African Journal of Advanced Pure and Applied Sciences (AJAPAS)
Online ISSN: 2957-644X
Volume 4, Issue 4, 2025
Page No: 636-640
Website: https://aaasjournals.com/index.php/ajapas/index
ISI 2025: 1.126 SJIFactor 2024: 6.752 معامل التأثير العربي: 1.62

Perceptions on the Role of Anatomy in Clinical Practice: A Questionnaire-Based Study of Medical and Dental Students

Moamer Altife Almahde [1], Karima Alfitory Ahmed [2*]
[1] Anatomy department, Faculty of Medical, University of Sirte, Sirte, Libya
[2] Pathology department, Faculty of Dentistry, University of Sirte, Sirte, Libya

تصورات حول دور التشريح في الممارسة السريرية: دراسة قائمة على الاستبيان لطلاب الطب وطب الأسنان

معمر اللطيف المهدي [1]، كريمة الفيتوري أحميد [2 *]
[1] قسم التشريح، كلية طب البشري، جامعة سرت، سرت، ليبيا
[2] قسم أمراض الفم، كلية طب الأسنان، جامعة سرت، سرت، ليبيا

*Corresponding author: karima.alfitory@su.edu.ly

Received: September 13, 2025	Accepted: November 23, 2025	Published: December 08, 2025

Abstract:

Background: Anatomical knowledge serves as a cornerstone of medical and dental education, underpinning accurate diagnosis and safe clinical practice. However, the extent to which students perceive its relevance and integration into clinical training remains a topic of ongoing discussion.

Objective: To assess the perceptions of medical and dental students regarding the importance of anatomy in clinical practice and to compare responses across disciplines.

Methods: A cross-sectional questionnaire-based survey was conducted among 364 students from various universities across Libya, including both pre-clinical and clinical years. The questionnaire assessed agreement levels on key statements related to the role of anatomy in clinical diagnosis, skill development, curriculum emphasis, and integration into practice. Data were analyzed using descriptive statistics and Chi-square tests to assess discipline-based differences.

Results: The majority of students agreed that anatomy is essential for clinical diagnosis (87.9%) and improves clinical skills (85.2%). A significant proportion (92.0%) supported greater curricular emphasis on anatomy. However, 27.5% of respondents found it difficult to integrate anatomy into clinical practice. Comparison by discipline revealed that medical students were significantly more likely to support increased emphasis on anatomy in the curriculum compared to dental students (95.0% vs. 88.4%, $p = 0.045$).

Conclusion: Students widely acknowledge the critical role of anatomy in clinical education. However, challenges persist in translating anatomical knowledge into practice. The findings highlight the need for curriculum reforms that promote clinically integrated anatomy teaching, tailored to the specific demands of each discipline.

Keywords: Anatomical knowledge, Clinical practice, Medical students, Dental students.

الملخص

الخلفية: تُعدّ المعرفة التشريحية حجر الزاوية في التعليم الطبي وطب الأسنان، إذ تُشكّل أساسًا للتشخيص الدقيق والممارسة السريرية الآمنة. ومع ذلك، لا يزال مدى إدراك الطلاب لأهميتها وتكاملها مع التدريب السريري موضوع نقاش مستمر.

الهدف: تقييم تصورات طلاب الطب وطب الأسنان حول أهمية التشريح في الممارسة السريرية، ومقارنة الردود عبر التخصصات.

