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Role of Anatomy in Interns and Post-graduate Courses in Clinical Postings and Clinical Subjects

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ABSTRACT

Background

Anatomy serves as a fundamental pillar of medical education particularly during the first two years when the students are introduced to the basic sciences. A step-by-step approach to learning anatomy helps in building a strong foundation for clinical approaches. A comprehensive understanding of anatomical structures is essential for accurate diagnosis, surgical precision, physical examination, and overall clinical competence. Going through its critical role, this study aimed to assess the importance of anatomy, particularly the cadaveric dissection in clinical practice among medical graduates.

Methods

A descriptive, cross-sectional study was conducted among 180 medical graduates from 28 November 2024 to 28 February 2025. Ethical approval was obtained from the Institutional Review Committee, Kathmandu Medical College and Teaching Hospital (Ref. No. KMC-IRC 16102024/13). Convenience sampling was used and data were collected through a structured questionnaire-based survey. Statistical analysis was performed using SPSS version 16.

Results

Out of 180 participants, clinicians represented the largest group (36%), followed by house officers (27%), interns (24%) and residents (13%). A significant majority (87.8%) agreed that cadaveric dissection played an important role in developing sufficient clinical knowledge, skills, and confidence. Among interns, 23.3% moderately acknowledged anatomy as a core element in daily clinical decision-making. A notable 93.8% of clinicians emphasized the value of cadaveric exposure in enhancing clinical competency.

Conclusions

The cadaveric dissection remains a vital educational tool, bridging the gap between theoretical knowledge and practical application. The continues exposure to cadaveric in anatomy during clinical training enhances surgical and diagnostic skills ultimately contributing to improved patient safety and care outcomes.

Keywords: anatomy; cadaver; clinical practice; dissection; medical education.

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INTRODUCTION

The Anatomy is derived from the Greek words ana (up) and temnein (to cut), meaning "to cut up" or dissect has been a cornerstone of medical education for centuries.[1,2] The medical education follows a step-by-step process with the first two years focused on basic medical sciences among which the anatomy plays a foundational role.[3] A deep understanding of human anatomy is essential for safe and effective clinical practice.[4] It forms the basis for comprehending physiological functions and pathological processes affecting the human body.[5] The study of anatomy is the mandatory across all the health science disciplines. However, theoretical knowledge alone is insufficient; hands-on exposure to real human structures is crucial to fully understand anatomical variation as encountered in living patients.[4] As, its critical importance in medical training, this study aimed to assess the perceived role and impact of anatomical education-particularly cadaveric dissection for the development of clinical knowledge, skills, and confidence among medical professionals.

METHODS

The confidential questionnaire-based survey was conducted from 28 November 2024 to 28 February 2025 in 3 months duration. The sample size was calculated based on the rating of anatomy as a great help among 86.7% participants after viewing the specimen among total 150 participants.[6] Sample size was calculated using the following formula,

$n = Z^2 pq/ e^2$, where, n = sample size, confidence interval- 95%, Z= 1.96, p= prevalence, 0.867 (86.7%), q = 1-p (1-0.867), e = allowable error, 0.05 (5%), The minimum sample required was calculated to be 177. The total of 180 samples were collected in this study. The study was conducted after getting the ethical clearance from the Institutional Review Committee, Kathmandu Medical College and Teaching Hospital (Ref. No. KMC-IRC 16102024/13). The health care professionals included doctors, dentist, physiotherapist. In this study, the intern, clinician and the house officer of all the streams were included. The study excluded non-medical and non-practicing health care. The data was collected and enrolled after the informed consent. The authors Ropa and Rani outlines three main aspects of a questionnaire which are general form, question sequence and question formulation and wording.[7] In this study, the question sequences have been used. The data collected was entered in Microsoft Office Excel worksheet and statistical analysis was done using SPSS version 16.

