ORIGINAL ARTICLE

DOI: 10.4274/nkmj.galenos.2024.46548
Nam Kem Med J 2025;13(1):30-37

The Attitudes of Interns Towards the Anatomy Course: A Cross-Sectional Study

İntörnlerin Anatomi Dersine Yönelik Tutumları: Kesitsel Bir Çalışma

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ABSTRACT

Aim: In this study, we aimed to evaluate the attitudes and perspectives of interns regarding anatomy, who were in the final stage of their medical education, in which anatomy knowledge is integrated with clinical knowledge.

Materials and Methods: An online survey incorporating the 14-item Anatomy Attitude Scale, organized into three subgroups, was created, and a total of 245 interns completed the questionnaire.

Results: The majority (91.8%, n=225) had a negative attitude towards the abolition of anatomy courses in medical faculties. Of the participants, 80.8% (n=198) stated that learning anatomy made them happy, and 75.92% (n=186) would not call someone who did not know anatomy a physician. A total of 94.3% (n=231) of participants agreed that they should refresh their anatomy knowledge at the beginning of every internship. During the internship, they found the circulatory system to be the system they needed the most and the locomotor system to be the most remembered.

Conclusion: It was observed that the participants better remembered the topics they needed most in the clinic. Additionally, the interns unanimously agreed that reminder lectures were definitely necessary. This study potentially contributes to determining the optimal balance of systems for programs planning vertical or horizontal integration.

Keywords: Anatomy education, attitudes of interns, integration of anatomy knowledge

ÖZ

Amaç: Bu çalışmada anatomi bilgisinin klinik bilgiyle bütünleştiği tıp eğitiminin son aşamasıda olan intörnlerin anatomi ile ilgili tutum ve görüşlerini değerlendirmeyi amaçladık.

Gereç ve Yöntem: Üç alt grupta düzenlenmiş 14 maddelik Anatomi Tutum Ölçeği'ni içeren çevrimiçi bir anket oluşturuldu ve toplam 245 intörn anketi tamamladı.

Bulgular: Katılımcıların çoğunluğu (%91,8, n=225), tıp fakültelerinde anatomi derslerinin kaldırılmasına olumsuz bir tutum sergiledi. Katılımcıların %80,8'i (n=198) anatomi öğrenmenin onları mutlu ettiğini belirtirken, %75,92'si (n=186) anatomi bilmeyen birine hekim demeyeceklerini ifade etti. Katılımcıların toplam %94,3'ü (n=231), her intörnlük döneminin başında anatomi bilgilerini tazelemeleri gerektiği konusunda hemfikirdi. İntörnlük döneminde, dolaşım sistemi en çok ihtiyaç duyulan sistem ve lokomotor sistemi de en çok hatırlanan sistem olarak bulundu.

Sonuç: Katılımcıların, klinikte en çok ihtiyaç duydukları konuları daha iyi hatırladıkları gözlemlendi. Ayrıca intörnler, hatırlatma derslerinin kesinlikle gerekli olduğu konusunda ortak bir fikirde birleştiler. Bu çalışma, dikey veya yatay entegrasyon planlayan programlar için sistemlerin optimal dengesinin belirlenmesine potansiyel olarak katkıda bulunabilir.

Anahtar Kelimeler: Anatomi bilgisinin entegrasyonu, anatomi eğitimi, intörnlerin tutumları

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Received: 29.10.2024 Kabul **Accepted:** 11.12.2024 **Publication Date:** 06.03.2025

Cite this article as: Akcaalan M, Karahan M, Turhan B. The attitudes of interns towards the anatomy course: a cross-sectional study. Nam Kem Med J. 2025;13(1):30-37

INTRODUCTION

Anatomy is crucial for medical students as it is the basis of medical courses and the oldest known medical science[1]. Anatomy education is essential for students to understand how diseases affect the body and to perform physical examinations[2]. Interns, i.e. students in the final year of training in medical faculties, put into practice all the knowledge they have learned so far, including basic sciences in the last year of training. During these years, interns are trained to learn clinical skills, perform some clinical procedures, provide patient management and use their judgement in clinical decision-making processes[3]. Interns are in a stage of education where anatomical knowledge is integrated with clinical skills. After they graduate and start working as a doctor, it is known that they need anatomy knowledge which is seen as a complex, intensive and challenging course for students in order to practice safely in procedures such as imaging, diagnosis and surgical operations[4-6]. In this process, the importance of anatomy knowledge is emphasized, and it is stated that malpractice may occur in cases of insufficiency of anatomy knowledge[7].

