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Teaching medical procedures on cadavers during medical school

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Abstract

Training medical procedures on cadavers is a traditional practice in medical training. This study aimed to evaluate if medical students were invited to perform procedures on cadavers, whether consent should be obtained, and whether the training was useful for learning. In total, 403 medical students (23.4±3.3 years) and 87 professors (51.1±10.4 years) participated. Overall, 3.7% of students were invited to perform procedures on cadavers, and 2.3% of the professors made the invitation. Only one professor requested consent. Most students and professors agreed that obtaining consent is needed (students: 92.3%; professors: 21.8%) and that the training was useful (83.1% and 66.9%, respectively). This study concludes that procedures on cadavers have a low frequency of occurrence, that on the participants corroborate on obtaining consent, and that training in cadavers is useful for learning.

Keywords: Education, medical, undergraduate. Cadaver. Bioéthics. Professional competence. Intubation, intratracheal.

Resumo

Ensino de procedimentos médicos em cadáveres durante curso de medicina

O treinamento de procedimentos médicos em cadáveres é uma prática tradicional no curso de medicina. O objetivo da pesquisa foi avaliar se estudantes de medicina foram convidados a realizar procedimentos em cadáveres, se o consentimento deveria ser obtido e se o treinamento era útil ao aprendizado. Participaram 403 estudantes de medicina (23,4±3,3 anos) e 87 professores (51,0±10,4 anos). Dos estudantes, 3,7% foram convidados a realizar procedimentos em cadáveres, enquanto 2,3% dos professores fizeram os convites. Dos professores, apenas um solicitou consentimento. A maioria dos estudantes e professores concordava com a obtenção do consentimento (estudantes: 92,3%; professores: 91,8%) e que o treinamento era útil (83,1% e 66,9%, respectivamente). Concluiu-se que procedimentos em cadáveres ocorrem com baixa frequência, que há concordância acerca da obtenção do consentimento e que os treinamentos são úteis ao aprendizado médico.

Palavras-chave: Educação de graduação em medicina. Cadáver. Bioética. Competência profissional. Intubação intratraqueal.

Resumen

Enseñanza de procedimientos médicos en cadáveres durante la carrera de medicina

El entrenamiento de procedimientos médicos en cadáveres es una práctica tradicional en el curso de medicina. El objetivo de la investigación fue evaluar si se invitó a estudiantes de medicina a realizar procedimientos en cadáveres, si se debería obtener el consentimiento y si el entrenamiento fue útil para el aprendizaje. Participaron 403 estudiantes de medicina (23,4±3,3 años) y 87 profesores (51,0±10,4 años). De los estudiantes, el 3,7% fue invitado a realizar procedimientos en cadáveres, mientras que el 2,3% de los profesores hizo las invitaciones. De los profesores, solo uno solicitó consentimiento. La mayoría de los estudiantes y profesores estaba de acuerdo con obtener el consentimiento (estudiantes: 92,3%; profesores: 91,8%) y que el entrenamiento era útil (83,1% y 66,9%, respectivamente). Se concluyó que los procedimientos en cadáveres ocurren con baja frecuencia, que hay acuerdo sobre la obtención del consentimiento y que los entrenamientos son útiles para el aprendizaje médico.

Palabras clave: Educación de pregrado en medicina. Cadáver. Bioética. Competencia profesional. Intubación intratraqueal.

Research

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Medical students, during the undergraduate course, must acquire a set of professional knowledge that will be necessary for future professional practice as general physicians. The subjects of the medical course include theoretical and practical content, which provides information, learning, reflection, training, development, and improvement.

The National Curriculum Guidelines (DCN) for the undergraduate course in medicine were published in 2014 by the Ministry of Education and describe the required profile of the undergraduate student of Brazilian medical courses under the terms of a *generalist*, *humanistic*, *critical*, *and reflective training* [1,2].

Future physicians must learn several skills throughout the undergraduate course, including healthcare and performing indispensable procedures in the initial care of urgencies and emergencies [1]. Among the procedures usually performed in this scenario, orotracheal intubation (OTI) and puncture of peripheral and central venous access stand out, which may also include venous dissection, thoracentesis, chest drainage, cricothyroidotomy, pericardiocentesis, paracentesis, among others [3,4].

