Journal of Health and Rehabilitation Research 2791-156X JHRR

For contributions to JHRR, contact at email: editor@jhrlmc.com

Original Article

Teaching Anatomy in Rehabilitation Sciences: Perceptions of Undergraduate Physical Therapy, Occupational Therapy and Sports Sciences Students of Ziauddin University, Pakistan

Fatima Hamza[1]*, Kiran Yameen[1], Mahnoor Khursheed[1], Saiqa Jalil[1], Areeba Khan[1]

[1]Sr. Lecturer, Ziauddin College of Physical therapy, Faculty of Allied health Sciences, Ziauddin University Karachi Pakistan.

Corresponding Author: Fatima Hamza; Email: fatima.hamza@zu.edu.pk

Conflict of Interest: None.

Hamza F., et al. (2024). 4(1): DOI: https://doi.org/10.61919/jhrr.v4i1.402

ABSTRACT

Background: Anatomy education serves as a cornerstone in the curriculum of rehabilitation sciences, encompassing physical therapy, occupational therapy, and sports sciences. The complexity of teaching and understanding human anatomy necessitates diverse pedagogical approaches to effectively prepare students for clinical practice. Recent trends emphasize the integration of clinical relevance and practical experience into anatomy education, reflecting the evolving needs of healthcare education.

Objective: This study aimed to explore the perceptions of undergraduate students from various rehabilitation science programs at Ziauddin University, Pakistan, regarding their anatomy education. It sought to identify the challenges faced by students, evaluate the effectiveness of current teaching methodologies, and assess the integration of theoretical knowledge with clinical practice.

Methods: A descriptive cross-sectional study was conducted over six months, from January to June 2023, involving 120 students from the Doctor of Physical Therapy (DPT), Doctor of Occupational Therapy (DOT), and Bachelor of Physical Education Health and Sports Sciences (BPEHSS) programs. Participants were selected using purposive sampling. Data were collected through a structured questionnaire distributed via Google Forms, assessing demographics, satisfaction with anatomy lectures, exposure to practical sessions, and perceptions of the relevance of anatomy to clinical practice. The analysis utilized SPSS version 25, presenting results in frequencies and percentages.

Results: Among the participants, 52.8% were aged 17-20, and 79.2% were female. The majority (83.2%) were in their preclinical years. A total of 66.4% expressed satisfaction with the duration of anatomy lectures, while practical sessions were attended by 52.8%. Challenges identified included the vast curriculum covered in a short time (79%), and a strong preference (83.2%) for physiotherapists trained as anatomists to teach anatomy. The relevance of anatomy to clinical performance was highly rated, with 63.9% recognizing its high relevance.

Conclusion: The study highlights the need for anatomy education in rehabilitation sciences to adapt to the demands of clinical relevance and practical application. Incorporating trained physiotherapists as instructors and increasing the focus on practical sessions could enhance students' learning experiences and preparation for clinical practice.

Keywords: Anatomy Education, Rehabilitation Sciences, Physical Therapy, Occupational Therapy, Sports Sciences, Teaching Methodologies, Clinical Relevance.

INTRODUCTION

Teaching is fundamentally an art that ignites the flames of curiosity within the minds of learners (1). In the realm of medical education, teaching human anatomy stands out as a unique endeavor, akin to unveiling the intricate and sublime mysteries of the human body. This ancient branch of science, one of the oldest known, is dedicated to the systematic study of the body's structures (2). It encompasses the examination of the body's internal and external structures, detailing their appearance, alignment, relationships, and composition (3). Human anatomy is a diverse field, comprising microanatomy (histology), macroanatomy (gross anatomy), and developmental anatomy (embryology), each focusing on different scales of bodily organization (4).

For healthcare professionals, acquiring a comprehensive understanding of anatomical principles is crucial for the development of effective clinical skills. Thus, anatomy courses are deemed foundational within the curricula of rehabilitation sciences, a field that

Journal of Health and Rehabilitation Research 2791-156X JHRR

spans various disciplines, including physiotherapy, occupational therapy, and sports sciences (5, 6). Professionals in rehabilitation sciences work to enhance both disability management and functionality, striving to help individuals achieve optimal function. A thorough knowledge of anatomy not only allows these experts to fully understand the normal functions of the human body but also to appreciate pathological conditions, thereby enhancing their clinical and practical skills (7). Consequently, integrating theoretical and practical anatomical knowledge with the clinical aspects of rehabilitation sciences is of paramount importance (8).

