ORIGINAL ARTICLE

Shortcomings of Current Anatomy Teaching Methodologies in Medical Schools and Possible Avenues of Improvement: A comparative study between undergraduates, postgraduate students and teaching faculty

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ABSTRACT

Background: Medical Education is undergoing a very fast-paced paradigm shift from the laboriously extensive teaching of basic sciences to an integrated, multi-disciplinary, dynamic and clinically oriented approach. Anatomy as part of the medical school curriculum is a challenging but vastly relevant subject and the current method of teaching limits it to the first two years of undergraduate training. The usefulness of such an approach is getting questionable in the wake of new advances in the fields of Medicine, Surgery and Imaging. This study analyses and draws conclusions from the limitations of the current teaching methodologies and possible improvements by evaluating the questionnaires duly filled by undergraduate and postgraduate students as well as the clinical and preclinical teaching faculty.

Methods: A questionnaire was devised exploring specific views on current anatomy teaching, modernization and clinical relevance of the course content. It was filled after informed consent by three groups of respondents: undergraduates, post graduates and teaching faculty. It consisted of free test, binomial, and 5-point Lickert scale responses.

Results: Most notably, the results establish that 28% of undergraduate students, 36.36% of postgraduate students and 38.46% of teaching faculty consider lengthy course content a contributing factor to the volatility of anatomy. 38% of undergraduates 54.54% of postgraduates and 69.23 % of teaching faculty proposed that anatomy should be taught in combination with clinical subjects in a vertically integrated manner.

Conclusion: Anatomy needs to adapt to the ever-changing landscape of medical education to stay clinically relevant and useful. Needless to say, a good understanding of anatomy makes for a better clinician, and it is vital to efficiently utilize the subject's capability of acting as a gel between pure science and clinical utility.

Keywords: Anatomy, Modernized Teaching, Clinical Relevance

INTRODUCTION

Despite there being an overall reduction in course hours dedicated to Anatomy and affiliated subjects[1], the importance of Anatomy as the baseline for much medical sciences study is undeniable and well established among both the authorities[2] and students[3]. The study of the human body follows strict conventions to ensure standardization of knowledge inference, and there is hardly a subject more apt at teaching these conventions to beginners of medical education than Anatomy[4].

However, the educational aspect of Anatomy goes back all the way up to the Renaissance, and the best way to teach Anatomy has been discussed extensively. It was agreed upon, and the viewpoint persists, that dissection of cadavers is the best tool to teach and learn about the Human Anatomy[5]. With the emergence of several other modalities of Anatomy teaching and the subsequent shrinkage of hours spent by students dissecting, many experts have given mixed opinions about whether it's helpful or not[6]. Dissection remains one of the first experiences a first year medical student has with the inner workings of human body but it has its disadvantages as described in several studies[7]. With the relegation of Anatomy to the first two years of medical education, the anatomical knowledge of doctors has dwindled and studies have shown that Clinicians consider the amount taught is inadequate and results in adverse changes to the competency of practicing physicians[8].

A comprehensive review of literature dealing with anatomy teaching revealed a pattern of similar problems that experts theorized were the reasons behind the decline in teaching methodologies employed in Anatomy. The length of the course was considered an impediment to an effective and useful teaching[9]. Gross Anatomy is without a doubt one of the most extensive subjects in the fields of science. It is highly objective with very little room for doubt and argument and subsequently scientific research, this invariability and inflexibility makes Anatomy a very difficult subject to assimilate[10]. Many educators agree that the objective of any subject taught to medical students should be to prepare clinicians to be better able to diagnose and manage diseases. Anatomy was thus subject to compression and pruning to fit into a clinically relevant model, but with varying results. Needless to say, any attempt to modify the subject causes much dissonance and the status quo of anatomical teaching is a big hurdle in the way. So, another identified reason was this lack of clinical relevance of the course[11].

The full-time anatomist is a rare breed these days, and the responsibility of teaching has largely been taken up

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by educators who are hired for their research skill and their ability to generate income through research grants and not for their expertise in medical teaching of anatomy[12]. This not only potentially affects the quality of teaching but also diminishes the contact of a student with an insightful anatomist who can inspire them to see anatomy as an essential study to good patient care.

Traditional teaching methodologies not conforming to recent technological advances in the teaching of other subjects in the medical field and elsewhere is also a perceived cause forthe inability of Anatomy to hold up to its importance. Technologies such as Virtual Reality and Holographic Imagery have not permeated into anatomy teaching, it is worth noting that despite the explosive growth of computer graphics, anatomy has not hugely benefited from it[13]. The unavailability of models, both physical and computer generated to most medical centers teaching anatomy is also a reason for its shortcoming.

