

Annual distribution of body donation application rates in Istanbul, Türkiye

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Abstract

Objectives: Body donation is infrequent in Türkiye. Therefore, understanding body donation behavior becomes vital for managing existing awareness activities. Studies on donor profiles and motivations provide valuable data that could be used to shape the content of awareness activities. The timing of awareness activities is also important for increasing the effectiveness. Although annual differences in donation registrations have been reported, studies investigating the monthly changes within a calendar year are limited. This study aimed to investigate the official records of two departments of anatomy in Istanbul for outlining the monthly changes of body donation registrations.

Methods: The official records of 450 body donors who registered between 2012 and 2019 to the body donation programs of two departments of anatomy were evaluated. Annual and monthly registration numbers were recorded and analyzed.

Results: For the 2012-2019 period, 154 female (34.2%) and 296 male (65.8%) donors were registered to both programs. In general, the registrations were more frequent in May, November and December ($\chi^2=51.28$; $p<0.001$). Interestingly, female donors preferred to register in May, June, November, and December ($\chi^2=40.961$; $p<0.001$), while males preferred to register in March, April, May, September, and December ($\chi^2=24.757$; $p=0.01$).

Conclusion: Currently, existing awareness activities in Türkiye are organized at the end of October which falls just before the Autumn peak of donor registrations. Therefore, planning awareness activities prior to the Spring peak might contribute to a more focused conduct of body donation awareness in Türkiye.

Keywords: body donation; body donation program; donor recruitment; registration; Türkiye

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Introduction

Human cadavers are an important part of the anatomy training and medical education.^[1] The use of cadavers in anatomical education provides a broad spectrum of opportunities for medical students and improves their manual dexterity, recognition of body structures, understanding of human variation, teamwork abilities, professional attitudes, interdisciplinary communication, reflections on death and dying, and empathy skills.^[2–4] For this reason, procuring an adequate number of bodies, i.e. the success of body donation programs, maintains its importance in anatomical sciences.^[5]

In countries with well-developed body donation programs,^[6] a campaign or promotion to raise body donation awareness in the society is not needed.^[7] On the other

hand, in countries where social awareness is low, such as Türkiye, awareness activities have vital importance for body donation programs.^[8–10] Although countries with well-developed body donation programs provide good examples for different awareness activities, cultural differences between countries suggest modifications or implementation of novel methods to those activities.^[9,11] Therefore, working with well-analyzed data and to keep the workforce-benefit balance at optimum in order to reach out to people who are more inclined to body donation becomes crucial.

Research studies aimed to increase the public awareness on body donation and body procurement rates provide valuable data for daily anatomy practice. These studies usually collect survey data from living individuals who

consider body donation, registered body donors, or the public for understanding body donation behavior.^[12–14] Quantitative and qualitative data obtained from these studies constitute the basis for determining the working strategies in awareness campaigns on body donation.^[9,15]

Official records of anatomy institutions could be another important data source for obtaining information on body donation. These records could provide data on living individuals who decided to register for body donation and deceased individuals whose bodies are used as cadavers for medical education and research. For example, previous studies that used official records showed that the population registered for body donation may differ from the general population in terms of demographic features or motivations.^[9,16–20]

These research studies provide an opportunity for anatomists to reach out to individuals with similar traits, be better prepared for individuals' concerns regarding body donation, and focus on distinctive motivations for body donation to recruit more body donors.

Similarly, temporal changes in official registrations have also been reported.^[21] Unlike profiling studies, these studies provide a timeframe for anatomists to focus their awareness activities to certain periods within a year and increase the effectiveness of given awareness activities.

For obtaining a more detailed understanding on the body donation behavior in Türkiye, this study aimed to discover the temporal relationships of official body donation registrations and to determine whether there are seasonal behavioral patterns.

Materials and Methods

A reported increase in body donation registrations since 2012 has led the authors to investigate the official registrations between 2012–2019 for outlining any temporal changes. Official consent forms of 450 citizens registered for body donation who applied to the donation programs of Istanbul University-Cerrahpaşa, Cerrahpaşa Faculty of Medicine (CFM) and Istanbul University, Istanbul Faculty of Medicine (IFM) between 2012 and 2019 were included in the study. The time (month and year) of registration and sex of the registered citizens were recorded.