The procedures that are performed in urgency and emergency care are aimed at severe patients, sometimes under hemodynamic instability and life-threat. This way, it is necessary that they are executed with precision and agility, preferably by trained professionals. However, medical students—or future physicians—will not have the skills until they are taught and can train the procedures. Learning requires knowledge of the instructions and the ability to repeatedly perform the technique steps .

In the past, it was common to train procedures on human cadavers of recently deceased patients in the care environment of teaching hospitals. A more experienced physician—usually a professor—would teach the technique to the student using the bodies of deceased patients [3-7].

Currently, there are mannequins and simulation laboratories that allow the learning of medical procedure techniques. Students are able to train several times until they reach the security to work in the care environment. However, the simulated environment may not truthfully reproduce human tissues and, especially, the emotion of the care environment [3,4,7]. Training medical procedures on cadavers of deceased patients in teaching hospitals still occurs in Brazil [8], and the Federal Council of Medicine (CFM), the Ministry of Education, and other regulatory entities are yet to provide opinions about the subject.

Literature on the practice of procedures on cadavers, both Brazilian and foreign, is scarce. The Brazilian study published by Cabar and collaborators [9] pointed out that 70.2% of the physicians performed procedures on deceased people, and 93% did not obtain prior consent. That was a cross-sectional study using data collected via social networks, and bias cannot be excluded due to the applied methodology.

The Penal Code of Brazil [10], in Article 212, prohibits cadaver abuse. The use of cadavers in teaching is regulated by Law 8,501/1992 [11] that legislated on the use of unclaimed cadavers for teaching and research, but did not specifically address medical procedures within teaching hospitals and at the time immediately after death.

The motivation for the present study came from the scarcity of scientific and normative literature. This complex context of medical education and performance of medical procedures on recently deceased cadavers raised the hypothesis that medical procedures on cadavers occur, while the perception of students and professors was unknown.

Thus, the main goal of this study was to evaluate whether medical students were invited and whether professors of the same course invited students to perform procedures on cadavers of recently deceased patients in a Brazilian teaching hospital located in the city of Curitiba/PR. The perceptions about the authorization to perform the procedures on cadavers and the usefulness of such training for medical learning were a secondary objective under evaluation.

Method

This research complied with the ethical regulations in research in force in Brazil and was

initiated after obtaining institutional permission and approval from the Human Research Ethics Committee of the Health Sciences Sector of Federal University of Paraná (UFPR). This was an observational and cross-sectional study, and the data were collected via questionnaires.

The research instruments used were questionnaires, one directed at the students (Table 1), containing 12 items, and another for professors (Table 2), containing 10 items. Both were developed by the researchers aiming to elucidate the objectives of the research and ensuring each could be filled out in less than five minutes. The questionnaires were constructed with simple, objective, and direct sentences. To characterize the sample, demographic data were included in the questionnaire header, such as sex, age, semester of enrollment for students, and time of professional experience for professors. Before application to the sample, a pilot study was conducted, in which all participants stated that they understood the items in their entirety and participation required less than five minutes.

All adult students regularly enrolled in the medical course of UFPR were invited to participate. Professors with degrees in medicine who regularly worked on the same course and who were, naturally, of legal age were also invited to participate. Underage students and professors of the medical course who had degrees other than medicine were not invited. The sample universe was composed of about 1,200 students and 400 professors and, considering prior surveys, it was stipulated that 50% of them would participate.

The invitation was first sent via the institutional email to the possible participants, containing an explanation and terms of the research. The link led to an informed consent form that did not require acceptance. Subsequently, the participant was directed to the research instrument. Due to low adherence, data collection was also conducted via a printed questionnaire. The research assistants made face-to-face visits to the classrooms and departments of the medical course, at times that were previously scheduled and widely disclosed on the premises of the university. The terms of the research were explained, and those who accepted the invitation signed the consent form. The printed questionnaire was then individually filled out by the participants.

To avoid duplicates, the research assistants confirmed with the participants if they had not previously participated in the online data collection. Data were collected between September and December 2022.

For the students, only one item of the questionnaire had a mandatory answer: *1) Have you ever been invited to train medical procedures on people who have just died?*; whereas for professors there were two mandatory items: *1) When you were in college, were you ever asked to train medical procedures on people who have just died?*; and *2) Currently, do you invite students to train procedures on people who have just died?*

The data were entered into an electronic spreadsheet. Participants whose questionnaires were crossed out, illegible, or had the required items unanswered were excluded. The statistical analysis was conducted using the *R* software version 4.2.1 R Core Team, 2022. Descriptive statistics were shown as absolute and relative frequency, mean, standard deviation, minimum, and maximum. For comparison purposes, the students were assembled into the academic cycles of the medical course, described by basic cycle (1st to 4th semester), clinical cycle (5th to 8th semester) and internship (9th to 12th semester). Inferential statistics were performed using Fisher's exact test to evaluate the association between two categorical variables in independent samples. The correlation between age and sex was performed using the Student's t-test. Statistical significance level was set at 0.05%.

