SPECIAL COMMUNICATION

Students' perceptions of usefulness of Anatomy demonstrations in traditional and hybrid undergraduate medical education curricula

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Abstract

A cross-sectional study was carried out to study students' perceptions on the usefulness of Anatomy demonstrations (AD) in the undergraduate medical education by comparing the Conventional Medical College (CMC) and problem-based learning as hybrid curriculum (HMC). Purposive sampling technique was used and all students were included. The completed questionnaire responses were returned by 92 CMC and 87 HMC students. CMC cohort understood the structural relationship more than HMC (p=0.03). AD helped 50 students (54%) of CMC to get through the theory examination, however 73 (84%) students of HMC found them useful in preparation for theory examinations (p<0.001). The importance of AD as a major content delivery strategy cannot be overemphasized in the anatomy curriculum and useful teaching strategies from various undergraduate medical curricula, such as the use of the plastic and plastinated models and the session handouts.

Keywords: Small-group interactive sessions, problem based learning, conventional medical curriculum, Anatomy, Demonstrations.

Introduction

The undergraduate medical education has experienced a major revival since last century, due to the arrival of the information technology as a major teaching tool in the biomedical sciences. This has led to major reforms in the medical curriculum, internationally as well as within Pakistan. To accommodate these latest technologically innovative advancements within the curriculum, different novel methods of teaching have been adopted by numerous institutions.[1] The most prominent approach that has led to the overhaul of undergraduate medical education is the introduction of the system-based and problem-based teaching methodologies. These essential skills and knowledge required for the future medical doctors is delivered in an integrated style with an early exposure to patient centered scenarios.[2]

In Pakistan, both systems of medical education; conventional as well as hybrid, are being currently practiced. In the conventional curriculum, there is a clear demarcation between preclinical years (where the subjects of basic medical sciences are taught) and clinical training with curriculum usually focused towards lectured based learning.[3] In hybrid systems, basic medical sciences are taught in an integrated manner which revolves around clinical scenarios in modules/ systems with the help of Problem based learning (PBL) sessions. PBL is a strategy by which active learning is facilitated in the small group session discussions, which are done around a given problem.[4]

Anatomy discipline, nevertheless is facing a tough time in both the curricula with the challenge of delivery of factual knowledge with connection to its relevance and delivery of core knowledge, upon which other concepts, such as pathophysiology and biochemistry are built.[1,5] The anatomy curriculum is based on didactic lectures supported by dissection and gross anatomy demonstrations. The rationale behind anatomy education is to enable the students to visualize structures of the human body, to develop reasoning skills for solving clinical problems and to promote ethics and humanism. In both the sets of medical colleges, there is an obvious shift from teacher-centered didactic lectures to student-centered learning strategies, which has led to smaller group interactive sessions with students leading the sessions while teachers facilitating the group in seeking the right information.[3,6] An example of these sessions is AD which are part and parcel of both sets of undergraduate medical curricula.

With the metamorphosis of medical education in terms of innovative teaching modalities for anatomy like PBL, team-based learning, computer assisted learning (CAL) peer teaching, and the ultrasound imaging methods, however, the question of the usefulness of traditional AD remains debatable. The decreased teaching contact hours of the anatomy, scarcity of the qualified faculty, fainted avenues of dissection, along with the numerous litigious allegations because of the issues related to the minimum

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competency level which is required for the medical students to practice medicine safely for the public.[7] Research question remains, whether the hybrid system of the medical education is useful or not. This study is thus aimed to identify the usefulness of AD at the touchstone of the student perceptions about both types of the undergraduate medical curricula.

