

Evaluation of the views of family physicians on radiological anatomy course

 Gülüzar Gül,  Ayla Tekin,  Tuncay Çolak

Department of Anatomy, Faculty of Medicine, Kocaeli University, Kocaeli, Türkiye

Cite this article as: Gül G, Tekin A, Çolak T. Evaluation of the views of family physicians on radiological anatomy course. *J Health Sci Med.* 2024;7(6):621-625.

Received: 29.08.2024

Accepted: 02.10.2024

Published: 27.10.2024

ABSTRACT

Aims: The feedback obtained from surveys administered to healthcare professionals working as physicians, in addition to students, is highly valuable for improving anatomy education. In our study, we aimed to contribute to the enhancement of anatomy education in medical faculties by obtaining the opinions of family physicians regarding the radiological anatomy course.

Methods: In our study, the opinions of family physicians regarding the radiological anatomy course were obtained through a survey prepared by the researchers, consisting of 12 questions, and conducted on a voluntary basis. A total of 387 family physicians participated, with 50.4% (n=195) being female and 49.6% (n=192) male, who responded to the survey form sent to Kocaeli and İstanbul family physician associations via email accounts.

Results: Only 19.4% (n=75) of the family physicians who participated in our study had taken a radiological anatomy course during their undergraduate education, and they stated that besides its contribution to theoretical and practical courses before graduation, it was also beneficial in their postgraduate medical careers. Of those who had taken the radiological anatomy course during their undergraduate education, 94.7% (n=71) believed that this course should be included in medical school curricula, compared to 91.9% (n=284) of those who had not taken this course during their undergraduate education.

Conclusion: We believe that to improve and enhance anatomy education, and thus contribute to the development of more qualified physicians and their professional careers, the radiological anatomy course should be added to the curriculum of medical faculties.

Keywords: Family physicians, medical faculty, anatomy

INTRODUCTION

In Türkiye, medical education generally follows a six-year structure, consisting of three years of basic sciences, followed by two years of clinical sciences, and then, one year of internship training.¹ Anatomy education, which is a fundamental component of basic medical sciences, serves as a cornerstone in medical school education.² Anatomy is the oldest medical discipline that studies the normal shape, structure, organs and relationships between these organs of the human body.³ In medical faculties, anatomy education is provided through theoretical and practical courses. The theoretical courses usually involve slides, while the practical courses involve the utilization of various models and cadavers. Making changes in anatomy education can enhance both the teaching and learning processes, leading to greater success for students. It has been demonstrated that the radiological anatomy course enhances students' understanding of anatomy from a theoretical aspect.⁴ Due to the lack of cadavers in medical faculties in our country, the time for dissection is limited.⁵ The addition of radiological anatomy courses not only contributes to the theoretical aspect but has also been

found to enhance the efficiency of dissection time in practical classes.⁶

A family physician is a specialist in family medicine who provides primary care, preventive health services for families and individuals, and provides first-line diagnosis, treatment, and rehabilitation services. They may also provide mobile healthcare services when necessary.⁷ It is extremely important for physicians to receive a high-quality education in basic medical sciences to enhance their clinical practices throughout their professional careers.⁸ Physicians should have a good knowledge of anatomy to conduct a proper physical examination and to make an accurate diagnosis of the patient.⁹ In conclusion, to produce competent physicians, medical faculties should provide a solid education in anatomy. As in many other fields, feedback obtained from surveys given to graduates and practicing physicians is valuable in assessing the achievement of targeted outcomes in anatomy education. The aim of this study is to contribute to the improvement and development of anatomy education by evaluating family physicians' opinions about the radiological anatomy course through a survey.

Corresponding Author: Gülüzar Gül, guluzarbny@gmail.com



This work is licensed under a Creative Commons Attribution 4.0 International License.

METHODS

The study was carried out with the permission of the Kocaeli University Non-interventional Researches Ethics Committee (Date: 02.11.2023, Decision No: 2023/18.25). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. The opinions of family physicians regarding the radiological anatomy course were collected using a Google Forms survey, consisting of 12 questions. The questions in the survey regarding the radiological anatomy course were prepared based on the survey questions from the study conducted by Rathan et al.,¹⁶ which had a Cronbach’s alpha value of 0.92, as well as the study conducted by Gülekon.³⁰ A power analysis conducted using the PASS 11 program for a 95% confidence interval and a 5% margin of error yielded a sample size of 385. The survey form was sent to the Kocaeli and İstanbul family physician associations via email accounts, and ultimately, 387 family physicians participated in the study. The surveys were conducted entirely on a voluntary basis, and at the beginning of the survey, a brief explanation about the study was provided. To ensure the confidentiality of the responses, personal information such as the names, surnames, and phone numbers of the family physicians was not collected. In the first three questions of the survey, family physicians were asked to specify their gender, age, and the medical faculties from which they graduated. For the remaining nine questions, they were expected to respond with “yes,” “no,” or “I don’t know.”