Results

In total, 437 students and 88 professors participated in the study. According to the research criteria, 34 students and one professor were excluded from the analyses, resulting in 403 students and 87 professors participating, that is, 33.6% and 21.8% of the expected sample universe, respectively.

Student results

The mean age of students was 23.4±3.3 years (minimum 18 and maximum 45), of which 234 reported being women (58.1%), 167 reported being men (41.4%), and two Informed other/preferred not informing (0.5%). Regarding school cycles, 208 students (51.6%) were enrolled in the basic, 77 (31.5%) in the clinical, and 68 (16.9%) in the internship. Table 1 describes the data relating to the students.

Regarding invitations to perform procedures on cadavers, 15 students were approached, of whom six were women (40.0%) and nine were men (60.0%), with no statistically significant difference between the sexes (p=0.24), even when stratified by academic cycle (p=1.00), training location (p=0.91), frequency of training (p=0.41) and type of procedure performed (p=0.23).

Regarding the students, only 44 women (11.3%) and 28 men (7.2%) knew they could be invited to participate in cadaver training. A total of 184 women (47.4%), 130 men (33.5%), and two others/prefer not to inform (0.5%) did not know about this possibility, with no statistically significant difference (p=0.86). In case of invitation to perform procedures on cadavers, most students (388, or 87.6% of the sample) would accept, with 192 women (49.4%), 146 men (37.6%) and two others/prefer not to inform (0.5%); 36 women (9.3%) and 12 men (3.1%) would refuse, with no statistically significant difference (p=0.063).

Table 1. Students' answers about the practice of procedures on cadavers (n=403)

Item of the questionnaire:	Answers	Total
1) Have you ever been invited to train medical procedures on people who have just died?[&]	Yes	15 (3.7%)
	No	388 (96.3%)
If the answer to question 1 was yes:		
1.1) When were you invited to train medical procedures on people who have just died?	Basic Cycle	1 (6.7%)
	Clinical Group	6 (40.0%)
	Internship	8 (53.3%)
1.2) Where were you invited to train medical procedures on people who have just died?	Teaching hospital	1 (6.7%)
	Associated hospitals	14 (93.3%)
1.3) In the last year, how often have you been invited to train procedures on people who have just died?	Only one time	9 (60.0%)
	Between one and five times	5 (33.3%)
	More than five times	1 (6.7%)
1.4) What procedure(s) was/were conducted?	Orotracheal intubation	9 (56.2%)
	Other	2 (12.5%)
	More than one procedure	5 (31.2%)
1.5) What feelings did you experience after the training?	Positive	6 (50.0%)
	Neutral	1 (8.3%)
	Negative	3 (25.0%)
	Positives and negatives	2 (16.7%)
2) I believe that requesting authorization from the patient/family member before the procedure is important	Strongly agree	252 (62.5%)
	I partially agree	120 (29.8%)
	I do not know	18 (4.5%)
	I partially disagree	10 (2.5%)
	I totally disagree	3 (0.7%)

continues...

Table 1. Continuation

Item of the questionnaire:	Answers	Total
3) I believe that training procedures on people who have just died is useful for medical learning	Strongly agree	197 (48.9%)
	I partially agree	138 (34.2%)
	I do not know	43 (10.7%)
	I partially disagree	14 (3.5%)
	I totally disagree	11 (2.7%)
4) Did you know that it is possible to be invited?	No	316 (81.4%)
	Yes	72 (18.6%)
5) If you were invited, would you:	Accept	340 (87.6%)
	I would not accept	48 (12.4%)

&: mandatory answer

Professors' results

The mean age of the physicians and professors who are participating in this study was 51.0±10.4 years (minimum of 30 and maximum of 74 years old), of which 39 reported being women (44.8%) and 48 reported being men (55.2%). The mean age of women professors was 48.4±8.3 years, and of men 53.0±11.5 years (p=0.03). A total of 68 (78.2%) practiced clinical specialties, 13 (14.9%) practiced surgical or clinical-surgical specialties, and six (6.9%) practiced management/diagnosis/other areas. Seven (8.0%) of the professors have been graduated for 0-10 years; 22 (25.3%) for 11-20 years; and 58 (66.7%) for more than 20 years. The chosen specialty and the time since graduation did not show statistically significant differences between the sexes (p=0.89 and 0.20, respectively). Table 2 describes the detailed answers of the professors.

