



**Journal of Education in Science,
Environment and Health**

www.jeseh.net

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Analysis of Their Attitudes**

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ISSN: 2149-214X

To cite this article:

Can, M.A. (2022). Development of an anatomy attitude scale for medical school students and analysis of their attitudes. *Journal of Education in Science, Environment and Health (JESEH)*, 8(2), 187-199. <https://doi.org/10.55549/jeseh.01115817>

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Development of an Anatomy Attitude Scale for Medical School Students and Analysis of Their Attitudes

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Article Info

Article History

Published:
01 April 2022

Received:
22 January 2022

Accepted:
30 March 2022

Keywords

Anatomy,
School of Medicine,
Scale Development,
Attitude

Abstract

Anatomy is one of the most fundamental areas of medical sciences. When medical education is given in its "normal" course, primarily macroscopic anatomy education and other basic medical sciences form the foundation, and then the clinical medical sciences are built on top of this foundation. Due to its importance, as mentioned above, it is known to be a course feared by students newly starting their medical education. A literature search showed that there was not an "Anatomy Attitude Scale" that questions the views of medical school students in our country about anatomy. This study aims to develop a scale to reveal the attitudes of medical school students towards anatomy validly and reliably and to investigate anatomy attitudes of medical school students using this scale in a pilot administration. This study included 700 Term 2, 3, 4, 5, and 6 students studying in the School of Medicine of Çanakkale Onsekiz Mart University (ÇOMU) in the academic year 2020-2021 who agreed to take part in the study. Of these students, 345 were recruited for factor analysis and 355 for investigation of attitudes. In the study, an Anatomy Attitude Scale was developed first in line with the literature, which consisted of 14 items and 3 subfactors, "Value of Anatomy", "Hating Anatomy", and "Time Allocated to Anatomy". The results of construct validity were also verified by confirmatory factor analysis. Then, the scale was administered to 355 students. The results obtained from the data showed that the students of ÇOMU Medical School were aware of the importance of anatomy as a fundamental medical science, and the physician candidates who intended to become a specialist in any branch in the future attributed more value to Anatomy. We believe that the "Anatomy Attitude Scale" we have developed as a result of this study will help shape medical education in our country.

Introduction

The anatomy course has been a historic area in medical education. Students who have just started medical education have negative prejudices about the course which has a large place in the first years of medical education because of the dense anatomical terminology it contains when they examine the course materials related to the anatomy course and meet with students who are in the later stages of medical education. As a result, students develop anxieties and this gains importance in the formation of their thoughts about the lesson. These concerns and prejudices cause problems in the student's interest in Anatomy and in following the course in the next process, and ultimately affect the student's success in the course. Determining the views and attitudes of students about Anatomy can be a guide in preventing such possible negativities. For this reason, it will be of great importance to determine the views of the students and will be a guide for the measures to be taken.

People evaluate their world. They have a feeling of like or dislike for almost everything they encounter (Aronson et al., 2010). In short, attitude is an individual's evaluation of other individuals, objects or thoughts (Ajzen & Fishbein, 2005; Crano & Prislin, 2006). The word "attitude" originally means "being available and ready for action" and it envisions something that can be observed directly, such as a boxer fighting in the ring. However, today, although the attitude cannot be observed directly, it is the structure that prioritizes the behavior and directs the choices and decisions of the individual regarding his/her action (Hogg & Vaughan, 2014). Attitudes consist of three components: thoughts and beliefs about the related object cognitive component; affective component of emotional reactions to the object; object-oriented behaviors constitute the behavioral component (Zanna & Rempel, 1988). Looking at the literature, we see that there are studies on the methodology and quality of Anatomy education, primarily in medical schools, and these studies' attitude has only been dealt with in very small portions (Acuner et al., 1999; Arı & Şendemir, 2003; Arı et al., 2003; Çetkin et al., 2016; Özcan & Kuş, 2020; Tuygar et al., 2015; Uygur et al., 2013). Some measurement tools intended to measure

"Attitude towards Anatomy" have also been used by some education institutions outside Medical Schools where anatomy education is provided. The scales used in the studies of Lök et al. (2009) may be shown as examples of these. However, a search of the literature has shown that an "Anatomy Attitude Scale" that directly reveals the attitudes of medical school students towards anatomy and particularly one that was developed in Turkish Culture using medical school students in Turkey is not available. This lack constitutes a justification for developing a measurement tool providing valid and reliable data for investigating the attitudes of medical school students who are candidates to become physicians in Turkey. This study aims to develop a scale for medical school students to reveal their attitudes towards anatomy validly and reliably and to investigate anatomy attitudes of medical school students using this scale in a pilot administration. Anatomy education methods, educational materials to be used and approaches to students can be arranged in the light of the data to be obtained, and the anxieties and prejudices that have arisen in students can be destroyed.