RESULTS

Out of the 387 family physicians who participated in our study, 50.4% (n=195) were female, and 49.6% (n=192) were male. In terms of age distribution, 57.4% (n=222) were in the 24-34 age range, 37.2% (n=144) were in the 35-45 age range, and 5.4% (n=21) were in the 46-56 age range.

11.4% (n=44) of the family physicians were graduates of Marmara University, 8.8% (n=34) were graduates of Uludağ University, and 5.4% (n=21) were graduates of Kocaeli University’s medical faculty. The remaining 74.4% were graduates of medical faculties from other universities (Figure 1).

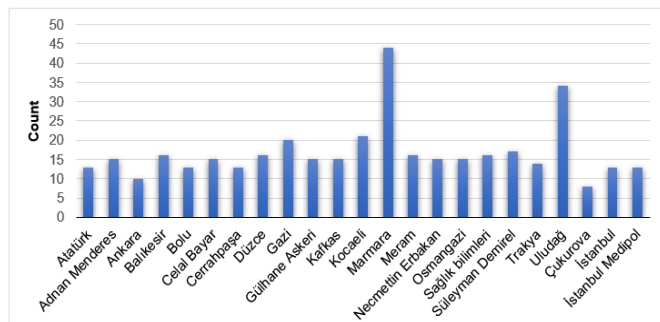


Figure 1. Medical faculties from which family physicians graduated

79.8% (n=309) of the family physicians answered “no,” 19.4% (n=75) answered “yes,” and 0.8% (n=3) answered “I don’t know” to the question 4: “Have you taken the radiological anatomy course?”. The responses of the 75 individuals who took the radiological anatomy course to question 5: “Did this course increase your interest in learning anatomy?” question

6: “Did this course make learning anatomy easier and more understandable?” question 7: “Have you seen any contribution of this course in your professional life?” and question 8: “Did this course increase the efficiency of your cadaver dissection time?” are shown in Figure 2.

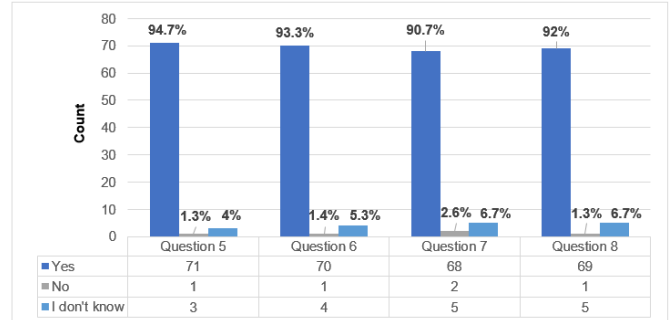


Figure 2. Opinions of family physicians who took the radiological anatomy course

The responses of family physicians who took the radiological anatomy course to question 9: “Do you think the radiological anatomy course should be included in the medical school curriculum?” question 10: “Would you prefer to have a radiological anatomy course in your medical school curriculum in the preclinical period?” question 11: “Would you prefer to have a radiological anatomy course in your medical school curriculum in the clinical period?” and question 12: “Would you prefer to have a radiological anatomy course in your medical school curriculum in both preclinical and clinical periods?” are shown in Figure 3. The answers given to the 9th, 10th, 11th, and 12th questions by family physicians who did not take the radiological anatomy course are shown in Figure 4.

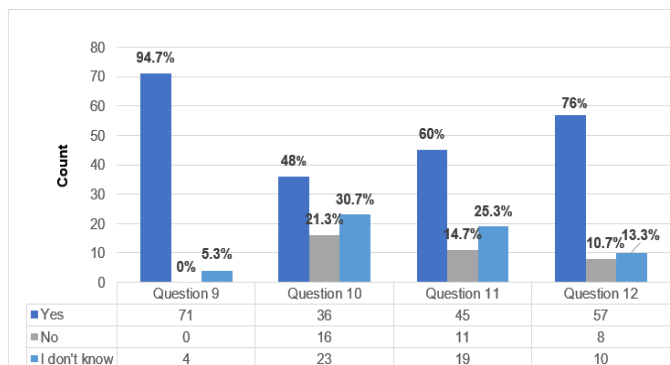


Figure 3. Responses of family physicians who took the radiological anatomy course regarding the medical school curriculum

