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Giving Your Last Gift: A Study of the Knowledge, Attitude and Information of Greek Students Regarding Organ Donation

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Statistical Analysis C
Data Interpretation D
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Background: Organ donation rates in Greece are the lowest in the European Union. Studying and improving young students' awareness may increase organ donation rates. This study aimed to investigate young students' knowledge, attitude and information regarding organ donation and whether they are modified by putative predictors.


Material/Methods: A 62-item electronic questionnaire was sent to 1451 eligible students aged 18–30 years in 16 Greek public technical schools. Two composite scales (knowledge and attitude) were created. The multivariate statistical analysis included ordinal logistic and linear regression, as appropriate.

Results: Only 37.9% of the students knew the correct definition of organ donation, 40.3% knew which organs can be donated, 27.4% were informed about the new Greek legislation, and 83.1% acknowledged the need for better information. Although 60.5% would donate an organ after death, only 16.1% would become living donors. Although 83.1% of the students declared knowing what brain death means, 18.6% believe that a brain-dead person could fully recover and 32.3% are unsure about it. Being a health professional or a blood donor, the parent's educational level, the wish to donate all organs after death, the information from announcements or posters, the fear of organ removal after death without prior consent, the consent for autopsy, the wish for better information, and the misbelief that a brain-dead person could fully recover emerged as important predictors of the knowledge and attitude, regarding organ donation.

Conclusions: An important lack of knowledge and misperceptions were noted regarding organ donation. Significant predictors were identified.

MeSH Keywords: Brain Death • Health Knowledge, Attitudes, Practice • Students • Tissue and Organ Procurement

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Background

On 31 December 2013, over 63 000 patients across the 28 Member States of the European Union were registered on organ donation waiting lists, among which 4100 died during 2013. Although the demand for organs is high, organ donation rates still remain impressively low in the European Union and significant disparities between countries exist. In 2013, Spain reported 35.3 deceased donors per million population (pmp), which was the highest organ donation rate among the 28 Member States of the European Union, whereas Greece reported the lowest organ donation rate (5.6 deceased donors pmp) [1]. Strikingly, both of these countries have adopted the 'soft' presumed consent approach (seeking relatives' approval), as opposed to the 'hard' approach (without relatives' approval). Indeed, the existing literature suggests that presumed consent for organ donation is not the sole causative factor [2]. A variety of other factors, such as healthcare and transplantation infrastructure and expenditures, medical mistrust, ethnic differences, religiousness, and public awareness may partly explain the substantial variability in organ donation rates among countries [3,4].

Focusing on the Greek situation, a number of studies attempting to elucidate the factors explaining the low organ donation rates have shown inconsistent findings [5–8], probably due to, among others, the fragmented nature of Greek healthcare services and the accidental nature of the legislative changes, thereby hindering any true reformative attempts [3]. Moreover, the need of new medical and nursing curricula sensitizing the undergraduate students to the importance of organ donation and activating them towards this direction has also been stressed [9]. This need stems from the importance of early exposure of health care students to the necessity of developing a trainer role for future professionals and a role model for the general public, in order to help improve donation rates [3,10–14].

Numerous studies have explored the learning needs, knowledge and attitudes of undergraduate health care students regarding organ donation [15–19]. However, the knowledge and attitude of many students that attend technical schools remain undefined. Technical schools prepare students for a wide variety of professions; thus, their alumni may serve as an immediate and excellent carrier of knowledge to and a role model for the general public.

This study explored the knowledge and attitude of young students of public technical schools regarding organ donation, highlighted significant prognostic factors and examined the students' knowledge and beliefs regarding brain death and related issues.