The pedagogical approaches to teaching anatomy have evolved significantly, moving beyond traditional lecture-based methods to incorporate a variety of teaching modalities. These include the use of anatomical models, overhead projectors, PowerPoint presentations, computer-based learning, and advanced technologies such as virtual dissection tables, with cadaveric anatomy becoming increasingly inaccessible to undergraduate students in rehabilitation fields (9). Teaching anatomy has historically been a challenging task, characterized by extensive curricula and the need for significant memorization. However, the past few decades have seen a shift towards more innovative teaching strategies, including case-based learning, flipped classroom models, 3D virtual learning, and subject-based learning, which are more student-centered than teacher-driven (10-12). These modern approaches have made learning anatomy a more engaging and interesting experience for students, though their responses to learning anatomy have varied widely, from finding it challenging to memorize to feeling excited about understanding the structure and function of the human body (13).

Despite the wealth of studies on medical students' perceptions of anatomy, there remains a notable lack of literature and data from developing countries, such as Pakistan. Moreover, there is a scarcity of research evaluating the perceptions of anatomy among students from different domains of rehabilitation sciences, including physical therapy, occupational therapy, and sports sciences. Additionally, there is an emerging preference for anatomy instructors with a background in physical therapy, given their ability to relate basic sciences to clinical practice. This study aims to shed light on the challenges faced by rehabilitation sciences students in studying anatomy and to explore ways to enhance teaching methodologies and techniques for imparting anatomical knowledge, filling a critical gap in the existing literature and contributing to the improvement of educational practices in the field.

MATERIAL AND METHODS

This descriptive cross-sectional study was undertaken over a six-month period from January to June 2023, targeting undergraduate students enrolled in the Doctor of Physical Therapy (DPT), Doctor of Occupational Therapy (DOT), and Bachelor of Physical Education Health and Sports Sciences (BPEHSS) programs at the Ziauddin College of Rehabilitation Sciences (ZCRS), Ziauddin University (ZU), across its Karachi and Sukkur campuses. The curriculum of the DPT and DOT programs spans five years, beginning with two years dedicated to the theoretical study of basic medical sciences, including anatomy, followed by three years focused on technical subjects and clinical training. The BPEHSS program, on the other hand, extends over four years, covering academics and activities pertinent to sports sciences. All participants had previously engaged with virtual anatomy dissection tables, such as anatomage, alongside anatomy models and histology slide microscopy. The study aimed to include a diverse sample of both male and female students, from the second to fifth year in the DPT and DOT programs and the second to fourth year in the BPEHSS program. Exclusion criteria were set to omit alumni, MBBS and BDS students, and any submissions of incomplete questionnaires.

Prior to commencing data collection, ethical approval was secured from the Departmental Research Committee (DRC) of ZCRS, ZU. The sample size was calculated to be 120 students using open epi software, based on a purposive sampling technique. Data collection was facilitated through a structured questionnaire disseminated via Google Forms, with permission obtained from the original author (14). The questionnaire was designed in three sections: the first gathered demographic information such as age, gender, level of education, and department; the subsequent sections gauged students' perceptions of and attitudes towards anatomy education. Students' dedication to learning anatomy was measured on a scale from 1 (extremely low dedication) to 5 (very strong commitment), while the perceived value of anatomy knowledge for professional development was assessed similarly, from 1 (no value) to 5 (considerable relevance).

At the time of the study, approximately 300 students were registered at the university, from which 190 students volunteered to participate. After applying exclusion criteria, 170 participants were deemed eligible for the study. Data from incompletely filled questionnaires were excluded, resulting in a final sample of 125 complete responses for analysis. Data analysis was conducted using SPSS version 25, with results presented in terms of frequencies and percentages. The study was conducted without external funding, relying solely on self-financing.

RESULTS

In the conducted descriptive cross-sectional study, a total of 125 respondents from the undergraduate programs at Ziauddin College of Rehabilitation Sciences were surveyed to gather insights into their perceptions and educational experiences related to anatomy.

Journal of Health and Rehabilitation Research 2791-156X JHRR

The demographic breakdown revealed a youthful participant pool, with 52.8% aged between 17 and 20 years and 47.2% aged between 21 and 24 years (Table 1). Gender representation was skewed towards female students, who constituted 79.2% of respondents, compared to 20.8% male students. The majority of students were in the preclinical stage of their education, accounting for 83.2%, while the remaining 16.8% were undergoing clinical training. When asked whether physiotherapy was their primary intended course of study, 68.8% of students affirmed this, indicating a strong inclination towards physiotherapy within the cohort (Table 1).

