

Ethical aspects of organ transplantation from medical students' perspective: a comparative study

Ramona de Jesus Santos ¹, Liliane Lins ², Mylla Regina Carneiro Santos ³, Marta Silva Menezes ⁴, Fernanda Amália Ramos de Carvalho ⁵, Fernando Martins Carvalho ⁶

Abstract

The objective of this study was to evaluate and compare the knowledge and opinion of medical students from different years (1st and 4th year) of medical school regarding the ethical aspects related to the topic of organ transplantation. A pre-coded questionnaire covering sociodemographic aspects and matters related to transplants and organ donation was applied to a sample of 190 medical students (95 from 1st year and 95 from 4th year) from a college in Salvador (Brazil). It was concluded that the level of students' knowledge regarding transplantation and organ donation was unsatisfactory in both groups. There was remarkable preference for practical aspects of transplantation to the detriment of anthropological ones, and at times students expressed unethical attitudes towards the dilemmas related to the theme in question.

Keywords: Organ transplantation. Tissue and organ procurement. Ethics. Bioethics. Medicine.

Resumo

Aspectos éticos dos transplantes de órgãos na visão do estudante de medicina: um estudo comparativo

O objetivo deste trabalho foi avaliar o conhecimento e a opinião dos estudantes de medicina acerca dos aspectos éticos relacionados à temática dos transplantes de órgãos em diferentes períodos (1º e 4º ano) do curso médico e compará-los. Por meio da aplicação e análise de questionário pré-codificado a uma amostra composta por 190 estudantes de medicina (95 do 1º ano e 95 do 4º ano) em uma faculdade da cidade de Salvador (BA), abrangendo aspectos sociodemográficos e relacionados aos transplantes e à doação de órgãos, concluiu-se que o nível de conhecimento dos participantes acerca dos transplantes e doação de órgãos foi insatisfatório em ambos os grupos. Houve notável predileção por aspectos práticos dos transplantes em detrimento dos antropológicos, e, em alguns momentos, os estudantes manifestaram atitude antiética perante os dilemas relacionados à temática.

Palavras-chave: Transplante de órgãos. Obtenção de tecidos e órgãos. Ética. Bioética. Medicina.

Resumen

Aspectos éticos de los trasplantes de órganos en la visión del estudiante de medicina: un estudio comparativo

El objetivo de este estudio fue evaluar el conocimiento y la opinión de los estudiantes de medicina sobre los aspectos éticos relacionados con el tema de los trasplantes de órganos y compararlos de acuerdo a los diferentes períodos (primero y cuarto año) de la escuela de medicina. Mediante la aplicación y el análisis de un cuestionario pre-codificado para una muestra compuesta por 190 estudiantes de medicina (95 de 1º año y 95 de 4º año), en una facultad de la ciudad de Salvador (BA), incluyendo aspectos sociodemográficos y relacionados a los trasplantes y a la donación de órganos, se concluyó que el nivel de conocimiento de los estudiantes sobre el trasplante y la donación de órganos fue insatisfactorio en ambos grupos. Hubo una notable predilección por los aspectos prácticos de los trasplantes en detrimento de los antropológicos y, en ocasiones, los estudiantes manifestaron una actitud antiética frente a los dilemas relacionados con la temática en cuestión.

Palabras clave: Trasplante de órganos. Obtención de tejidos y órganos. Ética. Bioética. Medicina.

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1. **Graduanda** ramona.jsantos@yahoo.com.br 2. **Livre-docente** lilianelinskusterer@bahiana.edu.br 3. **Graduanda** myllasantos12.1@bahiana.edu.br 4. **Doutora** martamenezes@bahiana.edu.br 5. **Graduanda** fernandaamaliarc@yahoo.com.br – Escola Bahiana de Medicina e Saúde Pública, Salvador/BA Pública 6. **Doutor** fmc.ufba@gmail.com – Universidade Federal da Bahia, Salvador/BA, Brasil.

Correspondência

Liliane Lins – Núcleo de Estudo e Pesquisa em Ética e Bioética da Faculdade de Medicina da Bahia da Universidade Federal da Bahia (FMB-UFBA), Escola Bahiana de Medicina e Saúde Pública (EBMSP). Rua Oito de Dezembro, 204, Graça CEP 40150-000. Salvador/BA, Brasil.

