

Knowledge of and Attitudes Toward Organ Donation: A Survey of Medical Students in Puerto Rico

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Objective: The increasing demand for organ transplants exceeds the organ donation rate. Addressing this discrepancy is challenging for organ procurement agencies and health professionals involved in the care of patients in dire need of organs. Research suggests that health-care professionals' knowledge of, attitudes toward, and behavior in terms of organ donation and transplantation are deciding variables in promoting organ donation. In Puerto Rico, there is a lack of information regarding medical student's knowledge of and/or attitudes toward organ donation, a lack that our study was designed to address.

Methods: Two hundred thirty participants (98 first-year, 45 second-year, and 87 third-year medical students) completed a questionnaire consisting of 55 questions; 10 questions assessed knowledge and 20, attitudes about organ and tissue donation. The remaining questions inquired after demographic information, history of blood donation, and educational experience.

Results: In terms of their knowledge about organ donation, the participating students had a mean score of 6.29 on a 10-point scale—with 10 being the highest possible knowledge score—and 45.7% of them scored 7 or more. These data also showed that participants had a positive attitude toward organ donation (44.9; range 14 to 56), with approximately 72% having a favorable view. However, while 40% of the participating students stated their intentions to donate their organs, only 23% of them had donor cards.

Conclusion: We determined that medical students have a positive attitude towards organ donation. However, a substantial lack of knowledge of organ donation among our subjects is a barrier to their taking the necessary measures to become active donors. Our data highlight the need to incorporate educational programs to increase knowledge and awareness regarding organ donation and the transplantation process. [P R Health Sci J 2013;4:187-193]

Key words: Transplant, Organ donation, Knowledge, Attitude, Medical students

Organ transplantation has been widely accepted as a solution for end-stage organ failure, and as a result the need for organs has increased (1). Despite the positive public attitude toward organ donation, the actual number of organ donors is significantly smaller than the number of patients needing transplanted organs (2). This discrepancy creates a challenge for the organ procurement agencies and health professionals involved in the care of patients needing organ transplants. It also suggests that there is a need for new strategies for increasing the number of organ donors so that more patients can receive transplants. Every day, the waiting list for lifesaving transplants grows, and the supply of donated organs remains relatively unchanged (3). Of those on the waiting list, approximately only 30% will receive a transplant (4).

It has been recognized that health professionals are the most critical link in the organ procurement process, as they are the first individuals to establish a relationship with the potential donor's family (5). Physicians are the individuals who follow a given patient throughout the hospital experience, understand

the critical state of a that patient, and determine when that patient is brain dead. Evidence has suggested that health care professionals' knowledge, attitudes, and behaviors are essential factors in the creation and promotion of an environment that has a positive influence on organ donation rates (6), meaning that these professionals play an important role in the donation process because of their unique relationships with potential donors and the families of those donors (7). Even though trained organ procurement organization (OPO) personnel address the possibility of organ donation with a family faced with the need

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to make decisions about a critically ill or already deceased family member, physicians play a vital role in raising the issue of organ donation and hence starting the process.

There are several barriers to physician involvement in the organ-donation process. These include the lack of time to discuss donation with patients or families, an unwillingness to address the issue in a non-urgent setting, discomfort with the subject, and a lack of adequate knowledge of the criteria for and the process of donation (6). Because of these and other barriers, physicians may be less likely to identify potential donors, may be more reluctant to discuss the topic of donation, or may be reticent to facilitate the process for grieving families after the death of a relative (8). It is important to address these barriers in order to promote organ donation and increase the number of potential organ donors.

Enhancing physician knowledge of and involvement in the donation and transplantation process may best be achieved through educational programs in medical schools (6). To achieve this goal, it is important to assess both the degree of knowledge and the attitudes of medical students about this topic since they will be physicians in the near future. Given that in Puerto Rico there is no information regarding medical students' knowledge of and/or attitudes on organ donation and transplantation processes, we assessed the knowledge of and attitudes towards organ donation in medical students attending the University of Puerto Rico School of Medicine.

Methods

Recruitment

An anonymous, voluntary survey was administered during class to first-, second-, and third-year students enrolled at the University of Puerto Rico School of Medicine in the 2007-2008 academic year. Out of 300 surveys handed out, 230 were completed by participants, those participants consisting of 98 first-year, 45 second-year, and 87 third-year medical students. Third-year students were asked to fill out the survey after they had completed their surgery clerkship rotation, since its curriculum includes a formal lecture on organ donation and transplantation. Fourth-year medical students were not included since the standard academic curriculum is completed by the third year.

