

## ATTITUDES OF MEDICAL AND ALLIED MEDICAL STUDENTS FROM SERBIA TOWARD WHOLE BODY DONATION

### *ATTITUDES DOS ESTUDANTES DE MEDICINA E ÁREAS MÉDICAS AFINS DA SÉRVIA EM RELAÇÃO À DOAÇÃO COMPLETA DO CORPO*

**Biljana SRDIĆ GALIĆ<sup>1</sup>; Zorka DRVENDŽIJA<sup>1</sup>; Goran ŠTRKALJ<sup>2</sup>**

1. Department of Anatomy, Faculty of Medicine, University of Novi Sad, 21000 Novi Sad, Serbia; 2. Department of Chiropractic, Faculty of Science and Engineering, Macquarie University, Sydney, NSW 2109, Australia.  
goran.strkalj@mq.edu.au

**ABSTRACT:** Anatomy, one of the key pre-clinical subjects in medical and allied medical disciplines, has traditionally relied on instruction based on the utilization of cadavers. Acquiring cadavers for anatomy education has presented a challenge in many countries. This challenge has been met through the organization of well informed and culturally sensitive body donation programs. Attitudes of the general population, medical professionals and students are important in devising these programs. The aim of this study was to investigate attitudes of medical and allied medical students from the University of Novi Sad toward whole body donation. A survey was carried out on the first and third year students enrolled in all degrees taught at the University and the sixth year medical students. A large number of respondents (87.38%) perceived cadavers as important in anatomy education. The majority of students (51.26%) would support the body donation of a stranger, while a much smaller proportion of respondents would become donors (19.51%) or support their family members (21.67%) to bequeath their body. There were differences in attitudes toward body donation related to respondents' year of study, ethnicity and religion. The main reasons for donation were altruistic, while the main reasons not to donate were lack of information and religious factors. Most of the respondents were in favor of introducing memorial services for the body donors. The results of the study highlight the importance of a culturally sensitive approach to students in the anatomy laboratories and the enrichment of anatomy education through the humanities. They also underscore the significance of well-organised and informative body donation programs.

**KEYWORDS:** Body donation. Students' Attitudes. Anatomy Education. Medical Education.

## INTRODUCTION

Human cadavers have played a key role in the learning and teaching about the structures of the human body since the establishment of anatomy as an empirically and experimentally oriented discipline in the mid-sixteenth century (PERSAUD, LOUKAS, TUBBS, 2014). In recent decades, following the changes in medical education and the broader social milieu in many countries and educational traditions, the centrality of cadavers in anatomy has been questioned (MCLACHLAN et al., 2004). However, it would appear that a majority of anatomy educators still see cadavers as one of the most valuable assets in teaching anatomy, differing mainly in the preference for the study of anatomy by dissection or study by prosection (PATHER, 2015).

Procuring cadavers for anatomy, however, faces many challenges, further overshadowed by the discipline's rather disturbing past in that respect (RICHARDSON, 2000; JONES, WHITAKER, 2009; QUIGLEY, 2012; PERSAUD, LOUKAS, TUBBS, 2014; HILDEBRANDT, 2016). Still, today, in many countries, cadavers are sourced from unclaimed bodies and even executed criminals (GANGATA et al., 2010; ANYANWU,

UDEMEZUE, OBIKILI, 2011). Among anatomists there seems to be general agreement that cadavers for anatomical study should be obtained exclusively through body donations (MCHANWELL et al., 2007; JONES, WHITAKER, 2012; REIDERER, 2016). Indeed, in an increasing number of countries, local legislation allows for only donated bodies to be used in anatomy. However, in some places, because of the cultural and social constraints, the donation rate is quite low, leading to a paucity of available cadavers. Several positive examples from different social milieus show how these adverse conditions can be overcome by reliance on carefully crafted, culturally sensitive and richly informative body donation programs (WINKELMANN, GÜLDNER, 2004; ZHANG et al., 2008, 2014). These programs successfully emphasise the importance of bodies in medical and science education and the fact that the bodies are treated respectfully while in the anatomy laboratory. Indeed, acknowledging the value of bequests and honouring the deceased often involves organization of commemorations for body donors as well as memorial sites and monuments erected in their honour.

The attitudes of the general public and relevant professional groups toward body donation has been invaluable in planning and implementing body donation programs. A number of surveys have already highlighted the complexity of the subject and the wide range of differences in outlook on body donation, influenced by various, complexly interrelated factors, including psychological, cultural, educational and social (BOULWARE et al., 2002; AJITA, SINGH, 2007; WIJBENGA et al., 2010; ATTEBY et al., 2012; CORNWALL et al., 2012; HALOU et al., 2013; ASAD, ANTEBY, GARIP, 2014; SUBASINGHE, JONES, 2015). At the same time, it has been suggested in several surveys that potential donors seem to be keener to bequeath their organs for transplantation rather than bodies for medical education and research (SANNER, 1994; ROKADE, GAIKAWAD, 2012).

The attitudes of medical and health professionals, anatomists and students toward body donation appear to be of particular importance. These groups, in their education and everyday work, directly depend on the availability of cadavers for dissection and study. They are therefore expected to participate in body donation programs, communicate with the general public and explain the importance of body bequests. There has been an increasing number of studies focusing on the attitudes of medical professionals, anatomists (ARRÁEZ-AYBAR, CASADO-MORALES, CASTAÑO-COLLADO, 2004; ŞEHIRLI, SAKA, SARIKAYA, 2004; BALLALA, SHETTY, MALPE, 2011; ANYANWU, OBIKILI, 2012; BOLT et al., 2012; ROKADE, GAIKAWAD 2012; ARRÁEZ-AYBAR, CASADO-MORALES, CASTAÑO-COLLADO, 2014), and students toward body donation (CAHILL, ETTARH, 2008; PERRY, ETTARH, 2009; CAHILL, ETTARH, 2011; ALEXANDER et al., 2014; MWACHAKA, MANDELA, SAIDI, 2016). While all these professionals and students acknowledge the importance of cadavers and the value of donations for anatomy, they do not feel that they or members of their family should necessarily bequeath their bodies. This appears to be particularly the case for students. Furthermore, students seem to become less likely to favor body donation after they finish their anatomy course (PERRY, ETTARH, 2009; ALEXANDER et al., 2014).

Serbia is one of the countries where the number whole body donations are relatively low and where lack of cadavers for anatomical study is felt to a considerable degree (MCHANWELL et al., 2007). Knowledge of students' attitudes, it is hoped,

might be one of the steps in devising more efficient donation strategies.

The aim of this study was to investigate attitudes of medical and allied medical students from the University of Novi Sad in Serbia toward whole body donation.

## MATERIAL AND METHODS

### Setting

A survey was carried out on a sample of medical and allied medical students at the Faculty of Medicine, University of Novi Sad. With around 50,000 enrolled students the University of Novi Sad is the second largest in Serbia and the Faculty of Medicine one of its fourteen faculties.

Anatomy classes at the Faculty of Medicine are taken, as a compulsory subject, by the students enrolled in the following programs: Medicine, Dentistry, Pharmacy, Health Care (Physician Assistant Studies), Medical Rehabilitation (Physiotherapy), and Special Education and Rehabilitation. Cadavers are used in laboratory practical sessions. Bodies for the anatomical study are obtained strictly through donation. However, bequests are relatively rare and so is the number of cadavers available for anatomical study. Consequently, students do not carry out dissection themselves, but study rather on prosected cadavers. At present no memorial service is arranged to honor the body donors.

