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Perspective of a Group of Students on Voluntary Body Donation for Academic and Scientific Purposes in Pernambuco, Brazil

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ABSTRACT

Introduction: human anatomy is known as one of the oldest subjects in the curriculum of health courses. It is necessary to use cadaveric human bodies in studying human anatomy, which has been decreasing in use over the years due to several factors. One way to solve this decline is by implementing body donation programs. This study aimed to verify the knowledge and perspective of students at a public state university in Pernambuco about donating their bodies for studies, as well as to understand the sociocultural factors that induce (or not) donation. Digital questionnaires were applied covering socioeconomic and sociocultural variables. The sample consisted of students affiliated with one of the campuses of a state university in Pernambuco, Brazil. It was observed that 81.5% of the participants had already heard about voluntary body donation, in contrast to 96.3% who did not know the procedures necessary to become a donor. There was almost unanimity among the participants when they were asked about their agreement with the use of cadaveric bodies in professional training (98.1%) and 38.9% mentioned that they would donate their bodies for study. Religion was not the determining factor for not donating (1.7%). It is concluded that the health students approached in this study generally showed low acceptance of voluntary body donation for the study of human anatomy. Religion generally showed a low relationship with the inability to donate bodies and the need to publicize these body donation programs is clear.

Keywords: Anatomy; Body donation; Altruism; Dissection; Cadaver.

Introduction

Human anatomy is described as one of the oldest disciplines in the Biology field, and is an essential component for training future health professionals. To this end, the most effective way to study the human body is through dissection. This is an ancient method, dating back to around 500 BC by the Greeks, although some authors claim that the Egyptians were the first to perform it. However, the first known records of dissection as the act of cutting bodies for studying anatomy date back to the 3rd century BC, in Alexandria[1].

It is possible to visualize the organ structures and functions through dissection, as well as the systems which compose the human body. Dissection was banned and neglected in the Middle Ages for several reasons, mainly religious and cultural, and was revoked in the Renaissance to discover the cause of death of influential people in society[2-5].

Nowadays, the availability of cadavers for study by medical and biological sciences faculties has become limited, becoming scarce over the years[6-7]. This is due to some factors such as socioeconomic development, causing a decrease in the number of undeclared (indigent) bodies; the inversely proportional relationship between the increase in the number of higher education institutions; the reduction in the workload of practical dissection classes in health courses; and the decrease in the availability of cadaveric bodies for study[8-10].

A lack in using cadavers can result in a significant deficit in learning and consequently in medical training[11]. Thus, learning with this teaching tool has directly affected the quality of the assimilation of content by students, being replaced by artificial models which scientifically and pedagogically do not make up for the lack of cadaveric bodies, but only complement it[12-15].

The use of cadavers is a fundamental component in the teaching and learning process of Anatomy. The relevance of studying human material and the difficulty arising from obtaining bodies have led governments and universities in different countries, including Brazil, to establish voluntary living body donation programs, respecting the specific laws of each territory[9,10,13,16-24].

Although the number of donations from these incentive programs is relatively low, it has been a temporary solution to the problem of the shortage

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of biological material for human anatomy studies[23, 25]. Given this, the tendency is for health professionals to be trained with a significant gap in knowledge of the human body. Alternative teaching methods to the cadaveric body are and should be considered complementary, not as the main practical teaching form of the human body[15].

In view of this scenario, the University of Pernambuco (UPE) implemented its Body Donation Program in view of its representativeness in the city of Recife, in the state of Pernambuco and in Brazil in training health professionals who occupy the most varied positions at regional, state, national and international levels. To this end, it is necessary to understand the perception of groups of students in the health field regarding their intentions to donate their bodies while alive for the study of science.

Thus, the objective of the study was to verify the knowledge and perspective of students at the Institute of Biological Sciences of UPE regarding donating their bodies for studies, as well as to understand the sociocultural factors that induce (or not) donation.

Material and Method

This is a cross-sectional study, meaning it is an observational analytical study which produced a snapshot of the condition at a given time[26]. It is quantitative, as it uses variables expressed in the form of numerical data[27], and descriptive, as it reports characteristics of a given population or phenomenon, or establishes the relationship between variables[28].

The study was conducted at the Institute of Biological Sciences (ICB), located on the Santo Amaro campus of the University of Pernambuco, Recife, Brazil, which offers courses in Biological Sciences, Medicine, Dentistry, Nursing and Physical Education.