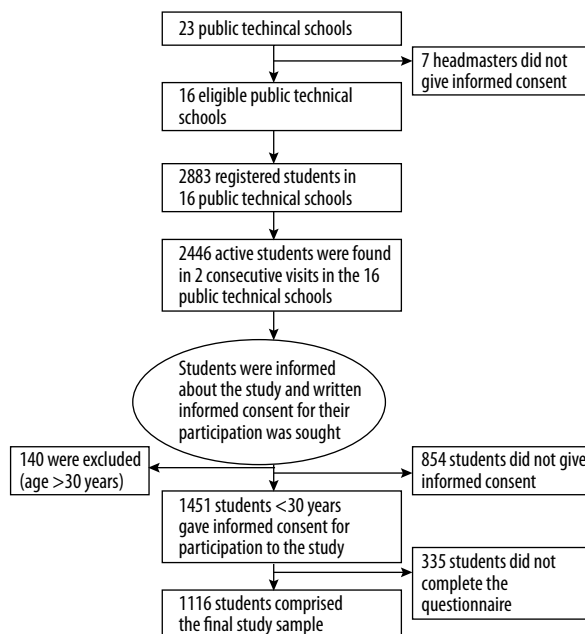


Figure 1. Flow chart explaining the study design.

Material and Methods

Study sample

The study sample consisted of young students aged 18–30 years attending public technical schools of the Attika prefecture. This particular prefecture, which contains the region of Athens, Piraeus, and their suburbs, was chosen because it encompasses the largest number of public technical schools and students coming from all over Greece, optimizing the representativeness of our sample.

All headmasters of the 23 public technical schools of Attika prefecture were contacted by phone and by email to obtain their informed consent to conduct of the study. Among them, 16 headmasters provided their informed consent, for a total of 2883 students eligible to participate in the study, among which 2445 were contacted in 2 consecutive visits to the 16 technical schools. All students were informed in detail about the aims of the study and the importance of their participation and their informed consent was requested. Our final study sample consisted of 1116 students (Figure 1).

Creation and structure of the questionnaire

Based on an extensive review of the available Greek and international literature, a preliminary version of the questionnaire was created. This version was given to 10 researchers and experts in the field, who were asked to complete the questionnaire

and highlight any ambiguous or problematic items. They were also asked to propose additional items not already captured by the questionnaire and to delete any trivial items, thus improving its content validity and reliability. All necessary modifications were made to the questionnaire, which was then administered to 30 subjects randomly selected from the student pool to find items that needed revision, which resulted in the final version of the instrument. This version consisted of 62 questions divided into 3 sections: i. sociodemographic questions; ii. questions regarding organ donation knowledge, attitude, and information; and iii. questions regarding brain death and legislation.

Administration of the questionnaire

The study took place between March 2013 and June 2014. The questionnaire was uploaded to an electronic platform and a web link was sent to all students who had already given their informed consent. In order to avoid missing data, all fields were marked as required and the questionnaire could not be submitted unless all questions had been answered. Two reminders were sent to the participants to maximize the response rate.

Ethics

The study protocol was approved by the General Secretariat for Lifelong Learning, which acts as the executive authority for public technical schools in Greece, as well as the Review Board of the Department of Social and Educational Policy of the University of Peloponnese. All students were informed that the anonymity of the participants would be respected and that no recriminations would occur irrespective of their decision regarding participation in the study.

Composite scale creation

Two composite scales were created: knowledge and attitude. The knowledge scale consisted of the following 4 multiple choice questions:

- #23 What does organ donation mean?
- #27 Which organs or tissues can be donated?
- #31 Are current transplantation needs fully covered?
- # 57 Which law is valid today regarding organ donation?

One point was given to each correct answer, the sum of which was the knowledge scale score (range: 0–4).

The attitude scale consisted of the following 5 multiple choice questions:

- #32 Do you have a donor card? (Answers: a. Yes/ b. No, but would like to/ c. No and wouldn't like to)
- #33 Would you become a living donor? (a. Yes/ b. Yes, but only for a relative/ c. No)

#34 Would you become a donor after your death? (a. Yes/ b. Yes, but only for a relative/ c. No)

#36 Would you accept an organ donation? (a. Yes/ No)

#37 Are you a blood donor? (a. Yes/ No)

In questions 32–34, 2 points were given for answer (a), 1 point for answer (b), and 0 points for answer (c). In questions 36 and 37, 1 point was given for answer (a) and 0 points for answer (b). The sum of all points was the attitude scale score (range: 0–8).