Declararam não haver conflito de interesse.

Many ethical and conceptual aspects related to organ transplantation are controversial and changeable, because they are based on personal opinions as well as religious and geographical factors¹ and involve socio-cultural, economic, emotional and technical issues, which deserve discussion and research². Thus, both ethics³ and bioethics are important references in the attempt to understand the complexity of issues that permeate the topic of organ transplantation². Ethics, as the basis for interpersonal relationships, takes into account values, traditions, concepts and practices of the individual or the community. Therefore, any action contrary to these factors is considered unethical³.

Bioethics, in turn, has as its primary objective to seek the benefit and assurance of human integrity through the defense of the dignity inherent to human beings⁴. This field of study was disseminated in Brazil under the principlism system (autonomy, beneficence, nonmaleficence and justice)⁵, presented as a tool capable of guiding decisions related to human behavior and, therefore, to be used as the base for discussions about organ donation.

Researches show that even among trained doctors the knowledge about transplants is still unsatisfying⁶. If professionals have basic information about the procedure, such as the possibility of organ transplantation to be carried out with organs from deceased donors and also from still living donors¹, the ethical considerations and even the steps necessary to perform each one of those procedures are not always sufficiently known. So even without any further analysis on the implications of this topic, it appears that medical education is the key to understanding the technical and ethical aspects of transplants, such as those discussed in this paper, and the consequent improvement of the organ harvesting index by medical professionals.

The first ethical aspect to be considered is the validity of removing part of someone's body to put it in someone else's body. In relation to post-mortem donation, it is important to know if the deceased individual has manifested in life the will to become a donor or not and his or her decision must be respected; However, as a decision of organ donation in life rarely occurs, the decision of authorizing or not organ transplants is actually left to the family. According to a resolution of the Conselho Federal de Medicina (CFM - Federal Council of Medicine), the surgical removal of organs from deceased donors can only be performed after diagnosis of brain death (BD)⁷, which is characterized by the irreversible clinical condition of complete cessation of

brain functions evidenced by severe coma of known cause, absence of brain stem reflexes and apnea⁸. In addition, *the donation will depend on the consent of the spouse or relative of legal age, subjected to degrees of kinship*⁹. However, it is necessary to have a consensus among the family because the donation will not occur without everyone's consent³.

This family oriented approach does not exclude the need for suitability of the actors involved, which is essential for the donation to be successful³. There cannot be any kind of embarrassment or threat and the moment of loss of a loved one requires maximum understanding from the professional, respect, affection and tact towards the family. The concept of brain death (ME) should be explained in a simple and clear way, and it is important to demonstrate the conviction that the treatment of the patient evolved unfavorably, despite all the efforts engaged by the teams involved³. It is the duty of the retrieval team to reconstitute the body of the donor¹⁰ in the best possible way, particularly after donation of multiple organs when the body is extensively mutilated. The body of the deceased donor should be released as soon as possible to the family¹. It is important to note that the medical team who takes care of the potential donor before and during his or her diagnostic of brain death (BD) should not be part of the transplant team⁸ and must commit every effort to recover the patient with severe neurological damage. The most cited conditions that prevent the donation are: religious reasons, no understanding of brain death (BD) and/or the trauma of loss, which does not allow a decision making¹.

A living donor can only give a part of his or her body that is regenerable or if it is a pair of organs¹⁰ which function can be fully carried out by the remaining organ. Donation among blood relatives or close emotional relationship (spouse) is consensually admitted. In Brazil, the law states that organ donation in life for transplantation is allowed to a legally capable person, to the spouse or blood relatives until the fourth degree, or to any other person through judicial authorization, except in the case of bone marrow⁹.

Many societies oppose organ donation of unrelated people because they think that, without a proper relationship, the only motivation would be economic. This justification may be false, considering that a donation can be genuinely altruistic. Besides, there is no guarantee that an organ donation between relatives won't have any sort of commercial relation¹.

However, even considering the possibility of financial incentive to organs donation, transplant services across the world have shown great restraint to compensation as it is seen an unacceptable form of economic constraint. But some doctors argue that seeing how sex workers, trapeze artists, race car drivers and boxers, among other categories, risk their health, their physical integrity and even their lives for money, an organ donation could involve financial compensation. There are also other issues that cause relevant and controversial discussions, such as the age of the donor, the use of donors whose organs are not perfect and the use of anencephalic infants as donors¹.