Questions.
Q. 1. Were the dissection and viewing of the sections of regional anatomy and the knowledge of the anatomical structures helpful during the day-to-day clinical practice?
Q. 2. Is Anatomy considered as the pillar during your day-to-day practice?
Q. 3. Was the anatomy dissection in basic science helpful in identifying the deep structures in the human body during the surgeries?
Q. 4. Were the illustrations to the surface marking, radiology, gross and osteology helpful during your practice?
Q. 5. After completing the pre-clinical do you go through any anatomy books?
Q. 6. Do you feel the contact to cadaver is important toward acquiring sufficient clinical knowledge, skill and confident?
Q. 7. Does the anatomy education have contributed to the development of the professional skills and ethics of medicine?
Q. 8. Is the anatomy course applicable for every clinical department?

RESULTS

Out of 180 total participants, the maximum were clinicians (36%) followed by house officers (27%), interns (24%) and residents (13%) (Figure 1).

The maximum number of clinicians (93.8%) felt the contact to cadaver was important toward acquiring sufficient clinical knowledge, skill and confidence. Also 15.6% of the clinicians had not gone through any anatomy books after passing the pre-clinical exams. The dissection and viewing the sections of regional anatomy, knowledge of the anatomy structures was considered moderately helpful during the day-to-day in clinical practice (21.9%) and also the anatomy was

considered as the pillar by 67.2% of the clinicians (Table 1).

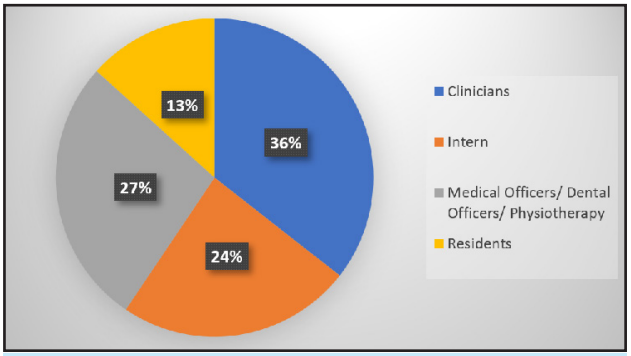

Figure 1. Distribution of participants among different medical professions. (n=180)

Among participants who were doing residency, 91.7% participants responded that the anatomy course was applicable for every clinical department. The illustration of surface marking, radiology and osteology were moderately helpful for 12.5% of them. Also 16.7% of them had not gone through any anatomy books after completing the pre-clinical exams (Table 3).

Among 43 interns, maximum number (86%) responded that the illustration of surface marking, radiology and osteology were helpful. Around 23.3% of them moderately considered anatomy as the pillar during day-to-day practice. Also, 27.9% of them had not gone through any anatomy books after completing pre-clinical exams (Table 4).

Table 1. Responses from the Clinicians. (n=64)

Questions	Responses			
	No n(%)	Maybe n(%)	Yes n(%)	Moderate n(%)
1. Were the dissection and viewing of the sections of regional anatomy and the knowledge of the anatomical structures helpful during the day-to-day clinical practice?	-	8(12.5)	42(65.6)	14(21.9)
2. Is Anatomy considered as the pillar during your day-to-day practice?	1(1.6)	6 (9.4)	43(67.2)	14(21.9)
3. Was the anatomy dissection in basic science helpful to identifying the deep structures in the human body during the surgeries?	-	9(14.1)	46(71.9)	9(14.1)
4. Were the illustrations to the surface marking, radiology, gross and osteology helpful during your practice?	-	5(7.8)	50(78.1)	9(14.1)
5. After completing the pre-clinical do you go through any anatomy books?	10(15.6)	8(12.5)	46(71.9)	-
6. Do you feel the contact to cadaver is important toward acquiring sufficient clinical knowledge, skill and confident?	1(1.6)	3(4.7)	60(93.8)	-
7. Does the anatomy education have contributed to the development of the professional skills and ethics of medicine?	3(4.7)	8(12.5)	53(82.8)	-
8. Is the anatomy course applicable for every clinical department?	5(7.8)	8(12.5)	51(79.7)	-

The maximum house officers (87.8%) felt the contact to cadaver was important toward acquiring sufficient clinical knowledge, skill and confidence. The dissection and viewing the sections of regional anatomy, knowledge of the anatomy structures was moderately helpful to 18.4% of the medical doctors. Also, 14.3% of them had not gone through any anatomy books after passing pre-clinical exams. And also 79.6% house officers showed that the anatomy education had contributed to the development of the professional skills and ethics of medicine during their practice (Table 2).