Survey design

The survey had 55 questions that covered 6 distinct areas of study and included the following: 4 questions on demographics, 10 questions regarding knowledge of organ donation, 22 questions on attitude and intention towards organ donation, 13 questions on blood donation and associated factors, and 6 questions regarding educational experience about organ donation. The demographic questions explored gender, age, religious affiliation, and academic school year. The study was

approved by the Institutional Review Board of the University of Puerto Rico Medical Sciences Campus.

The questions assessing the knowledge of the medical students were based on 10 true or false questions developed by Matten and collaborators (9). The original version's reliability for the knowledge subscale was 0.6767. Face and content validity of questions were obtained by having the questions reviewed by 2 specialists in organ donation and 1 specialist in evaluation and research. Eight questions from the original version were included, and 2 questions were substituted with new ones because they did not correspond to the context of Puerto Rico. Each correct answer was awarded a point. A student scoring 7 points or more was considered to be knowledgeable about organ donation.

To assess the attitudes of medical students toward organ donation, an instrument developed by Kim, Fisher, and Elliot was used (10). The scale has a Cronbach's alpha coefficient of 0.8330 (10). A Likert scale response format (*strongly agree to strongly disagree*) defined positive and negative attitudes towards organ donation. The higher the score, the more positive was the attitude that the given student had towards organ donation. The original scale contains 4 components. The first component refers to discomfort with organ donation; the second to enhancing the quality of life; the third component to the willingness to be a donor. The last component, "rewarding experience," was excluded because it focuses on direct experience with organ transplantation (10).

All the questions included in this study were translated by a certified translator to Spanish and then back to English in order to assess term correspondence. A panel of experts as well as nurses, organ donation coordinators, and faculty members of the School of Medicine revised the survey for our study. Experts reviewed the questions for validity, social context, clarity, response options, and purpose.

A pilot questionnaire was administered to 12 medical residents to assess the comprehensibility and the relative ease or difficulty of completing the questionnaire. The pilot test looked at the clarity of the instructions and the suitability of the questions and the feasibility of answering them. Using the pilot test results, minor changes consisting of grammatical corrections were made to improve the quality and accuracy of the data collected.

Analysis

Descriptive analysis was done to determine frequencies and averages. An inferential analysis was used to examine differences between the information sources and the demographic characteristics, attitudes, donor designation status, and donation decisions using a *t*-test and Analysis of Variance (ANOVA) for continuous variables and χ^2 for categorical variables. All statistical analyses were performed using the Statistical Package for the Social Sciences database (SPSS, Version 17).

Results

Table 1. Demographic characteristics of medical students

Gender	Male	49.1%
	Female	50.9%
Age distribution	21 years or younger	9.1%
	22-25 years	83.9%
	26 years or older	7.0%
Religious affiliation	Catholic	58.3%
	Protestant	23.5%
	Muslim	0.9%
	Buddhist	0.4%
	Other	7.0%
	None	10.0%
Year in school	1 st -year medical student	42.6%
	2 nd -year medical student	21.3%
	3 rd -year medical student	36.1%
Ethnicity	Puerto Rican	100%

Organ donation knowledge

For the 230 students who answered the survey (76% response rate), the mean score was 6.29 (SD 1.17), with the highest score being 9 points and the lowest score being 1 point. Figure 1 shows the distribution of the knowledge question scores of the students surveyed.

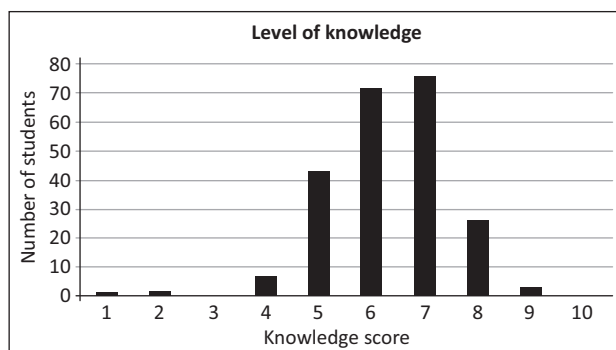


Figure 1. Distribution of knowledge scores

Only 45.7% of the students were less knowledgeable than the participants of other studies (8) about organ donation. Table 2 shows the percentage of students that answered each of the questions correctly. For example, in our study, 96.5% correctly answered that organ donation does not impede having an open casket at the funeral, 95.7% correctly understood that the costs for organ donation are not charged to the donor’s family, and 92.6% were aware that patients on the waiting list who are in critical condition are given higher priority to receive an organ transplant. Questions that students had more trouble with were understanding that brain death is not a requirement for all organ donations (27%), that there is no age limit for organ donation

(23%), that cardiovascular disease or diabetes mellitus are not contraindications for organ donation (26.5%), and that the family has the last word regarding donation once a patient has been declared brain dead (23%).

