3). According to these scores, comparative analyses were performed between classes. Organ donation attitude score between groups, organ donation information score and organ transplant information score were analyzed with Mann-Whitney U test. The relationship between student's attitude scores and knowledge scores was analyzed by Spearman correlation test. The value of $p < 0.05$ was considered significant.

Results

A total of 323 people participated in the study, including 187 (52.9%) first grade students and 136 (47.1%) sixth grade students. The average age of the students ($n = 323$) was 20.8 ± 2.6 ; 52.0% ($n = 168$) were males and 48.0% ($n = 155$) were females. There was no difference in terms of gender distribution between groups ($p = 0.462$).

When the educational status of the parents was evaluated, it was found that the education levels of the first and sixth grade students were generally high school/university and there was no significant difference between parent's education levels ($p = 0.60$ and $p = 0.729$, respectively). When the occupational status of the parents was evaluated, it was found that most mothers were housewives and their fathers worked as civil servants; and no significant difference was observed between classes ($p = 0.263$ and $p = 0.251$ respectively). There was no significance between classes in terms of health insurance of the students, monthly income of their families and residential location ($p = 0.572$, $p = 0.098$ and $p = 0.182$, respectively).

The rate of receiving education about organ donation among students who participated in the study was 3.2% for first year students; while it was significantly higher for last year students with 19.9% ($p < 0.001$). The proportion of those who perceived their organ donation knowledge level as "sufficient" was found to be significantly higher among 6th grade students (33.8%) than first year students (15.5%) ($p < 0.001$). Besides, a large majority (72.7%) of those who had education on organ donation considered themselves sufficiently knowledgeable ($p < 0.001$).

Similarly, the rate of participants who received organ transplantation education was significantly ($p < 0.001$) higher for 6th grade students with a ratio of 15.4% compared to 3.2% for first year students. The ratio of students who perceived their knowledge sufficient for organ transplantation (16.2%) was significantly higher than the first year students (7.5%) ($p = 0.014$). A great majority (59.3%) of the educated students considered themselves sufficiently knowledgeable ($p < 0.001$).

96.3% of 6th grade students stated that organ donation was legal; while 79.4% stated that it was not legal on the purpose of financial gain. For the first-year stu-

dents, these rates were 88.8% and 66.3%, respectively. For both cases, the difference was significant ($p = 0.014$ and $p = 0.002$, respectively). Regarding the religious appropriateness of organ donation, first year students found it to be inconvenient at a higher rate (17.6%) than the 6th grade students (5.1%), and the difference was quite significant ($p < 0.001$).

98.8% of the students who participated in the study thought that people did not have sufficient awareness about organ donation. 84.2% of the students stated that people should be informed by using media tools. When asked about the most effective method of increasing the numbers of donated organs, 49.2% of the students stated that informing the public through media was again the most effective way. Second was teaching organ donation in schools, with a ratio of 18.3%; while the third was providing financial support to donors, with a ratio of 10.2%. 45.5% of first year students thought that people had to pay for organ donation; whereas this ratio increased to 61.8% for 6th grade students ($p = 0.014$). Regarding participation in organ donation actions, the majority (56%) of the students stated that they did not want to participate in those activities, giving negative feedback.

It was determined that 48.6% of the students wanted to donate, 33.4% were indecisive, 12.4% did not want to donate, and 5.6% had donated before. 6th grade students had significantly higher rates of organ donation and willingness for organ donation compared to first-year students ($p = 0.008$ and $p = 0.014$, respectively). More than 70% of students who were willing to donate organs wanted to benefit needy people and avoid their organs to rot and disappear after they die. 50% of students who previously donated their organs stated that they donated their organs in order to benefit people. 35% of the students who did not want to donate had inadequate knowledge about organ donation.

When student's responses were examined in regard to which institutions they could apply for organ donation, no significant difference was found except for the affiliated family medicine center. 36.9% of the first year students and 53.7% of the sixth grade students stated that they could apply to family medicine centers, and the difference was found to be significant ($p = 0.003$).

The organ donation information score obtained from student's questions about organ donation was found to be 10.00 (8.00-12.00) for the first year students and 10.00 (8.00-11.75) for the sixth year students, and no statistically significance was observed ($p > 0.05$). When the organ transplantation information points received from organ transplantation questionnaires were examined, it was found that the information score among the first year students was 4.00 (3.00-5.00), while in the 6th grade students it was 5.00 (4.00-6.00); and the difference was quite significant ($p < 0.001$). The organ donation attitude score obtained from the student's attitude

Table 4: Distribution of information and attitude points.