Statistical analysis

The statistical analysis of the knowledge and the attitude of students was based on the respective composite scales. For the analysis of the information of students, we used a 5-point Likert-type question (item #24) asking the respondents to assess their level of information regarding organ donation. Statistical analysis used univariate and multivariate analyses of the associations between the 2 composite scales, item #24, and possible predictors. Univariate analyses were performed using non-parametric statistical tests. Only predictors proven statistically significant in the univariate analyses were included in the multivariate models. The level of statistical significance was set at 0.05. Where its assumptions were met, linear regression was performed using backward regression. When the assumptions were not met, ordinal logistic regression was performed, after having checked that the proportional odds model fit the data.

The statistical analysis was performed using STATA 11.0 statistical software (Stata Corporation, College Station, TX, USA).

Results

The scale's overall internal consistency reliability was good (Cronbach's $\alpha=0.786$). A total of 1116 out of 1451 students completed the questionnaire (response rate=76.9%). The mean age of the respondents was 21.1 ± 3.02 years (median=20 years). The sociodemographic characteristics of our final study sample are listed in Table 1.

Knowledge regarding organ donation

Only 37.9% of the participants were aware of the correct definition of organ donation. Furthermore, only 40.3% knew which organs or tissues can be donated, 59.7% acknowledged the importance of the organ shortage, and 27.4% knew which organ donation law is valid today. The mean composite knowledge scale score was 1.65 ± 0.988 (median=2). Table 2 presents the results of the multivariate analysis of the composite knowledge scale.

Table 1. Sociodemographic characteristics of the study sample (n=1116).

Categorical variables	Frequency (%)
Sex	
Male	225 (20.2%)
Female	891 (79.8%)
Nationality	
Greek	1079 (96.7%)
Other	37 (3.3%)
Religion	
Christian Orthodox	1018 (91.2%)
Other	98 (8.8%)
Family status	
Single	1029 (92.2%)
Married/divorced	87 (7.8%)
Health professional	
Yes	432 (38.7%)
No	684 (61.3%)
Employment status	
Unemployed and looking for a job	711 (63.7%)
Unemployed but not looking for a job	208 (18.6%)
Employed	197 (17.7%)
Smoking status	
Non-smoker	521 (46.7%)
Ex-smoker	171 (15.3%)
Smoker	424 (38.0%)
Mother's education	
Illiterate	8 (0.7%)
Primary school	212 (19.0%)
High-school (3 rd grade)	139 (12.4%)
High-school (6 th grade)	378 (33.9%)
Technical school	231 (20.7%)
University	148 (13.3%)
Father's education	
Illiterate	9 (0.8%)
Primary school	314 (28.1%)
High-school (3 rd grade)	203 (18.2%)
High-school (6 th grade)	215 (19.3%)
Technical school	241 (21.6%)
University	134 (12.0%)

Attitude regarding organ donation

According to the respondents, 55.7% would like to acquire a donor card, but only 0.8% of them actually did own one. Moreover, 60.5% would be willing to donate an organ after death and another 10.5% would only be willing to donate an organ after death for a close relative. The face, the skin, and the cornea were the organs and tissues that respondents would be less willing to donate (33.1%, 39.5%, and 48.4%, respectively), whereas the kidneys and blood were the organs and tissues that respondents would be most willing to donate (72.6% and 66.9%, respectively). Strikingly, however, only 16.1% would be willing to become a living donor, another 35.5% would only be willing to become a living donor for a close relative, but only 11.9% of the respondents cared who would receive the transplant after their death. Two out of 3 participants would accept an organ from a living or dead person but only 16.9% would accept an organ from an animal. Furthermore, only 32.3% of the participants were registered as blood donors. The mean composite attitude scale score was 3.81 ± 1.82 (median=4). Table 3 shows the results of the multivariate analysis of the composite attitude scale.

