Revista Bioética
Print version ISSN 1983-8042 | On-line version ISSN 1983-8034

Rev. Bioét. vol.30 no.2 Brasília Apr./Jun. 2022

Brain death as a bioethical issue in medical training

Adriano Torres Antonucci[1], *Anor Sganzerla*[1], *Marcel Schiavini*[2], *Anibal Rodrigues Neto*[2], *Marcio Francisco Lehmann*[3], *José Eduardo Siqueira*[3]

1. Pontifícia Universidade Católica do Paraná, Londrina/PR, Brasil. **2.** Hospital Universitário Regional do Norte do Paraná, Londrina/PR, Brasil. **3.** Universidade Estadual de Londrina, Londrina/PR, Brasil.

Abstract

The modern definition of brain death points this as what determines the death of the individual, who leaves behind a body that, although functional, is no longer a part of him, and can, thus, be subjected to termination of life support and organ and tissue harvesting. This article seeks to verify if medicine students receive adequate technical and ethical training to deal with the brain death diagnosis. To this end, a cross-sectional study was carried out, by applying a questionary, via internet, to medicine students. Of the 82 students that filled the research, 87% correctly identified the brain death diagnosis, but up to 46% could not define the right conduct in the face of the diagnosis. The bioethical discussion about death, focusing themes such as terminality, ending, and care, would be a viable alternative to solve this apparent flaw of medical training.

Keywords: Brain death. Medical education. Organ donation. Bioethics.

Resumo

Morte encefálica como problema bioético na formação médica

A definição moderna da morte encefálica aponta que esta determina a morte de um indivíduo, o qual deixa para trás um corpo que, apesar de funcional, não é mais parte dele, podendo, então, ser submetido a cessação de suporte ou coleta de órgãos e tecidos. Este artigo busca verificar se estudantes de medicina recebem formação técnica e ética adequada para lidar com o diagnóstico de morte encefálica. Para isso, realizou-se estudo transversal, por meio de aplicação de questionário, via internet, a estudantes de medicina. Dos 82 estudantes que completaram a pesquisa, 87% identificaram corretamente o diagnóstico de morte encefálica, contudo até 46% não souberam definir a conduta correta diante do diagnóstico. A discussão bioética acerca da morte, focando temas como terminalidade, finitude e cuidados, seria uma alternativa viável para a resolução dessa aparente falha da formação médica.

Palavras-chave: Morte encefálica. Educação médica. Doação de órgãos. Bioética.

Resumen

Muerte encefálica como problema bioético en la formación médica

La definición moderna de muerte encefálica es la que determina la muerte de un individuo, que deja un cuerpo, todavía funcional, que ya no es suyo, pudiendo ser sometido a cese de soporte o recolección de órganos y tejidos. Este artículo pretende conocer si los estudiantes de medicina reciben una adecuada formación técnica y ética para afrontar el diagnóstico de muerte encefálica. Para ello, se realizó un estudio transversal, mediante la aplicación de un cuestionario en línea a estudiantes de medicina. De los 82 estudiantes que completaron la encuesta, el 87% identificó correctamente el diagnóstico de muerte encefálica, sin embargo hasta un 46% no supo definir la conducta correcta frente al diagnóstico. La discusión bioética sobre la muerte, con foco en temas como el final de la vida, la finitud y el cuidado, sería una alternativa viable para solucionar este posible fracaso de la formación médica.

Palabras clave: Muerte encefálica. Educación médica. Donación de órganos. Bioética.

The authors declare no conflict of interest.
Approval CAAE-PUCPR 39666720.2.0000.0020

http://dx.doi.org/10.1590/1983-80422022302524EN

Medical students in general are great consumers of healthcare technology, assiduous readers of material on new treatments, devourers of books on the pathophysiology of diseases and keen searchers of body healing. But do they also seek with the same determination to understand death and dying? In their education in medical schools, are they encouraged to reflect on death?

The relationship between medical staff and patients often involves the proximity of death, which, although inescapable, is monitored and postponed at the expense of the constant possibilities of allowing even seriously ill people to live longer. With the advent of hemodialysis and transplant techniques, many people have benefited and others have been given palliative care, which helps them live longer and with greater quality when facing end-of-life.