To this end, we created a questionnaire that assessed three different groups of people concerned with Anatomy and its teaching. The key thing explored by it was the perception of those different groups about the deficiencies in the anatomy course, and how it could be modified/ supplemented to deal with those problems. The proposed solutions mostly address the aforementioned problems. Additionally, Problem Based Learning method was proposed. Problem Based Learning (PBL) for short is a learning tool first used by McMaster Canada, to provide an alternative to the traditional lecture based teaching method[14]. PBL aims to encourage active problem solving and resource gathering and discourage rote-learning methods, a technique used widely among medical students worldwide.

RESULTS

When asked about the deficiencies in anatomy course, 38.46% of teaching faculty, 36.36% of post graduates and 28% of students were of the view that lengthy course was the primary deficiency. 38.18% of postgraduate trainees, 32% of students and 23.08% of teaching faculty found the deficiency of clinical correlation with anatomy teaching as the major problem.

Only 14% of students, 16.36% of post graduates and 7.69% of teachers viewed lack of experienced teaching staff as a deficiency in anatomy teaching. 40% of post graduates point out that traditional methodologies are inadequate in providing optimum anatomical knowledge along with 18% of students and 7.69% of faculty. Non-availability of teaching material was marked a shortcoming by 16% of students, 14.54% of post graduates and 5.38% of teaching faculty.

Regarding modernization of Anatomy to make it more applicable in medicine, 15% of teaching faculty supported reduction in amount of factual knowledge, 9.1% of post graduates and 4% of students agreed to the proposition. 30.9% of post graduates and 30.77% of teaching faculty opted for integration of anatomy with other basic subjects to make it teaching modernized. 20% of students supported the idea. 20% of students 14% of post graduates and 7.69% of teachers proposed increasing content of surface anatomy to modernize anatomy teaching. An overwhelming 69.23% of teaching faculty, 54.54% of post graduates and 38% of students advocate that anatomy be taught in combination with clinical subjects in all five years of medical education. 14% of students, 20% of post graduates and 15.38% of teaching faculty voice that applied aspects of anatomy should be more stressed during teaching. 20% of students demand increased emphasis on PBL/CBL while only 5.45% of post graduates and 7.69% of teaching faculty agree.

DISCUSSION

Anatomy holds a very special place in medical education. The nature of the subject ensures that anatomy will always be a lengthy course, the details about human structure are staggering and the accumulated knowledge spanning several centuries can only be shortened so much. Anatomy is a strongly objective field of science, with typical scientific methods not applying strictly. This set in stone nature of anatomy is the perfect bedrock for medical education, with anatomic terminology serving as the medical dictionary for a student all the way through his academic years and beyond[15]. Despite, all of this the enormity of anatomy course poses several challenges, the constraints of time being the foremost. If Anatomy is studied to its essence, then its virtually impossible for the medical student to make time for anything else, and in this age it is not practical to dedicate a significant portion of study hours to just one subject. This results in programmes tailoring the curriculum to their liking, and that is suboptimal[16].

The second problem that stood out in the survey was of Anatomy not being clinically relevant. The practice of medicine and surgery is dynamic and changes every day, and although a firm grasp of basic sciences is indispensable, there is growing need every day to orient past knowledge to be helpful in the clinical setting. Many clinicians argue that if Anatomy is not helpful to a practicing doctor due to an irrelevant course, the course should be re-evaluated[17]. Attempts have been made to make anatomy more clinically oriented, however, it is not as simple as just changing the text of the books, the educational objectives and the anatomy course assessments should also be modified to better implement this[18].

Traditional Methods of teaching Anatomy include dissection, group demonstration and lectures. The advances in the field of teaching are numerous and very ingenious. The use of computer generated holographics can revolutionize the study of Anatomy and is a very exciting future prospect[19]. Hardware accelerated laparoscopic simulations are introduced in select places and intraoperative MRI monitoring is also on the horizon[20]. Teaching of Anatomy needs to angle for an era of noninvasive medical and surgical practice, and integrate radiological imaging more deeply into Anatomy. Additionally, the study of anatomy needs to be more active with students focussing on problem solving rather than memorizing pathways.