Interns have many responsibilities in the final term, which is important for the transition to professional life. Although the practice has been especially important for them in the final term, it should be complemented by the theoretical education they have received in the basic sciences during these practices. During the internship, some medical faculties provide horizontal and vertical integration instruction for basic sciences, detailed and case-oriented anatomy information related to clinical applications is mentioned as contents[8]. Therefore, in the integration approach, where basic sciences and clinical sciences are presented together, the reminder and case-oriented anatomy knowledge could be necessary.

Human beings have multiple point of views about the natural environment that they live in. People feel different emotions such as like or dislike about all the objects or events that they experience[9]. Therefore, an evaluation of an individual comes up as "attitude" about other people, opinions or objects[10,11]. There is a strong interaction process of teaching among instructor, students, and other learning components in the education settings of anatomy. The quality of this interaction may result in a meaningful impact on the attitudes of the learners in terms of anatomy education[12].

Many studies investigate medical students' opinions and attitudes about anatomy education. In the study of Cetkin et al.[13], most of the students in term I and term II asserted their positive opinions about anatomy lesson. Another study by Sindel et al.[14] demonstrated that the students of term I-II wanted to learn anatomy lessons with interactive and practical education methods[14]. Arı and Şendemir[15] evaluated the opinions of term IV-VI medical students about anatomy education and nearly all the students stated that anatomy lesson was not a waste of time. There are also studies on anatomy satisfaction conducted on students in medical schools and other faculties[16-19]. However, to the best of our knowledge, no previous study has evaluated the attitudes and opinions of only interns regarding anatomy education. The fact that the population of our study involved only interns is the unique aspect of our study.

Considering that anatomy education in Türkiye is generally included in the first and second academic year of the curriculum of medical faculties, we are curious about the attitudes and needs of intern students in terms of anatomy courses in the following years. The attitudes of intern students who take anatomy courses during basic education and are about to complete clinical training constitute the main subject of our study. In this context, this study's research questions are as follows: (Q1) How is the attitude of interns towards anatomy course? (Q2) Regarding the anatomy course, is there any attitude difference in terms of gender? (Q3) How are the values of anatomy, hating anatomy and allocating anatomy levels of the interns when the Anatomy Attitude Scale scores are analyzed? This study's hypothesis is that the interns have positive attitudes towards the anatomy course because the anatomy course is instructed in the first and second years of medical education and supported during vertical and horizontal integration education, and the interns comprehend the clinical importance of this lesson in the process.

MATERIALS AND METHODS

This study was a cross-sectional and descriptive study. Ethics approval was obtained from the Local Ethical Committee of Kırklareli University, Faculty of Medicine (decision no: 01, date: 16.05.2023). This study study was conducted between May and June 2023. Interns in Türkiye in the 2022-2023 period were invited to the research. The Anatomy Attitude Scale was created using Google Forms© and distributed to volunteers online. The students were motivated by the fact that they would have an important contribution to the development of the teaching methods of the course. The permission to apply the Anatomy Attitude Scale in the present research was received from the correspondent author via e-mail. The study was carried out in accordance with the principles of the Declaration of Helsinki.

Anatomy Attitude Scale

The scale "Anatomy Attitude Scale for Medical School Students" was developed by Can[4] and aims to evaluate the attitudes of medical faculty students (700 students) towards anatomy. The validity and reliability of the scale was introduced by the author who developed it. The Anatomy Attitude Scale

has 14 items and has three subgroups: "Value of Anatomy" (items 2, 3, 5, 6, 12, 13, 14), "Hating Anatomy," (items 1, 4, 7, 8) and "Allocating Time to Anatomy" (items 9, 10, 11). Survey questions about attitudes are given below (Appendix 1). The validity of the scale was performed by using confirmatory factor analysis with 345 students. The confirmatory factor analysis Fit-indices were X^2/Standard deviation (SD): 3.2[2], total lymphoid irradiation: 0.93, Complement factor I: 0.95 and root mean square error of approximation: 0.079[4]. The validity values demonstrated are at the appropriate level suggested by the literature[20]. The reliability of the scale was calculated with the data gathered from 355 students. The Cronbach Alpha score of the total scale, the value of the anatomy subscale, the hating anatomy subscale and the allocating time to anatomy subscale are 0.82, 0.89, 0.92 and 0.78, respectively. Therefore, the scale with the subscales was found appropriate to measure the attitude of medicine faculty students in terms of validity and reliability[4].