Facing so many ethical issues surrounding the subject of organ transplantation, the objectives of this study were to evaluate the knowledge and opinion of medical students about the ethical aspects related to this topic, assess how is the transmission of knowledge on the subject along the graduation and compare the diversity of knowledge and opinions among different periods of academic training (first and fourth year of medical school).

Method

This is a descriptive-analytic, observational and cross-sectional study where we used pre-coded questionnaires applied to a sample consisting of 190 medical school students in the city of Salvador, Bahia. It was a field research of original nature and exploratory character using a quantitative approach. The objective was to evaluate the student's knowledge and behavior in relation to ethical aspects of organs transplants. We proceeded then to a comparative analysis of the different school periods (first and fourth year), in order to establish whether there are differences in relation to ethical issues raised by the students according to their time in medical school, what is established as the primary outcome of this study.

The sample consisted of 95 first year medical students and 95 fourth year medical students. The choice for these periods was justified by the fact that they demarcate the initial period of medical school and the end of the basic cycle, allowing comparison between different periods. There was no limitation on the age of the student, and those who were present in the classroom during the questionnaires and who agreed to participate were included in the study, demonstrating their consent by signing a free and informed consent (IC).

The data collection instrument was a self-completion questionnaire, pre-coded and anonymous. It had been developed by the researchers and adapted from previous studies of similar nature^{6,11}. The questionnaires were applied in the classrooms of the institution under the supervision of the research's author, shortly before teaching activities or their immediate end. Each student had an average of 15 minutes to respond spontaneously to the questionnaire. The data collection period took place from May to September 2013.

Two softwares were used to tabulate and systematize data, allowing the building of a database and the performing of statistical calculations: Epi Info (version 3.5.1) and Bioestat (version 5.0). We calculated the mean, median, standard deviation and variance of continuous variables. Thematic analysis and segregation by topics, with subsequent analysis of their frequencies, were used for the dissertative variables. We also used frequency analysis for qualitative variables. The Chi-squared test was used to verify differences between prevalence ratios, as well as the Fisher's exact test, with a 95% confidence interval. Values of $p < 0.05$ were considered statistically significant.

This study respected the ethical principles of the Resolution 466/2012 from the Conselho Nacional de Saúde (National Health Council)¹².

Results and discussion

Sample profile

The socio-demographic profile of the sample, composed of two groups of students from either the first or fourth years of medical school, revealed a predominance of females (61.1% and 64.2%, respectively; $p = 0.76$), the mean age of 21.4 ± 2.5 and 22.6 ± 1.9 years, respectively. Most students in both groups reported to practice a religion (73.7% and 64.2%, $p = 0.20$), Catholicism being the most frequent one (45.3% and 35.8%; $p = 0.23$).

Religion and organ transplantation

According to the census of the Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics)¹³, the prevalent religions in Brazil are Catholicism and Protestantism. This finding shows how both the religions followers and health professionals need to know these religions positions on organ transplants, in order to have a good understanding of patients as well as a good care. In this sense, and considering the

regional peculiarities and religious practices in Brazil, a country of continental size, it is also important that health professionals from transplant teams, in order to achieve a better management and humanization of care, are aware of the possible positions of other religions on issues related to donation and transplantation of organs.

Organ donation is an acceptable practice to the Catholic community and it is even as evidence of solidarity and human nobility. This religion condemns only the commercialization of organs^{14,15}. When evaluating aspects of Baptist Protestantism in the city of Salvador, through interviews with seventeen Baptist theologians, Lins¹⁶ pointed out that the doctrine of this religion has no restrictions on transplantation and organ donation. The independent and voluntary decision about organ transplants is up to each individual. However it was noted the need for further reflection on the subject among the Baptists, including through training aimed at theologians on technical and ethical aspects of transplants. With respect to African religions, specifically *candomblé*, which is more common in Bahia, Goldim and colleagues¹⁷ describe an interview with one of *candomblé*'s leaders who stated that there is no impediment to transplantation and organ donation by their followers and organ donation is considered a process of return to nature of something which had been used by human beings in their earthly life.

