Anatomy Education at Vocational Schools of Health Sciences

Enseñanza de la Anatomía en las Escuelas Profesionales de Ciencias de la Salud

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SUMMARY: Anatomy, which has an important role for professionals working in health education, is a medical science that started from early ages and has come to the present day by showing continuous development. The success of people who are educated in the field of medicine and health sciences in their professions depends on a sound background in anatomy. For this reason, it was aimed to investigate views of first and second year students on the current state of anatomy education. This study was performed on Cukurova and Baskent University Vocational School of Health Science first and second year students (183 subjects, 45.6 %; and 218 subjects, 54.4 %, respectively) (n=401). The data were obtained by feedback method via a questionnaire with 41 questions. The survey was administered to 401 students. 357 subjects of all students stated that they chose their departments voluntarily. It was determined that 86.0 % of the students participated in the research stated that using many different tools in the lessons positively affected their learning, 88.5 % stated that various presentation techniques provided a better understanding of the anatomy subject, and 86.5 % of the students agreed with the idea that what they learned in the lessons would be very useful in their professional lives. Additionally, while 319 participants (79.55 %) gave a score of 5 or more out of 10 points to the question about whether they liked the anatomy course, 82 participants (20.45 %) gave a score of 4 or less. The 71.1 % of the participants thought that the primary purpose of the anatomy course was 'to understand the structure of the human body'. 2nd year students rated class duration significantly higher than 1st year students. Opinions of students can be beneficial and provide to improvement of anatomy education and new educational strategies These findings will help the identifying existing deficiencies and providing solutions.

KEY WORDS: Anatomy education; Students' opinions; Survey.

INTRODUCTION

Anatomy is recognized as the most cornerstone component of medical education (Turney, 2007). Anatomy etymologically means "cutting up" and is traditionally instructed at the beginning of the medical course to create the basic information in gross anatomy, neuroanatomy, histology/embryology (Turney, 2007; Ortadeveci *et al.*, 2022). Anatomy education based on dissection has historically been facilitated by cadavers, anatomical models and drawings in anatomy atlases (Bölek *et al.*, 2021). Throughout history, textbooks and cadavers have been the main stone for teaching and understanding the structural anatomy of the human body. The understanding of human anatomy properly is required both for health field and as a prerequisite for competent as a clinician (Kavvadia *et al.*, 2023). Also, this education is one of the most basic lessons of the health sciences departments and to ensure the well-being of everyone and improve overall health (Acar *et al.*, 2017). This model, also known as clinical reasoning and recommended in the World Health Organization's International Classification of Functioning, requires students to be able to collect and interpret information from the patient, to have knowledge about the normal function of anatomical structures in order to plan and implement treatment, and to identify possible impairments about movement and participation (Kundakcı & Bilir, 2023). There are many internet websites equipped anatomy images, applications on mobile phones, lectures, oral presentations, atlases with 2D pictures, and cadaveric dissection used in anatomy learning (Triepels *et al.*, 2020). The anatomy evaluation which is given in the form of slideshow presentation and a verbal description of the concepts, dissections and prosections, clinical cases and multimedia

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sources hinges on understanding the spatial interplay among structures, spanning across both two-dimensional (2D) and three-dimensional (3D) realms (Bölek *et al.*, 2021). In recent years, digital anatomy education, such as the three-dimensional (3D) reconstruction of human body, are used to support the study of the human body and healthcare delivery (Adnan & Xiao, 2023). The quality of the educational setting significantly influences students' learning outcomes. It is sophisticated subject and has instruction content, learning outcomes, the curriculum, teaching methods-strategies, learning facilities, teachers' competencies which may affect student's learn capacity and enthusiasm (Hadie *et al.*, 2021).