Overall, 42 (48.3%) professors were invited to perform procedures on cadavers when they were undergoing their own training, with no difference between men and women (p=0.57). The comparison between the specialty practiced and the performance of procedures at the time of graduation showed no correlation (p=0.74).

Only two professors answered positively that they invited the students. Due to the small number of professors who performed the procedures, it was not possible to perform the statistical study, and we opted for the data description. Both were women, over ten years of graduation, and experienced positive feelings in practices with cadavers. The first one invited the students at the teaching hospital, had clinical training, and totally disagreed with obtaining consent, whereas the second one made invitations to associated teaching hospitals, had surgical training, and partially agreed to the request for consent. Both answered that they had not invited students in the last year.

Table 2. Professors' answers about the practice of procedures on cadavers (n=87)

Item of the questionnaire:	Answers	Total
1) When you were in college, were you ever invited to train medical procedures on people who have just died?[&]	Yes	42 (48.3%)
	No	45 (51.7%)
2) Do you currently invite students to train procedures on people who have just died?[&]	Yes	2 (2.3%)
	No	85 (97.7%)
If the answer to question 2 was yes:		
2.1) Where do you usually invite students to train with fresh cadavers?	Teaching hospital	1 (50%)
	Associated capitals	1 (50%)

continues...

Table 2. Continuation

Item of the questionnaire:	Answers	Total
2.2) In the last year, how often have you invited students to train procedures on people who have just died?	Never	2 (100%)
2.3) To which procedures do you usually invite students?	Orotracheal intubation	2 (100%)
2.4) What feelings do you experience in training?	Positive	2 (100%)
2.5) I have the habit of requesting the patient/family's authorization before performing the procedure	Strongly agree	-
	I partially agree	1 (50,0%)
	I do not know	-
	I partially disagree	-
	I totally disagree	1 (50.0%)
3) I believe that requesting authorization from the patient/family member before the procedure is important	Strongly agree	60 (69.0%)
	I partially agree	19 (21.9%)
	I do not know	2 (2.3%)
	I partially disagree	3 (3.4%)
	I totally disagree	3 (3.4%)
4) I believe that training procedures on people who have just died is useful for medical learning	Strongly agree	31 (35.6%)
	I partially agree	28 (31.1%)
	I do not know	9 (10.3%)
	I partially disagree	13 (14.9%)
	I totally disagree	6 (6.9%)

&: mandatory answer

Perception of authorization for training on cadavers

When asked about the perception of authorization before performing procedures on cadavers, most students and professors agreed that the request should be obtained (Tables 1 and 2). Thus, the subgroups were stratified by sex to evaluate this variable's influence.

Among students, women agreed with greater conviction than men about prior authorization, which was demonstrated by the higher relative frequency of the answer "strongly agree" (women=68.8% and men=54.5%) and by the absence of total disagreement. Differences were statistically significant at $p<0.018$. Among the professors, the differences are not statistically significant (Table 3).

Table 3. Perception of students and professors about the statement "I believe that requesting authorization from the patient/family member before the procedure is important" stratified by sex

Item of the questionnaire:	Students (n=403)*			Professors (n=87)#	
	Women	Men	Other	Women	Men
Strongly agree	161 (68.8%)	91 (54.5%)	–	23 (59.0%)	37 (77.1%)
I partially agree	59 (25.2%)	59 (35.3%)	2 (100%)	12 (30.8%)	7 (14.6%)
I do not know	10 (4.3%)	8 (4.8%)	–	0 (0%)	2 (4.2%)
I partially disagree	4 (1.7%)	6 (3.6%)	–	2 (5.1%)	1 (2.1%)
I totally disagree	0 (0%)	3 (1.8%)	–	2 (5.1%)	1 (2.1%)

*Fisher's exact test: *students, p=0.018; #professors, p=0.148*

Research

Insight into the usefulness of training on cadavers

Most participants agreed that procedure training in cadavers was useful for medical learning (Tables 1 and 2). Thus, the subgroups were stratified by sex to evaluate whether the variable exerted an influence.