Statistical Analysis

Statistical analysis was performed by SPSS (Version 25.0, Armonk; NY, USA). The frequencies and percentages of the categorical data were calculated, and the normality distribution was tested with the Kolmogorov-Smirnov test. Independent t-test was used for normally distributed data, and the Mann-Whitney U test was used for non-normally distributed data compared to paired groups. When comparing the data of more than two groups, One-Way Analysis of Variance was used to analyze normally distributed data, and the Kruskal-Wallis test was used to analyze non-normally distributed data. In the evaluation, normally distributed data were expressed as mean ± SD, and non-normally distributed data were expressed as median, minimum and maximum. p-value of <0.05 was considered statistically significant.

The sample size was calculated using the online sample size calculator, Survey Monkey (https://www.surveymonkey.com/mp/sample-size-calculator/). The population size was nearly 15000, and the confidence level and margin of error were 85-90% and 5%, respectively. The calculated sample size was 205.

Table 1. Reasons for interns to choose medical school

	Frequency	%
Because my score is enough	27	11
Because it's my ideal job	113	46.1
Because my family wants	22	9
Because of its good status in society	37	15.1
Because it is a guaranteed profession that makes money	46	18.8

RESULTS

A total of 245 interns (124 women, 121 men) completed the questionnaire. The mean age of the participants was 24.38±1.3 years. Most participants (46.1%, n=113) chose medical school as their ideal job. A small percentage of interns stated that they chose medicine because their families wanted them to do so (9%, n=22) (Table 1).

In terms of following medical resources other than course presentations and course resources recommended by the instructor, 59.2% (n=145) of the interns stated that they followed resources related to medicine. In the future, 93.5% (n=229) of the participants wanted to undergo the medical specialization examination (MSE) and become specialists. Among those who wanted to be specialists, 48% (n=110) stated that they wanted to be specialists in surgical medical sciences, 48.5% (n=111) in internal medical sciences, and 3.5% (n=8) in basic medical sciences. The most preferred specialty was psychiatry (7.9%; n=18). None of the participants preferred anatomy as a specialty field.

It was determined that during their internship period, the circulatory system was the system in which interns needed the most anatomy knowledge in practice and remembered the most in routine (43.3%, n=106). The topic that the participants remembered the most during the internship was the locomotor system (24.9%, n=61) (Figures 1,2).

We evaluated the participants' attitudes towards anatomy using the "Anatomy Attitude Scale for Medical School Students". Cronbach's α was calculated to be 0.88. According to the scale scores of attitudes towards anatomy, the majority of the participants (91.8%, n=225) had a negative attitude towards the abolition of anatomy courses in medical faculties. Moreover, 80.8% (n=198) of the interns stated that learning anatomy made them happy, and 75.92% (n=186) stated that they would not call a person who did not know anatomy a physician. Furthermore, 94.3% (n=231) of the participants agreed to remind themselves of their anatomy knowledge at the beginning of every internship. In addition, 31.8% (n=78) of the participants supported removing anatomy from the MSE, 17.6% (n=43) were willing to study anatomy for a doctorate, and 67.3% (n=165) accepted anatomy as a basis for other medicine lessons (Table 2). Other details are provided in Table 2. In addition, the participants rate the question "How much do you think you use your theoretical and practical knowledge on anatomy in your internship applications?" as nearly 45%.

The scores of the two groups were similar (p=0.878) when we compared the attitudes of the male and female participants. The attitude score of those who followed sources other than course presentations and instructor-recommended materials