Nevertheless, the differences in the anatomy education system of anatomists, the lack of full consensus on issues such as anatomy knowledge level and skill competence have attracted the attention of anatomy learning activity (Hadie *et al.*, 2021). The important thing is that students should be interested in learning and in doing so, they should not avoid using all kinds of learning resources (Holmboe & Harden, 2017; Hadie *et al.*, 2021). Anatomy teaching also requires analyses by selecting the most appropriate tools and approaches to the learning process and constantly renewing them (Estai & Bunt, 2016). Health workers who apply all kinds of medical interventions or work in the field of health services should have a common medical terminology and communicate effectively with each other and have a good basic knowledge of anatomy in order to have a good basic knowledge infrastructure (Demir *et al.*, 2014; Babacan *et al.*, 2016; Babacan & Yuvarlakbas, 2022). In this article, Anatomy education in Vocational Schools of Health Sciences is important for training competent health professionals. Universities support students' anatomical competence and professional development by integrating comprehensive curriculum components, diverse teaching methods, and practical training opportunities. As healthcare evolves, continued innovation and adaptation in anatomy education remains crucial to meet the evolving needs of students, patients, and the healthcare industry. For this reason, this curriculum-based questionnaire aimed to measure the confidence, skills and attitude gained from the relevant anatomy courses and its impact on students' ability to apply these skills in the clinic and in their future careers, while also understanding the Vocational School students' anatomy education, scope, how and with which materials they want to learn anatomy courses and their experience of using digital resources in their studies.

MATERIAL AND METHOD

This study comprehensively analyze that explored anatomy education among associate degree classes across eight health department. Anatomy education like the other theoretical courses were held completely face-to-face in the spring semester of the 2023-2024 academic year. Theoretical courses are taught by the anatomy educators. Each Vocational School of Health Science is free to design and assess its anatomy teaching time, methods, and curriculum.

Our research was approved by the Cukurova University Non-invasive Clinical Research Ethics Committee and the study ethical rules were followed throughout. The study was carried out in the 2023-2024 academic year by Cukurova University Vacational School of Health Science and Baskent University Adana Vacational School of Health Science first grade and second grade anatomy students. 401 students taking the course were included. The study participants consisted of 117 (29.2 %) students from the Physiotherapy department, 79 (19.7 %) students from the Anesthesia department, 75 (18.7 %) students from the Emergency and Medical Aid department, 37 (9.2 %) students from the Medical Imaging department, 8 (2.0 %) students from the Oral and Dental Health department, 21 (5.2 %) students from the Dental Prosthesis Technology department, 19 (4.7 %) students from the Medical Laboratory Techniques department and 45 (11.2 %) students from the Elderly Care department. Students' opinions about the anatomy education they received were determined by survey method. The first 7 questions consist of demographic data.

In order to ensure reliability of the answers, the students' names, surnames and numbers were not included in the survey. Students were asked to give points from 1 to 5 of the 41 questions written in the survey. A five-point Likert-type scale is used to rate of agreement with the items ranging from 1 = strongly disagree to 5 = strongly agree. The questionnaire was used to collect data about students' ages, genders etc. Transferring the data obtained from the survey paper to the computer environment and statistically evaluating the data "IBM SPSS Statistics 22 for Windows" statistics program was used (SPSS for Windows v. 18.0, SPSS, Chicago, IL, USA). First, frequencies and percentages were calculated. The means and standard deviations of each of the items measured were calculated. Data are mean±standard was given as a deviation. The differences between the means for each group were determined using a nonparametric T-test for independent groups was used to analyze the data. A value of $p<0.05$ was considered statistically significant. We critically reviewed for answers relating to the current status of anatomical education from students, with the aim of coming up with recommendations for best teaching practice in anatomy education.

RESULTS

The students participated to study's age means were found as 20.96±2.91 years (min.;18 and max.;46 years). Demographic data is given in Table I. First of all, data were calculated according to gender distribution. The number of female students is 328, while the number of male students is 73. The percentage of female students is 81.8 %, whereas the percentage of male students is 18.2 %. Secondly, there are two different classes. The number of 1st grade students is 183 (45.6 %), and the number of 2nd grade students is 218 (54.4 %). There are more 2nd grade students in these universities. There is anatomy training at least 2 hours per week in 1st and 2nd grades. The number and percentage of students in the 1st and 2nd grades at our universities and weekly theoretical course hours are given in Table I. Thirdly, we determined participation in the survey by department. 117 students are studying in Physiotherapy, 79 students in Anaesthesia, 75 students in Emergency and Medical Aid, 45 subjects in Elderly Care, 37 subjects in Medical Imaging, 21 subjects in Dental Prosthesis Technology, 19 students in Medical Laboratory Techniques and 8 subjects in Oral and Dental Health. Interest in the physiotherapy program is higher compared to others. Morover, students were asked whether they chose the Vocational School of Health Sciences voluntarily (Did you prefer the Vocational School of Health Science with your own will?). Of the 401 participants, 357 (89.0 %), stated that they chose their departments voluntarily. Finally, attendance in weekly 2 hour classes is the highest (80.3 %), followed by attendance in 4 hour classes (12.2 %) and 3 hour classes (7.5 %). Most students attend classes for 2 hours per week. The number of weekly hour is different hours per week at both university Vocational School of Health Science associate degree departments. Question 6 named 'Do you like anatomy?' asked to students. The mean score indicating students' level of liking for the anatomy course is 6.33±2.48points. This suggests that, on average, students moderately enjoy the course. Also, while 319 participants (79.55 %) gave a score of 5 or more out of 10 points to the question about whether they liked the anatomy course, 82 participants (20.45 %) gave a score of 4 or less. Overall, the table provides insight into the general satisfaction level of students with the anatomy course. However, as indicated by the standard deviation, there are varying emotional responses among students. These data can be used to identify both strengths of the anatomy education and areas for improvement.