The conviction that the training would be useful was higher among male students than female students (58.7% and 42.3%, respectively, answered "strongly agree"). Only 3.0% of male students partially or totally disagreed, whereas 8.6% of female students partially or totally disagreed (p=0.019; Table 4).

On the other hand, among professors, most women partially agreed (51.3%) and most men totally agreed (39.6%). In addition, 35.4% of the professors partially or totally disagreed with the practices with cadavers, whereas only 6.2% of the professors disagreed (p<0.001; Table 4).

Table 4. Students' and professors' perception of the statement "I believe that training procedures on people who have just died is useful for medical learning" stratified by sex

Item of the questionnaire:	Students (n= 403)*			Professors (n = 87)#	
	Women	Men	Other	Women	Men
Strongly agree	99 (42.3%)	98 (58.7%)	–	12 (30.8%)	19 (39.6%)
I partially agree	86 (36.8%)	50 (29.9%)	2 (100%)	20 (51.3%)	8 (16.7%)
I do not know	29 (12.4%)	14 (8.4%)	–	5 (12.8%)	4 (8.3%)
I partially disagree	12 (5.1%)	2 (1.2%)	–	1 (2.6%)	12 (25.0%)
I totally disagree	8 (3.4%)	3 (1.8%)	–	1 (2.6%)	5 (10.4%)

*Fisher's exact test: *students*, p=*0.019*; #*professors*, p<*0.001*

Discussion

Medical students need to learn the procedures that usually are indicated in urgent and emergency situations during graduation, as society will benefit from more qualified physicians. The question is whether the cadavers of patients who died in teaching hospitals could be used as a teaching object for physicians in the training stage and with low experience. For initial learning, there are practices in the simulation environment that employ mannequins [8,9] and do not cause unnecessary harm to patients or cadavers. There is also the need to discuss the consent and authorization of family members before training and the possible ethical and moral impact on the period of construction of medical professionalism, as well as the repercussion on society.

In this study, a low frequency (3.7%) of training in cadavers of deceased patients in the teaching hospital was observed and 2.3% of the professors were responsible for the invitation to training. Of the latter, 48.3% were invited to similar practices during their own undergraduate studies. The practice of cadaver procedures decreased over time but still occurred at the teaching hospital where the study was conducted.

Most participating students and professors stated that authorization should be obtained before performing procedures on cadavers and that the training was useful for medical learning. Of those who performed procedures—whether students or professors—most experienced positive feelings, which will probably lead them back to the practice or to invite other students. One of the professors who invited students to practice with cadavers totally disagreed with obtaining consent, an attitude that can lead to a sequence of ethical and legal infractions, which will be shown in this discussion.

Autonomy refers to the capacity for self-government and self-determination, that is, the condition that the person must evaluate and decide on issues related to their own life, health, physical integrity, and relationships, to respect reasonable possibilities and the norms of society. Consent is the acceptance

of an autonomous, competent, and capable person who, after information and reflection, voluntarily exercises autonomy for a certain act [12].

Access to health and well-being is part of the set of human rights listed in the Universal Declaration of Human Rights of 1948 [13]. Aiming at the principle, health was included in the Constitution of the Federative Republic of Brazil of 1988, with universal and equal access, becoming a constitutional right of the Brazilian population to *actions and services for their promotion, protection, and recovery* [14]. Most Brazilian teaching hospitals serve the population via the National Unified Health System (SUS) [8]. In other words, when a sick person is treated in the public network, they are exercising a constitutional right.

It is the responsibility of all professionals, including physicians, to ensure that patients are cared for and that they receive appropriate healthcare. This study sheds light on the issue of procedures on cadavers, which may be related to degrading treatment of the honor and body of the deceased patient, which violates the honor of the deceased (described in article 5, items III and X, of the Constitution of the Federative Republic of Brazil [14]), even allowing for the demand for compensation from physicians, health services, and the State.

The culture of medical procedures on cadavers of recently deceased patients, despite not being publicly exposed to society, is a historical practice in medical schools [7,8]. In the past, teaching hospitals were philanthropic, charitable, and public institutions, which served the population with lower purchasing power [8]. It was another time, in which health was not part of human rights, access was not universal or a duty of the State, and autonomy and consent were not basic to society.