Death can be defined, then, as a process of transformation. The cultural view of death always tries to define not only when death occurs, but what happens to the "soul" after death. In using "soul" as a general term for individuals or for what makes people what they are, societies seem to share the view that individuals and their bodies are not the same thing and can be separated at the time of this event called death.

In accepting that point, it is clear that the evolution of the medical and legal understanding of death follows that definition. In view of evidence of irreversible damage to an individual's brain, it is no longer possible for him or her to return, since this is followed by a natural cascade of events that leads to cardiorespiratory arrest and, subsequently, body decomposition. Therefore, once brain death is defined, the understanding that this transition has already occurred (despite the fact that the heart is beating and the body is "alive") is only natural.

The legal, philosophical and cultural views on brain death allow us to conclude that it indeed determines the death of an individual, who leaves behind a body that, albeit alive, is no longer part of him/her. From then on, life support can be withdrawn or organs and tissues can be removed. The latter depends on the diagnosis of brain death. It is important to know, therefore, whether students are receiving adequate training to establish such a diagnosis.

This article presents a brief history of the evolution of the environment where medical training occurs, as it is in the hospital where most people are born and also where most people go to die, for various different reasons, and it is where physicians preserve and protect life. Next, it discusses how contact with death occurs in undergraduate medical education. Lastly, it proposes a bioethics-oriented reflection on the importance of continuous medical training regarding death.

To evaluate how well students are trained to establish the diagnosis of brain death, considering the possibility of harvesting and removing organs and tissues for transplants, a field survey was carried out with medical students in different years of medical school and, therefore, at different ages and levels of maturity. In the survey, the students were presented with a clinical case, to which they responded in an electronic questionnaire. The study followed relevant ethical standards, with the presentation of an informed consent form (ICF) and the submission of the project to the Research Ethics Committee.

Hospitals and medical education

There is a close relationship between hospitals and medical education, without which evolution in the different forms of treatment would not be possible. Future doctors are not trained only within the walls of universities, but in a hospital symbiosis, in which patients give them permission to learn from their illnesses and receive in turn the treatment they need.

The daily need for this relationship must be continuously discussed, closely monitored, improved and perfected in order to find the best form of human relationship between patients and those who can help reduce their suffering. Given this relationship, the question arises: do medical students understand death and dying?

Since the origin of life, human beings have been exposed to life-threatening diseases, and at each period of the transience of human existence, ills emerge and are eradicated. Existing implies risks, which can be reduced, but never, under any circumstances, extinguished. Therefore, there is no doubt that humans are exposed to risks and vulnerable from birth, and this is a given, not a theory or hypothesis.

Although this is an immutable reality, it is possible to expand it by considering the chronology of diseases. Human beings have organized themselves to reduce risks and thus been able to slightly increase their life expectancy. Understanding diseases and learning to treat them was a big step and, in this context, the development of medical science and hospitals has made great achievements, significantly reducing risks, gaining time and expanding perspectives. However, although it may seem that human beings have become masters of their own life, they are tenants of their body and do not master their death.

Hospitals are great allies in prolonging human life. The word "hospital" derives from the Latin *hospitalis*, which means to be hospitable, welcoming, which is consistent with the fact that hospitals do not have the sole function of preventing death but also play a role in comforting life when death is inevitable. The intrinsic relationship between medical practices and hospitals cannot be disregarded, as the former are directly linked to the care provided to sick people and the latter are the sites where this occurs, that is, hospitals are tools performing medical practices.

When medical science emerged, leading to the creation of hospitals remians unknown. However, ceramics from the Palace of Nineveh (3000 BC) present inscriptions documenting medical activity[1]. The Code of Hammurabi (2250 BC) also registers amounts, duties and punishments received for medical negligence, but there are no records of where medical activity was carried out[1].

According to the book *História e evolução dos hospitais* (History and Evolution of Hospitals), published by the Brazilian Ministry of Health, Herodotus reports that medical activity took place in the markets, where the sick were taken, as there were no doctors. Those who passed by the sick approached them to see if they themselves had suffered the same illness or if they knew of other people who had suffered from it. Thus, they could propose treatment that worked for them or for people they knew. It was forbidden to pass by the sick in silence. Everyone was obliged to question the cause of their illness[2].