Method

This cross-sectional study aims to show the validity and reliability of the scale developed and investigate students' anatomy attitudes. This study was conducted with the approval of the Clinical Trials Ethics Committee of Çanakkale Onsekiz Mart University dated 11/11/2020 and numbered 2011-KAEK-27/2020-E.2000157168.

Study Group

The literature on scale development requires conducting an exploratory factor analysis (EFA), a confirmatory factor analysis (CFA) and reliability analyses for the scale being developed. In particular, the EFA and CFA are expected to be run on the data obtained from different groups. This study was conducted with the data obtained from Term 2, 3, 4, 5 and 6 students studying in the School of Medicine of Çanakkale Onsekiz Mart University in 2020-2021. Term 1 students were not included in the study because the anatomy courses of Term 1 students are included chiefly in the fourth, fifth and sixth lesson committees given towards the end of the year. Our worry that they would not have had a sound opinion on anatomy before attending the course made us exclude Term 1 students.

Due to the COVID-19 pandemic, the ethics committee approval required the scale to be administered online. The scale was sent online to Term 2, 3, 4, 5 and 6 students. The consent information was displayed to the students first. The scale items were made visible for the students who gave their consent and the page was shut for those who did not consent. In this way, a total of 700 students participated in the study. The data file obtained was randomly divided into two parts to have a balanced distribution of terms. The first data file consisting of data from 345 students was used to perform the EFA and find the Cronbach Alpha reliability coefficient. The second data file consisting of data from 355 students was used to perform the CFA and investigate students' attitudes.

There are differing views in the literature about the size of the study group when developing a scale. Cattell (1978) argued that in a factor analysis, the number of participants should be three to six times the number of items and Gorsuch (1974) at least five times. Everitt (1975) stated that "the number of participants should be at least ten times the number of items. The draft "Anatomy Attitude Scale" developed had 27 items. Given this information, we ensured that the number of participants was ten times the number of items in the measurement tool or more. Some characteristics of the participants in the group are given in Table 1.

Table 1. Some characteristics of the study group

Variable		EFA and Reliability Investigation Group		CFA and Attitude Investigation Group	
		f	%	F	%
Gender	Female	183	53	182	51.3
	Male	162	47	173	48.7
Term	Term 2	83	24.1	99	27.9
	Term 3	90	26.0	91	25.7
	Term 4	61	17.7	59	16.6
	Term 5	59	17.1	52	14.6
	Term 6	52	15.1	54	15.2
	Total	345	100	355	100

Data Collecting Instrument

Preparation of the Anatomy Attitude Scale (AAS)

The data collecting instrument developed by the investigator is the "Anatomy Attitude Scale (AAS)". To develop the AAS, its draft form needed to be constructed first. The draft form of the AAS was prepared using the following procedures:

- As a result of literature searches, no scale was found in Turkey compatible with the Turkish Culture and directly measured the anatomy attitudes of medical school students. However, it was found that anatomy attitude scales were studied in different disciplines (health sciences, physical education, etc.). The items of these scales were examined.
- Literature articles and books related to anatomy attitudes, published in peer-reviewed journals, were reviewed.
- A total of 50 volunteering students, from Term 2, 3, 4, 5, and 6, ten from each, were asked to write their thought about anatomy as an e-mail composition and the expressions of attitude in the compositions were analyzed.
- Based on the previously studied scale items, literature data and opinions obtained from student compositions, 33 sample scale items were identified.
- These 33 sample scale items were sent for review to three faculty specialists working in medical school anatomy departments, a faculty member specializing in educational psychology working on attitudes, and another faculty member expertized in measurement and evaluation.
- Based on the feedback received from the specialists, 6 items were excluded from the scale. Another 5 items were modified—the 27 items remaining after this procedure were used in practice to obtain validity and reliability evidence. Anatomy Attitude Scale is given in English in Appendix-A and in Turkish in Appendix-B.

Data Analysis

Validity analyses in the development of AAS

There were not any lost data in the dataset. The dataset was tested for suitability for factor analysis. In the Kaiser Meyer Olkin (KMO) Test, any score below 0.500 is considered unacceptable. Scores between 0.501 and 0.700 are considered as moderate, 0.701 and 0.800 as good, 0.801 and 0.900 as very good, and those above 0.901 as excellent (Çokluk et al., 2010; Field, 2018; Tabachnick & Fidell, 2013). The Bartlett's Test of Sphericity analysis result is expected to turn out significant ($p < .05$) (Çokluk et al., 2010). A factor identification method was selected: The Principal Axis Factoring (PAF) method (Warner, 2008). This method is preferable to the principal components analysis if a scale is being developed for the first time and its conceptual background is not that apparent. Using the rotation method, the factors were identified and differentiated. Axis rotation was applied using the "Varimax" method (Özdamar, 2013). As reference values for the fit-indices for DFA, $0.05 \leq \text{RMSEA} \leq 0.08$ can be considered as acceptable and $0 \leq \text{RMSEA} \leq 0.05$ as excellent for RMSEA according to the literature, $0.05 < \text{RMR} \leq 0.08$ as acceptable and $0 \leq \text{RMR} \leq 0.05$ as excellent for RMR, over 0.90 as acceptable, and 0.95 and above as excellent for TLI, over 0.90 as acceptable, and 0.95 and above as excellent for CFI, and $2 < X^2/\text{sd} \leq 5$ as acceptable and $0 \leq X^2/\text{sd} \leq 2$ as excellent intervals for X^2/sd (Anderson & Gerbing, 1984; Bentler, 1990; Çokluk et al., 2010; Hooper et al., 2008; Hu & Bentler, 1999; Kline, 2005; Marsh et al., 1988; Özdamar, 2013; Şimşek, 2007; Tabachnick & Fidell, 2013; Vieira, 2011).