The responses to questions querying students' thoughts on anatomy education, opinions on the teaching method employed by the instructor, adequacy of the educational materials provided to them, thoughts onanatomy exams, and the level of communication with the instructor are presented in Table II. The responses are categorized into five levels of agreement: "Strongly Disagree," "Disagree," "Undecided," "Agree," and "Strongly Agree". According to q8; The majority of respondents, 168 students, which is 41.9 % of the total, agree that the course hours are sufficient. While a significant portion of students agree that the course hours are adequate for the anatomy course content, there are also notable proportions of students who disagree or are undecided. This suggests a diversity of perspectives among students regarding the sufficiency of course hours for the content covered in the anatomy course. According to q9; The majority of respondents, 195 students, which is 48.6 % of the total, agree that increasing course hours will improve their clinical skills. The data indicate that a significant portion of students believe that increasing anatomy course hours will contribute to the improvement of their clinical skills, with a notable majority expressing agreement or strong agreement with this statement. However, there are also some students who disagree or are undecided. According to q10; 218 students, which is 54.4 % of the total, agree that information related to the course is provided before classes.

According to q15; A majority of respondents (61.6 % + 24.4 % = 86.0 %) either agree or strongly agree that the use of many different tools in teaching lessons affects their learning positively. A small percentage (2.0 % + 3.7 % = 5.7 %) either strongly disagree or disagree with this statement. About 8.2 % are undecided, indicating a portion of respondents who may not have a strong

Table I. Demographic data.

Sex (q1)	Female	328 (81.8 %)
	Male	73 (18.2 %)
Grade(q3)	1st grade	183 (45.6 %)
	2nd grade	218 (54.4 %)
Department(q4)	Physiotherapy	117 (29.2 %)
	Anesthesia	79 (19.7 %)
	Emergency and Medical Aid	75 (18.7 %)
	Medical Imaging Techniques	37 (9.2 %)
	Oral and Dental Health	8 (2.0 %)
	Dental Prosthesis Technology	21 (5.2 %)
	Medical Laboratory Techniques	19 (4.7 %)
	Elderly Care	45 (11.2 %)
Volunteering(q5)	Yes	357 (89.0 %)
	No	44 (11.0 %)
Weekly lesson hours(q7)	2 hours	322 (80.3 %)
	3 hours	30 (7.5 %)
	4 hours	49 (12.2 %)

Table II. Frequencies of questions according to 5-point Likert.