Ferrazzo and colleagues¹⁵ concluded, in a literature review, that no religion is absolutely contrary to organ donation but some factors can interfere with the decision such as, for example, the belief that death is only established after cardiac arrest without recovery, as the Judaism believes, or rituals related to the deceased body, as it happens in certain Buddhist doctrines. This survey is corroborated by two population studies in Curitiba¹⁸ and in the state of Pará¹⁹, which did not show the influence of religion in the intention to donate organs.

Contrary to what some of the study participants thought, it was found that Jehovah's Witnesses do not take positions contrary to organ donation. They only condemn any kind of intervention where hemotherapy is necessary, seeing that they do not accept blood transfusion or even transfusion of its primary components (cells, platelet concentrate, frozen fresh plasma), including autologous blood transfusion²⁰. A retrospective study²¹ in 2013 illustrates this issue by analyzing four cases of liver transplants in Jehovah's Witnesses patients, successfully performed in a hospital of Ceará (one of Brazil's federative states). The authors show that

it is possible to perform this type of transplant, considered one of the most challenging, without the need for blood transfusion. They call the attention to some aspects such as preparation of the medical staff, hematological parameters at appropriate levels during the preoperative and availability of specialized equipment.

It is essential for the cross-cultural training of health professionals to understand the cultural differences that govern societies, especially those differences related to technical and health procedures, and also to consider beliefs and religions. This way health professionals will avoid discrimination when they are faced with conceptions different from their own^{15,16}.

Research carried out in Turkey²² with 264 theology students showed that for individuals undecided or contrary to organ donation ($n = 188$), the main arguments presented were that it is an inappropriate action because it is not in accord with the Islamic belief. Another reason was that some of them do not approve the loss of the body integrity. The same study showed, however, that the majority of respondents (67.9%) did not have enough religious knowledge on the issue.

In our study, 82 first year medical students (86.3%) and 84 fourth year medical students (88.4%) answered that religion exerts influence on organ donation ($p = 0.82$). Among the fourth year students, 45 (47.4%) revealed a negative impression about this influence ($p < 0.0001$); Now, among first year students, an impartial discourse prevailed, with 52 replies (54.7%; $p = 0.0001$). This difference was considered statistically significant.

To justify such an influence, 33 first year medical students (34.7%) stated that religious doctrines or beliefs are able to modify personal decisions, showing an impartial character of discourse, whilst only 16 of the fourth year students (16.8%) expressed the same opinion. The difference is considered statistically significant ($p = 0.008$). 24 fourth year students (25.3%) reported that there are religions which oppose or even prohibit the giving/receiving of organs among their believers ($p = 0.004$), 15 (15.8%) said that the understanding on the meaning of the body, within each religion, influences the decision on transplantation ($p = 0.014$), and 6 (6.3%) stated that religions like Jehovah's witness are contrary to transplant ($p = 0.029$). These sort of responses were presented by only 8 (8.5%), 4 (4.2%) and no first year student, respectively. The difference shows statistical significance (Table 1).

Table 1. Comparing responses of first and fourth year medical students from the Escola Bahiana de Medicina e Saúde Pública (Bahiana School of Medicine and Public Health) about the influence of religion on organ donation. Salvador/Bahia, 2013

How religion influences organ donation	Year				p
	First year (n = 95)		Fourth year (n = 95)		
	n	(%)	n	(%)	
Doctrines or religious beliefs can influence personal decisions	33	(34.7)	16	(16.8)	0.008
Some religions are against or prohibit organ donation/reception	8	(8.5)	24	(25.3)	0.004
The concept of body, according to each religion, influence the decision about organ transplantation	4	(4.2)	15	(15.8)	0.014*
Jehovah witnesses are against organ transplantation	0	0	6	(6.3)	0.029*
Religious beliefs influence the concepts of life or death, or life after death	11	(11.6)	4	(4.2)	0.066*
Personal conflicts about organ transplantation can happen if a religious entity has no official position on the matter	2	(2.1)	0	0	0.497*
Religious fanaticism prevents organ transplantation	3	(3.2)	0	0	0.246*
Religion is an obstacle to organ transplantation	1	(1.1)	2	(2.1)	1.000*
If part of the body of an individual is in another person then this can influence the decision about organ transplantation	2	(2.1)	0	0	0.497*
It is related to the individual be attached to material values or not, from a religious point of view.	1	(1.1)	0	0	1.000*
Religions can view organ donation as an act of charity or deem it as inadequate practice					
• Thought prejudice	0	0	1	(1.1)	1.000*
• Organ donation is viewed as a sin	0	0	2	(2.1)	0.497*
• The estimation of the time of death can influence organ transplantation	0	0	2	(2.1)	0.497*
• The impossibility to receive an organ that contains blood	0	0	1	(1.1)	1.000*
• Religions don't influence decisions about organ transplants because they see the preservation of life as priority	1	(1,1)	0	0	1.000*
• I don't know religions that influence this sort of decision	0	0	1	(1.1)	1.000*