Chi square test was used to compare categorical groups such as institutions and sex. The null hypothesis was there were no temporal changes among donation registrations. Therefore, a simulated control group was created for comparison with the assumption that the total registrations were equally distributed over each year and month. Temporal changes of donation registra-

tions were compared with McNemar's test. SPSS v.21 (IBM Corp., Armonk, NY, USA) was used for statistical evaluation.

Results

Among 450 individuals who were registered for the 2012–2019 period, 154 (34.2%) (IFM: 71; CFM: 83) were female and 296 (65.8%) (IFM: 138; CFM: 158) were male. There were no significant differences between both institutions regarding the sex ($p=0.917$), the number of annual applications ($p=0.167$), the number of applications per month ($p=0.551$), or the distribution of sex for annual registrations ($p=0.361$).

McNemar's test showed that there was a significant gradual increase for annual body donation registrations from 2012 to 2019 ($\chi^2=21.822$; $p=0.003$). Similarly, the annual number of registrations for females increased significantly within the study period ($\chi^2=17.532$; $p=0.014$). Despite a numerical increase in the number of registrations for males, no significant difference was found for the 2012–2019 period ($\chi^2=11.892$; $p=0.104$) (**Figure 1**).

For the 2012–2019 period, formal registration times showed significant monthly differences ($\chi^2=51.28$; $p<0.001$). Registrations were more frequent in May, November, and December (**Figure 2**).

Significant monthly increases were observed in the number of registrations for females ($\chi^2=40.961$; $p<0.001$) and males ($\chi^2=24.757$; $p=0.01$). Females were more frequently registered in May, June, November, and December, while males preferred to register March, April, May, September, and December (**Figure 2**).

When the institutions were analyzed individually, the annual number of registrations increased at IFM over the years ($\chi^2=24.455$; $p=0.001$). In contrast, there was no significant increase for annual registrations at CFM ($\chi^2=8.129$; $p=0.321$) (**Figure 1**).

Similarly, monthly registrations were significantly increased at CFM in March, September, November, and December ($\chi^2=36.095$; $p<0.001$) and at IFM in April, May, and December ($\chi^2=25.660$; $p=0.007$) (**Figure 2**).

Discussion

This study showed the presence of temporal changes in body donation registrations in Türkiye for the first time and provided an insight into body donation behavior. It also confirmed that there was a significant increase in annual body donation registrations in Istanbul between 2012 and 2019.^[9] Within a year, individuals who consider body donation frequently applied in May, November, and