The anatomy education profile among the respondents highlighted universal exposure to daily anatomy lectures, with all participants reporting lecture attendance (Table 2). Satisfaction levels with the duration of these lectures varied, with 66.4% expressing contentment, 12% dissatisfied, and 21.6% uncertain. Practical anatomy lectures had been attended by 52.8% of the students, demonstrating a balanced exposure to both theoretical and practical aspects of anatomy education. However, the level of supervision during these practical sessions received mixed reviews, with a larger portion of students rating it at level 3 (33.6%), followed by levels 4 (25.6%) and 5 (19.2%), suggesting room for improvement in supervision quality (Table 2). The use of electronic aids in anatomy lectures was more limited, with only 37.6% of students having had access to such resources, contrasting with 62.4% who did not use electronic aids. Notably, a significant majority (83.2%) confirmed that their physiotherapists were trained anatomists, emphasizing the integration of clinical expertise in their anatomy education (Table 2).

Table 1 General Characteristics of the Respondents (N=125)

Characteristic	Frequency	Percentage (%)
Age		
17-20	66	52.8
21-24	59	47.2
Gender		
Male	26	20.8
Female	99	79.2
Academic Level		
Preclinical	104	83.2
Clinical	21	16.8
Is Physiotherapy the Primary Intended Course?		
Yes	86	68.8
No	39	31.2

Table 2 Anatomy Education Profile of the Respondents

Variable	Frequency	Percentage (%)
Lecture Duration per Day (minutes)	125	100
Satisfaction with the Duration of Anatomy Lectures		
Yes	83	66.4
No	15	12.0
Not Sure	27	21.6
Exposure to Anatomy Practical Lectures		
Yes	66	52.8
No	59	47.2
Level of Supervision During Practical Classes		
1	15	12.0
2	12	9.6
3	42	33.6
4	32	25.6
5	24	19.2
Usage of Electronic Aids for Anatomy Lectures		
Yes	47	37.6

Journal of Health and Rehabilitation Research 2791-156X JHRR

Variable	Frequency	Percentage (%)
No	78	62.4
Physiotherapists were Trained Anatomists		
Yes	104	83.2
No	21	16.8

Table 3 Students' Perception of Anatomy Education

Perception Item	Frequency	Percentage (%)
Challenges to Anatomy Education		
Poor orientation on the benefits of anatomy	17	14.3
Lack of supervision in practical	16	13.4
Poor teaching facilities	7	5.9
Vast topics covered in short time	94	79.0
Poor teaching skills	6	5.0
Anatomy is Relevant for Better Performance in Clinical Courses		
1 (No Relevance)	0	0.0
2	4	3.3
3	12	9.8
4	28	23.0
5 (High Relevance)	78	63.9
Lecturers and Clinical Instructors in the Physiotherapy Department Link Education to Anatomy		
Yes	90	72.0
No	8	6.4
Not Sure	27	21.6
Anatomy Should Be Taught by Trained Physiotherapist Anatomists		
1 (Strongly Disagree)	7	5.6
2	6	4.8
3	18	14.4
4	32	25.6
5 (Strongly Agree)	62	49.6
Trained Physiotherapist Anatomists Help Create Better Links Between Anatomy and Physiotherapy		
Yes	104	83.2
No	21	16.8
Not Sure	0	0.0

Regarding students' perceptions of their anatomy education, several challenges were identified. The vast topics covered in a short time was the most prominent issue, reported by 79% of respondents, indicating a perceived overload of information (Table 3). Other concerns included poor orientation on the benefits of anatomy (14.3%), lack of supervision in practical sessions (13.4%), and inadequate teaching facilities (5.9%). Despite these challenges, the relevance of anatomy in enhancing clinical course performance was overwhelmingly acknowledged, with 63.9% of students rating its importance as high (level 5), and only a small fraction (3.3%) seeing little relevance (level 2) (Table 3).

The linkage between physiotherapy education and anatomy by lecturers and clinical instructors was viewed positively, with 72% affirming this connection, though 21.6% were unsure, highlighting potential areas for pedagogical enhancement (Table 3). The sentiment towards having physiotherapists who are trained anatomists teach anatomy was strongly supported, with 49.6% strongly agreeing (level 5) and an additional 25.6% agreeing (level 4). This indicates a clear preference for educators who can bridge theoretical knowledge with clinical practice. Moreover, a vast majority (83.2%) concurred that physiotherapists trained as anatomists could better facilitate understanding of the linkage between anatomy and physiotherapy, underscoring the value of clinically relevant anatomy education in their preclinical and clinical training phases (Table 3).