DISCUSSION

Anatomy forms the solid rock of medical education and plays a vital role in shaping the clinical career. The Anatomy has remains foundational throughout the course of medical education including for interns and residents engaged in clinical practice and specialization. For interns and postgraduate students, especially during clinical postings and exposure to clinical subjects, the anatomical

Table 2. Responses from the house officers. (n=49)				
Questions	**Responses**			
	No n(%)	**Maybe n(%)**	**Yes n(%)**	**Moderate n(%)**
1. Were the dissection and viewing of the sections of regional anatomy and the knowledge of the anatomical structures helpful during the day-to-day clinical practice?	-	5(10.2)	35(71.4)	9(18.4)
2. Is Anatomy considered as the pillar during your day-to-day practice?	-	7(14.3)	35(71.4)	7(14.3)
3. Was the anatomy dissection in basic science helpful to identifying the deep structures in the human body during the surgeries?	2(4.1)	10(20)	33(67.3)	4(8.2)
4. Were the illustrations to the surface marking, radiology, gross and osteology helpful during your practice?	-	7(14.3)	41(83.7)	1(2)
5. After completing the pre-clinical do you go through any anatomy books?	7(14.3)	12(24.5)	30(61.2)	-
6. Do you feel the contact to cadaver is important toward acquiring sufficient clinical knowledge, skill and confident?	1(2)	5(10.2)	43(87.8)	-
7. Does the anatomy education have contributed to the development of the professional skills and ethics of medicine?	-	10(20.4)	39(79.6)	-
8. Is the anatomy course applicable for every clinical department?	3(6.1)	10(20.4)	36(73.5)	-

Table 3. Responses from the residents. (n=24)				
Questions	**Responses**			
	No n(%)	**Maybe n(%)**	**Yes n(%)**	**Moderate n(%)**
1. Were the dissection and viewing of the sections of regional anatomy and the knowledge of the anatomical structures helpful during the day-to-day clinical practice?	1(4.2)	-	19(79.2)	4(16.7)
2. Is Anatomy considered as the pillar during your day-to-day practice?	-	1(4.2)	19(79.2)	4(16.7)
3. Was the anatomy dissection in basic science helpful in identifying the deep structures in the human body during the surgeries?	2(8.3)	4(16.7)	17(70.8)	1(4.2)
4. Were the illustrations to the surface marking, radiology, gross and osteology helpful during your practice?	-	-	21(87.5)	3(12.5)
5. After completing the pre-clinical do you go through any anatomy books?	4(16.7)	6(25)	14(58.3)	-
6. Do you feel the contact to cadaver is important toward acquiring sufficient clinical knowledge, skill and confident?	1(4.2)	2(8.3)	21(87.5)	-
7. Does the anatomy education have contributed to the development of the professional skills and ethics of medicine?	1(4.2)	2(8.3)	21(87.5)	-
8. Is the anatomy course applicable for every clinical department?	1(4.2)	1(4.2)	22(91.7)	-

knowledge becomes increasingly pronounced and practically sound. Furthermore, the clinical subjects such as surgery, orthopedics, ENT and radiology are fully depended on applied anatomical knowledge. Anatomy also contributes in clinical reasoning and patient safety. In every sector of the health section, the anatomy had played a vital role in proper diagnosis.

The misinterpretation of anatomical relationships and weak knowledge of anatomy can lead to procedural errors and incorrect in diagnoses. This article highlighted the ongoing the necessary role of anatomy in medical education, especially during the transition period from preclinical to clinical postings. Whereas, in traditionally Anatomy had been emphasized in the early two years of medical schools. Hence, consistent