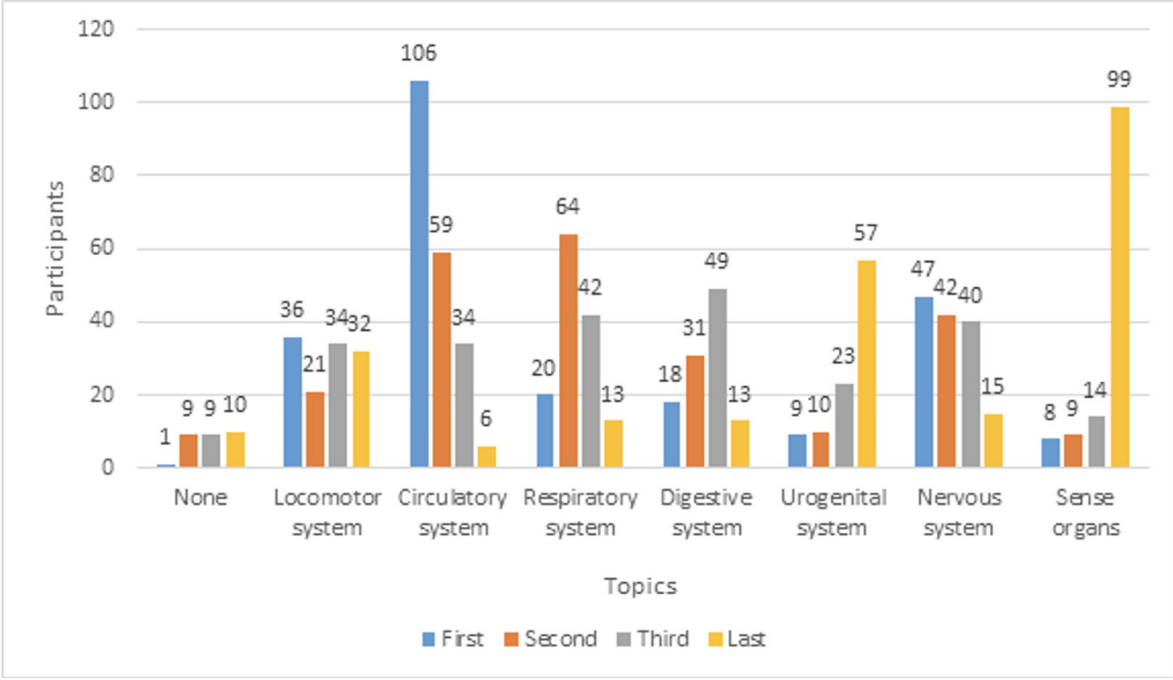

Figure 1. Ranking of the topics in which interns most need anatomy knowledge

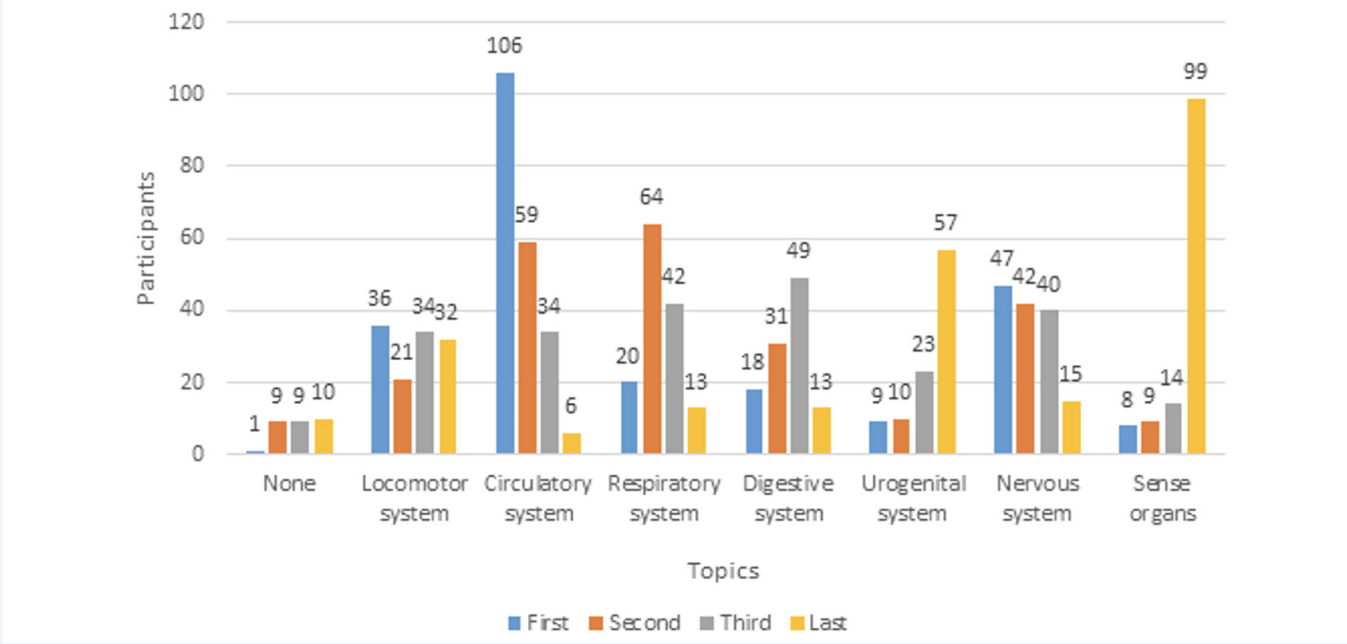

Figure 2. Ranking of the anatomy topics that interns remember best

(mean ± SD=3.41±0.649) was higher than that of those who did not (mean ± SD=3.242±0.631) (p=0.035). The reasons for choosing a medical school did not affect the attitude scores towards the anatomy course (p=0.829). Those who wanted to specialize in internal medical sciences and those who wanted to specialize in surgical medical sciences had similar attitude scores (p=0.115) (Table 3).

Table 2. The state of interns' attitudes about anatomy course

	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	X ± SD	Attitude score
1	164 (67)	61 (24.9)	12 (4.9)	4 (1.6)	4 (1.6)	1.46±0.802	4.54±0.802
2	15 (6.1)	32 (13.1)	77 (31.4)	74 (30.2)	47 (19.2)	3.43±1.124	3.43±1.24
3	10 (4.1)	49 (20)	77 (31.4)	71 (29)	38 (15.5)	3.32±1.085	3.32±1.085
4	114 (46.5)	101 (41.2)	21 (8.6)	6 (2.5)	3 (1.2)	1.71±0.822	4.29±0.822
5	5 (2)	9 (3.7)	58 (23.7)	89 (36.3)	84 (34.3)	3.97±0.956	3.97±0.956
6	5 (2)	15 (6.1)	47 (19.2)	109 (44.5)	69 (28.2)	3.91±0.947	3.91±0.947
7	77 (31.4)	90 (36.8)	48 (19.6)	14 (5.7)	16 (6.5)	2.19±1.138	3.81±1.138
8	121 (49.4)	110 (44.9)	8 (3.3)	3 (1.2)	3 (1.2)	1.6±0.727	4.4±0.727
9	111 (45.3)	91 (37.1)	25 (10.2)	11 (4.5)	7 (2.9)	1.82±0.982	1.82±0.982
10	85 (34.7)	79 (32.3)	41 (16.7)	28 (11.4)	12 (4.9)	2.2±(1.175)	2.2±1.175
11	99 (40.4)	94 (38.4)	40 (16.3)	5 (2)	7 (2.9)	1.89±0.947	1.89±0.947