Papyri also describe important discoveries of an organization of medical work done in Ancient Egypt. The Ebers Papyrus is considered one of the oldest and best-preserved medical treatises known and on display. Dating to approximately 1550 BC, it is preserved in the library of the University of Leipzig[3]. The Edwin Smith Papyrus is a veritable compendium of external medicine and treatment of bone injuries, containing the earliest known references to the brain and meninges and teaching how to treat some head wounds and perform trepanation[3]. Another important document is the Leiden Papyrus, which combines scientific and religious knowledge, describing temples as places of teaching, shelter and treatment of sick people, besides describing a kind of outpatient clinic[3].

However, so far there were no records of a "hospital" organization, since, at the time, religions were still responsible for healing, obviously based on their own philosophy, caring more for diseases of the soul than of the body.

Perhaps the world owes the first organization of a hospital system to Buddhism, starting in Ceylon (current Sri Lanka), where several places of care linked to monasteries sprang up, with care for sick people being provided by priests. This concept, influenced by the Hindu physician Sushruta and Buddhism itself, spread to China and soon after to Japan[1]. Sick people received treatment and also recovered in those places. There were also midwives and an isolation system for contagious diseases. Cadaveric dissection was prohibited, impeding the development of surgical practices[1].

Because such places were linked to religious temples, there was a spontaneous search for them, since sick people who went there to pray ended up being cared for by priests. Increased demand made it necessary to expand those sites and thus new temples were erected. In addition, given the space available, they started offering shelter to travellers[1].

From this context emerged the idea of hospitality, giving rise to hospitals. Public lodging houses appeared, the Greek *Iatreuns*, which were run by doctors, not priests. Most of the time it was the doctor's own house, a site that gradually started offering teaching also[1].

Rome was founded in year 753 BC and and with it a spirit directed towards conquest, wars, in a constant struggle for power, aiming to increase its territory. Although sites were built next to temples to receive the sick, in the 2nd century, the sick care system in Rome was more closely linked to caring for those wounded in war, so then military hospitals appeared[4]. In this context, individuals were cared for by the state in order to become good warriors, without any concern for human and personal aspects.

In the Middle Ages, the role of hospitals had no direct connection with healing. Their main function at the time was to provide shelter for the elderly and the poor, and only then for the sick who needed some technology. Therefore, the hospital, an important ally of urban life in the West, was not yet a medical institution, and medicine was not yet a hospital function[4].

With Christianity, a more humane approach to the sick emerged, resulting in changes in the social structure, which evolved towards new ways of providing support for human beings, with increased help for the needy, the sick and travelers. The relief system relied on financial help from Christians[4].

Prominent in this context was the Edict of Milan (313 AD) proclaimed by Emperor Constantine, which put an end to the persecution of Christianity, declaring the Roman Empire neutral in relation to religion and its charity initiatives[4]. The Council of Nicaea (325 AD), convened by Emperor Constantine also, equally stands out. Among other decisions, it provided compulsory care for destitute and/or sick people, a fact that drove the development of hospitals[4].

It was during the Renaissance that the idea of the modern hospital started taking shape. At the time, hospitals cut themselves loose from the monopoly of the Catholic Church and emerged as social institutions controlled by the state. Thus, the field of knowledge and science, previously a privilege of a few, started to expand to other sectors, becoming independent. An example of Church control was the prohibition to dissect corpses, an extremely important aspect for medical studies. With the end such control, hospitals were able to make progress thanks to the improvement of medical learning and the evolution of sanitary works.

Until then, there were differences between what the Catholic Church did and what medicine aimed for, and there was no real medical intervention on disease in a hospital system. Its internal structures and sanitary regime had to be reorganized so that it could evolve from a healing system to medical science. When that happened, physicians assumed a key role in hospital activities thanks to the advance of biomedical techniques standardized by Pasteur, Koch and Bernard in the mid-19th century. It was then that the hospital came to be seen as a safe environment, thus attracting the ruling elite[5] that was provided with medical care at home.