المنهجية: أُجريت دراسة استقصائية مقطعية قائمة على الاستبيان على 364 طالبًا من مختلف الجامعات في جميع أنحاء ليبيا، بما في ذلك السنوات ما قبل السريرية والسريرية. قيّم الاستبيان مستويات الاتفاق على العبارات الرئيسية المتعلقة بدور التشريح في التشخيص السريري، وتنمية المهارات، والتركيز على المنهج، ودمجه في الممارسة. حُلّلت البيانات باستخدام الإحصاء الوصفي واختبار مربع كاي لتقييم الاختلافات القائمة على التخصصات.
النتائج: اتفق غالبية الطلاب على أن التشريح ضروري للتشخيص السريري (87.9%) ويُحسّن المهارات السريرية (85.2%). وأيدت نسبة كبيرة (92.0%) زيادة التركيز على التشريح في المناهج الدراسية. مع ذلك، وجد 27.5% من المشاركين صعوبة في دمج علم التشريح في الممارسة السريرية. وكشفت المقارنة حسب التخصص أن طلاب الطب كانوا أكثر ميلًا لدعم زيادة التركيز على علم التشريح في المنهج الدراسي مقارنةً بطلاب طب الأسنان (95.0% مقابل 88.4%، قيمة $p = 0.045$).
الخلاصة: يُقرّ الطلاب على نطاق واسع بالدور الحاسم لعلم التشريح في التعليم السريري. ومع ذلك، لا تزال هناك تحديات في ترجمة المعرفة التشريحية إلى ممارسة عملية. تُسلّط النتائج الضوء على الحاجة إلى إصلاحات في المناهج الدراسية تُعزّز تدريس التشريح المتكامل سريريًا، بما يتناسب مع المتطلبات الخاصة بكل تخصص.

الكلمات المفتاحية: المعرفة التشريحية، الممارسة السريرية، طلاب الطب، طلاب طب الأسنان.

Introduction

Anatomy has long been considered a cornerstone of medical and dental education, serving as a foundational science that supports clinical understanding and practice. Its significance dates back to the early days of medical education when cadaveric dissection and anatomical texts were among the few available teaching resources. Today, despite advances in biomedical sciences and the integration of new technologies in clinical training, anatomy continues to play a critical role in shaping competent healthcare professionals. For both medical and dental students, a thorough understanding of human anatomy is essential for the accurate diagnosis, safe execution of procedures, and communication within interdisciplinary healthcare teams (1).

Historically, gross anatomy has been delivered through cadaveric dissection, prosections, models, and didactic lectures. However, the modern curriculum has undergone significant restructuring in many medical and dental schools due to pressures to compress academic schedules, incorporate problem-based learning (PBL), and integrate basic sciences with clinical relevance (2). Consequently, anatomy is often taught in shorter modules with less time for dissection, leading to concerns about the depth of anatomical knowledge retained by students upon entering clinical practice (3). This has prompted widespread discussion among educators regarding whether current approaches to anatomical education adequately prepare students for clinical responsibilities.

Multiple studies have emphasized the importance of anatomy knowledge in clinical practice. Anatomical knowledge directly impacts patient safety, surgical outcomes, and the accurate interpretation of physical signs (4). Inadequate anatomical understanding has been implicated in clinical errors, particularly in surgical specialties, anesthesiology, radiology, and dentistry (5). For dental students specifically, mastery of craniofacial anatomy is vital for procedures ranging from local anesthesia administration to oral surgery and prosthodontic treatment planning. Similarly, for medical students, anatomical comprehension underpins practices in various clinical fields, including internal medicine, emergency care, and orthopedics.

Student perceptions of anatomy teaching methods and their applicability to clinical settings have gained scholarly attention in recent years. Several researchers have explored how students' value different instructional techniques—such as dissection, virtual anatomy tools, or integrated case-based learning—in shaping their anatomical understanding and clinical reasoning (6 ,7). Students often express appreciation for clinically oriented anatomy teaching that bridges theoretical concepts with practical application (8). Despite this, gaps remain in understanding how medical and dental students compare in their perceptions of anatomy's role in their respective future clinical roles.

This disparity is particularly important given the discipline-specific anatomical needs of medical versus dental professionals. While both groups require knowledge of human structure, dental students typically focus more intensively on head and neck anatomy, whereas medical students engage with systemic and regional anatomy throughout the body. These differing emphases might shape students' perceptions of anatomy's relevance, the adequacy of their training, and their preferences for instructional methods.

Furthermore, recent technological advances and global educational shifts—including those prompted by the COVID-19 pandemic—have transformed anatomy teaching. The use of online resources, 3D models, and virtual dissection tables has expanded, especially in settings where traditional cadaveric dissection is limited (9). These changes may influence students' engagement, satisfaction, and perceptions of anatomy's long-term value.

Understanding students' views on the role of anatomy in clinical practice is crucial for educators seeking to enhance curricula and ensure that graduates are well-prepared for real-world clinical challenges. Student feedback can inform educational policy, highlight areas for improvement, and promote the adoption of learner-centered approaches that align anatomical education with clinical demands.