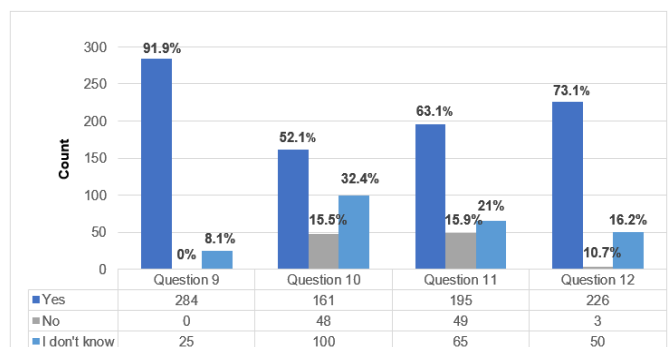


Figure 4. Responses of family physicians who did not take the radiological anatomy course regarding the medical school curriculum

DISCUSSION

The most effective and highest quality method for anatomy education is still a topic of debate.¹⁰ Consulting both students and faculty members, as well as clinicians, for their opinions is a method commonly used to improve anatomy education in medical faculties. As a result of the survey conducted by Yilmaz et al.¹¹ on 212 research assistants working at the faculty of medicine, it was stated that there was a need for improvement in anatomy education. The first study assessing the need for basic anatomy in clinical practice was conducted by Hankin et al.¹² on 50 participants consisting of family medicine and internal medicine residents, revealing the importance of basic anatomy knowledge in clinical practice. In conclusion, the opinions of family physicians working in primary care, who provide health services to patients of all age groups with discomfort throughout the body, are also important for the improvement of anatomy education.¹³

Recognizing and interpreting a radiological image is highly important in medical education. However, radiological anatomy is a grey area that is not comprehensively taught in either anatomy or radiology disciplines.¹⁴ The use of radiological and cross-sectional images in pre-graduate anatomy education provides *in vivo* visualization of anatomical structures and provides insight into pathological processes.¹⁵ The use of radiological images in anatomy courses has been observed to not increase the difficulty of the subject; on the contrary, simultaneous teaching of radiological anatomy alongside dissection courses has been found to enhance the retention of knowledge.^{16,17} It also allows students to interpret theoretical anatomical knowledge in two-dimensional sectional images and relate it to clinical information.¹⁸ Furthermore, it has been shown that there is an increasing benefit of radiological images in the diagnosis and management of patients in clinical settings during postgraduate medical practice.¹⁹ Consistent with the literature, in our study, 93.3% of family physicians who took the radiological anatomy course during their undergraduate education stated that it increased their interest in learning anatomy, and 90.7% stated that it made learning anatomy easier and more understandable.²⁰ In a study by Hammoudi et al.,²¹ students indicated that the radiological anatomy course they took would definitely be beneficial in their future careers, and similarly, in our study, 92% of family physicians who took the radiological anatomy course during their undergraduate education stated that they saw its contribution in their professional careers.

Anatomy education is an essential yet costly component of medical school curricula, and many countries around the world have limited financial resources in this regard. Over the past 15 years, a total of 432 articles related to anatomy education have been examined in the literature, particularly focusing on researching the most effective anatomy education methods for countries with limited financial resources. Economic and technical aspects of radiological imaging and courses have been found to demonstrate the highest operational feasibility compared to the less feasible dissection method.²² In our country, due to the ongoing shortage of cadavers in anatomy education, dissection cannot be performed in some medical faculties, and in many faculties,

the time allocated for dissection is limited.²³ In the study conducted by Sadegi et al.²⁴ on students in the 4th semester of medical education, it was observed that the group who took a radiological anatomy course in addition to practical anatomy knowledge was more satisfied with the course and their practical anatomy knowledge was more permanent. Pascual et al.²⁵ emphasized the integration of atlases used in practical dissection courses with radiology in their study. During the period when dissection was not possible due to the COVID-19 pandemic, Anatomy Departments of two universities in Brazil prepared a digital radiology atlas e-book, which was widely accepted. Even after face-to-face classes resumed, it was observed that students continued to use the e-book and their exam scores increased.²⁶ Our study is like the literature in terms of the contribution of radiological anatomy courses to practical lessons. 92% of family physicians who took the radiological anatomy course during their undergraduate education reported that this course increased the effectiveness of dissection time.