Frequencies (%Percentage)	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Lesson hours are sufficient according to the content of the anatomy course (q8).	44 (11.0 %)	65 (16.2 %)	87 (21.7 %)	168 (41.9 %)	37 (9.2 %)
I think increasing the number of anatomy class hours will improve my skills in the clinic (q9).	11 (2.7 %)	31 (7.7 %)	94 (23.4 %)	195 (48.6 %)	70 (17.5 %)
Information about the course is given before the lessons (q10).	14 (3.5&)	51 (12.7 %)	63 (15.7 %)	218 (54.4 %)	55 (13.7 %)
The way the lessons are taught affects my learning (q11).	6 (1.5 %)	14 (3.5 %)	41 (10.2 %)	208 (51.9 %)	132 (32.9 %)
I don't find the way the anatomy class is conducted interesting (q12).	27 (6.7 %)	138 (34.4 %)	115 (28.7 %)	86 (21.4 %)	35 (8.7 %)
Visual-auditory tools are used to strengthen the narrative in the course (q13).	13 (3.2 %)	35 (8.7 %)	43 (10.7 %)	223 (55.6 %)	87 (21.7 %)
The visual-auditory materials used in the lesson enable me to pay attention to the lesson (q14).	9 (2.2 %)	19 (4.7 %)	49 (12.2 %)	227 (56.6 %)	97 (24.2 %)
The use of many different tools in t eaching lessons affects my learning (q15).	8 (2.0 %)	15 (3.7 %)	33 (8.2 %)	247 (61.6 %)	98 (24.4 %)
Using different presentation techniques in lessons helps me understand the subject better (q16).	4 (1.0 %)	9 (2.2 %)	32 (8.0 %)	241 (60.1 %)	114 (28.4 %)
Important information is also emphasized in the lessons (q20).	9 (2.2 %)	7 (1.7 %)	47 (11.7 %)	229 (57.1 %)	109 (27.2 %)
There is a suitable environment for asking questions in class (q21).	20 (5.0 %)	30 (7.5 %)	51 (12.7 %)	226 (56.4 %)	73 (18.2 %)
By the end of the lesson, I understand the subject (q22).	15 (3.7 %)	37 (9.2 %)	151 (37.7 %)	155 (38.7 %)	43 (10.7 %)
Having access to lecture notes is helpful in my learning (q23).	4 (1.0 %)	8 (2.0 %)	23 (5.7 %)	237 (59.1 %)	128 (31.9 %)
I can easily reach the instructor before or after class (24).	8 (2.0 %)	34 (8.5 %)	89 (22.2 %)	206 (51.4 %)	64 (16.0 %)
The physical conditions of the environment where the lessons are taught are suitable and sufficient for me to learn (q25).	22 (5.5 %)	42 (10.5 %)	114 (28.4 %)	183 (45.6 %)	40 (10.0 %)
I think following the lesson in class is beneficial for my learning (q18).	4 (1.0 %)	11 (2.7 %)	21 (5.2 %)	233 (58.1 %)	132 (32.9 %)
I believe that taking notes is necessary for this course (q19).	2 (0.5 %)	23 (5.7 %)	32 (8.0 %)	205 (51.1 %)	139 (34.7 %)
There is a relationship between the anatomy course given in the curriculum and clinical practice (q33).	14 (3.5 %)	23 (5.7 %)	124 (30.9 %)	201 (50.1 %)	38 (9.5 %)
I need to repeat the anatomy course before clinical practice (q34).	10 (2.5 %)	10 (2.5 %)	84 (20.9 %)	225 (56.1 %)	60 (15.0 %)
During clinical practice, I realized that I was lacking in anatomy (q35).	12 (3.0 %)	38 (9.5 %)	123 (30.7 %)	183 (45.6 %)	45 (11.2 %)
During clinical practice, I reviewed my previous anatomy notes (q36).	14 (3.5 %)	55 (13.7 %)	102 (25.4 %)	196 (48.9 %)	34 (8.5 %)
Anatomy class increases my respect for the human body (q37).	2 (0.5 %)	11 (2.7 %)	35 (8.7 %)	225 (56.1 %)	128 (31.9 %)
What I learned in anatomy class motivates me for my career (q38).	3 (0.7 %)	17 (4.2 %)	70 (17.5 %)	226 (56.4 %)	85 (21.2 %)
I think what I learned in the course will contribute to my professional life (q40).	7 (1.7 %)	14 (3.5 %)	33 (8.2 %)	219 (54.6 %)	128 (31.9 %)
I am generally satisfied with the anatomy course (q41).	6 (1.5 %)	24 (6.0 %)	70 (17.5 %)	228 (56.9 %)	73 (18.2 %)

opinion or need further clarification on the matter. Overall, the data suggests that a significant majority of respondents perceive the use of various teaching tools positively impacting their learning experience. However, there's a small minority who disagree, and a portion who are undecided, highlighting potential variability in individual preferences or experiences.

According to q16; Students evaluated the effectiveness of various presentation techniques used in their classes. These data reflect students' perceptions regarding whether different presentation techniques help them better understand the subject. Majority of the respondents (88.5 %) believe that various presentation techniques contribute to better understanding of the subject matter. This indicates a strong perception that the use of different presentation techniques enhances the learning experience. Specifically, while 60.1 % agree with this notion, 28.4 % strongly support it. However, a small minority (3.2 %) of respondents do not agree with this view. Additionally, 8.0 % of the students are undecided, indicating a lack of clear opinion on the effectiveness of different presentation techniques. These findings provide valuable feedback for the design of course materials and teaching methods.