This study aims to assess and compare the perceptions of medical and dental students regarding the role of anatomy in clinical practice. By analyzing their experiences, attitudes, and perceived preparedness, this research seeks to contribute to the ongoing discourse on optimizing anatomy education for future healthcare professionals.

Material and methods

A descriptive cross-sectional study was conducted between January and July to examine the perceptions of medical and dental students regarding the role of anatomy in clinical practice. A total of 364 students from different academic years were recruited from different University in Libya using a convenience sampling approach.

A structured, self-administered questionnaire was developed based on relevant literature and expert consultation. The instrument consisted of multiple sections, including demographic information, perceptions of the relevance of anatomy to clinical training, satisfaction with teaching approaches, integration of anatomy during clinical years, and preferred learning modalities. Most items were measured using a five-point Likert scale.

Content validity was established through review by faculty members from the anatomy and clinical departments. A pilot test involving 20 students was conducted to assess clarity and ease of understanding. Internal consistency reliability was evaluated using Cronbach's alpha, which demonstrated acceptable reliability for the overall questionnaire ($\alpha = 0.78$). Minor modifications were made based on pilot feedback.

Data collection was performed using both paper-based and electronic formats to enhance accessibility and participation. Participation was voluntary, and informed consent was obtained from all respondents. Anonymity and confidentiality were strictly maintained. Ethical approval was obtained from the Research Ethics Committee of Sirt University prior to data collection.

Data analysis was conducted using online excel Microsoft . Descriptive statistics, such as means, standard deviations, frequencies, and percentages, were used to summarize the data. Inferential statistical tests, including Chi-square tests and independent t-tests, were applied to compare responses between groups (e.g., medical vs. dental students). A p-value of <0.05 was considered statistically significant.

Results and discussion

Demographic Characteristics of the Participants

A total of 364 medical and dental students participated in the study. As presented in Table 1 and Graph 1, the gender distribution was nearly equal, with 180 male students (49.5%) and 184 female students (50.5%). Regarding academic discipline, 200 participants (55.0%) were enrolled in medicine, while 164 (45.0%) were dental students. Most respondents were in their clinical years (214 students, 58.8%), compared to 150 students (41.2%) in the pre-clinical phase. This diverse demographic distribution provided a representative overview of students' perceptions across academic levels and disciplines.

Students' Perceptions of the Role of Anatomy in Clinical Practice

Overall, students demonstrated strong agreement regarding the importance of anatomy in clinical practice. As shown in Table 2 and Graph 2, **87.9% (n = 320)** agreed that anatomy is essential for clinical diagnosis, whereas only **3.9% (n = 14)** disagreed. Similarly, **85.2% (n = 310)** agreed that anatomical knowledge improves clinical skills. A large majority, **92.0% (n = 335)**, supported greater emphasis on anatomy in the curriculum.

Despite this strong support, **27.5% (n = 100)** of students reported difficulty integrating anatomical knowledge into clinical practice, indicating the presence of learning and application challenges.

Disciplinary Comparison of Perceptions (Medical vs. Dental Students)

Chi-square (χ^2) tests were used to compare perceptions between medical and dental students. Overall, both groups showed high agreement on the importance of anatomy, with some notable differences.

- **Anatomy is essential for clinical diagnosis:**
  Medical = 180 (90.0%), Dental = 140 (85.4%)
  The difference was not statistically significant
  $\chi^2 = 2.42$, df = 1, p = 0.120

- **Anatomy improves clinical skills:**
  Medical = 175 (87.5%), Dental = 135 (82.3%)
  No statistically significant difference was observed
  $\chi^2 = 2.07$, df = 1, p = 0.150

- **Anatomy should be emphasized more in the curriculum:**
  Medical = 190 (95.0%), Dental = 145 (88.4%)
  A statistically significant difference was detected
  $\chi^2 = 4.02$, df = 1, p = 0.045

These findings suggest that while both groups value anatomy, medical students express a significantly stronger preference for enhanced curricular emphasis compared to dental students.