Journal of Health and Rehabilitation Research 2791-156X JHRR

DISCUSSION

The study's exploration into the nuances of anatomy education within the context of rehabilitation sciences has illuminated the dynamic nature of this academic field, where the most effective methods for imparting knowledge continue to be debated. Teaching anatomy, a subject that delves into the complexities of human creation, necessitates a multifaceted approach, integrating various methods and tools to enhance the learning experience. Our research, involving 120 participants predominantly female and in their preclinical years aged between 20-22 years, has underscored the challenges faced by students, particularly the extensive curriculum required to be covered in a limited timeframe and the need for a harmonious blend of practical and theoretical knowledge. Notably, the study revealed a preference among students for anatomy instructors who are also trained physical therapists, highlighting the importance of linking anatomical knowledge with clinical practice in physical therapy.

This finding aligns with the work of Petronilla et al. (2022), who emphasized the necessity of identifying barriers to anatomy education and incorporating more interactive sessions to engage students during demanding anatomical lessons (14). Similarly, our results resonated with Turhan (2020), who observed that the vast topics covered in the anatomy curriculum over a short span make the subject overwhelming for students, suggesting a shift towards more student-centered and collaborative teaching methods (15). The significance of integrating explicit anatomy teaching in the clinical years of undergraduate studies, as suggested by Gangata and Vigrus (2017) after their investigation among physiotherapy students in the United Kingdom, was also echoed in our study, which highlighted the critical role of anatomical knowledge in enhancing clinical performance (16).

Furthermore, the suggestion by Olivier et al. (2020) to incorporate the linkage of anatomy with physiotherapy clinical skills during lectures was validated by our findings, where a significant majority of students stressed the importance of contextualizing anatomy education within the physiotherapy framework (17). This recognition underscores the awareness among undergraduate physical therapy students of the need for precise anatomical knowledge for a more effective clinical approach.

The emphasis on combining practical sessions with theoretical knowledge in anatomy education, a sentiment strongly echoed by our participants, aligns with Fatima Duman's (2017) assertion that anatomy education is incomplete without practical sessions (19). However, the debate on the efficacy of digital versus in-person practical sessions remains unresolved, as highlighted by Wolf (2019), who argued that the absence of cadaveric dissections does not inherently render anatomy teaching insufficient, given the availability of various practical modalities (19).

Our study's findings, indicating a general satisfaction with anatomy education despite concerns about the adequacy of digital practical sessions, contribute to the ongoing discourse on the diversity and complexity of teaching anatomy. This is supported by Shead et al. (2020), who advocated for the use of interprofessional approaches and multiple techniques in delivering anatomy education, emphasizing its relevance to professional, ethical, and humanitarian aspects (20). Furthermore, Rompolski et al. (2022) reinforced the suitability of practicing physical therapists as anatomy instructors, a perspective that resonates with our participants' preference for physical therapists to teach anatomy, facilitating a synergistic enhancement of both undergraduate and clinical anatomical skills (21, 22).

The study, while pioneering in its focus on rehabilitation students in Pakistan, is not without limitations. Data collection was confined to students from a single university, which may restrict the generalizability of the findings. This highlights the need for broader research encompassing a more diverse participant pool across different institutions to enrich the understanding of anatomy education within the rehabilitation sciences.

CONCLUSION

In conclusion, the study underscores the complexity of anatomy teaching, exacerbated by extensive curricula and the rarity of cadaveric dissection in Pakistani academic institutions. The incorporation of trained physical therapists as anatomy instructors is deemed crucial for bridging anatomical knowledge with clinical practice in physical therapy. Further embedding anatomy teaching into the clinical years of academic programs is recommended to ensure more informed clinical approaches by future physical therapists. This research not only contributes to the discourse on anatomy education but also identifies areas for improvement and calls for expanded investigations to enhance the educational experiences of rehabilitation sciences students.

REFERENCES

1. Kirylo JD. The thoughtful teacher: Making connections with a diverse student population. Rowman & Littlefield; 2021 Apr 15.
2. Chan LK, Pawlina W. Teaching Anatomy. A Practical Guide. Switzerland: Springer International Publishing. 2015.
3. Standring S, editor. Gray's anatomy e-book: the anatomical basis of clinical practice. Elsevier Health Sciences; 2021 May 22.