Reliability analyses in the development of AAS

The Cronbach Alpha reliability coefficient, which shows reliability in the sense of internal consistency, was calculated to obtain AAS reliability evidence. A reliability value over 0.70 was accepted as a high-reliability level (Özdamar, 2013; Warner, 2008).

Data analysis at the stage of determining student attitudes

Descriptive statistics (percentages, frequencies, means, etc.) and comparison tests were used to investigate students' attitudes towards anatomy. Tests for normality are highly susceptible (Tabachnick & Fidell, 2013). Additionally, measurements related to dependent variables do not show a normal distribution in many studies

(especially in social sciences) (Pallant, 2016). The Central Limit Theorem postulates that if the sample is large enough ($n=30+$), the distribution of means in the sample will be normal regardless of the distribution of variables, and the violation of normal distribution will not lead to a big problem (Everitt & Howell, 2005; Field, 2018; Pallant, 2016; Tabachnick & Fidell, 2013). In large samples, the skewness does not deviate from the normal to a considerable extent. A positive kurtosis starts to disappear in a sample size larger than 100 and a negative kurtosis in a sample size larger than 200 (Tabachnick & Fidell, 2013). Based on this information, it was decided to perform the analyses using parametric statistical techniques.

Findings

Findings Related to AAS Development

The KMO and Bartlett's Test of Sphericity were reviewed first in EFA. The KMO and Bartlett's Sphericity values turned out to be consistent with those suggested by the literature. However, some items in which the item-total correlations and EFA factor loading values could not reach the level recommended in the literature (0.30 and above) (Büyüköztürk, 2013). These were items 1, 2, 4, 6, 7, 8, 9, 10, 13, 17, 19, 20 and 26 in the draft form. After removing these items from the scale, the KMO and Bartlett's sphericity values were reviewed again. It was found that KMO (Kaiser Meyer Olkin): 0.879 and Bartlett's Test of Sphericity value X^2 : 3022.334, sd : 91 and P : 0.0001. As stated under the heading Data Analysis, the KMO and Bartlett's Test results were at levels suggested by the literature. After extracting the 13 items with item-total correlations and EFA initial extraction loading values below the levels suggested by the literature, the item-total correlations and factor analysis initial extraction loading values of the remaining 14 items are given in Table 2.

Table 2. Initial extraction loading values and item-total correlations

Item No	Initial extraction Loading Value	Item-Total Correlation	Item No	Initial extraction Loading Value	Item-Total Correlation
AA3	0,828	0,336	AA18	0,801	0,398
AA5	0,635	0,679	AA21	0,706	0,373
AA11	0,549	0,595	AA22	0,598	0,319
AA12	0,866	0,395	AA23	0,727	0,364
AA14	0,696	0,606	AA24	0,620	0,684
AA15	0,843	0,787	AA25	0,566	0,595
AA16	0,747	0,367	AA27	0,595	0,618

As seen in Table 2, the EFA initial extraction loading values and item-total correlations of these 14 items turned out to be 0.30 and above. Therefore, the retained items were considered to be suitable for the scale. The scree plot for the 14 items retained as a result of the EFA and 3 factors is shown in Figure 1.

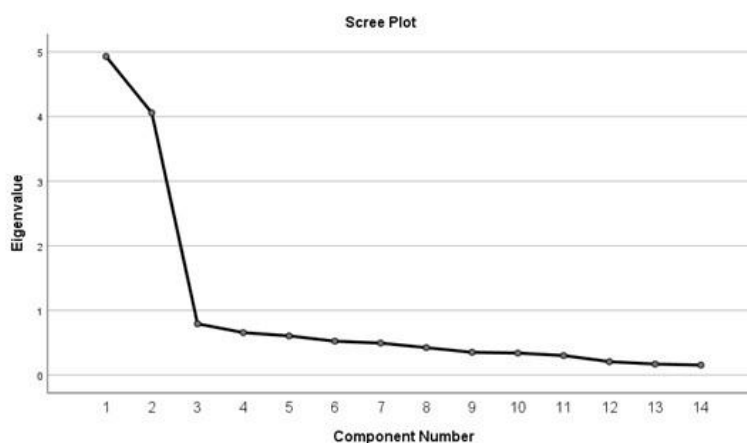


Figure 1. Scree plot of AAS items after EFA

As seen in the scree plot, there are 3 factors in the AAS. To see these 3 factors more distinctly, the "Varimax" axis rotation method was used. The subdimensions (subfactors) arising from this procedure and the level of variance explained by each dimension are shown in Table 3.