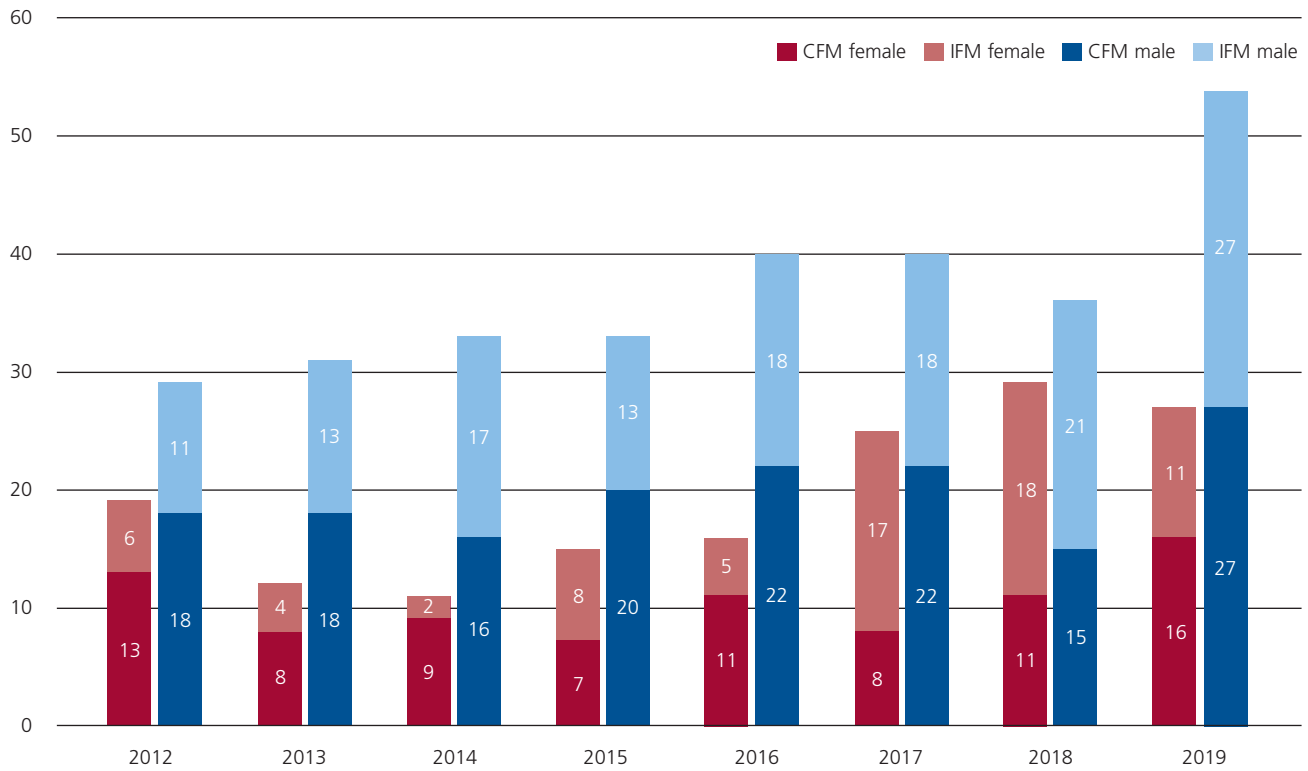


Figure 1. Clustered stacked bar chart showing the distribution of individuals who register for body donation for Cerrahpaşa Faculty of Medicine (CFM) and Istanbul Faculty of Medicine (IFM) by gender between 2012 and 2019.