Problem Based Learning has long been considered a very promising alternative to the traditional teaching methods, but studies suggest that it might actually be one of the reasons for the decline of quality Anatomy teaching[21]. The rationale behind that is the replacement of

an insightful anatomy instructor with a facilitator in PBL technique adversely affects the level of quality education dished out in the institutions with the reinforcement of suboptimal learning methods. PBLs also curiously scored low in this study all across the board. This is an area of potential future research, with systematic evaluation andcomparison of the usefulness of PBL in institutions they are historically implemented in and institution that have just recently adopted this method.

Another notable suggestion, both historically and in this study, is vertical integration of Anatomy into medical curriculum through all the years of education[22]. This can expand the usefulness of anatomy into medical and surgical practice. The purpose of this study is to highlight which areas of Anatomy need a makeover the most, and which of the proposed improvements are most promising according to the three groups of the target population.

CONCLUSION

The study points out that the problem lies with the lengthy course of Anatomy, more so in the way it is being taught. Clinicians find their learning of application of anatomy deficient, and they demand that traditional methods be ditched. Teachers find no problem with the traditional methods, ratherthey say lengthy course is a problem. Interestingly, a very minor percentage from each of the three groups support reduction of factual knowledge, implying that despite being troublesome it is important and helpful. All three groups are satisfied with the current course of surface and radiological anatomy. All three groups, most notably post graduates and teachers, want a continuous vertical integration of anatomy, which will help reinforce the teaching of medicine and surgery with basic sciences. Of all the three groups students had the highest percentage in favour of PBLs, but the teaching faculty as well as postgraduates are not enthusiastic about the implementation of pbl/cbl.

The study reinforces the importance of delivering thorough anatomical knowledge despite it being lengthy and factual. Needless to say, this factual knowledge needs to be efficiently delivered and efficiently learned and one way of doing it could be by integrating with other medical subjects. Importance of PBL/CBLs in anatomical teaching however could not gain acceptance in this study and needs to be re-evaluated by more studies.

REFERENCES

1. Plaisant O, Cabanis EA, Delmas V. Going back to dissection in a medical curriculum: the paradigm of Necker-EnfantsMalades. Surgical and Radiologic Anatomy. 2004Mar;26(6):504–11.
2. Moxham B, Plaisant O. Perception of medical students towards the clinical relevance of anatomy. Clinical Anatomy. 2007;20(5):560–4.
3. Patel K, Moxham B. Attitudes of professional anatomists to curricular change. Clinical Anatomy. 2005;19(2):132–41.
4. Banerjee A, Bancil AS. Teaching of anatomy: Is there more to consider? Clinical Anatomy. 2011Mar;24(4):510–.
5. Kerby J, Shukur ZN, Shalhoub J. The relationships between learning outcomes and methods of teaching anatomy as perceived by medical students. Clinical Anatomy. 2010;24(4):489–97.
6. Mclachlan JC, Patten D. Anatomy teaching: ghosts of the past, present and future. Medical Education. 2006;40(3):243–53.
7. Leonard RJ. A clinical anatomy curriculum for the medical student of the 21st century: Gross anatomy. Clinical Anatomy. 1996;9(2):71–99.
8. Waterston S, Stewart I. Survey of clinicians attitudes to the anatomical teaching and knowledge of medical students. Clinical Anatomy. 2005;18(5):380–4.
9. Griff ER. Changing undergraduate human anatomy and physiology laboratories: perspectives from a large-enrollment course. Advances in Physiology Education. 2016;40(3):388–92.
10. Turney BW. Anatomy in a modern medical curriculum. Ann R CollSurg Engl. 2007; 89: 104–7.
11. Singh R, Tubbs RS, Gupta K, Singh M, Jones DG, Kumar R. Is the decline of human anatomy hazardous to medical education/profession?—A review. Surgical and Radiologic Anatomy. 2015;37(10):1257–65.
12. Reidenberg JS, Laitman JT. The new face of gross anatomy. The new face of gross anatomy. The Anatomical Record. 2002;269:81–8.
13. Barrows HS. Problem-based learning in medicine and beyond: A brief overview. New Directions for Teaching and Learning. 1996;1996(68):3–12.
14. Older J. Anatomy: A must for teaching the next generation. The Surgeon. 2004;2(2):79–90.
15. Monkhouse WS. Anatomy and the medical school curriculum. Lancet 1992;340:834–835.
16. Heylings DJA. Anatomy 1999-2000: the curriculum, who teaches it and how? Medical Education. 2002;36(8):702–10.
17. Nayak S, Ramnarayan K, Somayaji S. Anatomy that must be taught to a medical undergraduate: An interview-based survey in an Indian medical school. The Anatomical Record Part B: The New Anatomist. 2005;285B(1):16–8.