Radiological images can be incorporated into anatomy education through various approaches such as self-directed learning, viewing in the dissection room, e-learning, or blended learning. The discussion has shifted from whether the radiological anatomy course should be included in the curriculum to when and how it should be taught in the curriculum.^{27,28} In a study conducted on 150 clinicians working at the Firat University Medical Faculty Hospital, approximately 90% of them stated that anatomy education in medicine is fundamental and important. Furthermore, it is suggested that for the permanence of anatomical knowledge, anatomy education should not be limited to the pre-clinical period but should also continue during the clinical period.²⁹ In a study conducted on students at Gazi University Faculty of Medicine, the percentage of those who wanted to take the radiological anatomy course increased from around 65% in the second year to around 95% in the sixth year. Approximately 60% of the students expressed their preference to take this course both in high school and in medical school, spanning both pre-clinical and clinical years.³⁰ Our results, in parallel with previous studies, show that a large majority, such as 76% of family physicians who took the radiological anatomy course and 73.1% of those who did not, expressed their desire to take this course both in pre-clinical and clinical years before graduation.

CONCLUSION

The fact that only 19.4% of the family physicians in our study had taken the radiological anatomy course during their undergraduate education indicates that this course is included in the curriculum of only a few medical faculties. However, most family physicians who took the radiological anatomy course during their undergraduate studies stated that this course contributed to both pre-graduation and post-graduation periods, with 94.7% of those who took the course and 91.9% of those who did not take the course expressing that this course should be included in the medical school curriculum. In conclusion, upon examining the responses from family physicians, we believe that including the

radiological anatomy course in the medical school curriculum and providing it in the most comprehensive manner possible would be beneficial. When we look at the literature, we come across studies conducted on students questioning whether adding radiological anatomy to the medical school curriculum for improving anatomy education leads to benefits only in the pre-graduation period. We believe that our study, conducted on family physicians, contributes to the existing literature by questioning the impact of radiological anatomy course both in the pre-graduation period and in the post-graduation medical career.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of the Kocaeli University Non-interventional Researches Ethics Committee (Date: 02.11.2023, Decision No: 2023/18.25).

Informed Consent

All family physicians signed a free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