As treatment started to be standardized and offered inside hospitals, those institutions inevitably became the place where patients died, so that the final phase of life migrated from homes to hospitals[6] and, little by little, the prevailing approach to death changed. Before the control of hospitals passed on to the state, death, more often than not, had a more religious connotation, of resurrection, as happened in the Middle Ages, when the teachings of the Catholic Church considerably influenced the way people died and hoped for life after death. It was the time of familiar, domesticated, tamed death[6].

Medical education has undergone several transformations since its inception. In the context of this teaching, knowledge was transmitted by someone with training who passed on their experience to those who were younger so that they could continue their craft of healing, always in an informal and practical way[6]. It is not difficult to imagine that society has evolved, and medical education could be no different, since new knowledge and ways of dealing with a subject gradually develop scientific robustness.

Every kind of teaching has a method for its development and to describe the experience required for it to be replicated. For example, in Padua, in the 14th century, a doctor could only enter the profession after one year of practice with another well-known physician and another three years in college[6]. In turn, in the United States, in the 18th century, and in Colonial Brazil, training with experienced doctors was an essential requirement for acquiring a medical license[6].

Student contact with death during medical education

Among the challenges that a person faces during their brief passage on this planet, death is perhaps the most intriguing, as it paralyzes, and this happens in all spheres, individual or collective, for students or teachers, for those providing care. This fact is faced in a manner that is much more irrational and illogical, due to fear and distress, than properly scientific and rational. Given such unpreparedness to deal with death, trying to avoid and deny it at all costs, it is not hard to imagine that the subject is avoided at all educational levels, including in medical training.

Throughout history, with the emergence and development of hospitals, medical science started being taught in the hospital, a place where diseases are treated but death is present. There is no doubt that the difficulty of dealing with death is inherent to the human condition. However, in the late 19th century, this was enhanced by the medicalization of death and the transfer of dying persons from their natural place of death, their home, to hospitals. Thus, society started to deprive itself of the need to learn about the death process, increasing the distress of the dying person on their deathbed, caused by loneliness[7]

Nowadays, people die in hospital beds and, in this context, it is not difficult to understand that at some point medical students will face someone's death. This is inevitable and raises a few questions: have the students been prepared for this? During their academic studies and residency period, do students deal with the issue of death, whether in any subject or in other ways, to acquire such knowledge?

The hospital is an environment where, for example, cardiac arrests are reversed, tumors are removed and medication is administered to relieve bronchospasm and control epileptic seizures. In this place, where life is preserved and maintained, talking about death is often avoided. Everything that involves this phenomenon is practically transformed into something mystical, aiming at life and denying death as part of this process[8]. For many professors, talking about death can be a sign of "failure," so they try to avoid it at all costs, including in speaking.

Trained only to diagnose illness and restore health, physicians are not taught to face death or even discuss it, nor the inevitable end itself is reflected. As in a vicious circle, what was not taught or discussed will continue to be the basis of medical education, and the denial of death will be the way professionals address the subject in the future, given the opportunity to teach medicine.

Regarding the denial of this subject in medical education, there are several works that prove that it is not mentioned in teaching guidelines in several places. For example, in 1968, brain death was consolidated as a diagnosis, according to Harvard criteria. In the United Kingdom, in a report on medical teaching by the Royal Commission on Medical Education[9], nothing was said about death and the act of dying. In the United States, only in 1980, on the recommendation of the Standing Medical Advisory Committee[10], did terminal patients become a topic in medical education, yet with no objective mention as to the content to be addressed.

According to article 23 of the *Universal Declaration on Bioethics and Human Rights*, which addresses bioethics education, training and information, *in order to promote the principles set out in this Declaration and to achieve a better understanding of the ethical implications of scientific and technological developments, in particular for young people, States should endeavor to foster bioethics education and training at all levels as well as to encourage information and knowledge dissemination programs about bioethics*[11].

In the Brazilian National Education Plan, which covers elementary and secondary education, death is not found as subject to be debated or taught[12]. Perhaps this topic should not be approached from a technical point of view, due to its emotional and philosophical nature. One option would be to address it across the curriculum, a method that is already well-established in the teaching of ethics in health. Thus, death could be approached as a subject among other themes, developed and supported by pillars that cover different perspectives, whether cultural, social, philosophical or religious, in a reaffirmation of pluralism[7].