Medical study at the University of Novi Sad is a six-year long course comprising three years of pre-clinical and three years of clinical training, Dentistry and Pharmacy are five-year long courses, while study in the other three disciplines are of four years' duration.

### Population surveyed

Participants in the study were first and third year students from all six study programs offered at the Faculty of Medicine as well as sixth year students of Medicine. Students were asked to participate in a survey which was both voluntary and anonymous. All respondents had completed and passed a relevant anatomy course before the survey was administered except for first year students, who took the survey whilst studying anatomy.

### Instrument

The questionnaire used was a modified version of the one applied in a survey conducted at Macquarie University on a sample of Australian chiropractic students (ALEXANDER et al., 2014). It comprised two groups of questions:

1. Basic demographic data (gender, age, ethnicity and religion);
2. Attitudes toward body donation (self-donation, donation of the body of a family member, donation of the body of a stranger);

Survey questions about the attitudes toward donation offered answers in the format of a five-point Likert item: „strongly disagree“, „disagree“, „undecided“, „agree“, and „strongly agree“.

As possible reasons for body donation the following answers were offered: “religious reasons”, “I want to feel useful after death”, “I want to help others”, “I want to avoid funeral costs?” and “I want to help medical research”. Offered answers against body donation were: “religious reasons”, “concern my body will not be respected” and “I do not feel well informed about donation”. Apart from the pre-designed answers, each set of the above-mentioned questions offered an open-ended response of “other (please, specify)”.

For comparative purposes, questions about students’ attitudes toward organ donation were included in the questionnaires. Students were also asked about their emotional experience while learning in the anatomy laboratories and the

following answers were offered: “confronting”, “unsettling”, “apathetic”, “comfortable”, and “engaging”. In addition, the questionnaire contained a special set of questions concerning the importance of using cadavers for teaching anatomy and students’ attitudes toward introducing a donor memorial ceremony.

### Data analysis

The data were processed using SPSS Statistics 17.0 (IBM SPSS, Chicago, IL). Absolute and relative numbers were reported in tables and graphs, and differences between frequencies were analyzed using the Chi-square test.

### RESULTS

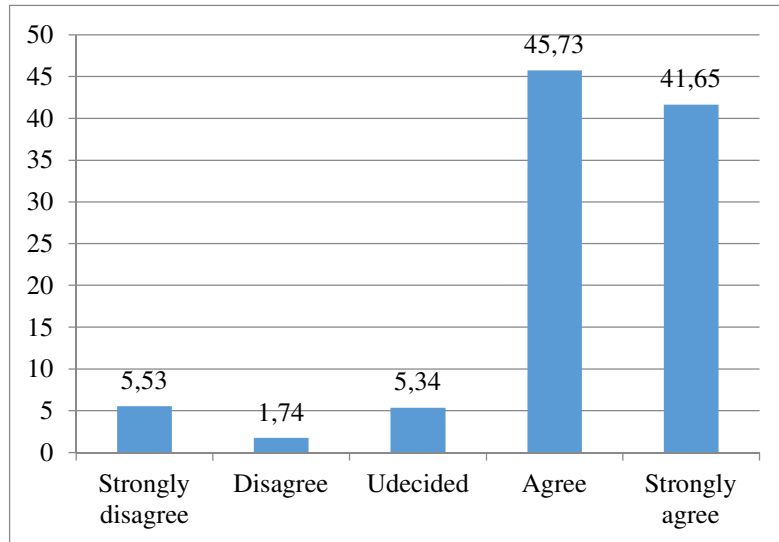
Out of 1072 students who participated in the survey 506 were enrolled in Medicine, 97 in Dentistry, 144 in Pharmacy, 148 in Health Care, 71 in Medical Rehabilitation and 106 in Special Education and Rehabilitation, out of which 546 were first year, 436 third year and 90 sixth year students. The response rate varied between 45.68% and 91.34% depending on the degree and year of study (Table 1).

**Table 1.** Sample profile

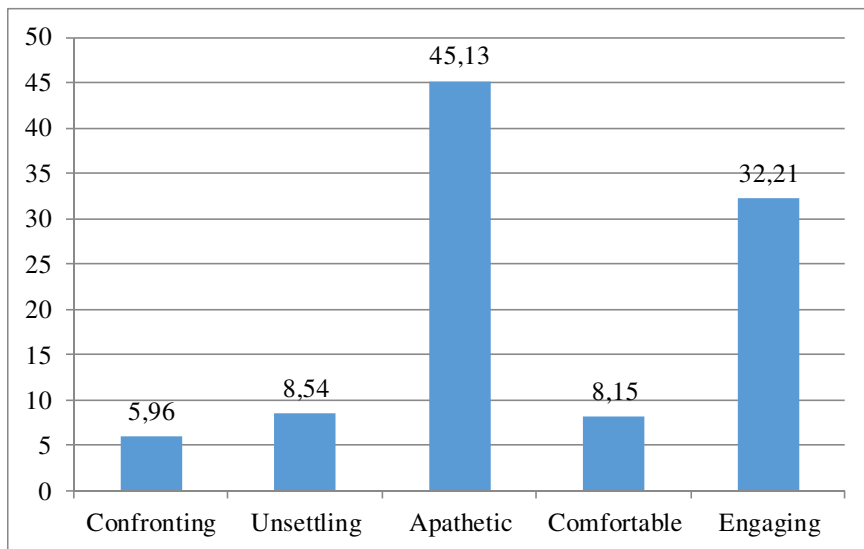
Study program	Year of study	Number of participants (relative to the total number of enrolled students)	Gender		Total
			Females	Males	
Medicine	1 <sup>st</sup>	224 (66.08%)	341 (67.39%)	165 (32.61%)	506
	3 <sup>rd</sup>	192 (65.08%)			
	6 <sup>th</sup>	90 (45.68%)			
Dentistry	1 <sup>st</sup>	55 (87.30%)	74	23	97
	3 <sup>rd</sup>	42 (48.27%)	(76.29%)	(23.71%)	
Pharmacy	1 <sup>st</sup>	74 (91.34%)	129	15	144
	3 <sup>rd</sup>	70 (62.50%)	(89.58%)	(10.42%)	
Nursing	1 <sup>st</sup>	83 (68.03%)	127	21	148
	3 <sup>rd</sup>	65 (54.62%)	(85.81%)	(14.19%)	
Physiotherapy	1 <sup>st</sup>	43 (89.58%)	56	15	71
	3 <sup>rd</sup>	28 (63.64%)	(78.87%)	(21.13%)	
Special education and rehabilitation	1 <sup>st</sup>	67 (87.01%)	97	9	106
	3 <sup>rd</sup>	39 (50%)	(91.51%)	(8.49%)	
Total:					1072

A large majority of students (87.38%) considered that the use of cadavers is important in medical education (Figure 1). Over three quarters of the students fell in two groups with regards to their

emotions while in the anatomy laboratory - apathetic (45.13%) and engaged (32.21%) (Figure 2).



