

# Anatomists' views on cadaver and cadaver procurement in medical education

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## Abstract

Despite the importance of cadavers in anatomy education, there are great difficulties in procuring cadavers in Türkiye due to the low quantity of donations. Anatomists have important roles in matters related to cadaver donation. Some of these roles are to explain to students and the public the value of cadavers in medical education and to inform them about cadaver donation. The aim of this study is to investigate anatomists' thoughts about cadavers and their supply. The study was conducted on anatomists who accepted the survey invitation sent from the digital platform. 100 volunteer anatomists participated in the survey. Ethics committee approval was received for the study. Anatomists argue that education with cadavers is a must (92%). Routine dissection is performed in 64% of the institutions to which the participants are affiliated. 78% of anatomists know the legal regulations regarding cadaver procurement, and 67% care about the method of procurement of the studied cadaver. While the participating anatomists found it appropriate to use unclaimed bodies for educational purposes, there was no common opinion among the anatomists in terms of ethics. Anatomists are more willing to recommend cadaver donation to someone they do not know than to donate a cadaver from their own family member. Only 13% of anatomists feel ready for body donation. The survey results show that anatomists have high knowledge and awareness about cadavers and their supply. High awareness has relatively less impact on anatomists' attitudes and behaviors regarding cadaver donation. It was determined that the majority of anatomists who participated in the research did not feel ready to donate cadavers. We think that bringing donation issues to the agenda more through trainings and events can contribute to the perspectives of anatomists.

**Keywords:** Cadaver, anatomist, survey, body donation, cadaver procurement

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## Introduction

Cadaver dissection is considered a universal symbol in anatomy education. Since the birth of the science of anatomy, education with cadavers has been a basic method of anatomy [1]. It is thought that current technological innovations cannot replace the cadaver and the gold standard for anatomy is still the cadaver [2].

Today, the largest acquisition of cadavers around the world is through body donation programs and unclaimed bodies that have no relatives or friends to request burial. In some countries where available body donations are low, the need for cadavers is met by importing cadavers from other countries [3,4]. Almost all developed countries such as the USA, Japan, Australia and European countries have successful donor programs. The dead bodies used in medical schools in these countries are the bodies of people who voluntarily donated their bodies to science before they died [3,5,6]. In countries that do not have a body donation program due to religious and/or cultural reasons, the most common option for procuring cadavers is unclaimed bodies [3]. However, this situation has given rise to different ethical thoughts and discussions. According to some authors, anatomists attribute the use of unclaimed bodies as cadavers to legal reasons and ignore the ethical aspect [7]. Due to ethical debates in cadaver procurement, the International Federation of Anatomist Associations (IFAA) published recommendations on the use of human organs in 2012. These recommendations also include a call for voluntary body donation. In addition, it was requested to end the use of the bodies of executed criminals and homeless people as a source of cadavers [8,9].

In Türkiye, a legal framework for cadavers to be used for education and research was established with the law no. 2238 enacted in 1979 and the articles added later [10,11]. There are similar cadaver procurement methods in Türkiye as in the world. These are voluntary body donations, imported cadavers and unclaimed bodies [5]. The most common option for cadaver procurement in Türkiye is unclaimed bodies. Although voluntary body donation has been recommended by IFAA

as a source of cadavers, the number of donated cadavers in our country is quite insufficient [5]. While there is a positive attitude towards organ donation in Turkish society, the willingness to donate for whole body donation is quite low. The reason for this reluctance can be considered as the lack of information and awareness in the society about body donation [12].

The Turkish Society of Anatomy and Clinical Anatomy (TSACA) has work through studies on the cadaver donation problem in Türkiye. A guide containing solution suggestions on the issue has been published [13]. Anatomists in Türkiye organize events during anatomy week to draw attention to cadaver donation [14]. Celebrities donating cadavers is also an important issue in terms of encouraging donation. On the other hand, raising the issue in the media can attract public attention [15].

When we look at the literature, there are many thoughts and judgments about cadavers and cadaver procurement that vary according to factors such as socio-cultural, economic, education and profession in different societies [16-18]. Anatomists are aware of the value of cadaver donation and have direct access to information regarding donation procurement and procedures. There are few studies investigating the attitudes of anatomists in Türkiye about cadaver donation and procurement. For this reason, it was aimed to investigate the opinions of anatomists in our country regarding cadavers and cadaver procurement.