According to q33; A significant majority of respondents (50.1 % + 9.5 % = 59.6 %) either agree or strongly agree that there is a relationship between the anatomy course and clinical practice. Additionally, there is a considerable portion (30.9 %) who are undecided.

According to q38; shed light on the profound impact of anatomy education on students' career motivation. Among the respondents, a substantial majority either agree or

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strongly agree that what they have learned in their anatomy classes serves as a source of motivation for their future careers.

According to q40; A significant majority of respondents (86.5 % = 54.6 % + 31.9 %) express agreement with the notion that what they have learned in their courses will indeed be beneficial in their professional lives. This resounding affirmation underscores the perceived relevance and utility of the educational content provided. Conversely, a small fraction of respondents (5.2 % = 1.7 % + 3.5 %) express disagreement with this sentiment.

According to q41; There is snapshot of students' satisfaction levels with their anatomy course, reflecting their overall experiences and perceptions. Impressively, a substantial majority of respondents (75.1 % = 56.9 % + 18.2 %) express either agreement or strong agreement with being generally satisfied with the anatomy course. Additionally, there is a noteworthy percentage of students (17.5 %) who remain undecided about their satisfaction with the anatomy course.

Additionally, in the 17th question; 'Anatomy course should be taught with the following' was asked. 172 of students have chosen the teaching of anatomy class mostly with Plastic Models, 3D Digital Atlas, and Videos (42.9 %). The combination of tangible models, digital resources, and videos can provide students with a comprehensive learning experience and support various learning styles.

According to the q29 results (Table III); 217 participants (54.1 %) prefer to use digital visualization resources before exams. This reflects students' belief that visual materials support the learning process and enhance understanding, especially during exam preparation. According to q30; 163 students (40.6 %) have chosen to identify anatomical structures. This result indicates that students prefer to use digital visualization resources primarily for identifying anatomical structures. It demonstrates that students effectively utilize visual materials for identifying and naming structures. According to q39; The ultimate goal of the anatomy course has been identified by 285 students (71.1 %) as "Understanding the structure of the human body." This result reflects the aim of the anatomy course to comprehensively teach students about the anatomical structures of the human body. However, among other goals, important objectives such as "Acquiring basic medical terminology" (8.5 %) and "Preparing for clinical rotations" (8.2 %) are also present. These findings indicate that the anatomy course plays a crucial role in providing students with fundamental knowledge and skills in the field of healthcare. According to q26 the usage rates of different devices for studying anatomy, the majority (57.9 %) prefer

to use smartphones (Table IV). Following smartphones, laptops (19.5 %), personal computers (12.7 %), and tablets (10.0 %) are also used. According to q27; looking at the time allocated for individual study sessions per week, the majority of participants (55.8 %) spend 0-2 hours. Those who allocate 2-5 hours follow with a rate of 38.8 %. Those who allocate 6-10 hours are fewer, with a rate of 5.5 %. There are no students who study for 10 hours or more. According to q31; among the reasons for not using digital resources, the most common one is the lack of knowledge on how to use them, accounting for 43.6 % of participants. Other reasons include inaccessibility (27.7 %), and the absence of individual or group assignments requiring the use of such resources (21.2 % and 7.5 %, respectively). According to q32; regarding the added value of digital visualization resources compared to anatomy textbooks/atlas or other teachings, 44.4 % of participants consider PowerPoint presentations to be sufficient. While anatomy textbooks are also a popular choice (31.4 %), lack of knowledge on how to use digital resources (12.7 %) and accessibility issues (11.5 %) are significant factors. Moreover, in the 28th question, students were asked: 'Can you use the power of digital visualization in individual studies for the anatomy course?' the question was asked. The number of participants using digital visualization resources for individual study sessions in anatomy class is 238 (59.4 %), while those not using them is 163 (40.6 %). Also, the regarding course duration shows that second-year students achieved a higher average in the analysis where the averages of the 8th and 9th questions for first and second graders were taken according to grades. On average, 2nd grade students rated the class duration higher (Mean = 3.5596) compared to 1st grade students (Mean = 3.3470). Additionally, the p value is 0.002. The suggest that there is a statistically significant difference in the class duration between the 1st and 2nd year students (p<0.005). The analysis where the mean scales of questions 37, 38, and 40 were taken based on voluntariness, participants who volunteered had a higher average. Additionally, with a p-value of 0.004, this difference is statistically significant (p<0,005). This finding indicates that respondents who participated voluntarily tend to have more positive perceptions or attitudes regarding career-profession related questions compared to those who participated non-voluntarily. The results for q6, reveal a statistically significant difference in the average ratings between respondents who like the anatomy course and those who do not (p<0.001). On average, respondents who reported liking the anatomy course (Mean = 6.51) scored significantly higher compared to those who did not like it (Mean = 4.89). This finding underscores the importance of respondents' attitudes towards the anatomy education, with those expressing a preference for the anatomy course indicating higher satisfaction levels.