	Grade	Median (25p-75p)	p value
Organ donation information score	1 st Grade	10.0 (8.0-12)	p = 0.505
	6 th Grade	10.0 (8.0-11.75)	
Organ transplantation information score	1 st Grade	4.0 (3.0-5.0)	p < 0.001
	6 th Grade	5.0 (4.0-6.0)	
Organ donation attitude score	1 st Grade	9.0 (6.0-11.0)	p = 0.001
	6 th Grade	10.0 (8.0-12.0)	

Table 5: Assessment of organ donation information and attitude points according to the educational status of organ donation.

	Educational status about organ donation	Median (25p-75p)	p value
Organ donation information score	Educated	10.0 (8.5-11.0)	p = 0.924
	Not educated	10.0 (8.0-12.0)	
Organ donation attitude score	Educated	12.0 (10.0-12.0)	p < 0.001
	Not educated	9.0 (6.0-11.0)	

Table 6: Relation of attitude and information scores of the students.

	N	Mean ± SS (Median)	Correlation coefficient	p value
Organ donation information score	323	9.98 ± 2.802 (10.0)	r = 0.163	p = 0.003
Organ transplantation information score	323	5.19 ± 1.649 (6.0)	r = 0.192	p = 0.001

questions was found to be 9.00 (6.00-11.00) for the first-year students and 10.00 (8.00-12.00) for the sixth-year students; and a significant difference was observed ($p < 0.05$) (Table 4).

The organ donation knowledge score of students receiving organ donation education was found to be 10.00 (8.5-11.00), while the information score of those who did not receive education was 10.00 (8.00-12.00). Organ transplant information score was found to be 5.00 (4.00-6.00) for those who received organ transplant education and 5.00 (4.00-6.00) for those who did not receive any education. In both cases, no statistically significance was found according to the education level ($p > 0.05$). When the attitude score was assessed according to the status of organ donation education, it was found to be 9.00 (6.00-11.00) for uneducated students, while it was 12.00 (10.00-12.00) for those receiving education, and this was significant ($p < 0.001$) (Table 5).

When the relation between organ donation and organ donation information scores and organ donation attitude scores of students was examined, it was found that the score of organ donation attitude increased along with organ donation knowledge score, and there was a weak but significant correlation between these two items ($r = 0.163$; $p = 0.003$). Likewise, the score of organ donation attitude increased along with the organ transfer knowledge score, and there was a weak but significant correlation between these two items ($r = 0.192$; $p = 0.001$) (Table 6).

Discussion

In our study, it was determined that a very small per-

centage of the students had been educated about organ donation and organ transplantation. A large number of students have responded that their information on the topic was insufficient or uncertain. A similar study by Baykan and his colleagues at Erciyes University found that 66% of physician candidates and Koçak and his colleagues in Ege University found that 58.5% of physician candidates had insufficient information about organ donation [8,13]. In the Koşar's study, 79% of physicians were reported to have insufficient knowledge about organ donation and organ transplantation; and inadequate information in occupational education (73.7%) was the cause of insufficiency [14]. In our study, knowledge rate of organ donation and organ transplantation increases along with the level of education of the students; and educated students found themselves more adequate in terms of information. However, this increase is considered as below the expected level. These results suggest that education on organ donation and organ transplantation should be reviewed.

In the study of Koçak and his colleagues, almost all the physicians stated that organ donation was legal, and in the study of Mr. Baykan and his colleagues, three quarters of the students stated that it was not legal to donate the organ for financial benefits which are concordant with our results [8,13]. Interestingly, half of the students who participated in the study think that they have to pay for organ donation, and this rate increases directly with the education level. Our students have a high rate of awareness of the legal status of organ donation and that makes us to hope for an increase in organ donation rates.

In the study of Koçak and his colleagues, 58% of the physician candidates thought that they did not have sufficient awareness about organ donation, and they wanted to participate in donation activities [8]. In our study, almost all of the students thought that there was no adequate knowledge level of the public regarding organ donation; and nearly half of the students wanted to participate in organ donation activities. In a study conducted in the United States, the most important source of information about organ donation was the media; errors in the organ distribution system and negative news such as organ mafia have affected people's minds [15]. Sato and his colleagues in Japan emphasized that the function of the media should be well evaluated in order to inform and guide the public about organ donation [16]. In our study, half of the students stated that the media was the most effective way to increase organ donation numbers. We suggest that the news and campaigns presented through the media will affect the society in an important way.

In the study of Naçar, et al. the rate of organ donation was 14% [7]. In the study of Sungur, et al. only one of the 63 6th-year medical students stated that they donated [17]. In a study conducted in Germany, the rate of donation among medical students was found to be 50% [18]. In our study, almost half of the students were willing or already donated their organs. In similar studies conducted, the percentage of participants who wanted to donate their organs was found to be very low compared to those who wanted to receive organs from others [13,19]. In our study, the ratio of organ donation was 50%, while the proportion of those who wanted to receive another individual's organ if needed was 80%. Compared with the Western countries, the donation rates remained too low. Sensibilities and awareness of students about organ donation can be increased by providing the opportunity to observe and follow patients who have a chance to treat with organ transplantation during education process.