## Materials and Methods

Our research is a cross-sectional study conducted on anatomists in Türkiye and was conducted by 100 anatomists who accepted the survey invitation sent from the digital groups for communication. The study was approved by the İzmir Katip Celebi Non-Interventional Clinical Studies Institutional Review Board with the decision numbered 0248. Participants were informed about the purpose of the survey and their consent was obtained. In addition, the participants were assured by the researchers about the confidentiality of their identity information before participating in the survey. The data were obtained between June 2023. Survey data was obtained digitally using

the “Google Forms” application (Google Inc., Mountain View, CA, USA).

The survey was divided into two sections: demographic characteristics of the participants and their opinions about cadavers and cadaver procurement. Demographic data in the first part of the survey included gender, level of expertise, and years of service. To investigate the possible effect of the participants’ level of expertise, six groups were formed: Professors (16), associate professors (15), assistant professor (20), medical specialist (8), research assistants (33) and MSc-PhD students (8). Additionally, five groups were created to investigate the possible impact of years of service. Groups were classified according to five years of experience (0-5, 5-10, 15-20, 20 and above). The second part included questions about cadavers and their supply. The attitudes and behaviors of anatomists were investigated with questions about the place of cadavers in education, ways to procure cadavers-legal processes, the use of unclaimed bodies as cadavers, the emotional impact of cadavers, and cadaver donation. They were also asked about anatomists’ willingness to donate themselves. A survey with three answer options: Yes/No and Undecided was used.

The data were evaluated in IBM SPSS Statistics 25.0 (IBM Corp, Armonik, New York, USA). The number of units and percentage values were given as descriptive statistics. For categorical variables, the exact method of the Chi-Square

test was used for comparisons between groups. A value of  $p < 0.05$  was considered statistically significant.

## Results

The survey was answered by 100 anatomists. 61 of the anatomists were women (61%) and 39 were men (39%). Other demographic information about the participants is included in Table 1.

The results of the opinions regarding cadavers and cadaver procurement in the second part of the survey are given in Table 2. Almost all of the participants (92%) think that cadavers should definitely be included in anatomy education. Most participants stated that they knew the ways to obtain cadavers (78%), that it was important to know the source of the cadavers they worked with (67%), and that working with donor cadavers had a positive impact on them (61%). While 62% of the participants find it correct in terms of education to use unclaimed bodies as cadavers, 46% find it ethically correct. 67% of participants think that knowing the cadaver donor while they are alive may affect them emotionally, and 57% do not want their families to become cadaver donors. While 71% of the participants felt responsible for informing the society about cadaver donation, 51% stated that they would encourage people around them to donate. Only 13% of participants feel ready to donate.

**Table 1.** Demographic characteristics of participants.

<b>Demographic parameters</b>	<b>n (%)</b>
<b>Gender</b>	
Female	61 (61)
Male	39 (39)
<b>Academic title</b>	
Prof. Dr.	16 (16)
Assoc. Prof	15 (15)
Asst. Prof	20 (20)
Medical specialist	8 (8)
Research assistant	33 (33)
MSc-PhD students	8 (8)
<b>Years of Teaching Experience</b>	
0-5	42 (42)
5-10	17 (17)
10-15	15 (15)
15-20	9 (9)
20+	17 (17)

Comparison of the answers to the survey questions between genders is given in Table 3. There is no statistically significant difference between genders in the answers given ( $p>0.05$ ).

A comparison of the anatomists' answers to the survey questions according to their level of expertise and years of service is given in Table 4.

In the seventh question (Q7), faculty members with Associate Professor degrees find the use of abandoned cadavers in medical education ethically correct when compared to other groups ( $p<0.05$ ) (Figure 1). The fifteenth question was answered negatively by anatomists with less than five years of service (Figure 2).