Materials and Methods

A cross-sectional study was carried out from January to December 2013 with the help of a self-reported questionnaire. (Appendix-I) Purposive sampling was used and all the students were included. The objectives were displayed on the departmental notice boards ahead of time for the both the groups. In both groups, facilitators used Power Point presentations and involved students by asking them analytical questions to hone their critical thinking skills and to integrate the central concepts outlined in the lectures. The questionnaire was distributed among 100 first year students of both the medical colleges. Students in the conventional curriculum following medical colleges (CMC) were taught the subject of Anatomy in 51 demonstrations and in 78% of the demonstrations (40/51) plastic models were used. In contrast, 19 out of 33 (57%) AD in the hybrid curriculum following medical colleges (HMC), the models were used in the sessions. Handouts were provided by almost all 31/33 (94%) of the demonstrations as a routine to all HMC students while only selective teachers in 4/51 (8%) CMC students gave handouts. The response obtained from 87 of 100 students of HMC comprised Group I; whereas Group II included 92/100 complete responses from CMC. Incomplete forms, were excluded from the study. A comparison was made between responses of students in Group I and Group II on the usefulness of demonstrations in the subject of Anatomy. In Group I, AD sessions comprised of 50 students with one tutor, while in Group II a batch of 25 students was looked after by one tutor. Data was analyzed using SPSS version 15.The responses were acquired in terms of usefulness of AD for understanding of content, relationship with other subjects, help with theory and written examinations. Chi square test was applied to evaluate significance of results in both groups.

Results

One hundred and seventy-nine students response were acquired. The statistics of students' perception has been summarized in Table. Both groups of the students reported that they were able to understand the content of the subject and difficult concepts in these sessions (HMC= 65% while CMC=58%). These sessions were reported as very useful since helped to learn anatomy by visualizing

Appendix-I: Questionnaire.

Objective	SD	D	N	A	SA
Able to understand gross Anatomy					
Able to understand the difficult concepts					
Able to visualize the structure in its anatomical state within the body					
Able to understand clinically applied Anatomy					
Helped in attempting MCQ and SAQ (Theory examination)					
Helped in OSPE and viva(Practical examination)					

SD: Strongly disagree
A: Agree
Neutral: N
A: Agree
SA: strongly Agree.

Table: Comparison of perception of students in conventional (CMC) and hybrid (HMC) curriculum.

	Strongly Disagree		Strongly Agree		
Objective	HMC (87)	CMC (92)	HMC (87)	CMC (92)	P value
Able to understand gross Anatomy	13 (15%)	17 (18%)	74 (85%)	75 (81%)	0.878
Able to understand the difficult concepts	30 (34%)	39 (42%)	57 (65%)	53 (58%)	0.591
Able to visualize the structure in its anatomical state within the body	21(24%)	12 (13%)	66 (76%)	80 (87%)	0.035
Able to understand clinically applied Anatomy	35 (40%)	35 (38%)	52 (60%)	57 (62%)	0.502
Helped in attempting MCQ and SAQ (Theory examination)	14 (16%)	37 (40%)	73 (84%)	50 (54%)	0.002
Helped in OSPE and viva (Practical examination)	39 (45%)	23 (25%)	48 (55%)	64 (69%)	0.031

The p Values represent the difference of positive responses amongst the two group analyzed by Chi square. $p < 0.05$ was considered significant.

the structures instead of mere power point presentations (HMC= 76% while CMC=87%). However, there was variation in their opinion regarding its usefulness in respect to exam preparation. The students belonging to HMC group mentioned that AD method of teaching was very helpful for preparing theory examination (84%) while only 55 % of these students reported its usefulness to be in terms of practical exam, suggesting it less appropriate to prepare for practical assessments (Table). On the other hand in the CMC group, greater number of students (69%) found this methodology to be helpful for preparing to appear in practical exam, while 54% of these students reported less effectiveness of AD in theory exam preparation. Furthermore, while commenting on the ability to understand the structural relationships of various organs, in comparison to HMC group, the CMC group reported a higher effectivity of AD (p=0. 03)

Discussion

Medicine is an unrivaled and a matchless limb of science, nurturing after all the ailments of mankind. The significance of anatomy lies in the fact that it forms the bedrock of the medical sciences. Over the years, teaching of Anatomy discipline has gone through thick and thin; a great deal has been said in its antagonism about the length, content and the clinical relevance of the subject. By the antithesis viewpoint, anatomy is blamed to be a demanding pedagogical discipline; which is considered to be the foundation of medicine irrefutably.[3] No wonders the role of anatomy as a core curriculum had also been jeopardized, yet anatomy had held its ground strong and remained unvarying.[8] Our study revolves around exploring the beneficial advantages or disadvantages of AD perceived by the students of HMC and CMC.