Chi-square of Pearson * Fisher exact tests

Therefore we should ponder that an individual's set of beliefs does not necessarily reflects the doctrine preached by his or her religion. According to the Portuguese language dictionary Ruth Rocha, belief is 1) the act of believing; 2) set of beliefs; 3) faith. The definition of doctrine is 1) set of dogmas or principles underlying a religious belief or a philosophical or political system; 2) system or rules that each individual follows²³. Thus, it is understood that the set of one's convictions (belief) can be sufficiently influenced by the multicultural environment in which it operates, interfering in how one interprets the doctrine of their religion (dogmas or principles). This can make a person, believing to be obeying religious precepts, to assume certain positions on certain topics - such as organ transplant - when in fact their

decision does not find support in the doctrine. This reflection is necessary because of the strong mystical-religious culture lived in Brazil and to know this sort of scenario is essential to the effective dialogue between those involved in the donation/transplantation of organs and also for this type of therapy to be performed.

Knowledge about brain death and organ donation

When asked about the concept of brain death (BD), 89 (93.7%) medical students from each group reported knowing it ($p = 1.0$), but only 44 (46.2%) and 47 (49.5%) first year and fourth year medical students, respectively, agreed about its definition ($p = 0.77$), and most of them characterized their level of knowledge on this subject as "regular"

(46.2% and 42.1 %; $p = 0.66$). The level of knowledge about the subject "organ transplantation" received the same qualification (49.5% and 55.7%, $p = 0.46$) (Table 2).

Regarding the knowledge about which organs are allowed for transplant from still living donors, liver was more cited by first year medical students (89 responses, 93.7%) than by fourth year medical students (75 mentions, 78.9%), a statistically significant difference ($p = 0.012$). Lung was also mentioned (36 indications, 37.8%, 12 indications, 12.6%, respectively; $p = 0.0001$). Only skin was more mentioned among fourth year students (27 responses, 28.4%) than by first year students (1 mention 1.1%), a difference also considered statistically significant ($p = 0.00$).

Although most students have qualified as "regular" their level of knowledge about brain death and organ donation, most of them didn't really know the concept of brain death. This deficiency became clear thanks to the discrepancy in the reference to living donors' organs, in which first year medical students showed more knowledge about donating parts of the liver and/or lungs than students fourth year students. In addition, the latter group also reported skin as an organ included in the transplantation from living donors. The Brazilian legislation provides that double organs or parts of organs and body tissue can be donated by still living donors as long as their surgical removal does not compromise the donor's vital functions and physical or mental skills and it doesn't cause deformation¹⁰. However, the

Ministry of Health²⁴ specifies that one kidney, parts of the pancreas, liver and lungs as well as bone marrow can also be donated by still living donors.

The deficiency of these contents among college students^{22,25}, especially medical students²⁶⁻²⁸, has been demonstrated in other studies. Survey conducted among students of Medicine in São Paulo²⁶ showed an increasing trend in the acquisition of knowledge on the subject during the graduation. The results of this study, however, were discordant, and showed that there is no evolution in relation to the acquisition of knowledge about organs transplantation throughout medical graduation. Perhaps this is explained by the fact that most organ transplants are performed in the state of São Paulo, allowing its students to have more opportunity to interact with patients, lecturers and clinical cases of transplants throughout the course.