Digital questionnaires were applied to obtain the data with the aim of optimizing the desired scope and reaching the sample with different education and purchasing power levels. The digital vehicle was through the research management application Google Forms. These questionnaires were applied to ICB students, of both sexes, of legal age. The digital questionnaire was sent by email and social media, and was also made available to the coordinators of each course linked to the ICB and through the latter upon spontaneous demand. The questionnaire covered socioeconomic and sociocultural variables, such as religion, course enrolled at UPE, course period, age, gender and marital status, in addition to analyzing participants' knowledge about voluntary body donation, the necessary procedures and also obtaining an insight into the interest and motivations that lead people to be voluntary donors or not.

For the eligibility criteria, students duly enrolled in one of the courses linked to the ICB, in addition to being of legal age, participated in the data collection. The exclusion criteria were students who were already registered as voluntary body donors while alive in some program and those who were not interested in participating in the study. The study was duly submitted to the Ethics and Research Committee of the University of Pernambuco, being approved under CAEE: 33274620.4.0000.5207. The data obtained were tabulated in Microsoft® Excel 2016. The Anderson-Darling test was used to verify the data normality, and finally Fisher's Exact Test for relevant associations between the variables in the participants' responses. The IBM SPSS version 25 program was used to obtain the statistical calculations.

Results

This study provides relevant data because it is the first in the state of Pernambuco to present information on the views of students from this region of Northeastern Brazil on the act of donating their bodies for studies. It is important to note that the data presented herein were collected before starting the activities of the Body Donation Program at the University of Pernambuco and may not reflect the results of other institutions in the health area which do not have a body donation project.

The study included 108 students, 71.3% of whom were female, from the Biological Sciences, Medicine, Dentistry, Nursing and Physical Education courses. Their ages ranged from 16 to 30 years old, and the majority were single individuals (96.3%). Of all the participants, 90.7% only studied and 9.3% reported that they had some kind of professional activity. The religious profile showed that 32.4% declared themselves to be Catholic, followed by 29.6% of other unspecified religions, 27.8% evangelicals, and 10.2% were spiritualists.

The results of the survey in relation to the objective questions of the questionnaire are presented in Table 1. It is observed that none of the students participating in the study were registered as a body donor. It is also worth noting that 81.5% of the participants have heard about voluntary body donation, while 18.5% declared that they had never heard about the subject.

When asked about the procedures required to participate in the voluntary donation process, 96.3% of respondents stated that they were not aware, while 3.7% stated that they were informed. In addition, a significant majority (98.1%) considered using cadavers and/or cadaveric parts for training healthcare professionals important, while 0.9% disagreed and 0.9% stated that they had no opinion.

When asked about donating their bodies for anatomical studies, 38.9% of respondents said yes, 28.7% responded negatively and 32.4% stated that they had no opinion on the subject. When asked about their trust in a surgeon whose training only involved studying anatomy in plastic models and alternative

Table 1: Survey of the perspective of students of the Institute of Biological Sciences on voluntary body donation.

Variable	n (%)
Total	**108 (100.0)**
P1. Are you already registered as a voluntary body donor?	
Yes	0 (0)
No	108 (100)
P2. What is your gender?	
Male	31(28.7)
Female	77 (71.3)
P3. How old are you?	
<18	4 (3.4)
>18	92 (85.2)
>24	12 (11.1)
P4. What is your civil status?	
Married	2 (1.9)
Single	106 (96.3)
Divorced	0 (0)
Others (Widow, Stable union)	2 (1.9)
P5. Which semester linked to the Institute of Biological Sciences are you in?	
1st or 2nd	46 (42.6)
3rd or 4th	14 (13)
5th or 6th	38 (35.2)
7th or 8th	7 (6.5)
9th or 10th	3 (2.8)
11th or 12th	0 (0)
P6. Are you working in any profession?	
Yes	10 (9.3)
No	98 (90.7)
P7. What is your religion?	
Catholic	35 (32.4)
Evangelical	30 (27.8)
Spiritism	11 (10.2)
Others	32 (29.6)
P8. Have you heard about donating bodies for the study of Anatomy?	
Yes	88 (81.5)
No	20 (18.5)
P9. Do you know the procedures required to participate in voluntary body donation?	
Yes	4 (3.7)
No	104 (96.3)