12	18 (7.3)	24 (9.8)	58 (23.7)	102 (41.6)	43 (17.6)	3.52±1.115	3.52±1.115
13	45 (18.3)	58 (23.7)	60 (24.5)	61 (24.9)	21 (8.6)	2.82±1.239	2.82±1.239
14	20 (8.2)	60 (24.5)	97 (39.6)	50 (20.4)	18 (7.3)	2.94±1.035	2.94±1.035

(1) Strongly Disagree (2) Disagree (3) Partially Agree (4) Agree (5) Strongly Agree, SD: Standard deviation

Table 3. The relationship between the targeted area and the attitude scale

	Groups	Median	Test statistic (H)	p-value
Value of anatomy	Surgical medical sciences Internal medical sciences	3.571 3.428	17.343	0.410
	Surgical medical sciences Basic medical sciences	3.571 4	-62.772	0.092
	Internal medical sciences Basic medical sciences	3.428 4	-80.114	**0.012**
Hating anatomy	Surgical medical sciences Internal medical sciences	4.5 4.25	19.092	0.256
	Surgical medical sciences Basic medical sciences	4.5 5	-36.39	0.936
	Internal medical sciences Basic medical sciences	4.25 5	-55.481	0.183
Allocating time to anatomy	Surgical medical sciences Internal medical sciences	2 1.666	6.949	1.000
	Surgical medical sciences Basic medical sciences	2 2.833	-65.119	0.128
	Internal medical sciences Basic medical sciences	1.666 2.833	-72.068	**0.029**
		Mean ± standard deviation		
Attitude score	Surgical medical sciences Internal medical sciences	3.438±0.556 3.238±0.677		0.115
	Surgical medical sciences Basic medical sciences	3.438±0.556 3.991±0.141		0.105
	Internal medical sciences Basic medical sciences	3.238±0.677 3.991±0.141		**0.008**