This finding highlights the need to review the curriculum of Brazilian medical schools, in order to provide their student with a broader experience concerning organ transplantation, seeing that one of the possible causes of this lack of knowledge is the failure in the presentation and discussion of the topic during graduation^{26,28}. In general, students are very interested in learning more about transplants^{27,28}, as it is perceived in this study, and they look for ways to meet this need by participating in extracurricular activities. Proof of this is that the vast majority of respondents considered graduation, not post graduation, as the best time to start discussions on the subject.

Table 2. Percentual and numerical distribution of the self-assessment conducted by first year and fourth year medical students from the Escola Bahiana de Medicina e Saúde Pública (Bahiana School of Medicine and Public Health) about the level of knowledge on brain death and organ donation. Salvador/Bahia, 2013

Level of Knowledge	Year				<i>p</i>
	First year		Fourth year		
	n	(%)	n	(%)	
Brain death (n = 94)					
Excellent	2	(2.1)	8	(8.4)	0.10*
Good	41	(43.2)	40	(42.1)	1.00
Adequate	44	(46.2)	40	(42.1)	0.66
Poor	6	(6.3)	6	(6.3)	1.00
Very poor	1	(1.1)	0	0	1.00*
Organ donation (n = 95)					
Excellent	3	(3.2)	5	(5.3)	0.72*
Good	38	(40)	30	(31.6)	0.29
Adequate	47	(49.5)	53	(55.7)	0.47
Poor	7	(7.4)	7	(7.4)	1.00
Very poor	0	0	0	0	1.00*

Chi-square of Pearson * Fisher exact tests

Tessmer et al²⁵ also suggest that the scope of this topic should be expanded to all students, given not only the fact that they are potential donors, but also the influence that their profession can offer, featuring the graduate as a model that could reflect positively in the society, contributing to increase the number of effective donors. This suggestion was motivated by the 33% decline in intention to donate organs when the word "death" was replaced by "brain death" in his study, which was conducted among 485 students of the city of Pelotas in Rio Grande do Sul, showing that the lack of knowledge about brain death impacts negatively the decision to donate, which is also shown in many studies^{18,19,27} on the population knowledge about the term "brain death", confirming the need for proper training of professionals in this segment to settle the doubts of the public at large.

In our study, the majority of students in both groups (1st and 4th year) pointed out that knowledge about transplants would be the responsibility of the basic training of the medical student during graduation (97.9% and 98.9% ; $p = 1.0$), and only 2.1% and 1.1% of them, respectively, considered to be a subject for the post graduation ($p = 1.0$).

In the case of possible approaches involving the study of organ transplants during graduation, 86.3% of respondents from the first year showed greater interest in the technique of transplants, while only 54.7% of students in the 4th year showed interest in the subject ($p < 0.0001$). Participants in the 4th year that showed curiosity about the subject, in turn, showed interest in transplant laws (88.4%), while 71.6% of first year medical students expressed the same interest ($p = 0.006$).

Postmortem organ donation and family clarification

Most students of both groups demonstrated desire to donate their organs after their death, what is a result similar to other studies conducted among the general population^{18,28} and college students, including medical students^{19,25-28}. Nevertheless, there was a prevalence in this research of a more favorable attitude among students from the most advanced period of the course (4th year, with 94 claims, 98.9%) compared to the first year (64 claims, 67.4%), which revealed a significant statistical difference ($p = 0.002$) that was not observed in similar studies^{26,27}.

On the other hand, first year medical students expressed further doubts on the issue (28 indications, 29.5%) compared to the other group of students (10 manifest doubts, 10.5%), difference that is also statistically significant ($p = 0.002$). Those first year students were more undecided about this type of transplant, which can be explained by the fact they are in early stage of the course and are not familiar with the concept of brain death, which might lead to insecurities and could influence their decision making. The main reasons for refusal of *postmortem* organ donation are shown in Table 3.

A considerable part of the students from both groups (46.3% and 62.2%) reported having communicated to their families about their will regarding *postmortem* organ donation and obtained their agreement, although this situation has been more frequent among the fourth year students ($p = 0.04$).