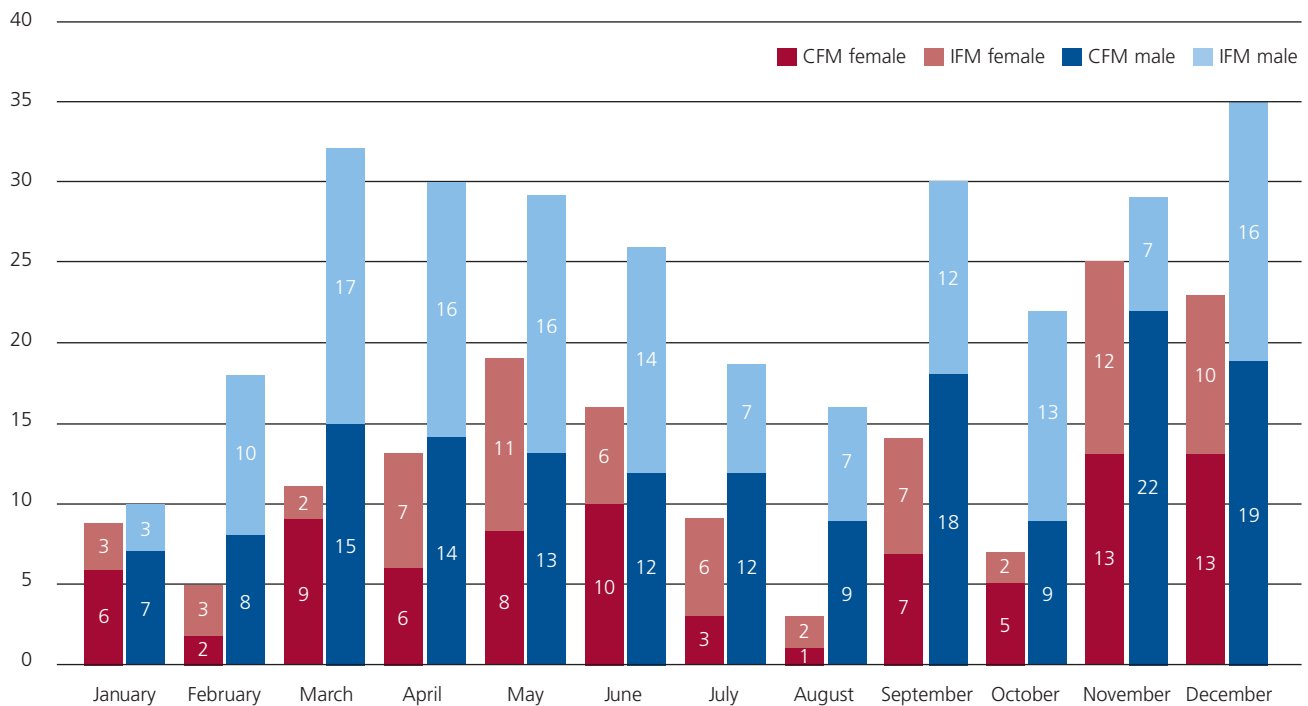


Figure 2. Clustered stacked bar chart showing the distribution of individuals who register for body donation for Cerrahpaşa Faculty of Medicine (CFM) and Istanbul Faculty of Medicine (IFM) by gender by month.

December. Interestingly, females and males frequently registered at different months. The data provided with this study might be useful for countries like Türkiye that need active and effective campaigns for increasing public awareness on body donation.

Although there are numerous studies that outline donor profiles and motivations, the temporal changes reported in these studies cover years or decades and lack data on registrations within a year.^[9,12,16–20,22,23] Interestingly, temporal behavior of individuals, who consider or register for body donation, between months is scarcely studied. Cornwall,^[21] investigated the records of 1352 registered body donors in New Zealand and reported that registrations in August, September, and October constituted nearly one third (32%) of all registrations. This period corresponds with the transition into spring for the southern hemisphere.^[21] The onset of spring was related with neuroendocrine and behavioral changes in individuals. The amounts of melatonin and serotonin are highest during the spring.^[24] Similarly, mood alterations and drastic decisions that involve significant or extreme behavior, such as suicide, is more frequent at the beginning of spring.^[25,26] Nevertheless, the effects of seasonal changes on body donation decisions remain unexplored. Similarly, the first peak in donor registrations in Istanbul was prominent during May, which marked the end of spring for the northern hemisphere. Despite the speculative data, temporal behaviors of two registered body donor cohorts at diverse geographical locations are similar.

As for low numbers of registrations, Cornwall^[21] reported that the lowest number of registrations were observed in the December–January period and July. In New Zealand, summer months of December and January constitute the major public and school holiday period over the Christmas period. In Türkiye, body donor registrations significantly decreased during the summer months of July and August which are the major public, school, and university holiday periods. Similar to the increase in spring transition, major holiday seasons seem to affect body donation decisions negatively. Cornwall^[21] suggested that the registration decrease in New Zealand during the winter in July may be related to an opposite process of the increase in spring. Interestingly, donation registrations in Istanbul were the least during January and February which are winter months. Additionally, the end of January and beginning of February is the semester holiday season for primary schools and universities in Türkiye. It is known that, despite their diverse cultural and geographical differences, body donors tend to have similar traits in demographics and motivations.^[9,13] This study and the study of

Cornwall^[21] show that individuals that decide to donate their bodies seem to have similar temporal behaviors for registering to a donation program, despite their cultural and geographical differences.