DISCUSSION

Since anatomy is an important science that forms the basis of medical education, we wondered about interns' attitudes towards anatomy[1]. Interns are the sample of this study because they are in a stage of medical education in which they combine their knowledge of anatomy and other basic sciences with clinical knowledge. Even though the students assume themselves as successful in the anatomy course by "just passing the course" in the early phases of medical education, it is inevitable to gain strong anatomy knowledge in order to improve their clinical skills in the later phases. Therefore, the students' attitude towards this lesson changes[5]. They need anatomy knowledge for safe and reliable implementations such as screening, diagnosis, and surgeries after graduation while working as doctors[5,6]. Our findings suggest that while interns recognize the importance of anatomy, they view it not as a career field but as foundational knowledge supporting their chosen specialty.

It is obvious that a doctor with sufficient knowledge of anatomy is confident and can endure difficult conditions or complications without fear[21]. However, clinical instructors think that students' knowledge is insufficient and are concerned that this may lead to dangerous practices[22]. Some studies state that few of them have confidence in their knowledge of anatomy[6,23]. In our study, it is supposed that the participant students know the confidence relation between anatomy knowledge and clinical applications because the students stated that learning anatomy helped them grow self-confidence and be happy, they did not trust doctors with inadequate anatomy knowledge and most of them did not consider doctors with inadequate anatomy knowledge as physicians.

In the preclinical period, students' view of anatomy is "just passing the course", whereas in the clinical period, the view that anatomy is necessary for the development of clinical skills evolves[5]. It is emphasized that in this period, the students argue that more anatomy courses should be included in the first two years of education[23]. Some instructors and students think that it would be useful to support this education with clinical applications and even to include reminder courses during the internship period[15,22]. Our study had similar results, and participants stated the necessity of anatomy reminder lessons. The majority of the students articulated that getting to know the human body with the help of anatomy made them feel like doctors. The attitude of distrust toward the doctors, who have insufficient anatomy knowledge, proves this opinion.

Additionally, interns highlighted the importance of certain anatomy topics during their internship experience. It is about the most necessary anatomy subject as the circulatory system and the most remembered subject as the locomotor system. Also, the subject of sensory organs is the least remembered subject of anatomy. We can say that the least needed topic was the least remembered topic. In Turhan[19], which was carried out on physiotherapy students, they ranked the locomotor system first and the nervous system last. However, needs during the education process may not be a predictor of remembering. The possibility of visualizing the structures during the learning phase affects the comprehension of the topic and therefore affects the recall rate[24]. In other words, the remembrance of a subject is a notion affected by many factors.

There are many resources, such as videos, websites, etc., besides coursebooks, for students to study and learn anatomy and also make them memorable[6]. Furthermore, there are many claimed learning strategies, such as drawing figures, watching videos etc. to teach the anatomy of the regions[1,25,26]. In our study, interns did not show a positive attitude towards drawing anatomical figures. Although watching anatomy videos is useful for learning, it is clear that interns in our study did not have positive attitudes towards watching anatomy videos. Moreover, most participants asserted that they followed different resources except for the lesson presentations and the resources suggested by the instructor. The participants who follow extra resources have a more positive attitude in terms of the value of the anatomy than the ones who do not follow extra resources. This positive attitude towards the lesson may be the result of the participants' being more interested and doing more research.

Medical faculty students study expertise in internal, surgical, or basic medical sciences with an MSE after graduation. Moreover, graduates of medical faculties can directly study for a doctorate in anatomy after graduation[13]. The majority of the participants in our study wanted to specialize in a field via MSE, but very few of them preferred basic medical sciences. None of them wrote anatomy in the answers. In the study of Triepels et al.[6], they suggested that the students preferring surgical sciences found anatomy more attractive compared to the students preferring fields outside of surgical sciences. However, there is no significant difference between the attitudes of the students who want to prefer surgical sciences and those of the students who want to prefer fields outside of surgical sciences in our study. There is also a significant difference between the attitudes of the students who prefer basic sciences and those who prefer internal sciences. The students' attitudes favoring the basic sciences are more positive regarding both the value and creating time for anatomy. The general score of the scale shows that the students who prefer basic science have more positive attitudes. Nevertheless, the medical faculty students are not interested enough in preferring anatomy as a postgraduate education or via MSE. This situation is a possible research topic for future investigations.