Currently, it cannot be inferred that people are the object of teaching, whether they are alive or deceased, just because they are receiving healthcare in a teaching hospital. To guide ethical medical practice, there is the Code of Medical Ethics [15]. Physicians are prohibited from treating people inhumanely (article 23), fail to ensure that patients decide about themselves (article 24), and disrespect physical integrity (article 27). Furthermore, it is prohibited for physicians to not obtain consent for care practice (article 22), in scientific research (article 101) and in the exercise of teaching (article 110). Finally, it is prohibited for the physician to fail to prepare a medical record (article 87).

Thus, performing procedures on cadavers of patients who have recently died in the teaching hospital would be reasonable only with the patient's prior consent or with obtaining authorization from family members prior to performing the technique [7]. Informing about risks and benefits at a time permeated by vulnerability and grief would thus be necessary. In addition, the description of the procedure should be written in the medical record for the purpose of recording the act performed, reporting possible injuries or complications. Also, the medical description brings the clinical history of the deceased patient in cases of medical-legal development.

The abusive treatment of cadavers, that is, outrageous or contemptuous, is listed in article 212 of the Penal Code of Brazil [10], with a penalty of imprisonment of one to three years for offenders. There is a gap in medical procedures on cadavers, which can be performed in a dignified, respectful, and consented manner and, at the same time, meet the needs of medical education. The Civil Code of Brazil [16] approaches the theme in Chapter II, on personality rights. Cessation of the threat may be demanded, and in the case of the deceased, collaterals may demand redress in accordance with article 12. Furthermore, the disposal of bodies is lawful (articles 13 and 14) and no one can be compelled to undergo medical treatment (article 15). Again, there remains the gap in ethical procedures and linked to teaching objectives.

Law 8,501/1992 [11] is close to the theme of the research, but touches it tangentially, as it addresses the use of unclaimed bodies for research, which does not concern the practice of procedures on deceased cadavers in teaching hospitals.

The practice of medical procedures on cadavers, specifically when there is no prior authorization from patients or legal guardians after death, is not regular, but there is possibly no intention of malice or outrage of the cadaver. Disrespectful conduct is, apparently, more related to the violation of personality rights and to the physician's ethical-professional infraction. The vacuum of

laws, regulatory norms, or teaching guidelines allows the practice of procedures on cadavers to occur without pre-established limits, creating noise and risks for society and physicians.

The American Medical Society has established rules for the practice of medical procedures on cadavers of recently deceased patients, which are called newly deceased. The document included respect for all those involved (cadaver, family members, student, professor, and health system), the clear benefits of practical training and the condition that they are part of the teaching structure of the medical course. The document also established that the procedures could only be performed after express and advance authorization from the patient or family members, and could not be presumed, and they should be recorded in the medical record [17,18].

Regulations such as those of the American Medical Society allow the academic society to evaluate the relevance of training on cadavers and for society in general to know the possibility. Clarifications can be offered in advance to patients, family members, and students, allowing time for reflection before the invitation or the opportunity to conduct them.

Most students in this research were unaware of the possibility of being invited to train medical procedures on cadavers. This fact shows an opportunity and an unreflective educational practice, in which students are thrown into the teaching field, which is possibly not aligned with the educational strategies and the construction of the desired professional in the DCN *with generalist, humanistic, critical, and reflective training* [1,2].

Requesting consent in a moment of frailty is challenging; however, McNamara, Monti and Kelly [19] described that, despite the challenge, they obtained 59% of family authorizations to perform retrograde tracheal intubation. The authors described that this was a context in which the applicant did not have a care relationship before death and the highest frequency of acceptance occurred in unforeseen deaths. No other more recent similar studies were found, nor were they conducted in Brazil. In the country, among the rare publications on the subject, Marques Filho [20] reflected on the need for medical training on cadavers, especially focused on surgical practices, but which must be preceded by authorization. The author questions whether bereaved family members should be subjected to the additional stress of the decision to dispose of the body for training with an exclusively didactic purpose.

The failure to obtain authorization, although ethically reprehensible, would be falsely associated with the protection of family members—falsely because the procedures rarely leave visible lesions. The practice of medical procedures on cadavers will not cause further damage to the patient's life, since death has already occurred. However, the possibility of discovering the procedures without authorization should not be ignored, as the damage is not only physical but emotional, moral, ethical, and legal [8,16,20]. In the same vein, Gomes and collaborators [8] explained that the practice of the procedures without consent was aimed at the professor's desire to teach the student, but that, in a selfish way, both characters ignored the rights of the deceased person and prioritized their own will. Cabar and collaborators [9] showed that the frequency of procedures on cadavers can be much higher than the one found in this research; The authors found that 70.2% of the physicians and students in that study performed procedures on deceased people and that 93% did not obtain consent.