**Figure 1.** Attitudes toward the statement that the use of cadavers is an important part of medical education (N=1030)



**Figure 2.** Emotional experiences of students while learning in the anatomy laboratory (N=1006)

Table 2 displays the attitudes of students toward whole body donation. A small proportion of students of around 20% supported self-body donation and donation of the body of a family member, while slightly more than half of the respondents supported the donation of the body of a stranger. At the same time, there was a relatively

high number of students who were undecided - around one-third of the respondents on all questions. Unlike body donation, most students supported self-organ donation, donation of the organ of a family member, or a stranger (45.38%, 43.53%, and 54.83%, respectively).

**Table 2.** Students' attitudes toward whole body donation

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	P
Self-body donation (N=1061)	125 (11.78%)	382 (36.0%)	347 (32.70%)	155 (14.61%)	52 (4.90%)	0.000
Family member body donation (N=1066)	132 (12.38%)	392 (36.77%)	311 (29.17%)	183 (17.17%)	48 (4.50%)	0.000
Stranger body donation (N=1065)	48 (4.51%)	129 (12.11%)	342 (32.11%)	437 (41.03%)	109 (10.23%)	0.000

The most common reasons for self-body donation were the wish to help medical research, to be useful after death, and to help others, while the most frequent answers against body donation were concerns regarding the possible lack of respect for their body, insufficient information and religious reasons (Table 3). Another common reason in favor of donation was “I don’t need my body after death”, while some of the other reasons against body-

donation were: “I would rather donate my organs – it is more useful”, “I’m distrustful”, “I don’t like to think that my body will be dismembered” and “I consider it unnatural”. Some answers with normally frequently appearing motives, such as wish to avoid the organization and cost of burial (BOLT et al., 2010), were very rare in this study (2,7% or respondents), most probably due to age of the respondents and their cultural background.

**Table 3.** Reasons for and against self-body donation

I would donate my body because...		I wouldn't donate my body because...	
Religious reasons	18 (1.7%)	Religious reasons	116 (10.6%)
I want to feel useful after death	188 (17.2%)	Concern my body will not be respected	335 (30.7%)
I want to help others	216 (19.8%)	I do not feel well informed about donation	317 (29.1)
I want to avoid funeral	28 (2.6%)		
I want to help medical research	273 (25%)		

In regard to year of study, students in their third and sixth years disagreed with stranger-body donation more often than first year students (Table 4). Student belonging to different programs did not have significantly different attitudes toward self-

and family member-body donation. However, there were significant differences with regard to attitude toward stranger-body donation – Medical and Dentistry students supported it more than students belonging to other programs (Table 5).

**Table 4.** The influence of the year of the study on the students' attitudes toward body donation

Categories	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	p
<i>Self-body donation</i>						
1. (N=545)	62 (11.52%)	196	167	89 (16.54%)	24 (4.46%)	0.112
3. (N=433)	50 (11.49%)	(36.43%)	(31.04%)	61 (14.02%)	21 (4.83%)	
6. (N=88)	13 (14.77%)	157	146	5 (5.68%)	7 (7.95%)	
		(36.09%)	(33.56%)			
		29 (32.95%)	34 (38.64%)			
<i>Family member body donation</i>						
	67 (12.29%)	196	154	101	27 (4.95%)	0.278
1. (N=544)	54 (12.47%)	(35.96%)	(28.26%)	(18.53%)	16 (3.69%)	
3. (N=432)	11 (12.50%)	159	130	74 (17.09%)	5 (5.68%)	
6. (N=89)		(36.72%)	(30.02%)	8 (9.09%)		
		37 (42.04%)	27 (30.68%)			
<i>Stranger body donation</i>						
1. (N=543)	17 (3.12%)	56 (10.29%)	173	225	73 (13.42%)	0.000
3. (N=432)	28 (6.48%)	55 (12.73%)	(31.80%)	(41.36%)	23 (5.32%)	
6. (N=87)	3 (3.37%)	18 (20.22%)	140	186	13 (14.61%)	
			(32.41%)	(43.05%)		
			29 (32.58%)	26 (29.21%)		

**Table 5.** The influence of the study program on the students' attitudes toward body donation

Catgories	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	p
<i>Self-body donation</i>						
Medicine (N=502)	63 (12.55%)	158	175	73 (14.54%)	33 (6.57%)	0.161
Stomatology (N= 97)	8 (8.25%)	(31.47%)	(34.86%)	17 (17.53%)	3 (3.09%)	
Pharmacy (N=143)	18 (12.59%)	39 (40.21%)	30 (30.92%)	17 (11.89%)	2 (1.40%)	
Health care (N=145)	16 (11.03%)	57 (39.86%)	49 (34.27%)	25 (17.24%)	4 (2.76%)	
Medical rehabilitation (N=71)	7 (9.86%)	59 (40.69%)	41 (28.28%)	9 (12.68%)	5 (7.04%)	
SER (N=103)	13 (12.62%)	23 (32.39%)	27 (38.03%)	14 (13.59%)	5 (4.85%)	
		46 (44.66%)	25 (24.27%)			
<i>Family member body donation</i>						
Medicine (N=501)	64 (12.77%)	171	156	86 (17.16%)	24 (4.79%)	0.501
Stomatology (N= 97)	11 (11.34%)	(34.13%)	(31.14%)	19 (19.59%)	6 (6.18%)	
Pharmacy (N=144)	16 (11.11%)	34 (35.05%)	27 (27.83%)	27 (18.75%)	1 (0.69%)	
Health care (N=147)	15 (10.20%)	59 (40.97%)	41 (28.47%)	24 (16.33%)	6 (4.08%)	
Medical rehabilitation (N=71)	8 (11.27%)	66 (44.90%)	36 (24.49%)	9 (12.68%)	5 (7.04%)	
SER (N=106)	18 (16.98%)	31 (43.66%)	18 (25.35%)	18 (16.98%)	6 (5.66%)	
		31 (29.24%)	33 (31.13%)			
<i>Stranger body donation</i>						
Medicine (N=501)	22 (4.39%)	46 (9.18%)	151	215	67 (13.37%)	0.001
Stomatology (N= 97)	4 (4.12%)	9 (9.28%)	(30.14%)	(42.91%)	10 (10.31%)	
Pharmacy (N=144)	4 (2.78%)	23 (15.97%)	31 (31.96%)	43 (44.33%)	3 (2.08%)	
Health care (N=146)	10 (6.85%)	26 (17.81%)	56 (38.89%)	58 (40.28%)	8 (5.48%)	
Medical rehabilitation (N=71)	5 (7.04%)	16 (22.53%)	47 (32.19%)	55 (37.67%)	10 (14.08%)	
SER (N=106)	3 (2.83%)	9 (8.49%)	17 (23.94%)	23 (32.39%)	11 (10.38%)	
			40 (37.73%)	43 (40.57%)		

The only differences in answers in regard to respondents' gender were noted in the attitude

toward stranger-body donation, where female students seem to be undecided more often (Table 6).

**Table 6.** Gender, ethnic and religious differences in attitudes toward body donation

	Gender	Ethnicity	Religion
I would donate my body	0.869	0.106	0.239
I would support a family member bequeathing their body	0.929	0.008	0.227
I would support a stranger bequeathing their body	0.009	0.008	0.330

Ethnic structure of the group was as follows: 788 Serbs, 33 Hungarians, 9 Slovaks, 7 Montenegrins, 6 Roma, 5 Croats, 12 others and 205 undeclared. Regarding their religion, most of respondents were Orthodox Christians (768), 50 were Catholics, 10 Muslims, 15 were "other", 24 atheists or agnostics, and 205 undeclared. Differences in answers between students belonging

to different ethnic groups were recorded for attitude toward family member- and stranger-body donation (Table 6). Regarding religion respondents were grouped into two categories, atheists and agnostics in the one and those who are religious in the other. The difference in attitudes was significant only in the attitude toward self-body donation, with atheists/agnostics being more likely to donate (Table 7).