**Table 2.** Distribution of answers to survey questions.

Questions	Yes <i>n</i> (%)	No <i>n</i> (%)	I'm not sure <i>n</i> (%)	Total <i>n</i> (%)
<b>Q1.</b> Is it necessary to have education with cadavers?	92 (92)	3 (3)	5 (5)	100 (100)
<b>Q2.</b> Does your institution perform regular dissection studies with cadavers for educational purposes?	64 (64)	28 (28)	8 (8)	100 (100)
<b>Q3.</b> Do you know the necessary legal arrangements regarding cadaver procurement?	78 (78)	11 (11)	11 (11)	100 (100)
<b>Q4.</b> Is it important for you to know how the cadaver you are working with was supplied?	67 (67)	30 (30)	3 (3)	100 (100)
<b>Q5.</b> Does working with a cadaver that you know is a donor affect you positively?	61 (61)	21 (21)	18 (18)	100 (100)
<b>Q6.</b> Do you think the use of unclaimed/ unidentified bodies in medical education is correct in terms of education?	62 (62)	21 (21)	17 (17)	100 (100)
<b>Q7.</b> Do you think it is ethically correct to use unclaimed/ unidentified bodies in medical education?	46 (46)	31 (31)	23 (23)	100 (100)
<b>Q8.</b> Does knowing the body donor while he/she is alive affect you emotionally?	67 (67)	21 (21)	12 (12)	100 (100)
<b>Q9.</b> Would you like your family to be a body donor?	16 (16)	57 (57)	27 (27)	100 (100)
<b>Q10.</b> Would your family approve of you becoming a cadaver donor?	7 (7)	74 (74)	19 (19)	100 (100)
<b>Q11.</b> Do you feel the responsibility to raise awareness/inform the public about cadaver donation?	71 (71)	13 (13)	16 (16)	100 (100)
<b>Q12.</b> Would you encourage people you know or don't know to become cadaver donors?	51 (51)	24 (24)	25 (25)	100 (100)
<b>Q13.</b> Do you feel ready for a cadaver donation?	13 (13)	57 (57)	30 (30)	100 (100)
<b>Q14.</b> Do you think it is right for the family to prevent body donation after death, even if the deceased person has made a written declaration of donation?	37 (37)	50 (50)	13 (13)	100 (100)
<b>Q15.</b> Do you think it is right that even if the deceased person does not have a written declaration of donation, they can be donated by their relatives if they have the consent of their first-degree relatives?	28 (28)	54 (54)	18 (18)	100 (100)

## Discussion

Cadaver dissection is one of the most important building blocks of anatomy education. Due to the insufficient number of cadavers in Türkiye, dissection opportunities are limited for both anatomists and students [5]. Body donation is an important factor in increasing the number of cadavers. There are studies on the attitudes and behaviors of doctors, health professionals, and people in different professional groups towards

cadavers and body donation [17,19,20]. In this study, anatomists' thoughts about cadavers and their supply were investigated. The majority of participants think that cadavers should be included in education. In addition, they care about how the cadavers they work with are obtained, and working with donor cadavers has a positive impact on them. Despite the necessity of cadaver anatomy education and the positive effect of donor cadavers, participants do not feel ready for cadaver donation.

**Table 3.** Comparison of the answers given to the survey questions according to gender.

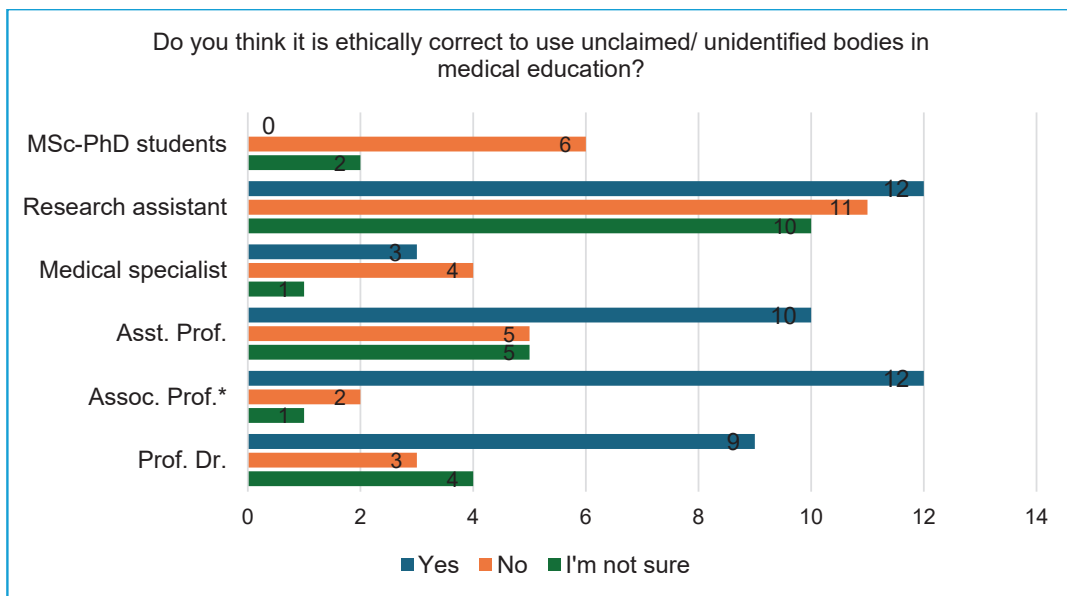
Questions	<i>p</i> *
Q1	0.527
Q2	0.727
Q3	0.960
Q4	0.673
Q5	0.116
Q6	0.225
Q7	0.092
Q8	0.978
Q9	0.737
Q10	0.522
Q11	0.580
Q12	0.896
Q13	0.991
Q14	0.790
Q15	0.811