Information regarding organ donation

Most of the respondents argued that the level of information they have regarding organ donation is moderate (3.13 ± 1.05 , median=3) and the vast majority among them (86.3%) stated that they would like to have more information regarding this subject. The prevailing source of information regarding organ donation seemed to be television, followed by the Internet, as shown in Table 4. Table 5 presents the results of the multivariate analysis of the students' reported level of information regarding organ donation.

Fears of the respondents

The fears of the students regarding organ donation were also examined and are shown in Table 6. Interestingly, the fear that

Table 2. Predictors emerging through the multivariate analysis of the composite knowledge scale.

Predictors	Category or increment	OR (95% CI)*	p
Health professional	Yes vs. no	0.383 (0.187, 0.789)	0.009
Blood donor	Yes vs. no	2.456 (1.172, 5.143)	0.017
Father's education	1 level increase	1.435 (1.122, 1.836)	0.004
Willingness to donate all organs after death	Yes vs. no	3.558 (1.646, 7.694)	0.001
Information from announcements/posters regarding organ donation	Yes vs. no	3.386 (1.231, 9.314)	0.018

* OR (Odds Ratio) was derived from ordinal logistic regression.

Table 3. Predictors emerging through the multivariate analysis of the composite attitude scale.

Predictors	Category or increment	OR (95% CI)*	p
Willingness to donate all organs after death	Yes vs. no	2.139 (0.967, 4.732)	0.060
Wish for better information regarding organ donation	Yes vs. no	3.140 (1.064, 9.263)	0.038
Fear of organ removal after death without prior consent	Yes vs. no	0.297 (0.142, 0.619)	0.001
Consent to necrotomy, if necessary	Yes vs. no	2.246 (1.072, 4.704)	0.032

* OR (Odds Ratio) was derived from ordinal logistic regression.

Table 4. Sources of information regarding organ donation.

	Yes N (%)	No N (%)
Television	531 (47.6%)	585 (52.4%)
Radio	82 (7.3%)	1034 (92.7%)
Newspaper	193 (17.3%)	923 (82.7%)
Friends	325 (29.1%)	791 (70.9%)
Relatives	306 (27.4%)	810 (72.6%)
Internet	506 (45.3%)	610 (54.7%)
Announcements/posters	144 (12.9%)	972 (87.1%)
Health professionals	243 (21.8%)	873 (78.2%)
High school or other educational centers	117 (10.5%)	999 (89.5%)
Course in public technical school	153 (13.7%)	963 (86.3%)
Other	55 (4.9%)	1061 (95.1%)
None	64 (5.7%)	1052 (94.3%)

Table 5. Predictors emerging through the multivariate analysis of the students' reported level information regarding organ donation.

Predictors	Category or increment	Coeff. (95% CI)*	p
Health professional	Yes vs. no	0.520 (0.147, 0.894)	0.007
Mother's education	1 level increase	0.175 (0.036, 0.314)	0.014

* Coeff. (Coefficient) was yielded from linear regression.

Table 6. Fears of the respondents regarding organ donation.

	Yes N (%)	No N (%)
#35 Would you be afraid that organs may be removed from your body before death without your prior consent?	387 (34.7%)	729 (65.3%)
#38 Are you afraid to donate blood?	199 (17.8%)	917 (82.2%)
#40 Would you be afraid that organs may be removed from your body after death without your prior consent?	441 (39.5%)	675 (60.5%)
#41 Do you believe that donated organs may be used for other purposes such as medical research or trade, despite the willing of the donor?	837 (75.0%)	279 (25.0%)
#42 Are you afraid that registering yourself as an organ donor or acquiring a donor card would be like "playing" with death (or provoking your death)?	396 (35.5%)	720 (64.5%)

“organs may be removed from your body before your death without your prior consent”, expressed by 34.7% of the respondents, emerged as the main reason for a negative attitude towards organ donation, the second being the belief that the body must remain intact after death (10.5%). Furthermore, 1 out of 5 respondents declared little or no confidence that the medical team would do its best to save the life of a person registered as a donor. Finally, 45.9% of the respondents admitted feeling an important level of fear of death and 27.4% declared that they often think about death.