Table III. Personal questions about anatomy studies.

When do you use digital visualization resources in your individual works? (q29).	Before the exam	217 (54.1 %)
	When it is difficult to understand the subject	108 (26.9 %)
	When the topic interests me and I want to learn more	45 (11.2 %)
	After finishing the subject of study	15 (3.7 %)
	In connection with homework	11 (2.7 %)
	Before moving on to the study topic	5 (1.2 %)
What makes you use digital visualization resources more in your individual works? (q30).	Ability to follow structures in the body	38 (9.5 %)
	To understand what organs and structures look like from different angles	68 (17.0 %)
	To understand the relationships of organs with each other	54 (13.5 %)
	To understand the relationship of the organ to the anatomy of the whole body	41 (10.2 %)
	To identify anatomical structures	163 (40.6 %)
	To learn about anatomical variations	37 (9.2 %)
What do you think the ultimate goal of an anatomy course could be? (q39).	Acquiring basic medical terminology	34 (8.5 %)
	Understanding the structure of the human body	285 (71.1 %)
	Preparing for clinical rotations	33 (8.2 %)
	Appreciation of human dignity	13 (3.2 %)
	Reflecting on life and death	8 (2.0 %)
	Promoting professionalism	28 (7.0 %)

Table IV. Personal questions about study equipment.

Can you use different devices to study anatomy lessons? (q26).	Tablet	40 (10.0 %)
	Personal computer	51 (12.7 %)
	Smart phone	232 (57.9 %)
	Laptop	78 (19.5 %)
How many hours a week do you spend on individual studies in anatomy class? (q27).	0-2 hours	223 (55.8 %)
	2-5 hours	155 (38.8 %)
	6-10 hours	22 (5.5 %)
	10 hours or more	0 (0 %)
What is your reason for not using digital resources? (q31).	Not accessible	111 (27.7 %)
	Not giving individual homework that require the use of resources	85 (21.2 %)
	Not giving group homeworks that require the use of resources	30 (7.5 %)
	I have no knowledge of how resources can be used	175 (43.6 %)
What added value do digital visualization resources have compared to, for example, an anatomy book/atlas, lecture, or other teachings? (q32).	Anatomy books are enough	126 (31.4 %)
	PowerPoint is enough	178 (44.4 %)
	I don't know how to use it	51 (12.7 %)
	Difficult to access digital resources	46 (11.5 %)

DISCUSSION

Anatomy, which is the most important building block of medical education, is the branch of science that examines the normal shape and structure of the body, the organs that make up the body, and the structural and functional relationships between these organs. With the medical education given before graduation, it is aimed for students to gain basic knowledge and skills, understand social ethical elements and acquire general medical skills (Çetkin *et al.*, 2016). All healthcare professionals who are tasked with protecting, promoting and treating human health must know and learn the human body in the best way possible. Healthcare professionals who know what to look for and understand that what they have found, will only be well equipped with the necessary and valid information based on anatomy and this basic science. On the basis of health professions education, anatomy education focuses on the many structures that make up the body and their relationships with each other. The anatomy course, which is generally taught in the first year of education as the basis of health professions education, forms the basis of the vocational courses that students will take in the following years. Students graduating from schools that train health professionals will have significant knowledge and skills in basic subjects from the moment they enter the profession, which will make significant contributions to the health of all individuals in our country (Büyüköztürk *et al.*, 2022). The goal of higher education institutions is to educate students as well-equipped individuals who can take responsibility in the relevant field and provide active and effective service (Akkoç *et al.*, 2021). In recent years,

technological progress has greatly affected anatomy learning in medical faculties, and the blended learning model has been implemented in many educational institutions (Adnan & Xiao, 2023).