\*: comparison by gender, Pearson's chi-squared test

**Table 4.** Comparison of the answers given to the survey questions according to academic title and years of teaching experience.

Questions	<i>p</i> *	<i>p</i> **
Q1	0.272	0.371
Q2	0.341	0.746
Q3	0.414	0.199
Q4	0.359	0.307
Q5	0.293	0.870
Q6	0.069	0.417
Q7	0.028***	0.466
Q8	0.458	0.076
Q9	0.435	0.303
Q10	0.289	0.569
Q11	0.096	0.468
Q12	0.760	0.052
Q13	0.469	0.448
Q14	0.121	0.375
Q15	0.077	0.038***

\*comparison by akademik title, Pearson's chi-squared test  
 .\*\*comparison by years of teaching experience, Pearson's chi-squared test. \*\*\* significant result (*p*<0,05).

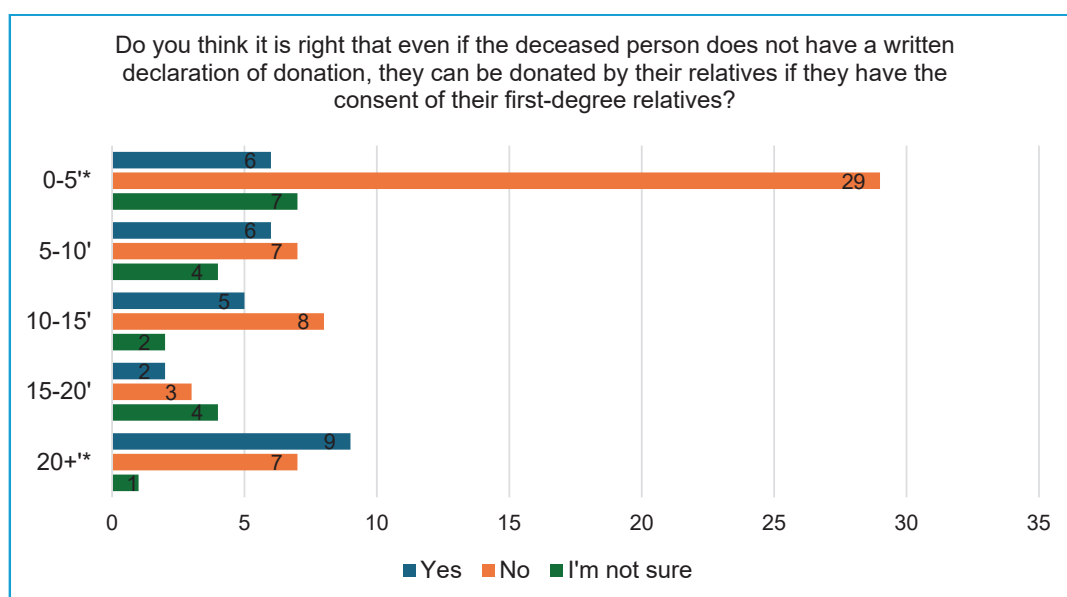


**Figure 1.** Distribution of the answers to the seventh question in the questionnaire according to the academic title.

The anatomists participating in the study are aware of the legal regulations regarding cadaver procurement. There is no consensus among participants about whether the deceased's family can prevent it, even though the deceased has a donation declaration. Complex situations such as the donor's desire to have a say in donor's body and donor family's wishes to hold a funeral can be considered among the reasons for indecision among anatomists. On the other hand, it is important for anatomists to communicate effectively with the family before the donor dies. This can reduce the likelihood of the family preventing donation after the donor's death [13]. 54% of participants do not find it correct that the deceased's family can donate even though donor does not have a written declaration of donation. The reason for this opinion of the participants may be that when a person dies, his/her personal rights are legally transferred to his/her family [13]. However, participants may think that the person's consent before death is more important. There are studies in the literature that reach similar conclusions regarding the legal processes of cadaver procurement and donation. Ballala et al. stated that medical doctors in India have heard of body donation and have information about ways to obtain cadavers. They also stated that they knew the legal regulations regarding cadaver donation [21].

Regular dissection studies are mostly carried out at the universities where the anatomists participating in the survey work. Participants believe that the use of unclaimed bodies as cadavers is correct in terms of education. However, ethical consensus has not been reached and there is a significant difference between the groups compared according to the level of expertise. The reason for this disagreement may be due to senior anatomists' consideration of the inadequacy of cadaver resources. Although it is right to use unclaimed bodies for good purposes in medical education, there are ethical debates about this issue. The biggest ethical problem is the lack of information and consent of the unclaimed cadaver. One of the ways to solve this problem is to work with donated cadavers instead of unclaimed cadavers. Anatomists have great responsibilities in this transition process [13].

According to the results of this study, the majority of anatomists who participated in the survey show that knowing the cadaver donor will affect them emotionally. Getting to know the cadaver donor may cause emotional fluctuations in the individual during dissection, and this may make the job of anatomists difficult. One study reported that anatomists felt uncomfortable at the thought of dissecting their own companions [22]. Similarly, the respondents do not want