Knowledge of brain death

The students' knowledge regarding brain death was also assessed; 83.1% of them declared that they knew what brain death means. However, 18.6% believe that a person who is declared brain-dead can recover and lead a normal life and 32.3% are unsure about it. These findings did not differ statistically significantly between health professionals and other students ($p=0.777$ and 0.068 for brain death meaning and recovery capability, respectively). Strikingly, 18.4% of those who declared knowing what brain death means believe that a brain-dead person can recover and lead a normal life and another 29.1% are unsure about it. The students' attitude regarding organ donation was statistically significantly associated with their knowledge of the meaning of brain death and the recovery capability of a brain-dead person, positively and negatively, respectively, in the univariate analyses ($p=0.030$ and $p=0.003$, respectively). However, in the multivariate analyses, none of the parameters regarding the students' knowledge about brain death were statistically significantly associated with the knowledge and attitude regarding organ donation.

Religious and legal issues related to organ donation

The majority of the respondents declared they were religious or very religious (46.8% and 17.7%, respectively); however, neither the degree of religiousness nor the knowledge of whether each respondent's religion is in favor of organ donation and transplantation was associated with the knowledge and attitude regarding organ donation. Furthermore, only 27.4% of the respondents knew the current Greek law about organ donation and most of them (62.1%) declared that the “hard” consent approach would be considered an insult to the deceased and his relatives as well as an abuse of power. The vast majority of them also believe that a relative's approval should be sought, either by a health professional from the National Transplantation Organization (49.2%) or by the family physician (31.5%). According to 54.0% of the respondents, the altruistic model, which is currently in effect, is the best option for organ donation. However, according to 58.1% of them, the provision of financial motives to organ donors and their families, such as free health or life insurance, would be most important.

Discussion

This is the first study trying to document the knowledge and attitude of young students attending public technical schools regarding organ donation and related issues. This study attempted to define the basic parameters related to organ donation and to pinpoint predictors concerning the knowledge and attitude regarding this subject, which in turn have emerged as prognostic factors of related behavior in the international literature [7].

The current study reveals an important degree of ignorance of young students regarding fundamental aspects of organ donation such as its definition and which organs can be donated, since less than half of them gave a correct response to the corresponding questions. However, young students, both health professionals and other students, acknowledge their lack of information regarding organ donation and most of them wish they would be better informed. This finding seems to be common throughout Europe [20].

The results of this study also demonstrate that young students are unreluctant to donate organs, especially to non-relatives, but would be more willing to do so after death, although this trend is strongly dependent upon the donated organ or tissue. Interestingly, the students' strong reluctance to donate their face, skin, and cornea may be explained by the fact that these tissues probably constitute the most basic morphological characteristics of an individual; the putative loss of the person's core morphological characteristics seems to have a significantly negative impact on the students' perception regarding organ donation after death. Furthermore, a number of fears were documented, among which the fear that registering oneself as an organ donor or acquiring a donor card would be like “playing” with death, which has also been documented in a Spanish study of teenagers [21]. This latter study also confirms our finding that some students believe that their body should remain intact after death. All the documented fears addressed in this study seem to hinder the willingness of students to become organ donors. In contrast, students seem more willing to accept organs from living or dead donors, which is a finding already documented in the international literature [22,23].

The current study also highlights the misperceptions of young students regarding brain death; they seem to ignore the true notion of brain death, despite their opposite belief. Knowledge regarding brain death was associated with their attitude about organ donation in the univariate analysis, which is in line with the findings of an older study [21]. However, this association was lost in the multivariate analysis. Another important finding of this study was the respondents' lack of awareness of the new Greek law regarding organ donation (the soft-content approach), which has also been implemented in other European

countries [24]. Such lack of awareness has also been reported in the UK [25].