- Benli AR, İnci H, Cebecik A, Sunay D. Türkiye’de tıp fakülteleri temel tıp bilimlerinin ders saatleri ve akademisyen sayılarının karşılaştırılması. *TED*. 2018;17(51):13-20. doi: 10.25282/ted.327551
- Brooks WS, Woodley KT, Jackson JR, Hoesley CJ. Integration of gross anatomy in an organ system-based medical curriculum: strategies and challenges. *Anat Sci Educ*. 2015;8(3):266-274. doi: 10.1002/ase.1483
- Taner D. Fonksiyonel Anatomi. 11. Baskı. Ankara: HYB Basım; 2017.
- Torres A, Staškiewicz GJ, Lisiecka J, et al. Bridging the gap between basic and clinical sciences: a description of a radiological anatomy course. *Anat Sci Educ*. 2016;9(3):295-303.
- Şahin Ç. Tıp fakültelerinde kadavra eksikliği ve üniversitelerin açtıkları kadavra alım ihaleleri üzerine bir değerlendirme. *Hacettepe HFD*. 2022;12(2):1998-2043.
- Pabst R, Westermann J, Lippert H. Integration of clinical problems in teaching gross anatomy: living anatomy, X-ray anatomy, patient presentations, and films depicting clinical problems. *Anat Rec*. 1986;215(1):92-94. doi:10.1002/ar.1092150114
- Aile hekimliği kanunu, 2021. Available from: <https://www.mevzuat.gov.tr/anayasa?MevzuatFihristDetayIframe?MevzuatTur=1&MevzuatNo=5258&MevzuatTertip=5> (accessed on: 10 January, 2024).
- McCuskey RS, Carmichael SW, Kirch DG. The importance of anatomy in health professions education and the shortage of qualified educators. *Acad Med*. 2005;80(4):349-351. doi:10.1097/00001888-200504000-00008
- Turney BW. Anatomy in a modern medical curriculum. *Ann R Coll Surg Engl*. 2007;89(2):104-107. doi:10.1308/003588407X168244
- Estai M, Bunt S. Best teaching practices in anatomy education: a critical review. *Ann Anat*. 2016;208:151-157. doi:10.1016/j.aanat.2016.02.010
- Yılmaz S, Susar H, Karaca İ, Yılmaz H, Nisari M, Ertekin T. Anatomi eğitimi üzerine araştırma görevlilerinin görüşleri. *Bozok Tıp Derg*. 2017;7(2):35-40.
- Hankin MH, Harmon DJ, Martindale JR, et al. Needs assessment of essential anatomy: The perspective of adult primary care resident physicians. *Anat Sci Educ*. 2023;16(3):504-520.
- Dietrich K, Hutchinson E, Lu MD. Advanced primary care orthopedics: bridging the gap in musculoskeletal education. *Fam Med*. 2020;52(6):444-447. doi:10.22454/FamMed.2020.362716
- Jeffrey DR, Goddard PR, Callaway MP, Greenwood R. Chest radiograph interpretation by medical students. *Clin Radiol*. 2003;58(6):478-481. doi:10.1016/s0009-9260(03)00113-2
- Gunderman RB, Wilson PK. Viewpoint: exploring the human interior: the roles of cadaver dissection and radiologic imaging in teaching anatomy. *Acad Med*. 2005;80(8):745-749. doi:10.1097/00001888-200508000-00008
- Rathan R, Hamdy H, Kassab SE, Salama MNF, Sreejith A, Gopakumar A. Implications of introducing case based radiological images in anatomy on teaching, learning and assessment of medical students: a mixed-methods study. *BMC Med Educ*. 2022;22(1):723. doi:10.1186/s12909-022-03784-y
- Rajprasath R, Kumar VD, Murugan M, Goriparthi BP, Devi R. Evaluating the effectiveness of integrating radiological and cross-sectional anatomy in first-year medical students-a randomized, crossover study. *J Educ Health Promot*. 2020;9:16.
- Murphy KP, Crush L, O’Malley E, et al. Medical student knowledge regarding radiology before and after a radiological anatomy module: implications for vertical integration and self-directed learning. *Insights Imag*. 2014;5(5):629-634. doi:10.1007/s13244-014-0346-0
- Webb AL, Choi S. Interactive radiological anatomy eLearning solution for first year medical students: development, integration, and impact on learning. *Anat Sci Educ*. 2014;7(5):350-360. doi:10.1002/ase.1428
- Lufler RS, Zumwalt AC, Romney CA, Hoagland TM. Incorporating radiology into medical gross anatomy: does the use of cadaver CT scans improve students’ academic performance in anatomy?. *Anat Sci Educ*. 2010;3(2):56-63. doi:10.1002/ase.141
- Torres A, Staškiewicz GJ, Lisiecka J, et al. Bridging the gap between basic and clinical sciences: A description of a radiological anatomy course. *Anat Sci Educ*. 2016;9(3):295-303.
- Chang Chan AY, Cate OT, Custers EJFM, Leeuwen MSV, Bleys RLAW. Approaches of anatomy teaching for seriously resource-deprived countries: a literature review. *Educ Health (Abingdon)*. 2019;32(2):62-74. doi:10.4103/efh.EfH_272_17
- Turamanlar O. Türkiye’de ilk kadavra temini ve disseksiyon çalışmaları ile günümüze yansımaları. *BSJ Health Sci*. 2024;7(1):50-54. doi:10.19127/bshealthscience.1380512
- Sadeqi H, Valiani A, Avizhgan M, et al. The effect of teaching integrated course of physical examination and radiological anatomy in practical limb anatomy on medical students’ learning outcomes. *BMC Med Educ*. 2021;21(1):461. doi:10.1186/s12909-021-02898-z

25. Pascual TN, Chhem R, Wang SC, Vujnovic S. Undergraduate radiology education in the era of dynamism in medical curriculum: an educational perspective. *Eur J Radiol.* 2011;78(3):319-325. doi: 10.1016/j.ejrad.2010.08.039
26. Camilo GB, Maciel SM, Camilo GCT, et al. Introducing medical students to radiological anatomy: the importance of experiential learning during the COVID-19 pandemic lockdowns. *Anat Sci Educ.* 2022;15(5):980-984. doi:10.1002/ase.2210
27. Grignon B, Oldrini G, Walter F. Teaching medical anatomy: what is the role of imaging today?. *Surg Radiol Anat.* 2016;38(2):253-260. doi:10.1007/s00276-015-1548-y
28. Nagaraj C, Yadurappa SB, Anantharaman LT, Ravindranath Y, Shankar N. Effectiveness of blended learning in radiological anatomy for first year undergraduate medical students. *Surg Radiol Anat.* 2021;43(4):489-496. doi:10.1007/s00276-020-02572-x
29. Akkoç RF, Aksu F, Kavaklı A, Ögetürk M. Klinisyenlerin gözüyle anatomi eğitimi: anket çalışması. *Fırat Med J.* 2021;26(4):234-238.
30. Gülekon İN. Anatomi eğitiminde radyolojik ve klinik anatominin yeri: öğrenci görüşleri. *Gazi Med J.* 2017;28(3):179-183. doi:10.12996/gmj.2017.54