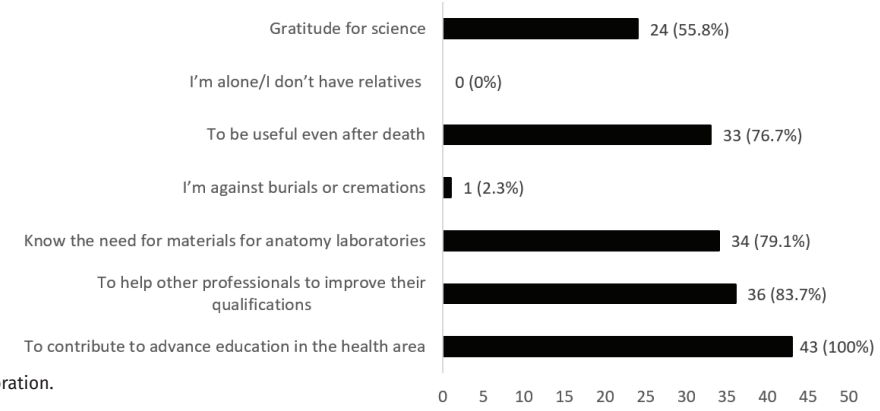
P10. Do you consider the use of cadavers and/or cadaveric parts important for good training of a healthcare professional?	
Yes	106 (98.1)
No	1 (0.9)
I don't have a formed opinion	1 (0.9)
P11. Would you donate your body for the study of anatomy?	
Yes	42 (38.9)
No	31 (28.7)
I don't have a formed opinion	35 (32.4)
P12. Would you trust being operated on by a surgeon who only learned anatomy on a plastic dummy and alternative methodologies and had no practical contact, in their training, with a human cadaver?	
Yes	7 (6.5)
No	81 (75)
I don't have a formed opinion	20 (18.5)
P13. Would you trust being operated on by a surgeon who has learned anatomy from the real human body?	
Yes	104 (96.3)
No	0 (0)
I don't have a formed opinion	4 (3.7)

Source: Authors' own elaboration.

methodologies without any practical contact with human cadavers, 75% of respondents stated they would not trust them, 18.5% stated that they had no opinion, and only 6.5% responded affirmatively (to trusting this professional). This is in stark contrast to when students were asked about their confidence in being operated on by a medical professional who had learned anatomy on real human bodies, as 96.3% of participants said they trusted them, 3.7% indicated they had no opinion, and no participant stated they lacked confidence.

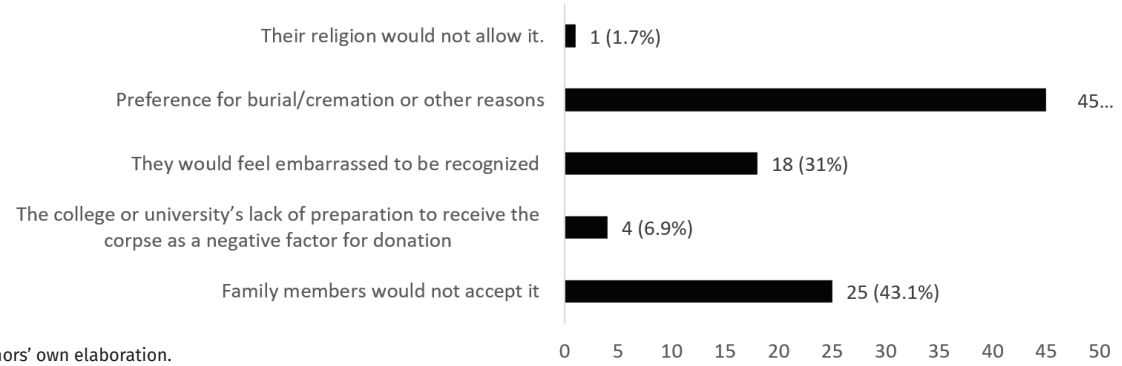
Graph 1 presents the results of the survey regarding the subjective questions. The main motivations for donating their bodies for the study of anatomy among the participating students who answered affirmatively to Q11 were the following: 100% identified the desire to contribute to advance education in the health area; 83.7% mentioned the intention of helping other professionals to improve their qualifications; 79.1% highlighted the need for materials for anatomy laboratories; 76.7% cited the desire to be useful even after death; 55.8% expressed gratitude for science, and only 2.3% indicated that they were against burials or cremations. No person stated the absence of relatives or loneliness as a negative factor.

Graph 2 presents the subjective results of the survey regarding question P11, in which participants indicated the reasons for not donating their bodies for anatomy study, including: 77.6% mentioned a preference for burial/cremation or other reasons; 43.1% indicated that family members would not accept it; 31% said they would feel embarrassed to be recognized; 6.9% considered the college or university's lack of preparation to receive the corpse as a negative factor for donation; and only 1.7% indicated that their religion would not allow it.



Source: Authors' own elaboration.

Graph 1. Participants who answered yes to Q.11 were asked: What was/were your reason(s) for deciding to donate your body for the study of Anatomy? (You can select 1 or more options).



Source: Authors' own elaboration.