Taking a step beyond the abovementioned findings, this study investigated the existence of predictors capable of modifying the knowledge and attitude of young students regarding organ donation. Although health professionals claim to have a better level of knowledge regarding organ donation, their level of knowledge on this subject is in fact inferior. This peculiar finding suggests the existence of a misperception on behalf of health professionals regarding their knowledge about organ donation. However, their poor level of knowledge might be explained by the fact that these particular health professionals have attained a lower educational level compared to health professionals that have graduated from universities. As already shown by an older study [26], a high level of medical education is positively associated with increased knowledge and a positive attitude towards organ donation. On the other hand, Essman and Thornton [27] found that medical students have significant gaps in knowledge regarding organ donation and that their knowledge regarding brain death was lower compared to a random adult sample.

This study also points out the notion of “intervention” in the human body during life or after death. In particular, being a blood donor, the wish for organ donation during life or after death, and the consent to autopsy, if needed, may denote a greater acceptability to such an intervention. In contrast, the belief that the body must remain intact after death or even the fear that organs may be removed from one’s body without prior consent may indicate the opposite. Interestingly, it seems that the positive attitude toward the idea of “intervention” in the human body was statistically significantly associated with better knowledge and a more positive attitude regarding organ donation. Indeed, numerous recent studies [28–31] have confirmed the correlation between being a blood donor and having a more positive attitude towards organ donation. A very recent Spanish study by Rios et al. [32] also highlighted the correlation between the consent to autopsy and the positive attitude to organ donation. Furthermore, the acquisition of information from announcements or posters regarding organ donation was found to be positively correlated with the level of knowledge regarding organ donation. This observation, which needs to be confirmed by further studies, supports the value of these particular means of education. In the case of announcements and posters, the individual has to play an active role by coming into close contact with these sources and to show an intrinsic interest in education and learning in order to acquire the relevant knowledge, which is not the case with sources such as television or radio; whether this active engagement may be the key for shaping the person’s knowledge and changing his behavior is an issue that has never

before been addressed. This study further supports that students desiring more information had a more positive attitude regarding organ donation, perhaps indicating more sensitized students, whereas the false belief in the potential of a brain-dead person to recover and lead a normal life was highly correlated with a negative attitude toward organ donation. This has also been confirmed by a recent study [32].

Finally, the parents’ educational level seems to play an important role in shaping the knowledge and attitude of young students regarding organ donation. However, an older study in secondary school students in Saudi Arabia by Shaheen et al. [33] did not confirm this finding. In accordance with another study [34], gender, age, and religious beliefs were not correlated to the attitude against organ donation. The same study also confirms the finding that persons who are unsure or who are against organ donation often believe that a brain-dead person could recover and lead a normal life.

To conclude, this study examined the knowledge, attitude and information of students regarding organ donation and related issues in a multifaceted way and revealed related prognostic factors. However, the selected population in terms of age, geographic distribution, and educational level, as well as the overrepresentation of women, may affect the ability to generalize our findings to a wider population. Finally, the creation of the composite scales needs to be validated to improve the validity and reliability of the study results.

Conclusions

This study revealed an important degree of ignorance of young students regarding fundamental aspects of organ donation. The students showed modest willingness to donate organs, which is dependent upon the donated organ, the recipient being a relative or not, and whether the donation would occur during life or after death. The students also expressed a significant number of fears and misperceptions regarding brain death. Furthermore, this study stressed the idea of acceptability to “intervention” in the human body during life or after death. The attitude of the respondents on this issue seemed to strongly influence their attitude regarding organ donation. Important predictors of the knowledge, attitude and information regarding organ donation were: being a health professional or a blood donor, the parents’ educational level, the wish to donate all organs after death, the information from announcements or posters, the fear of organ removal after death without prior consent, the consent for autopsy, the wish for more information regarding organ donation and the misbelief that a brain-dead person could fully recover.

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