Table 2. Knowledge questions

Knowledge of organ donation among surveyed medical students	Correct answer	Answered correctly (%)
Brain death is the irreversible and total cessation of all of the brain functions in the person, including the functions of the brain stem.	True	80.0
Organ donation prevents an open-casket funeral.	False	96.5
Persons who have experienced irreversible brain death but who are maintained on a life-support system can be considered as potential organ donors.	True	89.6
A person must be pronounced clinically brain dead in order to have that person’s organs donated.	False	27.0
The age of organ donors can range from 28 days to 70 years.	False	23.0
Having a cardiovascular condition or diabetes mellitus is a contraindication to becoming an organ donor.	False	26.5
When an organ is removed, the family of the deceased donor pays for the surgery to remove said organ.	False	95.7
If a deceased patient has signed an organ-donor card but the family does not wish to donate the organ(s), the hospital is required to honor the wishes of the family.	True	23.0
The approach for organ donation must be made to every religious group.	True	75.2
Patients on the waiting list who are in critical condition have priority over other patients.	True	92.6

First-year medical students had a mean score of 6.32 (SD 1.44), second-year students a mean of 6.35 (SD 0.99), and third-year students a mean of 6.22 (SD 0.90) in terms of their level of knowledge about organ donation. Fifty percent of first-year students had a score of 7 or more, while 42.9% and 42.2% of second- and third-year students, respectively, scored 7 or more. By comparing the means between each school year, the study showed that there was no major difference between the mean of knowledge and the year of school in which a given student was enrolled ($p = 0.82$).

There was no statistical difference between younger and older individuals regarding level of knowledge. In the age group consisting of participants who were under 21 years old, 52.4% were knowledgeable about organ donation and its attendant details, while those between the ages of 22 to 25

years and those who were 26 years or older had lower levels of knowledge on the subject, 44.6% and 50.0%, respectively. No significant differences were observed when stratifying by gender ($p = 0.785$). Overall, 49.6% of males had an adequate knowledge of organ donation, compared to 41.9% of females who demonstrated similar awareness.

Identified religious affiliation had no effect on organ-donation knowledge. The mean score within students self-identifying as Catholics was 6.32 (SD 1.20), while (self-identified) Protestants scored 6.26 (SD 1.11), and members of other religions, 6.05 (SD 1.39); those reporting having no religious affiliation had a mean score of 6.39 (SD 0.94). Overall, 44.8% of Catholics demonstrated a level of understanding of the subject that could be considered to be adequate, and 44.4% of Protestants were similarly knowledgeable. Of those students with other or no religion affiliations, only 36.8% possessed a level of knowledge that could be considered adequate.

Attitudes towards organ donation

Of the 230 students, 213 answered all of the survey questions exploring attitude toward organ donation. The maximum score was 55.00, with a mean of 44.89 (SD 5.59) and a mode of 49.00. The frequency distribution and the percentages of the different responses examining attitude are seen in Table 3. Among the age groups, students who were 21 years or younger had a mean score in attitude of 44.30 (SD 4.81); for those

aged from 22 to 25 years, the mean was 44.80 (SD 5.70); and those who were 26 years or older had a mean of 46.92 (SD 5.13). Within religious background, results showed a similar pattern. Catholics had a mean of 44.60 (SD 5.43), Protestants had 45.78 (SD 5.67), individuals of other religions had a mean of 42.76 (SD 6.97), and those who were not affiliated to any religion had a mean of 46.29 (SD 4.77). The attitude towards organ donation by gender showed a mean of 44.16 (SD 5.83) in males and 45.61 (SD 5.27) in females. These differences were not significant. More than half of the students favored organ donation after brain death for their relatives and for themselves and saw transplantation as a life-saving treatment that should be supported by insurance.

Of the students surveyed, 10.9% answered that they did not want to be organ donors, and 23% answered that they already were active donors (having signed an organ donor card or a living will). The remaining students were considering organ donation or had not yet made the decision to become active donors.

Discussion

Of late, organ donation has been a topic of interest in Puerto Rican society. Many public educational campaigns have been presented in order to increase awareness of it. Analysis of the knowledge and attitudes of the medical community, an essential component of the donation process, is warranted.