The Turkish Society of Anatomy and Clinical Anatomy (TSACA) had published the “Report on the Cadaver Problem in Turkey and Recommendations for a Solution” in 2013 for underlying the cadaver shortage at Turkish medical faculties.^[27] In order to increase the number of bodies procured for education and research, the TSACA suggested promoting body donation in Türkiye by an awareness campaign. The last week of October was selected as the National Anatomy Week to highlight the current cadaver problem, emphasize the importance of cadavers, and publicly promote the idea of body donation.^[11,28] The encouragement of the TSACA resulted in press releases,^[29] interviews,^[30] and official commemorations for body donors^[31] within the last decade. Ok and Gürses^[11] suggested that these activities significantly increased the average annual donation registrations to CFM and IFM for the 2012–2019 period when compared to the 2000–2012 period.^[9,11] Similarly, Erdoğan et al.^[8] demonstrated that the public awareness on body donation had reached a critical level where citizens are aware of what body donation means despite their lack of motivation to donate and knowledge on how. Additionally, the highest body donation registration rate was observed in November and December, just after the National Anatomy Week activities. This suggests that there might be temporal correlation between selected awareness campaign timeframe and registration months. On the other hand, the activities of the National Anatomy Week do not explain the increase in body donation registrations in September. Therefore, it needs further research to explain the increase in November and December whether it was caused by the National Anatomy Week, the seasonal effect of Autumn, or their cumulative effect.

A significant registration peak was also observed in May. Therefore, a second group of activities organized before May might further improve awareness among the population and increase registrations. Commemoration services might be an example for implementing the newly observed temporal behavior.^[32–34] Interestingly most commemorations performed in Türkiye were organized within the National Anatomy Week which falls into the middle of the first semester of an academic year where most medical schools are only a few months into anatomy laboratories and cadaver exposure. Although student opinions on the timing of a commemoration cer-

emony favor before the laboratory starts,^[35] most commemorations around the world are done at the end of the anatomy course.^[36–40] The end of term commemorations might give the students to reflect their empathy and gratitude towards the donors^[37,40] and provide a closure for students as well as donor relatives.^[41,42] Therefore, organizing commemorations services during a later time within the academic year, such as April or May might have a positive effect on the ongoing awareness efforts in Türkiye.

Both CFM and IFM had no differences for sex distribution of registered individuals, annual registrations, and monthly registration rates for the 2012–2019 period. Conversely, while the CFM received a relatively regular registration rate, the number of registrations to the IFM significantly increased over the years. Additionally, both institutions differed for highest registered months. This study showed that the temporal behavior of registered body donors differed in two institutions in Istanbul. This finding suggests that neither institution might not represent the city of Istanbul due to the small number of applications per year. This also implies that a second timeframe for additional awareness activities might differ among institutions or cities. Therefore, for the time being each institution in Türkiye might perform a similar analysis and determine an appropriate time for their additional awareness activities.

Although this study detected an alternative timeframe for awareness activities, it has limitations. The number of registrations to both institutions was limited to 450 for an eight-year period. Despite both institutions being located in the same city and district, the small sample size has led to significant differences in annual registration numbers and behavior of female and male donors. Therefore, the results might not reflect the city of Istanbul or Türkiye in general.

Conclusion

The number of body donation registrations are increasing in Türkiye. The individuals who consider body donation choose to register at certain months within a year. Peaks in registrations are observed during Autumn and end of Spring. Current awareness activities in Türkiye fall within the Autumn peak. Therefore, planning awareness activities in the Spring might contribute to a more focused conduct of body donation awareness in Türkiye. Nevertheless, due to the limited number of registrations per year, institutions might need to analyze their records for detecting appropriate timing.

Conflict of Interest

No conflict of interest was declared by the authors.

Author Contributions

AE: project development, data collection, data analysis, manuscript writing; OC: data collection, data management, data analysis; ÖID: data collection, data analysis, manuscript writing; İAG: project development, data analysis, manuscript editing.

Ethics Approval

Ethical approval was not needed for this study.