Graph 2. Participants who answered no to Q.11 were asked: What was/were your reason(s) for deciding to donate your body for the study of Anatomy? (You can select 1 or more options).

Discussion

It is necessary to maintain cadaver collections in higher education institutions given that students can observe the anatomical structures which compose the human body in three dimensions and in their textures, as this tool is the closest to what future health professionals will encounter in their daily professional lives. Furthermore, contact with cadavers in anatomy laboratories offers health students the opportunity to develop essential ethical principles to become competent professionals right from the beginning of their academic training.

Law No. 10,406 of the Brazilian Civil Code was enacted in 2002, which legally regulated the organization of body donation programs throughout the country[29]. Thus, the University of Pernambuco implemented its program at the Institute of Biological Sciences (ICB) in 2020. However, the perception of students attending the ICB Anatomy Laboratory regarding body donation for studies was unknown, as well as its potential influence on dissemination of the program. In addition, it is essential that they understand the necessary procedures so that they can assist in guiding potential donors.

Thus, in this study we observed similar results to those in the literature, in which a dominant participation of female individuals was identified (71.3%). This is due to the fact that the health area has a prevalence of this sex[7, 30-33].

When analyzing the participants' religion, it was found that Catholics and individuals who do not have a defined religion are more willing to donate their bodies, 32.4% and 29.6% respectively. This result was similarly found in the study by Likus and Janiszewska[33] when they analyzed the attitude of nursing and physiotherapy students in Poland regarding body donation for educational purposes in their first academic year, reporting that Catholicism is the majority in that country. Ciliberti *et al.*[32] conducted a pilot study in Italy on the knowledge and attitudes of medical students regarding body donation based on ethical and scientific aspects. The authors were able to observe that the majority of participants declared themselves to be Catholic, which is similar to the study by Gonzalez-Cruz *et al*[34], followed by those who did not have any religious belief, or were of another religion. In contrast to these studies, Park *et al.*[35] conducted a study on the trend of body donation at a University in Korea and observed that 84.5% of the donors were Protestant Christians. The authors mention that this result can be explained by the fact that the University is the largest and oldest Protestant missionary university in Korea, followed by Catholics with 4%.

Additionally, the results of this study indicated a statistical association between evangelical students (1.7%) and the lack of confidence in undergoing a surgical procedure with a professional who studied anatomy only through alternative teaching strategies and dummies without contact with human cadavers, presenting a value of P=0.038. Based on this, it was inferred that evangelical belief directly reflects in the confidence of surgeons who had their anatomical knowledge based on experience with human bodies already in the first years of the course, establishing reliability in their expertise developed. Perhaps this is a point for not trusting young doctors, giving more reliability to older ones who have more experience with patients of evangelical belief. The other results were not significant for a statistical association (P<0.05).

It was also observed that a significant number of participants reported knowing about the possibility of donating their bodies for educational purposes, as well as research (81.5%). This result can be observed in the studies by Likus and Janiszewska[33], in which the authors conducted a study with nursing and physiotherapy students, identifying that a significant number of participants already had knowledge about the possibility of donating a body for study and research purposes. This knowledge is because they are aware of the origin of the bodies used in the study of human anatomy.

In contrast to the data on knowledge about the possibility of donating one's body for studies, 96.3% stated that they did not know the procedures necessary

to become a donor. This result is very similar to that found by Prohmann *et al.*[10] who obtained 96.53%, leading us to realize that despite prior knowledge about donation, there is a need to carry out more actions to inform the population about how to perform the procedure, even if this is an academic one.

In this study, we analyzed the opinion of students about the willingness to become donors, in which it was observed that 38.9% of the participants mentioned that they would donate their body for studies, followed by 28.7% who reported that they would not donate their body, and 32.4% marked the option "I have no opinion formed". Some of our results were similar to some authors, such as Volanek and Rissi[36], who studied the perspective of voluntary body donation for teaching anatomy. The authors mentioned that 25% of the interviewees would donate their bodies for study. However, 51% would not donate and 24% had no opinion on the subject, with their results being corroborated by the study by Prohmann *et al.*[10].

The altruistic act of donating one's body provides a valuable resource for both teaching and research in human anatomy. Donors have certain common characteristics, including the desire to contribute to medical science as the main motivation for donating their bodies, being in long-term relationships and having siblings, and not following a defined religious affiliation, which can be corroborated by what is currently published in the literature[20, 32, 37-38].

Individuals who donate their bodies for research purposes generally have a donor nature consistent with their primary motivation, which is to donate their own body so that it can be useful to medical science. This type of information can be important to help identify potential body donors in new and established donation programs. Analyzing donor profiles can be useful to better understand for which groups of people death should not be perceived as the end, but rather can become a valuable and beneficial experience for those left behind[21].