Table 3. Factors and the extent to which they explain variances after a rotation procedure

Items	Factors			Factor Name
	1	2	3	
AA15. Knowing the human body with the help of “anatomy” makes me feel like a physician	0.891			Value of anatomy
AA14. Knowledge of anatomy should be reminded at the beginning of each training.	0.832			
AA27. Anatomy is the foundation of other medical courses.	0.731			
AA24. Practical anatomy lessons are engaging.	0.717			
AA11. I will not call a person who does not know anatomy a physician.	0.706			
AA5. Learning anatomy makes me happy.	0.676			
AA25. I loved anatomy owing to our faculty members.	0.624			
AA12. If a list of most unnecessary courses were made, anatomy would be at the top. *		0.915		Hating anatomy
AA3. If I were the health minister, I would remove anatomy course from the schools of medicine. *		0.880		
AA18. If I were a medical education planner, I would propose anatomy only as an elective. *		0.857		
AA16. If I were in charge, I would remove information on anatomy from the “Medical Specialization Examination (MSE)”. *		0.855		
AA23. I watch anatomy videos in my free time.			0.753	Allocating
AA21. I wish to do my doctorate on anatomy after I graduate			0.704	Time to
AA22. Drawing anatomic figures makes me happy.			0.697	Anatomy

* Items written in red have negative meanings and scored reversely.

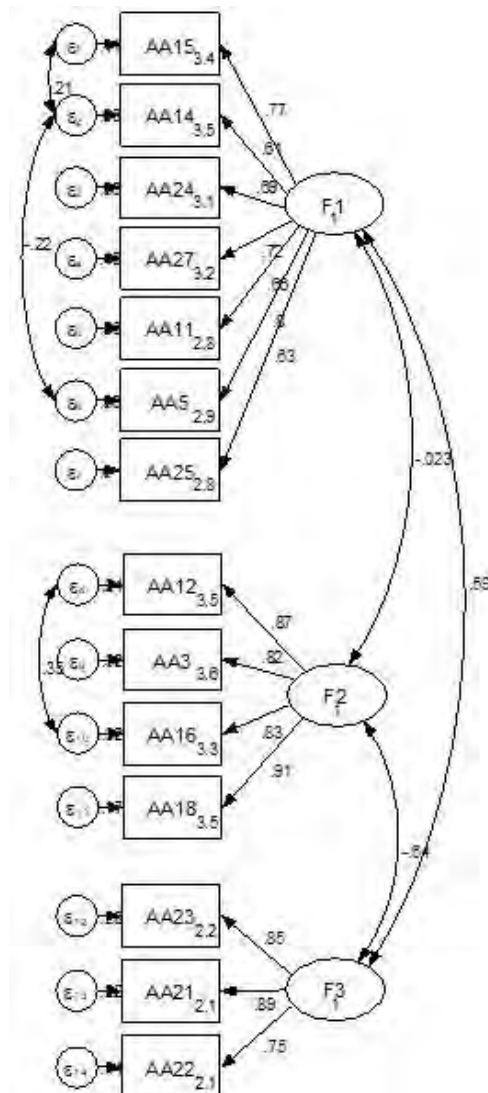


Figure 2. AAS confirmatory factor analysis diagram (standardized values)
 F1: Value of Anatomy, F2: Hating Anatomy, F3: Allocating Time to Anatomy

The total variance in attitude towards anatomy explained by the 14-item and 3-subdomain AAS was 69%. Hence the scale explains 69% of the attitude towards anatomy. The factors that appeared are named in Table 3. Value of anatomy explains 29% of the variance, hating anatomy 24% and allocating time to anatomy 16%. The Cronbach Alpha reliability coefficients were calculated for the AAS and its 3 subdimensions. The reliability level for the entire scale was 0.82. The reliability level was 0.89 for the value of the anatomy subfactor, 0.92 for the hating anatomy subfactor, and 0.78 for the allocating time to the anatomy subfactor. The McDonald ω composite reliability coefficients was determined as 0,91. This construct that appeared in the EFA needed to be tested for verification. This test can be done using CFA. The diagram obtained in the CFA is shown in Figure 2.

Fit-indices need to be identified for this diagram. These fit-indices determine whether the construct is appropriate or not. The CFA Fit-indices were χ^2/sd : 3.22, TLI: 0.93, CFI: 0.95 and RMSEA: 0.079. As stated under the heading Data Analysis, the CFA fit-indices were at levels suggested by the literature. Therefore, it can be said that the model created was appropriate.