CNE Resolution 4/2001, of the Brazilian National Council of Education (CNE), provides National Curriculum Standards for Medical Schools, determining in Article 6, Paragraph VI, that undergraduate courses in medicine should address *promotion of health and understanding of the physiological processes of human beings–pregnancy, birth, growth and development, aging and the process of death, physical and sports activities and those related to the social and natural environmental*[13]. As can be seen, the understanding of the physiological process of death should be part of the mandatory curriculum framework of medical courses. In 2014, the standards were revised, resulting in CNE Resolution 3/2014, which reiterates the obligation to address the death process in medical courses[14].

A 2009 survey by Falcão and Mendonça[15] showed that, among medical faculty in Brazil, 40% stated that students are inexperienced regarding the death process; 29% believed that the current education focused on biomedicine disregards the psychosocial dimension of patients; and 21% considered that medical students always strived to prevent death, which resulted in a more aggressive form of medicine. This opinion that only the biological processes of death are addressed in medical schools corroborates the perceived deficit in Brazilian medical education regarding the discussion of the death process from a bioethical or philosophical point of view.

For Camargo and collaborators[16], in a study carried out among intensivists, one of the solutions to improve care in life-threatening situations would be to include the discipline of thanatology in the curriculum of medical courses, with academic discussions on death and teaching focused on the doctor-patient relationship. Thanatology, derived from the Greek *Thanatos* (god of death and brother of Hypnos, god of sleep), is a multidisciplinary subject that covers the study of death in its various aspects.

Proposed in 1903 by Metchnikoff, thanatology started gaining the status of science in 1950. According to Fonseca and Testoni[17], with the publication of the book *On Death and Dying*, in 1959, Elisabeth Kübler-Ross triggered a movement of knowledge and education about death, culminating in the first courses on death in the United States, in 1960, and the foundation of the first hospice in London, in 1964[17].

When analyzing the syllabus and curriculum of the 50 best undergraduate medical courses in Brazil, Batista and Freire[18] divided them into four groups: 1) in the first, thanatology or a similar subject was mandatory; 2) in the second, such subjects were elective or optional; 3) the third included subjects that briefly address thanatology; and 4) the subjects of the fourth made no mention whatsoever to the topic. Among the 50 universities, only two (4%) were in the first group; nine (18%) were part of the second group; 16 (32%) were in the third; and, lastly, 23 (46%) belonged to the fourth group.

It is worth mentioning that the Brazilian National Curriculum Standards for undergraduate studies in medicine[13,14] only provide guidance on the physiological understanding of death, without any reference to a more philosophical and cultural understanding. Consequently, physicians become disappointed when dealing with patients with incurable diseases, as they are educated to underestimate the value of care and comfort for patients (even when possible) and constantly seek a cure[19]. This excessively healing-oriented training may contribute to the difficulties of evaluating and addressing brain death.

Method

This research used a cross-sectional study, carried out on March 2-8, 2021, through the administration of an online questionnaire with three groups of undergraduate medical students from a university located in a city in the north of Paraná. The classes interviewed were from Years 1, 3 and 6 of the course, each with 30 students who answered a questionnaire about a specific case of brain death, with and without the context of organ and tissue donation.

The participants received the link to the online questionnaire, thus being able to answer it without violating the social distancing measures imposed by the COVID-19 pandemic. The questionnaire evaluated the understanding of the diagnosis of brain death as death of the individual and whether the perception changes when organ donation is considered in relation to patients who are non-donors. Participants under de age of 18 were excluded from the study. To this end, each participant confirmed being overage by accepting, also online, the informed consent form before starting the research.

Data were analyzed in SPSS version 25.0. The results were presented in relative (%) and absolute (n) frequency. The chi-square and Fisher's exact tests were used to analyze the association between answers and classes. The Z test for proportions with Bonferroni correction was adopted to compare the relative frequencies between academic terms and answers. The alpha (cutoff for significance level) adopted was $p<0.05$.

Results

Of the 82 students who took the survey, 87% correctly identified the diagnosis of brain death (n=67). The success rate was 79% in the Year 1 (22 out of 28), 65% in the Year 3 (17 out of 26) and 100% in Year 6 (n=28). Table 1 shows the prevalence of answers for the case diagnosis in question.