**Table 7.** The influence of the religious attitude on the students' attitudes toward body donation

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	p
<i>Self-body donation</i>						
Atheists/agnostics (N=202)	6 (2.97%)	18 (8.91%)	71	78	29	0.001
Religious (N=860)	56 (6.51%)	149 (17.32%)	280 (32.56%)	274 (31.86%)	101 (11.74%)	
<i>Family member body donation</i>						
Atheists/agnostics (N=202)	8 (3.96%)	34	62	74	24	0.314
Religious (N=857)	64 (7.47%)	151 (17.62%)	279 (32.55%)	277 (32.32%)	86 (10.03%)	
<i>Stranger body donation</i>						
Atheists/agnostics (N=202)	6 (2.97%)	15 (7.42%)	51	94	36	0.425
Religious (N=856)	23 (2.69%)	49 (5.72%)	228 (26.63%)	427 (49.88%)	129 (15.07%)	

## DISCUSSION

Human tissue is of utmost importance in various medical disciplines, playing a crucial role in education, research and practice. Obtaining human tissue for medical use has always presented a challenge and throughout history the ways of acquiring it were often morally dubious and at times even illegal (PORTER, 1998). This was particularly the case for anatomy, a subject that has traditionally been based on dissection and/or the study of prosected and preserved cadaver derived specimens (JONES, WHITAKER, 2009; RICHARDSON, 2000; QUIGLEY, 2012; PERSAUD, LOUKAS, TUBBS, 2014; HIDEBRANDT, 2016). Even today, when regulations in medicine in general and anatomy in particular are quite stringent, both nationally and internationally, abuse still occurs, including in the most regulated of places (REDFERN, KEELING, POWELL, 2001; ANONYMOUS, 2007). Legal and ethical acquisition of human tissue is thus an imperative in medical disciplines and, consequently, developing effective donation programs.

As the number of medical schools is in constant increase globally, so is the requirement for human cadavers and human tissue in general (ŠTRKALJ, DAYAL, 2014). In some countries donation programs have been sufficiently successful to provide a satisfactory supply of tissues and cadavers for anatomical study. In other places, however, medical schools face serious challenges in human tissue acquisition. Serbia, and, indeed, most countries in South-Eastern Europe, have confronted serious problems in obtaining human tissue for

medical purposes (SPASOVSKI et al., 2012; BUŠIĆ et al., 2015).

In devising and implementing donation programs, one needs to be cognisant of the attitudes of both the general public on one hand, and medical practitioners, researchers and students on the other. The focus of this study was the attitudes of the medical and allied medical students from the University of Novi Sad toward the importance of cadavers and whole body donation in anatomy education.

The large majority of respondents in this study maintained that cadavers play important role in anatomy education and were thus in agreement with the views already expressed by students from other countries and also by professional anatomists (CORNWALL, STRINGER, 2009; QUINCE et al., 2011; ARRÁEZ-AYBAR, CASADO-MORALES, CASTAÑO-COLLADO, 2014). Indeed, in spite of the many new resources in anatomy provided by modern technology, such as interactive software, 3D images and prints (MCMENIMAN et al., 2014; ABOUHASHEM et al., 2015; CHAN, PAWLINA, 2015), human cadavers still seem to play a significant role in anatomy education. It has been argued that cadavers, in addition to their role in learning about the structures of the human body, are of great importance in comprehending human biological variation and in teaching professionalism and medical ethics (CORNWALL, STRINGER, 2009; BERGMAN, 2011; ŠTRKALJ, SPOCTER, WILKINSON, 2011; PATHER, 2015).

The large majority of students also supported body donation but this applied only to a bequest made by a stranger. A significantly smaller

number of students would bequeath their own body or support a family member to become a donor, while a considerable number could not decide on the matter. These attitudes are somewhat disappointing as students' own willingness to donate bodies might be seen as sending an encouraging and reassuring message to the general public. Similar attitudes, however, have been noted from students surveyed in other studies (PERRY, ETTARH, 2009; ALEXANDER et al., 2014; GREEN et al., 2014; MWACHAKA, MANDELA, SAIDI, 2016) who also tended to support donation of bodies for anatomy in high numbers as long as they were not their own or bodies of their family members.

The respondents who were willing to donate bodies did this mainly for altruistic reasons and the desire to assist medical education and research. This same factor was found to be the key motivator in other studies of both students and the general public (BOLT et al., 2010; ALEXANDER et al., 2014). One of the most common reasons not to donate was lack of information about bequests. This clearly reveals the importance of well-devised body donation and outreach programs. Indeed, if medical students felt uninformed about the donation process, one can only wonder how much is known of this process among the members of the general population. Recent research suggests there has been an improvement in organ donation in the region of South-East Europe to which Serbia belongs, which, to a large extent seems to be the result of newly implemented organ donation programs (SPASOVSKI, BUŠIĆ, DELMONICO, 2016). Similar strategies, capitalizing on what appears to be the wish of many people to help others, even after their death, could also perhaps produce better outcomes in attempts to increase the number of whole body donations (MCHANWELL et al., 2007). Indeed, in some countries, as a result of these strategies, whole body donations outnumber organ donations (BOLT et al., 2010).

At the same time, this study has found that the most common reason not to donate body was a fear of disrespect. Perceived possible lack of respect for the body donated to anatomy seems to demotivate possible donors among medical/science professionals, including students and the general public alike (ŞEHIRLI, SAKA, SARIKAYA, 2004; ALEXANDER et al., 2014). Indeed, in one of the early surveys on body donations it was detected that, albeit in small numbers, even among the people who had already bequeathed their bodies to anatomy, there was some apprehension concerning possible lack of respect in the laboratory (RICHARDSON, HURWITZ, 1995).

In a similar vein, one of the factors that might have influenced students surveyed in this study not to donate was the experience in the anatomy laboratory. Previous studies have suggested that being exposed to working with cadavers influences attitudes toward body donation (ŞEHIRLI, SAKA, SARIKAYA, 2004; CAHILL, ETTARH, 2008; PERRY, ETTARH, 2009; BOLT et al., 2012; ALEXANDER et al., 2014; PLAISANT et al., 2014). After their anatomy course, which included cadaver-based instruction, students were less keen to become donors or to advise their family to do so (CAHILL, ETTARH, 2008; PERRY, ETTARH, 2009; ALEXANDER et al., 2014). It appears that this experience and the manner in which the human body is treated in the laboratory has a disturbing side which makes students rethink their attitudes toward donation (ALEXANDER et al., 2014). This may be an argument for the need to devise strategies to ensure not only respect toward the donors but also reduction in the stressfulness of the emotionally challenging situations presented by the anatomy laboratory, while facilitating the development of coping mechanisms. It has been demonstrated, for example, that preparative activities such as showing students a video of dissection can be helpful in this respect (ARRÁEZ-AYBAR, CASADO-MORALES, CASTAÑO-COLLADO, 2004).