Findings Related to Students' Attitudes Towards Anatomy

Students' attitudes towards anatomy were reviewed based on AAS items. Descriptive statistics (frequencies, percentages, means and standard deviations) were used for this review. The results are shown in Table 4.

Table 4. Student attitudes towards anatomy

Items	Don't agree at all		Don't agree		Partly agree		Agree		Fully agree		Mean (S. Dev.)
	f	%	f	%	f	%	f	%	f	%	
	AA3. If I were the health minister, I would remove the anatomy course from the schools of medicine.	183	51.5	76	21.4	63	17.7	17	4.8	16	
AA5. Learning anatomy makes me happy.	33	9.3	36	10.1	140	39.4	90	25.4	56	15.8	3,28 (1,13)
AA11. I won't call a person who does not know anatomy a physician.	32	9	58	16.3	138	38.9	74	20.8	53	14.9	3,16 (1,14)
AA12. If a list of most unnecessary courses were made, anatomy would be at the top.	135	38	102	28.7	80	22.5	24	6.8	14	3.9	2,10 (1,11)
AA14. Knowledge of anatomy should be reminded at the beginning of each training.	16	4.5	22	6.2	119	33.5	114	32.1	81	22.8	3,61 (1,04)
AA15. Knowing human body with the help of "anatomy" makes me feel like a physician	19	5.4	22	6.2	119	33.5	114	32.1	81	22.8	3,61 (1,07)
AA16. If I were in charge, I would remove information on anatomy from the "Medical Specialization Examination (MSE)".	112	31.5	114	32.1	83	23.4	25	7	21	5.9	2,24 (1,14)
AA18. If I were a medical education planner, I would propose anatomy only as an elective.	139	39.2	103	29	72	20.3	25	7	16	4.5	2,09 (1,13)
AA21. I wish to do my doctorate in anatomy after I graduate	109	30.7	96	27	109	30.7	28	7.9	13	3.7	2,27 (1,09)
AA22. Drawing anatomic figures makes me happy.	91	25.6	62	17.5	121	34.1	51	14.4	30	8.5	2,63 (1,24)
AA23. I watch anatomy videos in my free time.	89	25.1	95	26.8	120	33.8	32	9	19	5.4	2,43 (1,12)
AA24. Practical anatomy lessons are interesting.	28	7.9	23	6.5	130	36.6	102	28.7	72	20.3	3,47 (1,12)
AA25. I loved anatomy owing to our faculty members.	37	10.4	46	13	153	43.1	69	19.4	50	14.1	3,14 (1,14)
AA27. The foundation of other medical courses is anatomy.	21	5.9	30	8.5	163	45.9	84	23.7	57	16.1	3,35 (1,04)

The lowest mean value was in item "If I were the health minister, I would remove anatomy course from medical schools". However, considering the item has a negative meaning, it is understood that the students found the course necessary. The items with the highest mean values were "Knowledge of anatomy should be remembered at the beginning of each training" and "Knowing the human body with the help of anatomy makes me feel like a physician". These items show that the opinion on the course was positive.

Gender*Term and Anatomy Attitude

Whether there were any differences between the anatomy attitudes of students who had different genders and were studying in different terms was tested using the multivariate variance test (MANOVA). MANOVA was preferred because there were two group-forming variables (gender and term of study) and three measurement variables (value of anatomy, hating anatomy and allocating time to anatomy). No significant difference was found in any of the subfactors of anatomy attitude scale with respect to the basic effects of “gender”, “term” and “gender-term interaction” ($F(3-343)=2,16, p>.05$; $F(12-1035)=1,11, p>.05$ and $F(12-1035)=0,73, p>.05$, respectively).

Reason for choosing a medical school*following medical sources outside textbooks*willingness to be a specialist in the future and anatomy attitude

The students' attitudes towards anatomy with respect to the rationale for choosing a medical school, following medical sources outside textbooks, and willingness to be a specialist in the future were analyzed using the MANOVA test. The results are shown in Table 5.

Table 5. Students' attitudes towards anatomy with respect to the reason for choosing a medical school, following medical sources outside textbooks, and willingness to be a specialist in the future

	Value	F	df	Error df	p
Reason for choosing school of medicine;	0.058	1.653	12.000	1005.000	0.072
Following sources related to medicine outside course presentations and lesson material proposed by the faculty member	0.003	0.336	3.000	333.000	0.799
Willingness to be a specialist in the future	0.028	3.210	3.000	333.000	0.023
Reason for choosing a school of medicine * Following sources related to medicine outside course presentations and lesson material proposed by the faculty member	0.035	0.989	12.000	1005.000	0.457
Reason for choosing school of medicine * Willingness to be a specialist in the future	0.016	0.458	12.000	1005.000	0.939
Following sources related to medicine outside course presentations and lesson material proposed by the faculty member * Willingness to be a specialist in the future	0.008	0.897	3.000	333.000	0.443
Reason for choosing a school of medicine * Following sources related to medicine outside course presentations and lesson material proposed by the faculty member * Willingness to be a specialist in the future	0.049	1.401	12.000	1005.000	0.159

The MANOVA test showed that from the basic effects, only willingness to be a specialist created a significant difference in the anatomy attitude subfactors ($F(3-333)=3.210, p<.05$). The other basic effects and interactions were found not to create any difference in the subfactors of the anatomy attitude scale ($p<.05$). An ANOVA test was performed to see in what subfactors of the anatomy attitude scale the willingness to be a specialist in the future created a difference. The results are shown in Table 6.