The two groups which are object of this study demonstrated a good level of family dialogue about organ donation but family members of fourth year medical students were more tolerant on the

Table 3. Percentage and numerical distribution of reasons to deny *postmortem* organ donation, as answered by the total of first year and fourth year medical students from the *Escola Bahiana de Medicina e Saúde Pública* (Bahiana School of Medicine and Public Health), Salvador/Bahia, 2013

Reasons to not donate an organ	Year				p
	First Year (n = 95)		Fourth Year (n = 95)		
	n	%	n	%	
Simply doesn't want to	3	3.2	1	1.1	0.62
Fear	2	2.1	1	1.1	1.00
Lack of information	2	2.1	0	0	0.49
Lack of maturity to decide	1	1.1	0	0	1.00
Didn't think or doesn't have an opinion about the subject	1	1.1	1	1.1	1.00

Fisher exact tests

decision of the student about *postmortem* organ donation. It is possible that this is explained by the influence of time on graduation, as fourth year students, having being more exposed to scientific information, can promote a greater exchange of information with their families, optimizing such reflections on their families. But further investigation on this matter is necessary.

Other studies also showed good level of discussion among medical students and their families, considering their intention of being (or not) organ donors^{25,27,29}, which shows awareness of the importance of communication for an effective donation in the case of diagnosis of brain death.

Regarding the authorization for organ donation from relatives diagnosed with brain death, the percentage of first and fourth year medical students who are in favor was 71.6% and 82.1%, respectively ($p = 0.12$), provided that it is known, however, the will of the relative about organ donation. First year students had a greater doubt index (15.8%) than fourth year students (5.3%), a statistically significant difference ($p = 0.01$).

Respect for the potential donor's will is evidenced in this study when a minority of students from both periods said they would donate organs of relatives diagnosed with brain death even not knowing the position of the relative about organ donation. This observation was also made by Tessmer et al²⁵, who reported a decrease of approximately 52.5% in the intention to donate organs from deceased relatives if the person's position on donation was unknown. The study was conducted with students in the University of Pelotas/RS. Other studies also demonstrate the relevance of this kind of dialogue in the family^{27,29}.

About organ transplants from still living donors and commercialization of organs

When asked about the possibility of being a living donor in a transplant, the vast majority of students in both groups responded positively (93 first year students, 97.9%, and 87 fourth year students, 91.5%), with no great difference between them ($p = 0.10$), even being aware of the risks involved in this type of intervention (60 first year students, 63.2%, and 63 = fourth year students, 66.3%; $p = 0.76$). In such cases, the main recipients considered by the students were first-degree relatives (95.8% and 88.4%; $p = 0.07$). First year medical students would donate more to friends (51.7%) than fourth year students (34.8%). First year students were also more willing (11.6%) than the other group

(2.1%) to donate any organ as long as their quality of life would be guaranteed. This difference is statistically significant ($p = 0.03$ and $p = 0.02$).

Again, it is believed that maturity influence this type of decision as first-year students, still in their initial period in a medical school, are not fully aware of the risks involved in this type of transplant, although many of them said to be aware of the risks. The same can be considered when such students are more willing to donate any organ, as long as their quality of life after transplantation is guaranteed; however, it must be considered that such a disposition may be associated with the desire to save the life of a loved one, as the main beneficiaries considered were first degree relatives what similar to the findings from other studies^{18,26,27}.

The possibility of organ trade between still living donors and non related recipients was also researched among students in the first and fourth year of medical school: 78 first year students (82.1%) and 70 fourth year students (73.7%) believe in that possibility ($p = 0.25$). However, 62 (79.5%) and 48 (68.6%) of them, respectively, believe in this type of donation as an action that should be made out only of solidarity ($p = 0.22$). In addition, fourth year students (25.3%) showed more belief in preventing, through legal means, the commercialization of organs for donation between living people than students first year students (10.5%), a statistically significant difference ($p = 0.01$).

62 first year students (65.3%) and 48 fourth year students (50.5%) would accept the possibility of paying for an organ ($p = 0.06$), and the amount to be spent on that sort of transaction ranged from 500.00 reais (1.1% and 0%, $p = 1.0$) to 3.000.000 reais (0% and 1.1%, $p = 1.0$) among those who responded objectively. But other students used expressions such as "as much as it would cost" (6.3% and 1.1%, $p = 0.12$), and "as much as I had" (14.7% and 5.3%, $p = 0.05$), among other answers.