In this study, students' emotional reaction to the experience of working with cadavers tended to cluster around two rather opposite poles as most of them felt that anatomy laboratories made them either apathetic or engaged. A similar dichotomy was noted in Hafferty's classical sociological study of student behavior in dissection laboratories which revealed that there were two major groups of students regarding their attitude toward cadavers (HAFFERTY, 1991). One group treated cadavers as biological specimens, showing minimal engagement and empathy, while the other showed more empathy and tended to treat each cadaver as a person. The former attitude appears to have been traditionally encouraged in medical schools as the main coping mechanism under the notion of "detached concern" (CURLIN, 2011). However, anatomy education has undergone significant changes in recent decades in an attempt to imbue the discipline and the way it is taught with humanistic values (DYER, THORNDIKE, 2000; TALARICO, 2013; ŠTRKALJ, 2014). This new approach tends to favor the treatment of cadavers as exhibited by the second group of students. Indeed, showing empathy and treating the cadaver as the "first patient" or "teacher" has become the model behavior in many



medical schools. This new approach can be further developed by the borrowing and incorporation of knowledge from humanistic disciplines such as arts, philosophy and history in the teaching of anatomy (ŠTRKALJ, 2016). It might be hypothesized that such an approach can positively influence possible student donors.

One of the activities which may promote the tendency to a more humanized model of anatomy is the arrangement of memorial services for body donors. Significantly, the majority of students surveyed in this study supported the idea of holding a memorial ceremony to honor the body donors. Such ceremonies are common in many institutions in a significant number of countries and belonging to various cultural circles (TSCHERNIG, PABST, 2001; TAYLOR, WILSON, 2007; PARK et al., 2011; JONES, LACHMAN, PAWLINA, 2014; ZHANG et al., 2014). They have been positively appraised and welcomed by anatomy students, academic staff and donors and their families (BOLT, 2012; ZHANG et al., 2014). Students' attitudes as well as positive feedback from institutions already practicing these memorial ceremonies constitute a strong argument for their introduction.

It was suggested from previous surveys of the student body that older students seem to be less influenced by their encounter with cadavers in dissection room, in a way that would make them less inclined to become donors (CAHILL, ETARH, 2009; ALEXANDER et al., 2014). This was not found to be the case in this study. The reason for this might be that most of the students surveyed in this study enroll immediately after graduating from high schools and the difference in age between them is not as pronounced as in universities having higher proportions of mature age students.

In looking at different disciplines, students of Dentistry and Medicine were more likely to support donation of a stranger. These two disciplines, lasting one or two years longer than others, seem to provide a more comprehensive medical education. It might be argued that students of the two last-mentioned disciplines were more acutely aware of the importance of cadavers and human tissue in medical education. Furthermore, it was also found in previous studies that older colleagues, anatomists and medical professionals seem to be more likely to donate their bodies when compared to the general population (BOLT et al., 2010; ROKADE, GAIKAWAD, 2012). One might assume that experiences in medical education and practice confirm and further highlight the importance of donations and at the same time absorb

some of the negative emotion, which is often present among the younger students entering the anatomy laboratory for the first time. Thus, more experienced professionals are more disposed not only to support body and organ donation but also to become donors themselves.

Similar to the respondents in other studies, students from the University of Novi Sad were more likely to donate their organs for transplantation than their bodies for anatomical study (ŞEHIRLI, SAKA, SARIKAYA, 2004; ANYANWU, OBIKILI, 2012). Bearing in mind that altruism seems to be the most common motivator for donation, this difference is understandable as the benefit of organ donation is more obvious than that of the body donation. Another reason for willingness to donate organs rather than make a whole body donation might be found in the way in which the two types of donation are organized (in Serbia and many other countries). There is much more information among the general public about organ donation than whole body donation and it is consequently easier to become an organ than a body donor (MCHANWELL et al., 2007).

In this study there were significant differences in attitude toward body donation between students of different ethnicities. This is not surprising as culture to a large extent shapes a person's attitude toward death and dying. Similar attitudinal variations between ethnic groups were noticed in other studies focusing on body donation (BOULWARE et al., 2004; CORNWALL et al., 2012; ALEXANDER et al., 2014). This is why students working with cadavers in their laboratories need to be approached and prepared in a way inclusive enough to account for cultural diversity. Similarly, cultural differences have to be taken into account when the body donation programs and memorial services are conceptualized. Gender differences in attitude toward body donation were not pronounced and significant only in that female students were more undecided about support of body donation made by a stranger. The reasons for this indecisiveness are not clear and should, perhaps, be sought in the local cultural and social context.

This survey also detected significant differences in attitudes with regard to respondents' religious beliefs (cf. MWACHAKA, MANDELA, SAIDI, 2016). When divided in two groups - atheist/agnostics on the one hand and religious students on the other, the former group was significantly more likely to become body donors. Studies carried out in Greece, Turkey and Australia revealed a similar attitudinal pattern (ŞEHIRLI,

SAKA, SARIKAYA, 2004; HALOU et al., 2013; ALEXANDER et al., 2014). However, the simple dichotomy - atheist/agnostic generally in favor and religious individuals against self-body donation - is a simplification as the patterns of influence seem to be more complex. A study carried out in Hong Kong, for example, suggested that Confucianism and Buddhism motivate the local population to donate their bodies (CHIU et al., 2012). Similarly, in Thailand, Buddhist-derived principles were used as key motivators in organizing very successful donation programs (WINKELMANN, GÜLDNER, 2004). A recent survey carried out at one of the Polish universities established that the majority of body donors (76.36%) were Catholic (BAJOR et al., 2015). It should be borne in mind that a decision on body donation is influenced in a multi-factorial manner and made through the interplay of various determinants, where religion might or might not play a decisive role (BOLT et al., 2011; ASAD, ANTEBY, GARIP, 2014; KONSCHAKE, BRENNER, 2014). More broadly, a recent study suggested that students' broader, metaphysical belief in the existence of the soul (which might not have religious underpinning) is positively correlated with higher level of stress during dissection (MARTYN et al., 2014).

Attitudes of students surveyed in this study were in many ways similar to the attitudes of students at universities in other countries. Some minor differences that were found were mainly due to educational, social and cultural idiosyncrasies of Serbian society. To address the current state of body bequests in the country, similar to other places with a relatively small number of bequests, body donation programs have to be organized in accordance with the cultural and ethical norms of the society. These have to be highly informative,

clearly reflecting the importance of human tissue and the advantages of bequests in medical education, and firmly assuring the respectful treatment of human remains. Students themselves should be given further support during their education, particularly in addressing the humanistic values and emotional challenges posed by medical practice. Students, just like medical educators and practitioners, should play an important role in body donation programs.

The survey carried out among medical and allied medical students from the University of Novi Sad corroborates some of the major findings of previous studies focusing on attitudes toward whole body donation. Students see the significance of cadavers as well as body donation in anatomy, but whereas they seem to be keen to support the donation of a stranger, they are more reluctant to become donors themselves or support the bequeathal of a family member. The study also reaffirms the importance of the culturally sensitive preparing of students for study in the anatomy laboratory as well as the respectful treatment of cadavers, including organization of memorial ceremonies. Organizing and implementing body donation programs that embrace and address different social strata and cultural groups is also seen as a necessity. Students, if sufficiently informed and empowered not only with medical and anatomical knowledge but also humanistic values, could play an active role in this process.

#### ACKNOWLEDGEMENT

We thank Mr David J. Chorn of the University of Aberdeen for proof-reading the manuscript of this paper.