In this study, the systems that the students have difficulty with in anatomy knowledge and other necessary topics besides their attitudes towards anatomy are investigated during their internship. The strength of our study is the large sample size. The most remembered and least used anatomy knowledge was determined in the present study. In conclusion, this study is possibly beneficial to determine the balance of the systems for the programs planning vertical or horizontal integration.

Study Limitations

The study is limited to the answers of students who participated in the study. The participants involved in the study were assumed to give their answers honestly. Another limitation of the study is that it could not be generalized to the students who could not fill out the questionnaires via Google Forms© questionnaires. Moreover, it was ignored that interns did internships in different departments and might need different levels of anatomy knowledge.

CONCLUSION

The first part of the attitude scale was about the value participants placed on anatomy, and they had positive attitudes towards the statements in this section. The issue they agreed on most was the need for reminder courses. The second section assessed hating anatomy, and students' attitudes towards this section were positive. The third part assessed the desire to devoted time to anatomy. Participants were not very willing to spend time on anatomy. There was a correspondence between the topics students remembered best and the topics they needed the most information on. The sensory organs were the subjects they remembered least and needed the least information on. The system they needed the most information about was the circulatory system; the system they remembered the best was the locomotor system. It was seen that the participants had better remember the topics they needed most in the clinic, and the common idea of the interns was that reminder lectures were certainly necessary. While this study focuses exclusively on interns, it primarily presents their perceptions of anatomy training. To enhance impact, exploring links between these perceptions and career/specialty choices (e.g., surgery or radiology) or identifying specific strengths or weaknesses in anatomy knowledge could significantly contribute to curricular design.

Ethics

Ethics Committee Approval: This study was a cross-sectional and descriptive study. Ethics approval was obtained from the Local Ethical Committee of Kırklareli University, Faculty of Medicine (decision no: 01, date: 16.05.2023).

Informed Consent: In this study, informed consent was obtained online through Google Forms, and a mandatory checkbox was used for participants to indicate their consent.

Footnotes

Authorship Contributions

Concept: M.A., M.K., B.T., Design: M.A., M.K., B.T., Data Collection or Processing: M.A., M.K., B.T., Analysis or Interpretation: M.A., M.K., B.T., Literature Search: M.A., M.K., B.T., Writing: M.A., M.K., B.T.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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Appendix 1. Anatomy Attitude Scale

(1) Strongly Disagree (2) Disagree (3) Partially Agree (4) Agree (5) Strongly Agree

Items	(1)	(2)	(3)	(4)	(5)
1. If I were the health minister, I would remove the anatomy course from the schools of medicine.	(1)	(2)	(3)	(4)	(5)
2. Learning anatomy makes me happy.	(1)	(2)	(3)	(4)	(5)
3. I won't call a person who does not know anatomy a physician.	(1)	(2)	(3)	(4)	(5)
4. If a list of most unnecessary courses were made, anatomy would be at the top*.	(1)	(2)	(3)	(4)	(5)
5. Knowledge of anatomy should be reminded at the beginning of each training.	(1)	(2)	(3)	(4)	(5)
6. Knowing human body with the help of "anatomy" makes me feel like a physician.	(1)	(2)	(3)	(4)	(5)
7. If I were in charge, I would remove information on anatomy from the" MSE*.	(1)	(2)	(3)	(4)	(5)
8. If I were a medical education planner, I would propose anatomy only as an elective course*.	(1)	(2)	(3)	(4)	(5)
9. I wish to do my doctorate in anatomy after I graduate.	(1)	(2)	(3)	(4)	(5)
10. Drawing anatomic figures makes me happy.	(1)	(2)	(3)	(4)	(5)
11. I watch anatomy videos in my free time.	(1)	(2)	(3)	(4)	(5)
12. Practical anatomy lessons are interesting.	(1)	(2)	(3)	(4)	(5)
13. I loved anatomy owing to our faculty members.	(1)	(2)	(3)	(4)	(5)
14. The foundation of other medical courses is anatomy.	(1)	(2)	(3)	(4)	(5)

MSE: Medical specialization examination