Student feedback by questionnaire is one of the many forms of evaluation showing the quality of the education offered to them and is a method with high reliability and validity. In this context, it is extremely critical to objectively assess the feedback obtained from the subjects in the survey studies and reflection the reports or feedbacks obtained from the individuals to the training process in the following training periods. Routine assessment of students' views related to the education will make a great contribution to increase the quality of their education, eliminating existing deficiencies and achieving and developing new goals. For this reason, student feedback regarding achievement of the aims targeted in anatomy education is important (Çetkin *et al.*, 2016). In previous studies, attempts were made to ascertain the needs of the student cohort by soliciting feedback directly from students (Pickering & Swinnerton, 2019; Turhan, 2020; Ojukwu *et al.*, 2022).

In feedbacks and survey, student departments, ages, genders are an important factor. In understanding the demographics of our student population, age distribution plays a pivotal role. The following statistical overview provides insight into the age composition among our students. The calculated average age of 20.96 years suggests that our student population is generally young. With a standard deviation of 2.914, we observe a degree of variability in ages around the mean, indicating the dispersion of ages within our student community. The presence of students as young as 18 and as old as 46 underscores the diversity of age ranges within our institution. This diversity enriches our learning environment by bringing together individuals with varied life experiences, perspectives, and goals. It also emphasizes the inclusive nature of our educational programs, catering to students from different stages of life and career paths. Understanding these demographic characteristics aids in tailoring educational approaches and support services to meet the diverse needs of our students effectively. In a survey distributed to first and second-year 104 medical students, many of students showed no satisfaction with the quality of education and her/his inability to participate (Shahrvini *et al.*, 2021). In another study with 42 surgeons, 65 % of participants reported that they accepted cadaver based education as the most useful and practical method of anatomy teaching and that this understanding should be expanded in health sciences (Sheikh *et al.*, 2016). Thus, anatomy educators have integrated digital teaching resources into anatomy education, including in-house created content, recording of investigated cadavers,

and virtual anatomy software (Harmon *et al.*, 2021; Boscolo-Berto *et al.*, 2021). Additionally, Çetkin *et al*'s study, It was found that the students used the lecture notes during theoretical and practical part of the anatomy individually. There was no significant correlation between general average grade and lengths of anatomy study of students 50 % of students reported that don't use of cadaver is always a lack in anatomy education (Çetkin *et al.*, 2016).

The higher the quality of the information and technological resources used, the greater the opportunities for students to use digital resources outside the classroom (Steffens, 2006; Keenan & Ben Awadh, 2019). Anatomy classes have a traditional history of utilizing cadaver dissection as a fundamental teaching tool (Albanese, 2010). As increasing student numbers and the expenses associated with cadavers escalate, videos emerge as a viable alternative to conventional methods of anatomical education (Theoret *et al.*, 2007; Chung *et al.*, 2013; Ozer *et al.*, 2017). Therefore, delivering anatomical education through videos may not match the effectiveness of certain traditional methods like prosection, particularly considering the diversity in students' learning styles. However, it can enhance the overall learning experience, boost test performance, and alleviate anxiety among students throughout the course (Koop *et al.*, 2021).

It is seen that there are studies using many methods used or preferred in anatomy education (Bukowski, 2002; Pandey & Zimitat, 2007; Mitrousias *et al.*, 2018; Darras *et al.*, 2019; Ben Awadh *et al.*, 2022) and comparing traditional methods with new methods (Lochner *et al.*, 2016; Koop *et al.*, 2021). It is also reported that there is a need for more studies that focus on what students do and what affects their learning (Kirkwood & Price, 2014; Babacan & Yuvarlakbas, 2022). One study showed that what is important for students to understand images of anatomical structures, is to allow students to explore the images at their own method and pace, and that students deliberately seek to create variations to precisely distinguish images, especially regarding associated parts (Pettersson *et al.*, 2023).