---

**RESUMO:** Anatomia, um dos principais temas pré-clínicos em disciplinas da medicina e áreas médicas afins, tradicionalmente tem contado com a instrução baseada na utilização de cadáveres. A aquisição de cadáveres para o ensino da anatomia tem se mostrado um desafio em muitos países. Este desafio tem sido enfrentado através da organização de programas de doação de corpo bem informados e culturalmente sensíveis. Atitudes da população geral, de profissionais e estudantes de medicina são importantes na elaboração desses programas. O objetivo deste estudo foi investigar as atitudes de estudantes de medicina e áreas médicas afins da Universidade de Novi Sad em relação à doação completa do corpo. A pesquisa foi conduzida com todos os estudantes do primeiro e terceiro anos inscritos em todos os cursos oferecidos pela universidade e com os estudantes do sexto ano de medicina. Uma grande parcela dos entrevistados (87,38%) reconhece a importância dos cadáveres no ensino da anatomia. A maioria dos estudantes (51,26%) apoiaria a doação de corpo de um estranho, enquanto que uma proporção muito menor dos entrevistados se tornariam doadores (19,51%) ou apoiariam seus familiares a doarem os corpos deles (21,67%). Houve diferenças nas atitudes em relação à doação de corpo relacionadas aos anos de estudo, etnia e religião dos entrevistados. As principais razões para as doações foram altruísticas, enquanto que os principais motivos para a não doação foram a falta de informação e fatores religiosos. A maioria dos entrevistados foi a favor da introdução de serviços memoriais para os doadores de corpos. Os resultados do estudo destacam a importância de uma abordagem culturalmente sensível aos estudantes nos laboratórios de anatomia e do enriquecimento do ensino da

anatomia através das humanidades. Eles também ressaltam a importância de programas de doação de corpo bem organizados e informativos.

**PALAVRAS-CHAVE:** Doação de órgãos. Atitudes dos estudantes. Ensino de anatomia. Educação médica.

---

## REFERENCES

- ABOUHASHEM, Y.; DAYAL, M.; SAVANAH, S.; ŠTRKALJ, G. The application of 3D printing in anatomy education. **Med. Educ. Online**, v. 20, 29847, 2015. <http://dx.doi.org/10.3402/meo.v20.29847>
- AJITA, R.; SINGH, Y. I. Body donation and its relevance in anatomy learning – a review. **J. Anat. Soc. India**, v. 56, n. 1, p. 44-47, 2007.
- ALEXANDER, M.; MARTEN, M.; STEWART, E.; SERAFIN, S.; ŠTRKALJ, G. Attitudes of Australian chiropractic students toward whole body donation: a cross-sectional study. **Anat. Sci. Educ.**, v. 7, n. 2, p. 117-123, 2014. <http://dx.doi.org/10.1002/ase.1390>
- ANONYMOUS. Cadaver abuse: UNSW apologises. **Sydney Morning Herald**, 6 February 2007.
- ANYANWU, E. G.; OBIKILI, E. N. Dissecting the dissectors: knowledge, attitude, and practice of body bequest by Nigerian anatomist. **Anat. Sci. Educ.**, v. 5, n. 6, p. 347-353, 2012. <http://dx.doi.org/10.1002/ase.1298>
- ANYANWU, E. G.; OBIKILI, E. N.; AGU, A. U. The dissection room experience: a factor in the choice of organ and whole body donation-a Nigerian survey. **Anat. Sci. Educ.**, v. 7, n. 1, p. 56-63, 2014. <http://dx.doi.org/10.1002/ase.1370>
- ANYANWU, G. E.; UDEMEZUE, O. O.; OBIKILI, E. N. Dark age of sourcing cadavers in developing countries: a Nigerian survey. **Clin. Anat.**, v. 24, n. 7, p. 831–836, 2011. <http://dx.doi.org/10.1002/ca.21187>
- ARRÁEZ-AYBAR, L. A.; BUENO-LÓPEZ, J. L.; MOXHAM, B. Anatomists' views on human body dissection and donation: an international survey. **Ann. Anat.**, v. 196, n. 6, p. 376-386, 2014. <http://dx.doi.org/10.1016/j.aanat.2014.06.004>
- ARRÁEZ-AYBAR, L. A.; CASADO-MORALES, M. I.; CASTAÑO-COLLADO, G. Anxiety and dissection of the human cadaver: an unsolvable relationship? **Anat. Rec.**, v. 279B, n. 1, p. 16–23, 2004. <http://dx.doi.org/10.1002/ar.b.20022>
- ASAD, A. L.; ANTEBY, M.; GARIP, F. Who donates their bodies to science? The combined role of gender and migration status among California whole-body donors. **Soc. Sci. Med.**, v. 106, p. 53–58, 2014. <http://dx.doi.org/10.1016/j.socscimed.2014.01.041>
- ATTEBY, M.; GARIP, F.; MARTORANA, P. V.; LOZANOFF, S. Individuals' decision to co-donate or donate alone: an archival study of married whole body donors in Hawaii. **PLoS One**, v. 7, n. 8, e42673, 2012. doi: 10.1371/journal.pone.0042673
- BAJOR, G.; LIKUS, W.; KUSZEWSKI, P.; KOSTRO, K.; ŁOŚ, A.; KŁAKUS P. “*Mortui vivos docent*” or who gives his body to science? The analysis of the personal questionnaires of Polish donors in the conscious body donation program. **PLoS One**, v. 10, n. 3, e0121061, 2015. <http://dx.doi.org/10.1371/journal.pone.0121061>
- BALLALA, K.; SHETTY, A.; MALPE, S. B. Knowledge, attitude, and practices regarding whole body donation among medical professionals in a hospital in India. **Anat. Sci. Educ.**, v. 4, n. 3, p. 142-150, 2011. <http://dx.doi.org/10.1002/ase.220>

BERGMAN, R. A. Thoughts on human variations. **Clin. Anat.**, v. 24, n. 8, p. 938–940, 2011.  
<http://dx.doi.org/10.1002/ca.21197>

BOLT, S. Dead bodies matter: gift giving and the unveiling of body donor monuments in the Netherlands. **Med. Anthropol. Q.**, v. 26, n. 4, p. 613–634, 2012. <http://dx.doi.org/10.1111/maq.12010>

BOLT, S.; EISINGA, R.; VENBRUX, E.; KUKS, J. B.; GERRITS, P. O. Personality and motivation for body donation. **Ann. Anat.**, v. 193, n. 2, p. 112–117, 2011. <http://dx.doi.org/10.1016/j.aanat.2011.01.005>

BOLT, S.; VENBRUX, E.; EISINGA, R.; GERRITS, P. O. Anatomist on the dissecting table? Dutch anatomical professionals' view on body donation. **Clin. Anat.**, v. 25, n. 2, p. 168–175, 2012.  
<http://dx.doi.org/10.1002/ca.21215>

BOLT, S.; VENBRUX, E.; EISINGA, R.; KUKS, J. B. M.; VEENING, J. G.; GERRITS, P. O. Motivation for body donation to science: more than an altruistic act. **Ann. Anat.**, v. 192, n. 2, p. 70–74, 2010.  
<http://dx.doi.org/10.1016/j.aanat.2010.02.002>

BOULWARE, L. E.; RATNER, L. E.; COOPER, L. A.; LAVEIST, T. A.; POWE, N. R. Whole body donation for medical science: a population-based study. **Clin. Anat.**, v. 17, n. 7, p. 570–577, 2004.  
<http://dx.doi.org/10.1002/ca.10225>