**Figure 2.** Distribution of answers to the fifteenth question in the questionnaire according to years of teaching experience.

their family members to be cadaver donors. In a study, medical doctors tend to recommend body donation to someone from the community rather than their family [23]. While participants do not want family members to be cadaver donors, they are willing to encourage someone they do not know. In addition, participants feel responsible for raising awareness in society about cadaver donation. With this sense of responsibility, various donation campaigns and events are currently organized in Türkiye [14]. On the other hand, there are also findings on body donation encouragement in our study that contradict the literature. Reported participant views (71% felt responsible and 51% said they would encourage people) do not correlate with the studies that evaluate Turkish anatomy departments' official websites [5,24]. In the literature reported that the anatomy departments of all the institutions in Türkiye had informative official web pages. However, only twelve (12%) departments provided information and/or documents on body donation [24]. It shows that anatomists are willing to promote body donation on an individual level, although not on an institutional level.

There is also a general reluctance among anatomists to donate their own bodies [22,25]. In our study, results similar to other studies were obtained. Only 13% of participants feel ready for cadaver donation. In another study, only 15% of anatomists were willing to donate bodies [12]. The fact that anatomists' attitudes towards body donation have not changed over the years should be evaluated carefully. Cadaver and donation issues should be covered more during anatomy specialty training and these issues should be kept on the agenda in anatomy meetings to be held across the country. In addition, anatomists stated that his/her family would not accept him/her being a donor. In a study conducted with Nigerian anatomists, the most common reason for reluctance in body donation was that the person's wish to be a cadaver donor was not accepted by his/her family [26]. The fact that most families of anatomists are reluctant to donate body compared to society may be due to the fact that they have more knowledge about dissection. Having deeper knowledge may

create psychological factors such as anxiety and tension in families. In addition, many reasons such as religious, traditional, social issues and the person's psychological unpreparedness may play a role in the reluctance to donate body [25].

## Conclusion

Our study reveals the opinions of anatomists in Türkiye about cadavers and their supply. The supply of cadavers, which are of invaluable value in anatomy, and the attitude of anatomists in relation to this make it important to address this issue. Because anatomists have an important role in raising public awareness about cadaver donation.

The majority of anatomists surveyed were familiar with the legal framework. In addition, although most anatomists feel responsible for informing the society, they are not willing to donate themselves as cadavers. Increasing anatomists' willingness to donate may enable the public to positively support donation campaigns in the near future.

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## Conflict of interest

The authors declare that they have no conflicts of interest.

## Data availability statement

The data are available for review upon request.

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