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References

1. Arráez-Aybar LA, Sánchez-Montesinos I, Mirapeix RM, Mompeo-Corredera B, Sañudo-Tejero JR. Relevance of human anatomy in daily clinical practice. *Ann Anat* 2010;192:341–8.
2. Cook MS, Kernahan PJ. An unembalmed cadaveric preparation for simulating pleural effusion: a pilot study of chest percussion involving medical students. *Anat Sci Educ* 2017;10:160–9.
3. Kumar Ghosh S, Kumar A. Building professionalism in human dissection room as a component of hidden curriculum delivery: a systematic review of good practices. *Anat Sci Educ* 2019;12:210–21.
4. Lempp HK. Perceptions of dissection by students in one medical school: beyond learning about anatomy. A qualitative study. *Med Educ* 2005;39:318–25.
5. Gürses İA, Coşkun O, Öztürk A. Current status of cadaver sources in Turkey and a wake-up call for Turkish anatomists. *Anat Sci Educ* 2018;11:155–65.
6. Habicht JL, Kiessling C, Winkelmann A. Bodies for anatomy education in medical schools: an overview of the sources of cadavers worldwide. *Acad Med* 2018;93:1293–300.
7. Biasutto SN, Sharma NA, Weiglein AH, Benia FM, McBride J, Bueno-Lopez JL, Kramer B, Blyth P, Barros MD, Ashiru O, Ballesteros LE, Moxham BJ, Krishnan S. Human bodies to teach anatomy: importance and procurement - experience with cadaver donation. *Revistata Argentina de Anatomia Clinica* 2014;6:72–86.
8. Erdoğan K, Özen K, Yıldız H, Malas MA. Assessment of awareness, knowledge and attitudes about the importance of cadaver and cadaver donation: Report of Izmir, Turkey. *International Journal of Morphology* 2020;38:831–7.
9. Gürses İA, Ertaş A, Gürtekin B, Coşkun O, Üzel M, Gayretli Ö, Demirci MS. Profile and motivations of registered whole-body donors in Turkey: Istanbul University experience. *Anat Sci Educ* 2019;12:370–85.
10. Kurtuluşlu Olgunus Z, Yeşil Kayabaşı Ç. Evaluation of knowledge and attitudes of physicians in Turkey about body donation processes. *Anatomy* 2021;15:152–62.
11. Ok F, Gürses İA. Evaluation of information on body donation promotion at official websites of Turkish anatomy departments. *Anat Sci Educ* 2021;14:816–827.