Passarinho, Gonçalves e Garrafa³⁰ suggest that the willingness to pay for an organ reflects the fear of the finiteness of life and the anxiety generated by the possibility of the loss of a loved one and it might be also related to the sense of responsibility, inherent to family relationships, to find an organ for transplantation, including by purchase, weakening or overcoming moral and ethical values. According to these authors, this type of transaction is a function of the vulnerability of those involved: on the one hand, the donor, in urgent financial Need³¹, and on the other hand, the receiver, weakened by the proximity of death.

In turn, fourth year medical students were more trusting that the Brazilian law, by judicial authorization, could be able to curb the commerce of organs between living individuals who are not related. Passarinho, Gonçalves e Garrafa³⁰ showed the discredit of this law in their work, view that is shared even by prosecutors and judges²⁹.

Criteria in the selection of organ transplant recipients and funding of transplants

Regarding the selection criteria for the distribution of organs to recipients in waiting list, there was a significant difference between the groups: 92 first year students (96.8%) prioritized the seriousness criterion, while 72 fourth year medical students (75.8%) shared the same opinion ($p = 0.001$), and 14 (14.7%) agreed that a chronological criterion should prevail, but only two first year students (2.1%) considered such criterion as a priority ($p = 0.003$).

Most of the students in both groups – 68 (71.6%) from the first year and 68 (71.6%) from the fourth year ($p = 1.0$) – would not deny the possibility of transplants to anyone. However, there was a significant difference between groups who considered the exclusion of alcoholics from a transplant list: 11.6% from the first year and 3.2% from the fourth year ($p = 0.03$).

It was noted in this research that while most students from both groups did not manifest intention to exclude someone from the transplant list, fourth year students were more willing to exclude alcoholics. Galvão et al²⁶ also showed a trend among students from the last years of medical school to exclude one or more groups of people from a transplant list. This kind of positioning raises questions about the ethical and bioethical preparation because, by depriving a patient from the therapeutic treatment that would provide a better quality of life, those student's positions hurt the principles of beneficence, justice and nonmaleficence¹⁰, in addition to violating the basic principles of the Brazilian Sistema Único de Saúde (National Health System)³², which grants the universal right to access and equity in health care.

On the cost of transplants, 83 first year medical students (87.4%) and 85 fourth year medical students (89.5%) said that the cost is a

sole and exclusive responsibility of the Federal Government ($p = 0.82$). However, 79 (83.2%) and 75 (78.9%) of the respondents think that private health plans should also be responsible for the costs ($p = 1.0$).

Although the theme “transplants” being widespread, both in scientific circles and among the general public, and even considering all the technical improvement and scientific advances related to organ transplantation, unfortunately the lines of people waiting for an organ remain immense³³. There are not enough donors to meet the demand, or an effective government enterprise, through public policies, able to eradicate chronic diseases which may be responsible for the failure of certain organs, causing many individuals to require transplantation³⁴, what only perpetuates a vicious circle. Therefore it is up to health professionals and medical students, future doctors, to adequate themselves to the social reality and seek the technical, ethical and anthropological training necessary to deal with these issues, so that they can contribute to the optimization of organ harvesting and to reduce the number of people on waiting lists - either by transplantation or by reducing the prevalence of chronic diseases.

Final considerations

In a brief, situations where medical students demonstrated unethical actions as the intention to exclude people from the transplant list and acceptance of donation with financial compensation were identified among the ethical aspects. Regarding the knowledge of transplants and organ donation, both groups showed little knowledge about the technical aspects of transplants. Both groups excluded anthropological aspects of organ transplantation in face of technical aspects of transplants. This study did not show significant differences between the two groups in relation to the aspects mentioned above. A better approach during the undergraduate course is necessary in order to provide to these future professionals more information on organ transplantation so they can act positively to identify potential donors and improve the index of organ retrieval.

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Participation of the authors

Ramona de Jesus Santos collected data, participated in the drafting of the text and analysis of results. Liliane Lins participated in the project design, directed the work, interpreted and analyzed data and made a critical review. Mylla Regina Carneiro Santos made analysis of results and text of the article. Marta Silva Menezes participated in the design of the project and critical review. Fernanda Carvalho Amalia Ramos collected data and also contributed with analysis and critical review. Fernando Martins Carvalho made data analysis and critical review. All authors were responsible for the final approval of the text.