Although it has been reported that there are many teaching methods available, it has also been reported that people in undergraduate and postgraduate education think that their anatomical knowledge is insufficient (Fitzgerald *et al.*, 2008; Triepels *et al.*, 2018). Suggested education model reported that 2D and new 3D teaching methods should be combined to reach the desired level of anatomical knowledge (Bergman *et al.*, 2011). However, no an adequate information is available on the effectiveness of the different 3D learning methods being developed relative to traditional anatomy learning methods. To educate anatomy for clinicians requires combining competencies based on relevant and

comprehensive knowledge in the anatomical sciences, considering anatomy as a whole. Vertical and horizontal integration of anatomy are needed to provide the basis and critical knowledge and the presentation of other biomedical sciences and clinical disciplines. This education behavior develops the clinical reasoning (Brauer & Ferguson, 2015). In learning anatomy, students use many different learning styles such as vision, touch, 3-dimensional perception, association, and discussion. Recently, it has been reported that there has been a change in traditional, cadaver-based anatomy teaching due to the use of an integrated or system-based curriculum (Tibrewal, 2006), and some factors such as religious belief, cost and time factors play a role in this change. In this case, it was added that the time allocated to anatomy teaching was not sufficient (Lockwood & Roberts, 2007). Medical and health sciences students must acquire many skills and acquire a wide range of knowledge during their time at university to become competent clinicians. In particular, anatomy is one of the cornerstones of health education. Regardless of the field of healthcare, clinicians who do not fully understand anatomy may not be able to perform research effectively because they need information about organs and tissues (Singh *et al.*, 2015).

As a result, anatomy is often taught in the earlier stages of healthcare educational curricula. In order to be successful in health science, human anatomy should be conceived well. It is obvious that anatomy education is necessary in the Vocational School of Health Sciences in order to train competent, skillful and versatile health professionals who love their job. Determining and analyzing the competencies and deficiencies in the anatomy knowledge of students who will perform clinical applications on patients in clinical reasoning processes, can contribute to this field while planning the anatomy curriculum. Measuring students' perceptions of the anatomy education environment as a feedback mechanism is key to improving anatomy teaching and learning in order to train a good, educated, experienced and competent healthcare professional. Therefore, the evaluation of anatomy education and students' positive/negative opinions should be continuously reviewed in the creation and development of anatomy education model.

POLAT, S.; SÖNMEZ, E.I.; TUNÇ, M.; IS¸IK, E.I.; ÖZSAHIN, E. & GÖKER, P. Enseñanza de la anatomía en las escuelas profesionales de ciencias de la salud. *Int. J. Morphol., 42(6)*:1488-1496, 2024.

RESUMEN: La anatomía, que ocupa un lugar importante para los profesionales que trabajan en la educación del área de la salud, es una ciencia médica que comenzó en épocas tempranas y ha demostrado un desarrollo continuo. El éxito de las personas que se educan en el campo de la medicina y las ciencias de la salud en sus profesiones, depende de una buena formación en anatomía. Por este motivo, se propuso investigar las opiniones de los estudiantes de primer y segundo año sobre el estado actual de la educación en anatomía. Este estudio se realizó en estudiantes de primer y segundo año de la Escuela Vocacional de Ciencias de la Salud de la Universidad de Cukurova y Baskent (183 sujetos, 45,6 %; y 218 sujetos, 54,4 %, respectivamente) (n=401). Los datos se obtuvieron mediante el método de retroalimentación a través de un cuestionario con 41 preguntas. La encuesta se administró a 401 estudiantes. 357 estudiantes declararon que eligieron sus departamentos de forma voluntaria. Se determinó que el 86,0 % de los estudiantes que participaron en la investigación afirmaron que el uso de muchas herramientas diferentes en las lecciones afectó positivamente su aprendizaje. El 88,5 % afirmó que varias técnicas de presentación proporcionaron una mejor comprensión de la asignatura de anatomía y el 86,5 % de los estudiantes estuvo de acuerdo con la idea de que lo que aprendieron en las lecciones sería realmente útil en sus vidas profesionales. Mientras que 319 participantes (79,55 %) dieron una puntuación de 5 o más sobre 10 puntos a la pregunta sobre si les había gustado el curso de anatomía, 82 participantes (20,45 %) dieron una puntuación de 4 o menos. El 71,1 % de los participantes pensó que el objetivo principal del curso de anatomía era "comprender la estructura del cuerpo humano". Los estudiantes de segundo año calificaron la duración de la clase significativamente más alta que los estudiantes de primer año. Las opiniones de los estudiantes pueden ser beneficiosas y proporcionar una mejora en la educación en anatomía y nuevas estrategias educativas. Estos hallazgos ayudarán a identificar las deficiencias existentes y a proporcionar soluciones.

PALABRAS CLAVE: Educación en anatomía; Opiniones de los estudiantes; Encuesta.

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