Table 3. Attitudes towards organ-donation responses

Statement	Strongly agree n (%)	Agree n (%)	Disagree n (%)	Strongly disagree n (%)
If an approach is made to the family members of a brain-dead patient for organ donation, they will be upset.	12 (5.0)	57 (24.9)	126 (55.0)	34 (14.8)
My family would be upset if they were required to consent to my donating my organs after my brain death.	15 (6.6)	31 (13.5)	99 (43.2)	84 (36.7)
If I were asked for my family member’s organ donation, I would be upset.	11 (4.8)	15 (6.6)	107 (46.9)	95 (41.7)
I’d like to keep my body intact for life after death.	18 (7.9)	18 (7.9)	65 (28.5)	127 (55.7)
It is valuable to discuss organ donation with a dead patient’s family members after the declaration of brain death.	102 (44.7)	93 (40.8)	19 (8.3)	14 (6.1)
If I donate my organs, some parts of me will still be alive.	48 (21.1)	62 (27.3)	44 (19.4)	73 (32.2)
As a general rule, prolonging life through the use of human organ transplants is appropriate.	148 (64.6)	66 (28.8)	11 (4.8)	4 (1.7)
Medical insurance should be expanded to include organ-transplant surgery.	156 (67.8)	65 (28.3)	7 (3.0)	2 (0.9)
Organ donation is desirable when a patient is declared brain dead.	94 (41.6)	107 (47.3)	21 (9.3)	4 (1.8)
I approve of organ donation from brain-dead patients.	124 (44.4)	90 (39.5)	13 (5.7)	1 (0.4)
In the event of my own death, my choice would be to donate my own organs.	133 (58.6)	68 (30.0)	22 (9.7)	4 (1.8)
If the members of a bereaved family would like to donate their loved one’s organs, I’d like to actively refer them to a transplant team.	121 (53.1)	85 (37.3)	16 (7.0)	6 (2.6)
I would donate the organs of my family members if they were diagnosed as being brain dead.	96 (42.5)	93 (41.2)	28 (12.4)	9 (4.0)
If I donated my organs in the future, my soul would be comforted.	76 (34.7)	69 (31.5)	36 (16.4)	38 (17.4)

A study by Essman states that “health professionals are the most critical link in the organ procurement process,” as they are the first individuals to establish a relationship with the potential donor’s family and to initiate the discussions surrounding the option of organ donation (4). Physicians must be prepared to answer questions on organ donation and transplantation. Appropriate medical management of the potential donor by the attending physician is necessary to preserve the option of donation. As future physicians, medical students will become part of that critical link.

Ours is the first study that tries to assess the knowledge of and attitudes toward organ donation among medical students in Puerto Rico. We demonstrated that medical students lack information regarding organ donation. The mean of the participating students was 6.29 as opposed to the 7.5 that resulted in a similar study by Matten et al. (9). In Figure 1 we can see the general distribution of scores within the UPR School of Medicine. These results correlate with other studies that address the same question, leading to the conclusion that students in general are not sufficiently informed about organ donation (4-7,11-15).

Though the majority of students understood the definition of “brain death,” they had difficulties with many concepts regarding organ donation. These included understanding that organ donation is not limited to brain-dead donors but can also be achieved after cardiac death via a living-donor donation. Another concept about which students were not aware was that there is no age limit if the donor patient has healthy organs. Students also failed to be cognizant of the fact that cardiovascular diseases and diabetes (systemic illnesses) are not contraindications for organ donation. Finally, they failed to acknowledge the fact that in Puerto Rico, family members can halt the organ donation process at any time, even though the patient has signed an organ donor card. In 2011, after this study was completed, the law in Puerto Rico was amended to incorporate an electronic donor registry that acts as the legal consent for donation, obviating the need for family consent if the potential donor has registered. However, family participation is still an essential part of the process (16).

Most of the areas in which students were lacking in knowledge will be covered as they gain experience in their medical training. However, this study did not show any improvement in the level of knowledge about organ donation or transplantation with higher levels of medical training, in spite of there being a lecture concerning organ donation that is given in the third-year surgery clerkship. Our study was not designed to evaluate this finding. Possible reasons for the lack of improvement over time found in the study may include differences in contents of the survey and lecture, an ineffective educational format, or an insufficient sample size.

A study by Feeley, Tamburlin, and Vincent proposed that low levels of knowledge in medical students might be caused

by a lack of exposure to appropriate training programs (6). Most medical school curricula do not include organ transplant and donation as a core course during medical training, and most schools cover the subject in a single lecture. Sometimes the topic is not fully presented until the last years of medical training or as part of elective courses. These facts may be part of the reason that students have many questions regarding organ donation. We suggest that the subject of organ donation be presented early in each student’s medical training, thereby providing that individual with the correct information and emphasizing the importance of the subject.