Table 6. Student attitudes towards anatomy with respect to willingness to be a specialist in the future

		N	Mean (S. Dev.)	F	p	Significant Difference
Value of Anatomy	Yes	322	23,91 (5,53)	7.398	0.007	Yes>No
	No	33	20,82 (7,04)			
Hating Anatomy	Yes	322	8,22 (4,09)	1.720	0.191	
	No	33	9,24 (4,36)			
Allocating Time to Anatomy	Yes	322	7,37 (3,06)	.173	0.678	
	No	33	6,88 (3,14)			

The test showed that the willingness to be a specialist in the future made a difference only in the "value of anatomy" subfactor of the anatomy attitude scale ($F=7,398, p<.05$) and made no significant difference in the other subfactors ($p>.05$). The value attributed to anatomy by the physician candidates who are willing to become specialists in the future (mean=23.91) was higher compared to those who do not intend to be a specialist (mean=20.82).

Discussion

Anatomy is the oldest branch known among the medical sciences, and the sources that have survived to our time mainly consist of information on and drawings of the human body. Existing sources of medical history show that ancient medical data consisted mainly of anatomical information. This should be considered normal because when medical information such as disease, cause and treatment could not be expressed definitively, the most correct information obtainable in a concrete way would be on the human body as an observable and examinable material. The process progressed in this way; information on the human body was collected first, which formed the foundation for medicine and then the changes and disorders observed in this structure were defined, the concept of disease was raised, and possible diseases were identified, and finally, treatment methods for correcting these began to be argued. Also, in today's medical education, the "normal" is being explained at the early stages of the education, emphasizing macroscopic anatomy to establish the foundation. Then, the other medical departments are built on this foundation, first as essential medicine and then as clinical medical sciences. Therefore, the role of anatomy education and the need for candidates to have sound anatomy knowledge are indispensable for the development of future physicians.

Studies have shown that student's willingness to learn is essential for effective learning. The more a person is willing to learn and has interest and love toward the subject to be learned, the more the function of learning is encompassing and perpetual. To perceive and interpret a piece of information, the student must have believed in the necessity of that information. Due to these facts, we can say that to give medical education at an adequate level. It is of utmost importance that the students adopt and embrace fundamental medical knowledge, particularly anatomy, in the first years of education. Another criterion used to shape medical education is student feedback. To this end, an attitude scale was developed in this study to assess student opinions and behaviours towards anatomy. The construct validity studies of the scale showed that the anatomy attitude scale was a valid scale consisting of 3 subfactors. The results of construct validity were also verified by the results of a confirmatory factor analysis. The reliability values of the scale ranged between .78 and .92 for the subscales. The reliability value of the entire scale was found to be .82. These results show that the reliability level of the scale is also high. It will be helpful to retest this scale for validity and reliability in different groups in studies to be conducted in the future. In this way, contribution may be provided to develop the scale further.

In this study that was conducted using the scale developed, the data obtained from Term 2, 3, 4, 5 and 6 students studying in the School of Medicine of Çanakkale Onsekiz Mart University in the academic year 2020-2021 were used. It is remarkable that the item "Knowing the human body with the help of anatomy makes me feel like a physician", which we think expresses the students' attitudes towards anatomy in a most general way, received a high score in the positive direction. This showed that the students were aware of the importance of anatomy as fundamental medical science. It is also observed that students similarly valued anatomy in the previous studies questioning the method and quality of anatomy education in medical education. In a study made by Arı et al. (2003), 47.6% of the students responded as "partly" for the role of anatomy education in making the students feel that they are in a school of medicine, and 45.5% responded as "completely" (93.1% in total). In another study made by Uygur et al. (2013), 84.8% of the students agreed with the view "anatomy education makes me feel I am in a school of medicine" (partly agree 31.6%, agree 26.6% and fully agree 26.6%), which showed the positive thoughts of students about anatomy. In the study of Arı & Şendemir (2003), 89.6% of the students stated that they did not see anatomy education as a waste of time. Similarly, in the study of Özcan & Kuş (2020) on clinical anatomy education, 62.3% of the students did not see Clinical and Cross-Sectional Anatomy lessons as a waste of time, and 89.3% stressed the importance of anatomy lessons by stating that this course was necessary for their professional life and 90.2% that these lessons will positively influence the clinical practice they will receive in the future.