In similar studies, benefiting people was found to be at the top of the reasons why participants wanted to donate organs [13,20,21]. In our study, the result was consistent with the literature. In a study conducted on university students, 26% of participants avoided donation as they did not have enough information on the subject [22]. In another study conducted on health professionals; the most frequent reason was the concern of early decision making of death, while the second was lack of knowledge [23]. The most common reason why students do not want to donate organs is the fact that they do not have enough information. Apparently, the lack of information on organ donation affects the decisions in the negative direction. These results are an indication that effective education may increase the number of organ donation.

The decision released by the Supreme Council for

Religious Affairs in 1980 revealed that organ transplantation was appropriate in terms of religion [24]. In some studies, participants reported that organ donation was inconvenient in terms of religion at rates ranging from 3.9% to 20.3% [7,8,17,21,25]. More than half (58.5%) of the physician candidates who participated in our study did not report any religious inconveniences, and a few stated that it was objectionable. The proportion of people who consider organ donation is not objectionable in terms of religion is increasing significantly along with the level of education. The religious beliefs of people have an important influence on their attitudes towards the subject.

The insufficiency of donating organs from cadavers is an issue that has been discussed and investigated in many countries around the world. However, this problem is more important in our country, and regarded as the most important obstacle against organ transplantation. In the study of Koçak, et al. 46.8% of the students stated that transplanted organs can only be obtained from the cadavers; while 29.2% stated that sources are living and 5.8% stated resources are both living and cadavers [8]. More than half of the students who participated in our study stated that organs could be obtained from both living and cadavers; while one fourth of them stated that they could only be obtained from the living. The main way to increase donation rates from cadavers is to make people donate during their lifetime by increasing their awareness on the subject.

In studies conducted by Akış and Cillimoğlu, the condition of "first degree relative approval" required to carry out organ transplantation from those who have not volunteered for organ donation was highly recognized by the participants; there was a lack of information on "brain death and doctor's approval" condition [26,27]. In our study, in accordance with the literature, "first degree relative approval" was more widely known, while the rate of knowledge of "brain death and doctor's approval" was low. Although the correct level of awareness increases depending on the level of education, the rates are not as high as expected. It is important for the physicians to inform and to have full knowledge of organ donation and transplantation for to effect on people's decisions positively.

In a study, the organ donation knowledge level of medical students was increased directly with education, and the organ donation attitude was influenced positively [7]. In some studies, while the level of knowledge of students increased, there was no significant change in their attitudes, and that sociocultural factors also had an impact on organ donation behavior [9,28]. In our study, students were more knowledgeable about organ transplantation, while there was no difference according to the level of education in terms of organ donation information score of the students. However, although organ donation knowledge was not high, students

with organ donation education and 6th grade students showed a positive attitude.

Physician candidates are expected to experience differences in their knowledge and attitudes as a result of witnessing and observing patients treated for organ donation and transplantation. The reason why there was no difference in the level of organ donation knowledge among our students may be the fact that the subject was not adequately addressed during medical education. It is thought that student's attitudes are also positively influenced by the increased awareness of organ donation during medical education.

Investigating the relationship between student's knowledge scores and attitude scores in our study, we found that there was a weak but significant relationship between positive and negative organ donation and organ transplantation information and attitude scores. A weak relationship between student's knowledge and attitude levels suggests that other factors may also influence the attitude.

The limitation of our study is that evaluation could not be performed on all of the students. Further studies should be planned to assess the same students at the beginning and end of medical education. Strengths of our study were that the questionnaire was applied to a different group before the beginning of the survey and finalized in line with their recommendation; and the participation rate is as high as 85.0%.

Conclusion

In conclusion, the rate of receiving organ donation and transplantation education was found to be low in our study group, although senior students were found to have higher education and knowledge levels, but this raise is considered to be insufficient. Student's lack of information is the leading cause of avoiding organ donation; and this suggests that effective training will improve the number of donated organs. The knowledge levels of physician candidates had no meaningful effect on the thoughts and behaviors on organ donation. The weak relationship between student's knowledge levels and attitudes suggests that other factors are also influential on attitudes. Factors affecting the thoughts of indecisive people and those who do not accept organ donation can be identified, and studies can be planned to overcome them. Many students do not have enough sensibility for organ donation and participation to donation actions. Activities such as social responsibility projects can be scheduled and the participation of the students can be ensured so that they can be interested on the subject and make decisions in a positive way. Awareness can be increased by informing the students about organ donation, particularly during family medicine internship. In addition, effective use of media tools can be beneficial in raising public awareness and the number of donated organs.

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