Table 1. Prevalence of answers for the case diagnosis

Answers	All		Term 1		Term 3		Term 6		*p*
	n	%	n	%	n	%	n	%	
a) Patient in brain death No clinical perspective	67	87%*	22	79%*	17	65%*	28	100%	0.008
b) Patient in severe coma Decompressive craniectomy	6	7%	2	7%	4	15%	0	0%	
c) Patient in severe coma Intracranial pressure monitoring and intensive care	9	11%	4	14%	5	19%	0	0%	
Total	82	100%	28	100%	26	100%	28	34%	

n: absolute frequency; %: relative frequency; p*: chi-square and Fisher's exact and Z tests*

Z test for proportions with Bonferroni correction revealed no differences in frequencies between the terms

** Significantly higher than the other answers in the same term.*

Among the selected students, after demonstrating knowledge of how to recognize a case of brain death, the diagnostic accuracy rate drops to 33% regarding clinical behavior in the case of non-donors of organs and tissues (the accuracy rate being 14% in Year 1, 24% in Year 3 and 54% in Year 6). The answers to this question are shown in Table 2.

Both the students who accurately identified the diagnosis of brain death in the first question and those who identified the correct behavior towards non-donors of organs and tissues were removed from the rest of the study. Students who correctly identified the case of brain death and failed to indicate the disconnection of life support were faced with the same case, now in relation to donors of organs and tissues. The overall success rate increased to 58% (53% in Year 1, 46% in Year 3 and 77% in Year 6).

Regarding non-donors, the two most cited answers in all years (both with 35% of the total) were not having enough legal support for such medical behavior and not agreeing that the final decision belongs to the physician rather than to the family, with the latter being the predominant response in Years 1 and 3 (40% and 67%, respectively), and the former prevailing in Year 6 (60%). Three people checked "other" as a reason, which were mentioned in two cases.

Table 2. Prevalence of answers to the question "After the diagnosis of brain death has been confirmed: in the case of non-donors, after discussing with family members, what is the correct behavior?" among students who correctly identified the diagnosis

Answers of students who correctly identified the diagnosis	All		Term 1		Term 3		Term 6		p
	n	%	n	%	n	%	N	%	
a) Disconnect life support because the patient has died	22	33%*	3	14%	4	24%	15	54%**	0.027
b) Maintain minimum life support to await progression to death	23	34%	9	41%	5	29%	9	32%	
c) Maintain intensive care until death	2	3%	1	5%	1	6%	0	0%	
d) Provide palliative care until death	20	30%	9	41%	7	41%	4	14%	
Total	67	100%	22	100%	17	100%	28	100%	

n: absolute frequency; %: relative frequency; p: *chi-square and Fisher's exact and Z tests*

Z test for proportions with Bonferroni correction revealed no differences in frequencies between the terms

** Significantly higher than option c)*

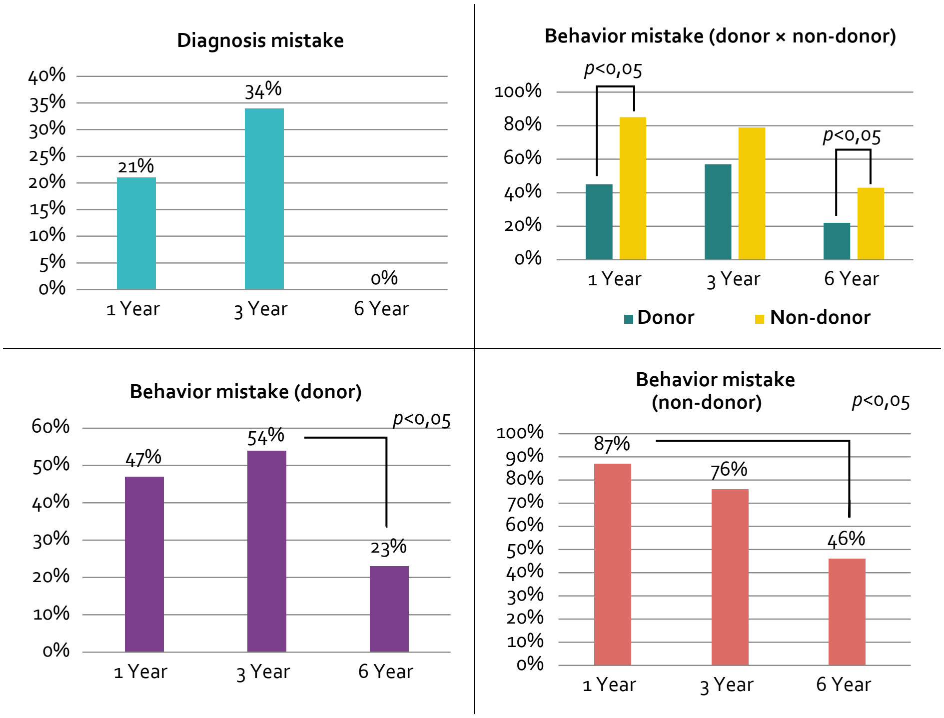
*** Significantly higher than option d)*