Table 1. Demographic Characteristics of Participants (n = 364)

Variable	Frequency (n)	Percentage (%)
Discipline		
– Medical students	200	55.0
– Dental students	164	45.0
Academic Year		
– Pre-clinical	150	41.2
– Clinical	214	58.8

Table 2. Students' Perceptions of Anatomy in Clinical Practice

Question	Agree n (%)	Neutral n (%)	Disagree n (%)
Anatomy is essential for clinical diagnosis	320 (87.9)	30 (8.2)	14 (3.9)
Anatomy improves clinical skills	310 (85.2)	40 (11.0)	14 (3.8)
Anatomy should be emphasized in the curriculum	335 (92.0)	20 (5.5)	9 (2.5)
Anatomy is difficult to integrate into clinical practice	100 (27.5)	50 (13.7)	214 (58.8)

Table 3. Comparison of Perceptions Between Medical and Dental Students

Question	Medical Agree n (%)	Dental Agree n (%)	χ^2	df	p-value*
Anatomy essential for diagnosis	180 (90.0)	140 (85.4)	2.42	1	0.120
Anatomy improves clinical skills	175 (87.5)	135 (82.3)	2.07	1	0.150
Emphasize anatomy in curriculum	190 (95.0)	145 (88.4)	4.02	1	0.045*

*$p < 0.05$ indicates statistically significant difference.

Discussion

This study provides valuable insights into the perceptions of medical and dental students regarding the relevance of anatomical knowledge in clinical practice. The findings highlight a strong consensus on the significance of anatomy, with 87.9% of participants affirming its essential role in clinical diagnosis and 85.2% agreeing that it improves clinical skills. These results are consistent with previous literature emphasizing that a solid foundation in anatomy enhances diagnostic accuracy, procedural safety, and patient outcomes (9,7).

A particularly notable finding is that 92% of students advocated for greater emphasis on anatomy within the curriculum. This aligns with concerns in the academic community regarding the reduction of anatomy teaching hours and its implications for clinical competency (3,12). Students' recognition of anatomy's importance suggests the need for revisiting curriculum design to ensure adequate integration of anatomical sciences in modern medical and dental education.

Despite the overall consensus on the value of anatomy, **27.5% of students reported difficulty in applying anatomical knowledge in clinical practice**. This finding warrants careful consideration, as it represents a significant challenge in translating theoretical knowledge into practical skills. Several factors may contribute to this difficulty: traditional anatomy instruction often emphasizes memorization rather than clinical application, limited exposure to cadaveric dissection or imaging-based learning, and insufficient incorporation of clinically oriented case discussions during pre-clinical years (13,14). Innovative teaching strategies, including case-based learning, clinical imaging correlation, cadaveric dissections, and simulation-based training, may bridge this gap by providing contextual learning that connects anatomy with real-world clinical scenarios (15).

The comparison between medical and dental students revealed high agreement on the importance of anatomy, with medical students demonstrating a significantly stronger preference for curricular emphasis (95.0% vs. 88.4%, $p = 0.045$). This difference may reflect variations in the perceived complexity and clinical reliance on anatomical knowledge, as medical students often encounter more anatomically demanding contexts, particularly in surgical and diagnostic specialties (16).

Overall, these findings underscore that while students appreciate the value of anatomical knowledge, **curricular innovations are essential to enhance its integration into clinical reasoning and skill development**, particularly to support the minority of students struggling with practical application.

Conclusion and Educational Implications

This study confirms that medical and dental students recognize the critical role of anatomy in clinical education. However, the reported difficulty by 27.5% of students in integrating anatomy into practice highlights a key educational gap.

To address this, the following recommendations are proposed for medical and dental schools:

1. **Increase clinically oriented anatomy instruction** through dedicated sessions linking anatomy to real cases.

2. **Expand hands-on learning opportunities**, including cadaveric dissections, 3D models, and imaging-based simulations.
3. **Incorporate case-based learning and problem-solving exercises** that require the application of anatomical knowledge to clinical scenarios.
4. **Regularly review and update curricula** to balance theoretical instruction with practical skill development.

By adopting these strategies, medical and dental programs can improve students' ability to translate anatomical knowledge into safe and effective clinical practice.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

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