Another indicator of the importance students attribute to anatomy is the item "If I were the health minister, I would remove anatomy course from medical schools", which received the lowest mean value but from which we concluded that the students believed that the course was necessary considering it had a negative meaning. For this item, a positive value of 90.6% was obtained (Don't agree at all 51.2%, Don't agree 21.4% and Partly agree 17.7%).

The items "Learning anatomy makes me happy", "I won't call a person not knowing anatomy a physician", and "The foundation of other medical courses is anatomy" also reached above 3 as a mean value, reflecting a relatively positive opinion. Supporting this, the items "If I were a medical education planner, I would propose anatomy only as an elective" and "If a list of most unnecessary courses were made, anatomy would be at the top" are significant in showing the value attributed to anatomy for being negative statements and receiving the lowest scores, and thus taking the lowest places on the list.

When we consider the high-scoring item "Knowledge of anatomy should be remembered at the beginning of each training", we conclude that students who are at later stages of medical education and attending clinical training were more aware of the importance and necessity of anatomy. As stated earlier, it is pleasing to see that students are aware of the necessity of anatomy, which is one of the fundamental elements of medical education. However, as expressed by the students, it appears that anatomy reinforcement lessons, which they believe are insufficient, should be given particularly at the beginning of clinical training within the scope of spiral integration. Additionally, the other branches of science should also be integrated into this process within the same framework.

Since the item "Practical lessons of anatomy are interesting" received a high score, we think that anatomy, more of an illustrative branch of science, attracts more attention due to educational materials used in laboratories such as cadavers, organ samples, and models. Instead of entirely abstract, theoretical lessons, practical applications, and small-group works showing the structure and neighborhood of formations in the human body as they appear in reality will make medical education more effective. The high score received by the item "I loved anatomy owing to our faculty members" shows us that faculty members' behaviors and approaches to education during courses are also critical. Although the item "If I were in charge, I would remove information on anatomy from the Medical Specialization Examination (MSE)" received an average score, we think that this was due to the necessity of very detailed information in the examination and because the students at the final years of medical education would think they have to study old subjects in detail again.

The items "I watch anatomy videos in my free time" and "Drawing anatomic figures makes me happy" also received mean scores close to 3, which seemed positive. The burden of medical education and the differences in personal learning methods may explain the relatively low score received by video watching. Since drawing anatomic figures depends on the drawing talents of persons, we did not think this item would receive a high score. However, students still draw pictures of structures in detailed or simple forms or study topics by schematizing them, depending on their learning methods.

Although the item "I wish to do my doctorate on anatomy after I graduate" seemed to have a low score with 7.9% "Agree" and 3.7% "Totally agree" responses, it received a relatively high value. This was because a large group of medical students is known to dream about receiving a specialization education in a clinical branch. It was observed in a study made by Çetkin et al. (2016) that a large majority of students had an inclination to clinical sciences in their preferences for an area of specialization, while a tiny group of them, 6.5%, wanted to prefer basic medical sciences and 1.2% anatomy. We hope that enough basic medicine and particularly anatomy specialists will graduate from the increasing number of medical schools to meet the need.

When we compared the basic effects with the attitude scale we developed, we found no significant difference in any of the subfactors of the anatomy attitude scale with respect to gender and term. Having no difference was an expected result because neither gender nor learning new subjects in later years directly relates to anatomy. The need for anatomy is clearly known in understanding the other branches studied together with anatomy during the early years of medical education, and the clinical branches later added on top of these.

When the items "the reason for choosing a medical school" and "following medical sources outside textbooks" were compared with the attitude scale, no significant difference was found in any of the subfactors of the anatomy attitude scale. When we consider the reasons for choosing a medical school, although their reasons may be different, students today choose what they will encounter and what courses they will take when they come to a medical school. As far as we can see, the issue students are aware of most is that anatomy lessons are present, and this course is challenging. We think that students receiving medical education accept this course and the fact that it is difficult and study hard to have a good command of it, and that they comprehend the importance of this course. It was also an expected result that following medical sources outside textbooks would have no relationship with the factors of the attitude scale.

It was found that the willingness to be a specialist in the future made a significant difference only in the "value of anatomy" subfactor of the anatomy attitude scale and made no significant difference in the other subfactors. Physician candidates who intend to become specialists in the future attribute more value to anatomy than those with no such ideation. This shows us that students are aware that they will need the knowledge of anatomy more during their specialization education. Students who wish to specialize in any branch will need extensive anatomy knowledge in the medical specialization examination. This shows that they consider anatomy important for these two reasons.

Conclusion

An analysis of the study data gave the following results:

- A 14-item Anatomy Attitude Scale was constructed.
- The Anatomy Attitude Scale consists of 3 subfactors, "Value of Anatomy", "Hating Anatomy," and "Allocating Time to Anatomy".
- The ÇOMU Medical School students who were administered the Anatomy Attitude Scale were aware of the importance of anatomy as a basic medical science.
- It was observed that the percentage of those who wish to receive anatomy education after Graduation increased compared to previous studies.
- Gender, term of study, reasons for choosing a medical school, and following materials outside textbooks were found not to change students' viewpoint towards anatomy.
- It was revealed that the physician candidates who intended to become a specialist in any branch in the future attributed more value to anatomy.