The same justification was selected by students who indicated organs and tissue donation for donors but did not choose disconnection of life support for non-donors, the main reason being–cited in all years–that the decision regarding brain death is the responsibility of the family (63.2%).

In the case of participants who did not correctly identify the diagnosis, the questionnaire was terminated and they were asked to answer about their contact with the subject and why they thought they had failed to answer correctly.

Figure 1 summarizes the results regarding diagnostic errors and relationship with the characterization of patients as organ and tissue donors.

Figure 1. Comparisons of wrong answers regarding diagnosis and behavior.



Discussion

Results showed a significantly reduced error rate in relation to the diagnosis of brain death among senior year students, with a 100% success rate. In other words, the concept of brain death as a clinical entity was well recognized in relation to the proposed controls: students in Years 1 and 3 who have not yet completed their theoretical training.

However, when asked about the behavior to be adopted after diagnosis, not even senior year students attained the same level of correct answers, with behavior mistakes in 46% of cases of non-donors of organs and tissues and 23% of cases of organ and tissue donors. It is inferred that such students, despite recognizing brain death, do not share the view that this is equivalent to the definitive death of the patient, which is why almost half chose not to disconnect life support.

In a survey on the teaching of death to undergraduate medical students, Freitas [20] evaluated, through a questionnaire, the perception of students in the 1st and 9th terms about the role of physicians in the death process. The survey showed that both students at the beginning of the course and those who were already at the end identified that, in this process, the physician's most important role was to give attention and emotional support to patients (57.7% and 50.8%, respectively), to mitigate their pain and suffering (32.3% and 34.4%, respectively) and, lastly, to provide emotional support to families (25.3% and 29.5%, respectively).

The answers of both groups were similar, with a single noteworthy difference: students in the 9th term mentioned organ and tissue donation and medico-legal aspects in their answers. In other words, the view of the physician's role in relation to the death of patients does not seem to have significantly altered during the course. In the same survey, most students answered, on a different occasion, that they did not believe that the approach to teaching about death in their undergraduate course was satisfactory and they did not feel confident in dealing with this process [20].

That result is in line with the assumptions of this research, revealing clearly the superficial technical knowledge of teaching about death in universities (both brain death and death in general). It is also evident that there is no development of the physician's bioethical role in this process or any teaching subjects dedicated to this discussion.

It is interesting to note that the proposed questionnaire showed a significant reduction in behavior mistakes in cases of organ and tissue donors. This is not a difference in concept, since the diagnosis is objectively the same (death). The hypothesis of this article is that the donation of organs and tissues (which are harvested by a specific team when approved) exempts the doctor who makes the diagnosis from the responsibility of acting in accordance with the diagnosis of patient's death.

In a study with 100 intensive care units (ICU) in France, 45.2% (1,452 professionals) stated that organ and tissue donation was a motivating event for the ICU; 30.1% (965 professionals) considered it a neutral event (neither motivating nor stressful); and 20.7% (664 professionals) considered organ and tissue donation a stressful event [21]. Among the main factors cited by participants who considered death a motivating event is the view that organ and tissue donation was a motivating event in their work unit.