BUŠIĆ, M.; SPASOVSKI, G.; ZOTA, V.; CODREANU, I.; SARAJLIĆ, L.; SIMEONOVA, M; MILOJIČIĆ, N.; NIKOLOV, I.; ASHKENAZI, T.; DURRO, V.; DELMONICO, F. South Eastern European Health Network Initiative for Organ Donation and Transplantation. **Transplantation**, v. 99, n. 7, p. 1302–1304, 2015.  
<http://dx.doi.org/10.1097/TP.0000000000000726>

CAHILL, K. C.; ETTARH, R. R. Student attitudes to whole body donation are influenced by dissection. **Anat. Sci. Educ.**, v. 1, n. 5, p. 212–216, 2008. <http://dx.doi.org/10.1002/ase.42>

\_\_\_\_\_. Attitudes to cadaveric organ donation in Irish preclinical medical students. **Anat. Sci. Educ.**, v. 4, n. 4, p. 195–199, 2011. <http://dx.doi.org/10.1002/ase.236>

CHAN L. K; PAWLINA W. (Ed.) Teaching anatomy: a practical guide. New York: Springer, 2015, 403 p.

CHIU, H. Y.; NG, K. S.; MA, S. K.; CHAN, C. H.; NG, S. W.; TIPOE, G. L.; CHAN, L. K. Voices of donors: case reports of body donation in Hong Kong. **Anat. Sci. Educ.**, v. 5, n. 5, p. 295–300, 2012.

CORNWALL, J.; PERRY, G. F.; LOUW, G.; STRINGER, M. D. Who donates their body to science? An international, multicenter, prospective study. **Anat. Sci. Educ.**, v. 5, n. 4, p. 208–216, 2012.  
<http://dx.doi.org/10.1002/ase.1278>

CORNWALL, J.; STRINGER, M. D. The wider importance of cadavers: educational and research diversity from a body bequest program. **Anat. Sci. Educ.**, v. 2, n. 5, p. 234–237, 2009. <http://dx.doi.org/10.1002/ase.103>

CURLIN, F. R. Detachment has consequences: a note on caution form medical students' experiences of cadaver dissection. In: LANTOS J. D. (Ed.) Controversial bodies: thoughts on the public display of plastinated corpses. Baltimore: Johns Hopkins University Press, 2011, p. 56–62.

DYER, G. S. M.; THORNDIKE, M. E. L. *Quidne mortui vivos docent?* The evolving purpose of human dissection in medical education. **Acad. Med.**, v. 75, n. 10, p. 969–979, 2000.  
<http://dx.doi.org/10.1097/00001888-200010000-00008>

GANGATA, H.; NTABA, P.; AKOL, P.; LOUW, G. The reliance on unclaimed cadavers for anatomical teaching by medical schools in Africa. **Anat. Sci. Educ.**, v. 3, n. 4, p. 174–183, 2010.  
<http://dx.doi.org/10.1002/ase.157>

GREEN, C.; BOWDEN, D.; MOLONY, D.; BURKE, N.; FELLE, P.; DUDENEY, S. Attitudes of the medical profession on the whole body and organ donation. **Surgeon**, v. 12, n. 2, p. 73-77, 2014. <http://dx.doi.org/10.1016/j.surge.2013.06.002>

HAFFERTY, F. W. Into the valley: death and socialization of medical students. New Haven: Yale University Press, 1991. 234 p.

HALOU, H.; CHALKIAS, A.; MYSTRIOTI, D.; IACOVIDOU, N.; VASILEIOU, P. V.; XANTHOS, T. Evaluation of the willingness for cadaveric donation in Greece: a population-based study. **Anat. Sci. Educ.**, v. 6, n. 1, p. 48-55, 2013. <http://dx.doi.org/10.1002/ase.1304>

HILDEBRANDT, S. The anatomy of murder: ethical transgressions and anatomical science during the Third Reich. New York: Berghahn Books, 2016. 374 p. <http://dx.doi.org/10.1016/j.aanat.2016.01.011>

JONES, D. G.; WHITAKER, M. I. Speaking for the dead: the human body in biology and medicine. 2. ed. Burlington: Ashgate Publishing, 2009. 296 p.

JONES, D. G.; WHITAKER, M. I. Anatomy's use of unclaimed bodies: reasons against continued dependence on an ethically dubious practice. **Clin. Anat.**, v. 25, n. 2, p. 246-254, 2012. <http://dx.doi.org/10.1002/ca.21223>

JONES, T. W.; LACHMAN, N.; PAWLINA, W. Honoring our donors: a survey of memorial ceremonies in United States anatomy programs. **Anat. Sci. Educ.**, v. 7, n. 3, p. 219-223, 2014. <http://dx.doi.org/10.1002/ase.1413>

KONSCHAKE, M.; BRENNER, E. "Mors auxilium vitae" - causes of death of body donors in an Austrian anatomical department. **Ann. Anat.**, v. 196, n. 6, p. 387-393, 2014. <http://dx.doi.org/10.1016/j.aanat.2014.07.002>

MARTYN, H.; BARRETT, A.; NICHOLSON, H. D. A belief in the soul may contribute to the stress experienced in the dissecting room. **J. Anat.**, v. 224, n. 3, p. 345-351, 2014. <http://dx.doi.org/10.1111/joa.12122>

MCHANWELL, S.; BRENNER, E.; CHIRULESCU, A. R. M.; DRUKKER, J.; VAN MAMEREN, H.; MAZZOTTI G.; PAIS, D.; PAULSEN, F.; PLAISANT, O.; CAILLAUD, M. M.; LAFORÊT, E.; RIEDERER, B. M.; SAÑUDO, J. R.; BUENO-LÓPEZ, J. L.; DOÑATE OLIVER, F.; SPRUMONT, P.; TEOFILOVSKI-PARAPID, G.; MOXHAM, B. J. The legal and ethical framework governing body donation in Europe – a review of current practice and recommendations for good practice. **Eur. J. Anat.**, v. 12, n. 1, p. 1-24, 2007.

MCLACHLAN, J. C.; BLIGH, J.; BRADLEY, P.; SEARLE, J. Teaching anatomy without cadavers. **Med. Educ.**, v. 38, n. 4, p. 418-424, 2004. <http://dx.doi.org/10.1046/j.1365-2923.2004.01795.x>

MWACHAKA, P. M.; MANDELA, P.; SAIDI, H. Repeated exposure to dissection does not influence students' attitudes towards human body donation for anatomy teaching. **Anat. Res. Int.**, 2016, 2016. <http://dx.doi.org/10.1155/2016/9251049>

MCMENAMIN, P. G.; QUAYLE, M. R.; MCHENRY, C. R.; ADAMS, J. W. The production of anatomical teaching resources using three-dimensional (3D) printing technology. **Anat. Sci. Educ.**, v. 7, n. 6, p. 479-486, 2014. <http://dx.doi.org/10.1002/ase.1475>

PARK, J. T.; JANG, Y.; PARK, M. S.; PAE, C.; PARK, J.; HU, K. S.; PARK, J. S.; HAN, S. H.; KOH, K. S.; KIM, H. J. The trend of body donation for education based on Korean social and religious culture. **Anat. Sci. Educ.**, v. 4, n. 1, p. 33-38, 2011. <http://dx.doi.org/10.1002/ase.198>

PATHER, N. The pros and cons of dissection and prosection. In: CHAN, L. K.; PAWLINA W. (Ed.) Teaching anatomy: a practical guide. New York: Springer, 2015, p. 213-222.