For attitudes related to organ donation, the results were consistent with those of prior studies demonstrating that medical students generally have a positive attitude towards organ donation (6,7,10,11). Even though the study design did not stipulate a cut-off value to determine positive or negative, the mean in general was 44.89; the higher the number, the more positive the individual’s attitude was toward organ donation. The attitude score distribution seen in Figure 2 shows that the curve deviates toward the higher values, indicating that the majority of respondents had an affirmative view of organ donation. In this context, it is safe to assume that medical students are eager to help, heal, and take care of those in need. Having a positive attitude towards organ donation may support the physician’s belief that organ donation is a treatment option that may benefit a patient. In this aspect 88.6% of students agreed with the statement that in the case of death an option would be to donate their own organs, and 83.7% agreed that they would be willing to donate the organs of a family member if that individual were to be pronounced brain dead.

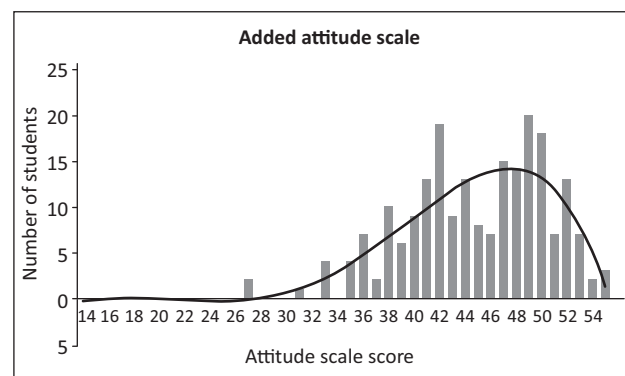


Figure 2. Distribution of possible scores on attitudes related to organ donation

“Attitude” is defined as a tendency expressed by some degree of approval or disapproval (Eagly AC. The psychology of attitude. 1993), and is relevant here in terms of a given medical student’s having a positive or negative (approval vs. disapproval) attitude toward organ donation. A positive attitude could also be expressed through the action of signing an organ donor card (12,17). In order to determine what point in the process

each participant had reached, the students were asked whether they had were planning to donate their organs upon death. The majority of the students (57.4%) answered positively to the statement. This willingness to donate correlates with what has been seen in other studies (6,7,13,17,18) and can be explained by the following statement of Essman and Thornton: "Medical students may have altruistic nature that leads them to pursue a medical career and to sign a donor card" (6). This statement can be applied to our investigation. Being or becoming an organ donor, in that sense, may be viewed as a step to further assist a patient in his or her recovery.

Only 23% of students answered that they were donors (had signed an organ donor card), implying a major disparity between attitude and action. This discrepancy may also be related to the fact that our students had not been exposed to this topic before, as seen in the assesment of knowledge. Other studies have shown a similar discrepancy in medical students and healthcare professionals (19,20,21). This emphasizes the concern that medical students are non-committal about becoming donors or have doubts about the process of becoming a donor. Processes that may improve the signing rate of organ donation cards among medical students include making the process more convenient, publicizing how to sign up in the donor registry, and providing education to correct misconceptions related to organ donation (17). In Puerto Rico, as is the case in the individual states in the US, organ donation status may be indicated on the driver's license, with the local organ procurement organization, and more recently, via an online donor registry. By contacting the Puerto Rico Board for Organ, Body, and Tissue Donation or the local OPO, information on how to become an active organ donor is provided via available educational materials. By truly committing themselves to becoming organ donors, health care professionals can serve as role models for patients and their relatives, and a higher success rate for organ procurement might be achieved (17,22).

A limitation of this study is the lack of data from other medical schools in Puerto Rico. Since the data were collected from 2007 through 2008, the results drawn from those data may not be strictly representative of current students. However, our study is the first one to document the limitations in knowledge about organ donation in Puerto Rican medical students, present results by level of education, and show weak areas. The high number of student participants validates the findings. Although the study was not designed to evaluate specific educational activities in the curriculum, after the completion of this study, another lecture on organ donation was added to the anatomy course that is given in the first year of medical school at UPR. A clinical elective in organ donation and transplantation is also open to students starting in the first year. It remains to be seen whether these additional educational activities will impact student knowledge of this subject.

Conclusion

Our study documents the limitations in knowledge about organ donation in medical students and demonstrates that there are positive attitudes towards the act of donation. The early introduction of the subject in the curriculum could address some of the noted deficiencies. A study evaluating the progression of these variables through medical school might be needed to determine ways to improve the medical curriculum and, ultimately, positively impact the rate of organ rescue in the future.

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