Table 4. Responses from interns. (n=43)				
Questions	Responses			
	No n(%)	Maybe n(%)	Yes n(%)	Moderate n(%)
1. Were the dissection and viewing of the sections of regional anatomy and the knowledge of the anatomical structures helpful during the day-to-day clinical practice?	1(2.3)	6(14)	27(62.8)	9(20.9)
2. Is Anatomy considered as the pillar during your day-to-day practice?	2(4.7)	4(9.3)	27(62.8)	10(23.3)
3. Was the anatomy dissection in basic science helpful to identifying the deep structures in the human body during the surgeries?	4(9.3)	9(20.9)	27(62.8)	3(7)
4. Were the illustrations to the surface marking, radiology, gross and osteology helpful during your practice?	-	4(9.3)	37(86)	2(4.7)
5. After completing the pre-clinical do you go through any anatomy books?	12(27.9)	9(20.9)	22(51.2)	-
6. Do you feel the contact to cadaver is important toward acquiring sufficient clinical knowledge, skill and confident?	3(7)	7(16.3)	33(76.7)	-
7. Does the anatomy education have contributed to the development of the professional skills and ethics of medicine?	3(7)	6(14)	34(79.1)	-
8. Is the anatomy course applicable for every clinical department?	5(11.6)	7(16.3)	31 (72.1)	-

reinforcement and knowledge of Anatomy in the health sectors can be viewed not just as an academic necessity but also as a patient safety measure and proper treatment plan. Some authors also claimed that the decreased in contact hours, it has been suggested that anatomy education should focus more closely on the clinical correlation.[6-8] The anatomy is considered as a fundamental to medical education and essential to do the safe clinical procedure particularly the surgical procedure.[9] Although some author claimed that the traditional cadaver-based teaching has declined due to integrated/system-based curriculum, many trainees and young surgeons still attend cadaver dissection courses in- order to gain the detailed knowledge of surgical anatomy. One key reason for this continued interest is the rise in medico-legal law condition related to surgical malpractice.[10-12]

In the anatomy, the dissection has been the main anatomy teaching method for over 400 years. Learning the anatomy by using dissection of human cadavers has advantages that is difficult to quantify such as; enhancing active and deep learning about the human body, sharpening the students for clinical practice, preparing students for encounters with death, practice of manual skills and for understanding the relationship between patients' symptoms and pathology.[13-14]

In this study, the maximum participants were the clinician. In this study, the various groups strongly agree that anatomy education is a crucial component of the medical curriculum. However, data on agreement ratings reveal that all the categories had accepted that anatomy education had directly enhances their effectiveness in practice. However, research indicates that relatively junior clinicians may not fully appreciate the relevance of anatomy content to diagnostic reasoning and clinical decision-making.[15] According to some authors findings also support the use of cadavers as a tool for teaching by either dissection or prosection.[5] Some studies have shown that dissection is essential for understanding and learning anatomy properly. And the retention is highest when learning is combined with experience of dissection.[16] It has been suggested that active observation and participation in cadaveric dissection guided by demonstrators helps the understanding of three-dimensional structures and enhances development and attitudes towards teamwork.[15] Whereas the question was raised in this study, about the importance of the dissection during the clinical

practiced show the higher percentage of agreement in all the participants.

In a survey conducted in the medical schools in Jeddah, Saudi Arabia came with the conclusion that teaching cadaver dissection was rated as the most important method for learning anatomy by the majority of students was also supported by studies conducted by several authors.[16-18] In this study also all the clinicians, house officers. Intern and resident's maximum of them accepted cadaveric study maximizes the skill of the doctors.

Limitations

Our study has some of the limitation. In this study, the sample size was less which restrict the generalizability of the findings to broader medical training environments. If the sample were more, it would be more effective. There is variability in anatomy curriculum across the medical schools and health sectors. It would be great if the study was conducted between the different variety of curriculum of Anatomy. And also, it will be more relevant if the study done only in the particular medical streams.

CONCLUSIONS

The cadaveric dissection has been using as a main tool for the Anatomy. The Cadaveric dissection remains a vital educational tool, bridging the gap between theoretical knowledge and practical application. All the medical professional also claimed that Anatomy has been the pillar during their clinical practice. The anatomy is not a subject confined to the preclinical years but a dynamic and indispensable component of clinical practice. The continued exposure to anatomy during clinical training enhances surgical and diagnostic skills, ultimately contributing to improved patient safety and care outcomes.

Conflict of interest: None

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