PERRY, G. F.; ETTARH, R. R. Age modulates attitudes to whole body donation among medical students. **Anat. Sci. Educ.**, v. 2, p. 4, p. 167-172, 2009.

PERSAUD, T. V. N.; LOUKAS, M.; TUBBS R. S. A history of human anatomy. 2. ed. Springfield: Charles C Thomas, 2014. 390 p.

PLAISANT, O.; STEPHENS, S.; APYDIN, N.; COURTOLS, R.; LIGNIER, B.; LOUKAS, M.; MOXHAM B. Medical students' attitudes towards science and gross anatomy, and the relationship to personality. **J. Anat.**, v. 224, n. 3, p. 261-269, 2014. <http://dx.doi.org/10.1111/joa.12043>

PORTER, R. The greatest benefit to mankind: a medical history of humanity. New York: W.W. Norton, 1998. 831 p.

QUIGLEY, C. Dissection of display: cadavers, anatomists and public spectacle. Jefferson: McFarland & Co., 2012. 216 p.

QUINCE, T. A.; BARCLAY, S. I. G.; SPEAR, M.; PARKER, R. A.; WOOD, D. F. Student attitudes toward cadaveric dissection at a UK medical school. **Anat. Sci. Educ.**, v. 4, p. 4, p. 200-207, 2011.

REDFERN, M.; KEELING, J.; POWELL, E. The Royal Liverpool Children's Inquiry, Report. URL: <http://www.rlcinqury.org.uk/download/appen/pdf>. 2001. Accessed: 9 April 2016.

RIEDERER, B. M. Body donations today and tomorrow: what is the best practice and why? **Clin. Anat.**, v. 29, n. 1, p. 11-16, 2016. <http://dx.doi.org/10.1002/ca.22641>

RICHARDSON, R. Death, dissection and the destitute. Chicago: University of Chicago Press, 2000. 453 p.

RICHARDSON, R.; HURWITZ, B. Donors' attitudes towards body donation for dissection. **Lancet**, v. 346, n. 8970, p. 227-279, 1995. [http://dx.doi.org/10.1016/S0140-6736\(95\)92166-4](http://dx.doi.org/10.1016/S0140-6736(95)92166-4)

ROKADE, S. A.; GAIKAWAD, A. P. Body donation in India: social awareness, willingness, and associated factors. **Anat. Sci. Educ.**, v. 5, n. 2, p. 83-89, 2012. <http://dx.doi.org/10.1002/ase.1263>

SANNER, M. A comparison of public attitudes toward autopsy, organ donation, and anatomic dissection. A Swedish survey. **JAMA**, v. 271, n. 4, p. 284-288, 1994. <http://dx.doi.org/10.1001/jama.1994.03510280046031>  
<http://dx.doi.org/10.1001/jama.271.4.284>

ŞEHIRLI, Ü. S.; SAKA, E.; SARIKAYA, Ö. Attitudes of Turkish anatomists toward cadaver donation. **Clin. Anat.**, v. 17, n. 8, p. 677-681, 2004. <http://dx.doi.org/10.1002/ca.20056>

SPASOVSKI, G.; BUŠIĆ, M.; DELMONICO, F. Improvement in kidney transplantation in the Balkans after the Istanbul Declaration: where do we stand today? **Clin. Kidney J.**, v. 9, n. 1, p. 172-175, 2016. <http://dx.doi.org/10.1093/ckj/sfv116>

SPASOVSKI, G.; BUŠIĆ, M.; PIPERO, P.; SARAJLIĆ, L.; POPOVIĆ, A. S.; DZHALEVA, T.; CODREANU, I.; RATKOVIĆ, M. M.; POPESCU, I.; LAUŠEVIĆ, M.; AVSEC, D.; RALEY, L.; EKBERG, H.; PLOEG, R.; DELMONICO, F. Current status of transplantation and organ donation in the Balkans – could it be improved through the South-eastern European health Network (SEEHN) initiative? **Nephrol. Dial. Transplant.**, v. 27, n. 4, p. 1319-1323, 2012. <http://dx.doi.org/10.1093/ndt/gfs071>

SUBASINGHE, K.; JONES, D. G. Human body donation programs in Sri Lanka: Buddhist perspectives. **Anat. Sci. Educ.**, v. 8, n. 5, p. 484-489, 2015. <http://dx.doi.org/10.1002/ase.1525>

ŠTRKALJ, G. The emergence of humanistic anatomy. **Med. Teach.**, v. 36, n. 10, p. 912-913, 2014.

\_\_\_\_\_. Humanistic anatomy: a new program for and old discipline. New York: Nova Science Publishing, 2016. 100 p.

ŠTRKALJ, G.; DAYAL, M. R. Working together, sharing resources: an interuniversity collaboration to advance anatomy education. **Anat. Sci. Educ.**, v. 7, n. 6, p. 501-502, 2014. <http://dx.doi.org/10.3109/0142159X.2014.907884>

ŠTRKALJ, G.; SPOCTER, M. A.; WILKINSON, A. T. Anatomy, medical education and human ancestral variation. **Anat. Sci. Educ.**, v. 4, n. 6, p. 362–365, 2011. <http://dx.doi.org/10.1002/ase.1496>

TALARICO, E. F. A change in paradigm: giving identity to donors in the anatomy laboratory. **Clin. Anat.**, v. 26, n. 2, p.161–172, 2013. <http://dx.doi.org/10.1002/ca.22103>

TAYLOR, S. J.; WILSON, D. J. The human tissue act (2004), anatomical examination and the importance of body donation in Northern Ireland. **Ulster Med. J.**, v. 76, n. 3, p. 124-126, 2007.

TSCHERNIG, T.; PABST, R. Services of thanksgiving at the end of gross anatomy courses: a unique task for anatomists? **Anat. Rec.**, v. 265, n. 5, p. 204-205, 2001. <http://dx.doi.org/10.1002/ar.10012>

WIJBENGA, B. S.; KONING, R. H.; KOOISTRA-AKSE, B. J.; BOLT, S.; KUKS, J. B.; VAN ZANTEN-TIMMER, G.; VEENING, J. G.; GERRITS, P. O. ‘Last-minute’ donations influence actuarial prediction in an anatomical body donation program. **Ann. Anat.**, v. 192, p. 1, p. 2–6, 2010.

WINKELMANN, A.; GÜLDNER, F. H. Cadavers as teachers: the dissection room experience in Thailand. **BMJ**, v. 329, p. 1455-1457, 2004. <http://dx.doi.org/10.1136/bmj.329.7480.1455>

ZHANG, L.; WANG, Y.; XIAO, M.; HAN, Q.; DING, J. An ethical solution to the challenges in teaching anatomy with dissection in the Chinese culture. **Anat. Sci. Educ.**, v. 1, n. 2, p. 56-59, 2008. <http://dx.doi.org/10.1002/ase.15>

ZHANG, L.; XIAO, M.; GU, M.; ZHANG, Y.; JIN, J.; DING, J. An overview of the roles and responsibilities of Chinese medical colleges in body donation programs. **Anat. Sci. Educ.**, v. 7, n. 4, p. 312–320, 2014. <http://dx.doi.org/10.1002/ase.1422>