It can be inferred that, when the environment favors organ and tissue donation, professionals feel more confident to adopt this procedure in cases of brain death. However, organ and tissue donation is not the goal of defining brain death as a diagnosis, but rather a consequence. Thus, this procedure should be accepted or debated only when the individual is considered dead; it is not a matter of verifying whether there is brain death with a view to donation. A professional who does not disconnect the life support of a brain-dead patient who is not a donor for believing he still alive, when indicating the donation of organs and tissues of a donor patient, is ultimately indicating the removal of organs and tissues from a patient he considers alive, based solely on the need for harvesting. Thus, the results of this study are not isolated in the Brazilian literature, as discussed below.

In a study carried out with intensivists at a tertiary hospital in Teresina/PI, Magalhães, Veras and Mendes [22] formulated questions about brain death situations. The majority (85.6%) of the interviewed physicians correctly defined the concept of brain death: 94.4% of them mentioned the obligation to run complementary tests and 85.6% highlighted the need to repeat clinical tests. However, when asked about the time of death of a patient with a confirmed diagnosis, with the agreement of the family and indication of organ and tissue donation, or the disconnection of life support, only 37.8% stated that the time of death would be the closing time of the protocol[22].

The results of other Brazilian studies show the difficulty of physicians in pointing out the moment of diagnosis of brain death. In a study conducted by Ramos[23] in Recife/PE, 28.7% of physicians considered the moment of organ and tissue removal as the time of death. In turn, the research by Schein[24], carried out in Porto Alegre/RS, shows that 24% of physicians had the same answer. It is therefore concluded that, theoretically, these professionals recommended removing organs and tissues from patients whom they did not consider dead.

In certain circumstances, patients diagnosed with brain death can be kept on life support, for example: preparation for organ and tissue donation, brain-dead mother with a viable fetus or when requested by family members or patients, given their personal view on the subject[25]. It is also worth noting that, since 2006, with the issuance of CFM Resolution 1805, provided that the will of the patient or their legal representative is respected, physicians are allowed to limit or suspend treatments or procedures that extend the life of a patient in the terminal phase of a serious and incurable illness[26].

Final considerations

This article showed that there are gaps in the understanding of medical students about both death as an event, a biographical and somewhat inexorable moment, and the psychological and ethical-bioethical preparation, more than technical, for the diagnosis of brain death. The possibility of donating organs and tissues should not be a prerequisite for determining such a diagnosis.

The survey showed that students at the end of the course are ready to establish the diagnosis of brain death with 100% accuracy; however, in relation to the behavior adopted after this diagnosis, the error rate is quite relevant, especially regarding the death of patients that are not donors of organs and tissues.

The educational gaps could be resolved with the inclusion of topics about finiteness, end-of-life care and grieving across the curriculum, in order to sensitize students to the temporality of life. The thanatology approach is undoubtedly a viable alternative.

In the same sense, bioethical reflection must permeate education across the curriculum also, especially as technologies have brought about a pragmatic change regarding when to diagnose death besides enabling obstinate and useless prolongation of life. However, technologies cannot replace the ethical reflection that supports medical decisions.

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Adriano Torres Antonucci – Master – adrianoantonucci@yahoo.com.br
iD 0000-0003-4364-0334

Anor Sganzerla – PhD – anor.sganzerla@gmail.com
iD 0000-0001-8687-3408

Marcel Schiavini – Graduate (specialist) – schiavini2901@gmail.com
iD 0000-0001-8099-0910

Anibal Rodrigues Neto – Graduate – anibalneto.r@gmail.com
iD 0000-0002-2969-7126

Marcio Francisco Lehmann – PhD – mflehmann@hotmail.com
iD 0000-0001-9583-7329

José Eduardo Siqueira – PhD – eduardo.siqueira@pucpr.br
iD 0000-0002-7513-1385

Correspondence

Adriano Torres Antonucci – Av. Robert Koch, 60 CEP 86038-350. Londrina/PR, Brasil.

Participation of the authors

Adriano Torres Antonucci conceived the project, did the bibliographical review, and wrote and reviewed the article. Anor Sganzerla contributed to writing and proofreading the article. Marcel Schiavini and Anibal Rodrigues Neto contributed to the literature review and writing of the article. Marcio Francisco Lehmann did the literature review, and wrote and reviewed the article. José Eduardo Siqueira contributed to the review of the article.

Received: 12.14.2021
Revised: 4.28.2022
Approved: 5.9.2022

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