Students enthusiastically entitled AD as attention grabbing and find AD supportive for easy understanding of difficult concepts. Many studies have already avowed about the usefulness of AD.[9] Demonstrators have the freedom of conveying the anatomy knowledge, according to varying levels of understanding of different students in the form of small groups. They can use various methods like models, prosected parts, computer aids to clear the concepts and yet make the things palatable for the students. In our study adjuncts used in AD of CMC was the presentation and description of the topic with the use of models.

Anatomy has remained controversial due to its overtly factual framework, yet its conceptual aspect is indispensable to the clinical knowledge and practice. Even students in their higher classes of medical school realize its pivotal role and vote for the discipline's concepts to be the fundamental platform for future subjects of medicine. Various studies have highlighted concerns over inadequate delivery of core concepts of anatomy. As a result there has been a steady increase in anatomical errors encountered during surgical malpractices throughout the world.[10-12] Our expedition about understanding of difficult concepts through AD had shown that both sets of students grabbed more knowledge, and got clear understanding of difficult concepts. HMC students were a little ahead in giving their verdict for AD to be an effective teaching methodology. The clear objectivity, making difficult concepts easy by small group sessions has also been demonstrated by various other studies.[9]

Clarity of human body structures and safe medical practicing go hand in hand. The multitudes of reported anatomical errors globally comes with no surprise due to declining depth, allocated teaching time, paucity of teaching faculty and dissection classes in the discipline of anatomy. Pro section studies and dissection classes may improve overall understanding of human bodily organization and so may improve this grim situation. Medical schools have now either removed the practical, hands-on aspect of dissection from the curriculum or are considering such a measure, on financial and/or human resource grounds.[7] High cost and challenging standards of maintaining the anatomy mortuary and difficulties in provision of cadavers are impediments in keeping up with such teaching methodologies. Possible answers to this dismal situation are making a shift towards the small group sessions, and trying to cater the students with the competency level well equipped to cope up with the safety challenges.[10] We got significant results while searching about structural relationships of organs to one another at gross anatomical levels which seem to be better understood by CMC students in which presentation was done on the basis of models.

The study of anatomy is the foundation of medicine; a silent actor, a stepping stone over which newer concepts of other disciplines like physiology, pathology, surgery and other disciplines are built. Unparalleled opinions about importance of anatomy relevance have already been declared for pathological aspects to be unveiled and understood. Evidence suggests small group sessions to aid students associate the anatomy with the clinical aspects.[11] Our destiny entails towards the same approach and both HMC and CMC students had affirmed the role of AD in making them getting clear notion of pathological aspects.

Efficacy of AD does not reside in making students understand the anatomical features from macro to micro levels but better conceptualization of difficult concepts and in correlation of knowledge with the horizon of clinical scenarios. It has proven its mettle in extending its

worth also in getting good scores in the theory examinations. Various studies have acknowledged this fact by employing various types of small group sessions like computer assisted learning and student focus groups.[12] We have come across a very interesting finding during our analysis, with a substantial proportion (40%) of CMC students against the view that AD had helped them getting good grades in their theory examinations. While another significant result has been shaped by students of HMC who had strongly voted for the invaluable place of AD in making them passing their theory examinations with flying colours. This probably can be explained on the basis of handouts provided by HMC teachers which helped their students.