The donor's age, awareness of the program, occupation, relationship status, political preference, organ donor status, and with whom the donors discussed their decision to donate are important information to help identify potential body donors in donation programs[20].

Given the importance of promoting body donation for scientific purposes which is based on the broader concept of health protection, the need for better legislation on the subject has become quite evident today. The need for clearer and more precise legislation, in addition to deriving from an ethical need, also arises from scientific progress, which allows for constant and continuous expansion of the research field[21]. For example, the vast majority of students surveyed in this study (96.3%) reported not knowing the legal processes for voluntary body donation, which was corroborated by the findings of Volanek and Rissi[36] and Prohmann *et al.* [10]. On the other hand, a vast majority of participants in this study consider the use of cadavers to be important for the proper training of health professionals (98.1%).

Our study revealed that 38.9% of students expressed interest in becoming donors. However, a small number of participants actually expressed a willingness to donate their own bodies. In view of this, the students suggested that encouraging people to register to donate their bodies through mass media and instructing students to respect cadavers in the dissection environment are the best solutions to address the shortage of cadavers. These findings corroborate those of Abbasi Asl *et al.*[31], Prohmann *et al.*[10] and Brenner *et al.*[24], who indicate that lack of awareness about body donation may be the main factor responsible for the lack of willingness to donate bodies. This may be related to the result obtained in the present study, in which the sum of those who answered "no" and "I have no opinion formed" significantly exceeds those who showed interest in donating. This same result was obtained by Prohmann *et al.*[10], since the authors highlighted the low interest of students in donating their bodies for study. Therefore, increasing public awareness and addressing the positioning of students may help to overcome the current lack of donated cadavers.

The reasons given by the students in the study for donating their bodies were "contributing to advance education in the health area", "helping others to become better qualified professionals", "knowing the need for this material in anatomy laboratories", "being useful even after their death", "thanking science" and "being against burial or cremation". The reasons why the students stated their inclination to voluntarily donate are similar to those already described in the literature by Marsola[25], Volanek and Rissi[36], Farsides, Smith and Sparks[38], Bolt *et al.*[39], Jenkin, Garrett and Keay[40], and Elisa, Usman and Fischer[41].

The participating students who responded that they would not donate their bodies for the study of anatomy claimed "the desire to be buried/cremated or others", "the non-acceptance of family members in donating their bodies", "embarrassment in being recognized", "unpreparedness of the university to receive the body" and "religious issues", which can be corroborated with findings in the literature such as in the studies by Prohmann *et al.*[10], Volanek and Rissi[36], Rokade, Gaikawad[37], Jenkin, Garrett, Keay[40], Elisa *et al.*[41], Zhang *et al.*[42] and Mwachaka, Mandela and Saidi[43]. According to the aforementioned literature, disrespect for cadavers by students is part of a negative stigma as a factor in not accepting to donate their own body, as well as cultural beliefs, religious beliefs, fear that the body will be misused, not being mentally prepared, or fear that the body will be mutilated. Another relevant factor is the misinformation on the subject in society, since health students in this study

did not know the necessary procedures for donating a living body. Quiroga-Garza *et al.*[7], Abbasi Asl *et al.*[31], Ciliberti *et al.*[32] and Volanek and Rissi[36] highlight the importance of widely publicizing these programs so that their objectives of informing and enlightening the population are fully achieved. This will allow a greater number of people to be aware of the procedures, in addition to increasing the number of living donors.

Conclusion

It is concluded that the health students surveyed generally have low acceptance of donating their bodies for the study of human anatomy and recognize the real importance of cadaveric parts for satisfactory learning. It was found that the main motivation of health students to donate their bodies for studies is to contribute to advance education in the health area. On the other hand, the main reason for not donating their bodies is the desire to be buried or cremated.

Among the sociocultural variables questioned, religion generally did not appear to be a determining factor in not being the main reason for the individual not becoming a donor. Additionally, evangelical students do not feel comfortable undergoing surgical procedures if they know that the professional has not had experience with human bodies during their undergraduate studies. For students, it is necessary to systematically publicize on websites, social media, interviews and ecclesiastical ceremonies with the aim of informing the population about the possibility of donating one's body for studies, what Brazilian legislation says, the paths which should be followed and the respect that is given to donors in life, and especially after death, in order to win over those who are still undecided, as well as to win over new donors.

Despite the advances in technology and the development of cutting-edge models and software, the cadaver still continues, and will always continue, to be the best tool in the teaching-learning process of human anatomy.

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Mini Curriculum and Author's Contribution

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