The core of this research was the practice of procedures on cadavers in the teaching environment. It is possible to consider that, when medical students perform a procedure under faculty supervision on a living patient, there is the intention to provide the necessary medical assistance to that person and, at the same time, to offer medical education. The opportunity provided by the care environment is used for learning and medical improvement in training. However, when procedures are performed on recently deceased cadavers of patients, it cannot be argued that there is a benefit from care, resulting only in medical education.

In the light of contemporary medical ethics and legislation, performing medical procedures on cadavers without consent is utterly questionable [9]. From the point of view of the construction of the medical student's morality [8], the mistaken information is passed on

that cadavers of deceased patients in teaching hospitals are teaching material, supposedly passable and available to be used in the learning phase. In undergraduate studies, more than just techniques are taught: the foundations of medical professionalism are built.

An interesting and innovative look was proposed by Gomes and collaborators [8], which brought the discussion of cadaver training closer to organ donation in Brazil. There was a presumed character, that is, that every available human body could be an organ donor, which led to a negative reaction from society and the medical community. Thus, the authorization for the family axis was modified, making the decision to donate organs and tissue responsibility of the heirs, in a similar way to what is done with other rights and assets [8].

If, from one angle, there are many criticisms regarding the practice of medical procedures on cadavers, however, there may be benefits in the educational context [8,9,21,22]. Student proficiency in medical techniques requires learning the indications, directed study, training in simulation manikins, and supervised practice by professors in the care field. It is crucial that the students' technical learning path is equally permeated by ethics, legislation, and moral competence in medical practice. Simulation has become an integral part of medical education because it allows students to practice procedures on mannequins simulating the reality of care under the supervision of professors [8,9]. Although this ethical approach avoids the use of vulnerable people as teaching material, mannequins may not fully reproduce the complexity of the human body, limiting the perception of the care reality [8,9,23,24].

The restoration of health is not always possible, and death is part of the life trajectory of human beings, even though contemporary society avoids addressing finitude. The denial of death makes people unaware of their own values during life, but they are called upon to reflect forcefully on its end. It is the contemporary false belief of immortality described by Ariès [25]. Society has shifted death from public to private life, calling the current era of "savage death." Thus, everything related to death seems unpleasant, sordid, and vile, and should be experienced in the private context and never be shared. Physicians who lack thanatological thinking treat death as described by Ariès [25], that is, allowing the abuse of deceased bodies for the sake of teaching, justifying their acts with a utilitarian bias to the detriment of the personality of the one who has just died.

Not being able to deal with death in a thoughtful and ethical way possibly means that physicians are unable to approach family members to request authorization and perform procedures on cadavers. They prefer to execute them in a hidden way and without consent, taking high ethical and legal risks, disrespecting society. Medical students will need to learn the technique of the procedures during their undergraduate studies, and society lacks information so they can make truly autonomous and consented decisions. This research is intended to take skeletons out of the closet, or rather, to take the cadavers that are behind the screens in the emergency rooms of teaching hospitals.

No data were found in the literature that quantified training with cadavers in a medical course in Brazil, so this study is innovative. However, the limitations are related to the methodology, as it was the students and professors who described quantitatively the experiences they would have lived, and it is impossible to be sure about the accuracy of the answers. Despite the effort in data collection, only about 30% of the students and 20% of the professors agreed to participate. It is possible that the uncomfortable theme caused several participants to refuse to fill out questionnaires or, perhaps, to answer in an untrue way.

Final considerations

The frequency of students who performed procedures on cadavers at the teaching hospital was low (3.7%), as well as the frequency of professors who invited students to perform the procedures (2.3%). Regarding perceptions, most students and professors believed that it was important to obtain authorization before performing the procedure and that the practice was useful for medical learning. Based on this study, it is concluded that there is a need for

the academic environment to reflect so that the training of future physicians is not only qualified regarding the technique of the procedures, but also permeated by ethics, legality, and respect for the cadavers of deceased patients in the teaching hospital. There is also a need for normative institutions to establish parameters to regulate the practice within reasonable limits.

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Research

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