The sphere of practical examination ordeal encompasses through wide range of students' probations, from structured or non-structured viva examinations, surface markings to Objective Structured Practical Examination (OSPE) and Objective Structured Clinical Examination.[3] Diverse forms of small group sessions also have proven accepted beliefs about positive outcomes of passing the practical examinations by developing clearer understanding in students. To come across these challenges the students need to have well-groomed interpersonal and communication skills, deeper level of understandings of various disciplines and practical implementation of knowledge to solve clinical circumstances.[13,14] It is the second time that we have gathered another exciting set of observations; in HMC students raising voices against this documented fact ($p<0.020$), while the CMC students reflecting the same thoughts of AD making them achieve improved performances in their practical examinations.

The financial obligations, rigid mindset of orthodox teaching faculty and skilled workforce restrictions determine the type of modalities used in these small group sessions; but plasticized model sessions, model studies, PBL and latest computer technology, videos and web based learning are employed in the anatomical demonstrations to varying extents. The study is limited in terms of small sample size ,variability in number of teaching hours, number of students in each group, difference in use of support like hand outs and model presentation and subjective variation in teaching style of demonstrators. This however, is the first study conducted in Pakistan which improvises the need for collection of similar data from other medical colleges across Pakistan with an attempt to continue AD in medical universities with or without problem-based learning curricula.

Conclusion

Our study equally harmonizes with the ideology of AD being beneficial to medical students in setups of both types of curricula. It enabled medical students to understand the structure and content of the subject. The HMC students who received the hand outs with AD performed well in the theory examinations whereas CMC students who had model studies performed well in the practical assessments. In order to facilitate the better understanding of structural organization and relationships, the use of plastic and plastinated models, wet specimens, and student study handouts should be enhanced.

References

1. Rehman R, Razi MS, Syed S, Sultan T. Impact of alterations in teaching methodologies on learning capabilities. J Pak Med Assoc. 2011; 61: 982.
2. Howe A, Campion P, Searle J, Smith H. New perspectives-approaches to medical education at four new UK medical schools. BMJ. 2004; 329: 327-31.
3. Rehman R, Khan AN, Kamran A. The role of small group interactive sessions in two different curriculums based medical colleges. J Pak Med Assoc. 2012; 62: 920-3.
4. Rehman R, Rubab ZE, Usmani A, Rehan R. Steps towards implementation of modular hybrid system at Bahria University Medical & Dental College. J Postg Med Inst. 2014; 28.
5. Memon IK. Anatomy education faces challenges in Pakistan. Anat Sci Educ. 2009; 2: 193-4.
6. Howe A, Campion P, Searle J, Smith H. New perspectivesâ€"approaches to medical education at four new UK medical schools. Bmj. 2004; 329: 327-31.
7. Turney B. Anatomy in a modern medical curriculum.Ann R Coll Surg Engl. 2007; 89: 104-7.
8. Leung KK, Lu KS, Huang TS, Hsieh BS.Anatomy instruction in medical schools: Connecting the past and the future. Adv Health Sci Educ Theory Pract. 2006; 11: 209-15.
9. Chan LK, Ganguly PK. Evaluation of small?group teaching in human gross anatomy in a Caribbean medical school. Anat Sci Educ. 2008; 1:19-22.
10. Nieder GL, Parmelee DX, Stolfi A, Hudes PD. Team?based learning in a medical gross anatomy and embryology course. Clin Anat. 2005; 18:56-63.
11. Bergman EM, van der Vleuten CP, Scherpbier AJ. Why don't they know enough about Anatomy? A narrative review. Med Teach. 2011; 33:403-9.
12. Sugand K, Abrahams P, Khurana A. The anatomy of anatomy: A review for its modernization. Anat Sci Educ. 2010; 3: 83-93.
13. Kivell TL, Doyle SK, Madden RH, Mitchell TL, Sims EL. An interactive method for teaching anatomy of the human eye for medical students in ophthalmology clinical rotations. . Anat Sci Educ. 2009; 2: 173-8.
14. Rizzolo LJ, Rando WC, O'Brien MK, Haims AH, Abrahams JJ, Stewart WB. Design, implementation, and evaluation of an innovative anatomy course. Anat Sci Educ. 2010; 3: 109-20.