12. Bolt S, Eisinga R, Venbrux E, Kuks JBM, Gerrits PO. Personality and motivation for body donation. *Ann Anat* 2011;193:112–7.
13. Cornwall J, Poppelwell Z, McManus R. “Why did you really do it?” A mixed-method analysis of the factors underpinning motivations to register as a body donor. *Anat Sci Educ* 2018;11:623–31.
14. Richardson R, Hurwitz B. Donors’ attitudes towards body donation for dissection. *Lancet* 1995;346:277–9.
15. Delaney MF, White KM. Predicting people’s intention to donate their body to medical science and research. *J Soc Psychol* 2015;155: 221–37.
16. Anteby M, Garip F, Martorana PV, Lozanoff S. Individuals’ decision to co-donate or donate alone: an archival study of married whole body donors in Hawaii. *PLoS One* 2012;7:e42673.
17. Asad AL, 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* 2014;106:53–8.
18. Bolt S, Venbrux E, Eisinga R, Kuks JBM, Veening JG, Gerrits PO. Motivation for body donation to science: more than an altruistic act. *Ann Anat* 2010;92:70–4.
19. Cornwall J, Perry GF, Louw G, Stringer MD. Who donates their body to science? An international, multicenter, prospective study. *Anat Sci Educ* 2012;5:208–16.
20. Techataweewan N, Panthongviriyakul C, Toomsan Y, Mothong W, Kanla P, Chaichun A, Amartayakong P, Tayles N. Human body donation in Thailand: donors at Khon Kaen University. *Ann Anat* 2018;216:142–51.
21. Kramer B, Hutchinson EF. Transformation of a cadaver population: analysis of a South African cadaver program, 1921–2013. *Anat Sci Educ* 2015;8:445–51.
22. Olejaz M, Hoeyer K. Meet the donors: a qualitative analysis of what donation means to Danish whole body donors. *European Journal of Anatomy* 2016;20:19–29.
23. Cornwall J. Annual variation of body donor registrations in New Zealand. *Eur J Anat* 2014;18:55–9.
24. Wirz-Justice A. Biological rhythm disturbances in mood disorders. *Int Clin Psychopharmacol* 2006;21:S11–5.
25. Hiltunen L, Suominen K, Lönnqvist J, Partonen T. Relationship between daylength and suicide in Finland. *J Circadian Rhythms* 2011;9:1–12.
26. Postolache TT, Mortensen PB, Tonelli LH, Jiao X, Frangakis C, Soriano JJ, Qin P. Seasonal spring peaks of suicide in victims with and without prior history of hospitalization for mood disorders. *J Affect Disord* 2010;121:88–93.
27. Turkish Society of Anatomy and Clinical Anatomy. TAKAD 2013 Türkiye’de kadavra sorunu ve çözüm önerileri. [Internet]. [Retrieved on December 13, 2018]. Available from: <http://www.anatomidernegi.org.tr/belgeler>
28. Turkish Society of Anatomy and Clinical Anatomy. Ulusal anatomi haftası basın bildirgesi. [Internet]. [Retrieved on December 13, 2018]. Available from: <http://www.anatomidernegi.org.tr/belgeler>
29. Turkish Society of Anatomy and Clinical Anatomy. Beden bağıışı bilgilendirme. [Internet]. [Retrieved on December 13, 2018]. Available from: <http://www.anatomidernegi.org.tr/belgeler>
30. Çubukçu B. Kadavrasız anatomi dersi. [Internet]. [Retrieved on December 13, 2018] Available from: <http://www.aljazeera.com.tr/al-jazeera-ozel/kadavrasiz-anatomi-dersi>
31. Anadolu Ajansı. Eğitime bağışlanan kadavra 8 yıl sonra toprağa verildi. [Internet]. [Retrieved on December 13, 2018]. Available from: <https://www.aa.com.tr/tr/saglik/egitime-bagislanan-kadavra-8-yil-sonra-torenle-topraga-verildi/1670703>
32. Kumar Ghosh S. Paying respect to human cadavers: we owe this to the first teacher in anatomy. *Ann Anat* 2017;211:129–34.
33. Kumar Ghosh S. The practice of ethics in the context of human dissection: setting standards for future physicians. *Ann Anat* 2020;232: 151577.
34. Jones DG. Searching for good practice recommendations on body donation across diverse cultures. *Clin Anat* 2016;29:55–9.
35. El-Haddad J, Prvan T, Štrkalj G. Attitudes of anatomy students toward commemorations for body donors: a multicultural perspective. *Anat Sci Educ* 2021;14:89–98.
36. Crow SM, O’Donoghue D, Vannatta JB, Thompson BM. Meeting the family: promoting humanism in gross anatomy. *Teach Learn Med* 2012;24:49–54.
37. da Rocha AO, Maués JL, Chies GAF, da Silva AP. Assessing the impact of a ceremony in honor of the body donors in the development of ethical and humanistic attitudes among medical students. *Anat Sci Educ* 2020;13:467–74.
38. Jones TW, Lachman N, Pawlina W. Honoring our donors: a survey of memorial ceremonies in United States anatomy programs. *Anat Sci Educ* 2014;7:219–223.
39. Park JT, Jang Y, Park MS, Pae C, Park J, Hu KS, Park JS, Han SH, Koh KS, Kim HJ. The trend of body donation for education based on Korean social and religious culture. *Anat Sci Educ* 2011;4:33–8.
40. Talarico EF Jr. A change in paradigm: giving back identity to donors in the anatomy laboratory. *Clin Anat* 2013;26:161–72.
41. Halliday NL, Moon MB, O’Donoghue DL, Thompson BM, Crow SM. Transformation and closure for anatomical donor families that meet medical students. *Anat Sci Educ* 2019;12:399–406.
42. Jiang J, Chen Q, Zhang M, Hong T, Huang K, Meng H, Ding J, Zhang L. Effects of commemorations and postdonation services on public willingness to donate bodies in China. *Anat Sci Educ* 2020;13: 218–29.

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