Journal of Health and Rehabilitation Research 2791-156X JHRR

4. Wilson E. A system of human anatomy. BoD–Books on Demand; 2022 Oct 24.
5. Clifton W, Damon A, Nottmeier E, Pichelmann M. The importance of teaching clinical anatomy in surgical skills education: Spare the patient, use a sim!. Clinical Anatomy. 2020 Jan;33(1):124-7.
6. Ardern CL, Büttner F, Andrade R, Weir A, Ashe MC, Holden S, Impellizzeri FM, Delahunt E, Dijkstra HP, Mathieson S, Rathleff MS. Implementing the 27 PRISMA 2020 Statement items for systematic reviews in the sport and exercise medicine, musculoskeletal rehabilitation and sports science fields: the PERSiST (implementing Prisma in Exercise, Rehabilitation, Sport medicine and SporTs science) guidance. British journal of sports medicine. 2021 Oct 7.
7. Simons AC, McHugh KM, Appling S, Harris SL, Burgoon JM. Instructional approaches: Anatomy education of physical therapists. Anatomical Sciences Education. 2022 Jan;15(1):102-14.
8. Yohannan DG, Oommen AM, Bhaskaran Jayaprasad A, Raju NK, Suresh RO, Nair SJ. "Air anatomy"–teaching complex spatial anatomy using simple hand gestures. Anatomical Sciences Education. 2022 May;15(3):552-65.
9. Zargaran A, Turki MA, Bhaskar J, Spiers HV, Zargaran D. The role of technology in anatomy teaching: striking the right balance. Advances in medical education and practice. 2020 Mar 31:259-66.
10. Smith CF, Finn GM, Holland J, Stewart J, Connolly SA, Hennessy CM, McHanwell S. Core syllabi in anatomy. Teaching Anatomy: A Practical Guide. 2020:443-52.
11. Patra A, Asghar A, Chaudhary P, Ravi KS. Integration of innovative educational technologies in anatomy teaching: new normal in anatomy education. Surgical and Radiologic Anatomy. 2022 Jan;44(1):25-32.
12. Singh K, Bharatha A, Sa B, Adams OP, Majumder MA. Teaching anatomy using an active and engaging learning strategy. BMC medical education. 2019 Dec;19(1):1-8.
13. Roxburgh M, Evans DJ. Assessing anatomy education: A perspective from design. Anatomical Sciences Education. 2021 May;14(3):277-86.
14. Ojukwu CP, Anyanwu EG, Onyebuchi CB, Uchenwoke CI, Okemuo AJ, Okafor CJ, Ikele CN. Anatomy education in physiotherapy training: perceptions of Nigerian-based undergraduate physiotherapy students. Physical Therapy Reviews. 2022 Jan 2;27(1):60-7.
15. Turhan, B., 2020. Physiotherapy and rehabilitation students' opinions on anatomy education: a cross-sectional survey study. Physiotherapy Quarterly, 28(2), pp.46-51.
16. Gangata, H. and Vigurs, K., 2017. An analysis of pedagogical concepts used by anatomy teachers to facilitate the teaching and learning of anatomy to physiotherapy undergraduates. Physiotherapy, 103, pp.e47-e48.
17. Olivier, B., Ihunwo, A.O., Shead, D. and Roos, R., 2019. Opinions of South African physiotherapists on gross anatomy education for physiotherapy students. South African Journal of Physiotherapy, 75(1), pp.1-10.
18. Duman, F., 2017. Importance of anatomy education in physical therapy and rehabilitation in Turkey: A qualitative study. New Trends and Issues Proceedings on Humanities and Social Sciences, 4(4), pp.64-71.
19. Wolf, A., 2019. Exploring Current Topics and Trends in Anatomy Education: A Scoping Review.
20. Shead, D.A., Roos, R., Olivier, B. and Ihunwo, A.O., 2020. Curricular and pedagogical aspects of gross anatomy education for undergraduate physiotherapy students: a scoping review. JBI Evidence Synthesis, 18(5), pp.893-951
21. Rompolski, K., Fojas, C., Taylor, M. and Countess, T., 2022. How Do Physical Therapists Perceive Anatomy Education?. FASEB Journal: Official Publication of the Federation of American Societies for Experimental Biology, 36.
22. Bozer, C. and Kose, K.C., The Opinions of Physiotherapists With And Without Training in Manual Therapy on Undergraduate Anatomy Education: A Cross-Sectional Survey Study.