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in JESEH journal belongs to the author.

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Appendix – A

Development of an Anatomy Attitude Scale for Medical School Students

Distinguished medical student,

This scale is about the necessity of the anatomy course you saw in terms 1 and 2 in medical school, the benefit it provides you, its contribution to your professional life, and your feelings towards the course. What is expected of you is to read each statement and tick the option (totally agree, agree, partially agree, disagree, strongly disagree) in response to the statement. Your name will not be mentioned on the scale. Thank you for your participation.

Gender

Female Male

Term

Term 2 Term 3 Term 4 Term 5 Term 6

Why did you choose medical school? (Tick only one option)

- Because my score is enough Because it's my ideal job
 Because my family wants Because of its good status in society
 Because it is a guaranteed profession that makes money

Apart from the lecture presentations and the lectures suggested by the lecturer, do you follow the resources related to medicine?

Yes No

Do you want to pass the “Medical Specialization Exam” and become a specialist in the future??

Yes No

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

* Items written in red have negative meanings and scored reversely.

Appendix – B

Tıp Fakültesi Öğrencilerinin Anatomi Dersine Yönelik Tutum Ölçeğinin Geliştirilmesi

Çok değerli tıp fakültesi öğrencisi,

Bu ölçek dönem 1 ve 2’de gördüğünüz anatomi dersinin tıp fakültesindeki gerekliliği, size sağladığı fayda, meslek hayatınıza katkısı, derse yönelik duygularınız ile ilgilidir. Sizden beklenen her bir ifadeyi okumanız ve ifadeye karşılık size uygun olan seçeneğe (tamamen katılıyorum, katılıyorum, kısmen katılıyorum, katılmıyorum, kesinlikle katılmıyorum) işaretlemenizdir. Ölçekte isminiz belirtilmeyecektir. Katılımınız için teşekkür ederiz.

Cinsiyetiniz

Kız Erkek

Döneminiz

Dönem 2 Dönem 3 Dönem 4 Dönem 5 Dönem 6

Tıp fakültesini neden seçtiniz? (Yalnızca bir seçeneği işaretleyiniz)

Puanım yettiği için İdealimdeki meslek olduğu için
Ailem çok istediği için Toplumdaki statüsü iyi olduğu için
Para kazandıran garanti meslek olduğu için

Ders sunuları, öğretim üyesinin önerdiği ders kaynakları dışında tıp ile ilgili kaynakları takip eder misiniz?

Evet Hayır

Gelecekte TUS kazanıp uzman olmak istiyor musunuz?

Evet Hayır

(1) Kesinlikle Katılmıyorum	(2) Katılmıyorum	(3) Kısmen Katılıyorum	(4) Katılıyorum	(5) Kesinlikle Katılıyorum	
Maddeler (İfadeler)					
3. Sağlık bakanı olsam tıp fakültelerinden anatomi dersini kaldırırım. *	(1)	(2)	(3)	(4)	(5)
5. Anatomi öğrenmek beni mutlu ediyor.	(1)	(2)	(3)	(4)	(5)
11. Anatomi bilmeyen kişiye hekim demem.	(1)	(2)	(3)	(4)	(5)
12. En gereksiz dersler sıralaması yapılırsa “Anatomi” başta gelir. *	(1)	(2)	(3)	(4)	(5)
14. Her staj başında anatomi bilgilerinin hatırlatılması gerekir.	(1)	(2)	(3)	(4)	(5)
15. “Anatomi” ile insan vücudunu tanımak bana kendimi hekim gibi hissettiriyor.	(1)	(2)	(3)	(4)	(5)
16. Yetkili olsam “Tıpta Uzmanlık Sınavından (TUS)” anatomi bilgilerini kaldırırım. *	(1)	(2)	(3)	(4)	(5)
18. Tıp eğitimi planlayıcısı olsam Anatomi’yi sadece seçmeli ders olarak önerirdim. *	(1)	(2)	(3)	(4)	(5)
21. Mezun olduğumda Anatomi doktorası yapmayı isterim.	(1)	(2)	(3)	(4)	(5)
22. Anatomik şekilleri çizmek beni mutlu eder.	(1)	(2)	(3)	(4)	(5)
23. Boş zamanlarımda anatomi videoları izlerim.	(1)	(2)	(3)	(4)	(5)
24. Anatomi pratik dersleri ilgi çekicidir.	(1)	(2)	(3)	(4)	(5)
25. Öğretim üyeleri nedeniyle Anatomi’yi çok sevdim.	(1)	(2)	(3)	(4)	(5)
27. Diğer tıp derslerinin temeli Anatomidir.	(1)	(2)	(3)	(4)	(5)

*Tersten puanlanan maddeler.