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Original Article

Perceptions of Medical Students on Anatomy Education Environment in Medical Colleges by Aeemi: A Bi-Centre, Comparative Study

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ABSTRACT

Objective: The aim of the study was to evaluate the different constructs of the Anatomy learning environment and the perception of medical students regarding the teaching facilities.

Study Design: It was a thorough cross-sectional study.

Place and Duration of Study: The study was conducted in a public sector and private sector medical college over a period of 6 months from Nov 2021 to Apr 2022.

Methodology: It was a descriptive study in which a structured and self-administered questionnaire was distributed after obtaining consent from the subjects. For this study project, the best fit and validated model of The Anatomy Education Environment Measurement Inventory (AEEMI) was selected to evaluate the perception of medical students of educational climates with regard to teaching and learning anatomy. The sample size was 163 and 104 respectively. Data was collected from final year students of two medical colleges; one teaching Anatomy in a traditional manner and other teaching Anatomy via integration so we assumed that the Anatomy learning environment is different in both colleges.

Results: The analysis of data revealed that out of 163 students from the traditional curriculum, 75(46.0%) had a positive area about Perceptions of Anatomy Knowledge Relevance and 61(37.4%) had a positive area about Students' Positive Perceptions of Anatomy Teachers. Moreover, 104 students from integrated curriculum (63.8%) had a positive area about Students' Negative Perceptions of Anatomy Teachers and 36(22.1%) had a positive area about Students' Perception of Anatomy Subject Mastery. In addition, 48(29.4%) out of 163 had positive areas about Students' Perception of Anatomy Learning Resources. Students learning Anatomy via integration had positive perceptions in all five domains of inventory.

Conclusions: The data reveals that out of 163 students, 56(34.22%) had a positive perception of the constructs of the anatomy learning environment. Total 67(61%) students who were studying Anatomy via integration had positive perceptions about their Anatomy teachers, whereas 80(49%) students of traditional curriculum were of the view that Anatomy educators need to improve their teaching methodologies. Nearly 55(50%) students of integrated curriculum were satisfied that they have mastered the subject and 63(57%) were happy about novel and updated learning resources.

Keywords: Anatomy learning environment, Constructs, Educational climate, Medical students, Resources, Student's perception.

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INTRODUCTION

Anatomy is paramount in medical education and is taught in first two years of our undergraduate curriculum. While the curricula is shifting globally towards outcome based education and integration, most medical colleges are still adhering to traditional methods of teaching Anatomy via didactic lectures, cadaveric dissections and prosections costing money, manpower and time.[1,2] This lack of flexibility in Anatomy educators is causing wide gap between teachers and students whose learning preferences, style and tools are entirely different from previous three generations.[3] These millennial learners are hyper connected via internet, therefore value teamwork and communication. They like outlined goals, objectives and work efficiently when held socially accountable.[4] This lack of understanding our learner's preferences and demands has created a learning environment to which they don't relate, thus causing lack of interest and demotivation.[5]

Educational environment, nowadays, is not limited to spatial arrangement of dissection hall, museum and classrooms. Rather, technology has expanded it to a social network creating virtual Anatomy laboratory filled with 3 D models/images, guided tour through cross-sectional anatomy, video tutorials of cadaveric anatomy, and so much more.[6] Students' feedback suggests that they feel more relaxed, autonomous and belonged with these technological modalities which piqued their interest and motivates them to study, thus proving self-determination theory.[7] Therefore, learning novel methods of teaching Anatomy will lead towards

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transformation in practices of Anatomy teaching, will bridge the generation gap and will, eventually, lead towards a better learning environment.[8]

There are Anatomy teachers who still prefer dissection as the major method for teaching Anatomy, despite reported anxiety and fear in medical students,[5] and availability of simulations, video tutorials and cross sectional images. To challenge those educationists on their resistance to learn innovative teaching methodologies and improve educational climate of their department, we decided to look into our students' perceptions about Anatomy learning environment formed mainly by teachers, learning resources and clinical relevance of the subject. For the said purpose we decided to use a validated tool; The Anatomy Education Environment Measurement Inventory (AEEMI), in two different medical colleges; one following traditional method whereas other following integrated, modern methods of teaching anatomy.

Table-I: Comparison of students' perceptions about Anatomy learning environment based on curricula

Domains	Perceptions of students studying Traditional Anatomy Curriculum			Perceptions of students studying Integrated Anatomy Curriculum			*p*-value
	Area of Concern	Area of Improvement	Positive Area	Area of Concern	Area of Improvement	Positive Area	
Perceptions of Anatomy Knowledge Relevance	22(13.5)	66(40.5)	75(46.0)	18(16.4)	30(27.2)	62(56.4)	0.081
Students' Positive Perceptions of Anatomy Teachers	22(13.5)	80(49.1)	61(37.4)	14(12.7)	29(26.4)	67(60.9)	0.001
Students' Negative Perceptions of Anatomy Teachers	10(6.1)	49(30.1)	104(63.8)	21(19.1)	37(33.6)	52(47.3)	0.185
Students' Perceptions of Anatomy Subject Mastery	59(36.2)	68(41.7)	36(22.1)	19(17.3)	36(32.7)	55(50.0)	0.003
Students' Perceptions of Anatomy Learning Resources	36(22.1)	79(48.5)	48(29.4)	20(18.2)	27(24.5)	63(57.3)	0.001

METHODOLOGY

This cross sectional, bi centre, comparative study is approved by the Ethics committee of two colleges. Data was collected from final year students of two medical colleges; one teaching Anatomy in a traditional manner and other teaching Anatomy via integration so we assumed that the Anatomy learning environment is different in both colleges. Total 273 {138(50.5%) males, 135(49.5%) females} students were included. Of these, 163{57(35%) males, 106(65%) females} were studying traditional Anatomy curriculum and 110 {81(73.6%) males, 29(26.4%) females} were studying integrated Anatomy curriculum. All those who gave consent, and filled the inventory completely were included in the study. We chose final year students as they had studied Anatomy in initial two years of medical college, and now were taking clinical clerkships in Surgery and medicine, so we assumed that they can better relate their Anatomy teaching to clinical practice.

The students were briefed about research objectives and the confidentiality of their responses was guaranteed. It took 5 minutes to respond to questions asked on AMEEI. This Inventory made them reflect on learning sessions related to Anatomy teaching and learning; spatial arrangement, resources used and educator's competence. All information obtained is for the purpose of analysis and improvement in learning practices in Anatomy teaching. The responses were taken on five point Likert scale. The inventory had its own scoring system grouping the responses into five main domains. Each domain was further categorized into three frequencies labelling them as area of concern, improvement or positive area (See Table-I). The responses were compared for students studying in two different Anatomy learning environments.

RESULTS

In our study, significant perceptions were observed by final year respondents in five domains of Anatomy education environment studying in different educational environment. Students learning Anatomy via integration had positive perceptions in all five domains of inventory. On the other hand, 75(46%) students learning Anatomy via traditional means had positive perceptions in one area only which is Anatomy knowledge. Another interesting finding was that 104(63%) students of traditional Anatomy environment had negative perceptions of their teachers as compared to 52(47%) students who studied Anatomy in integrated environment of five domains, three showed significant *p*-value of <0.05 (Table-1) when responses of students studying different curricula were compared. A difference in perceptions of students was mainly in areas of teachers, subject

mastery and learning resources. Total 67-61% students who were studying Anatomy via integration had positive perceptions about their Anatomy teachers, whereas 80(49%) students of traditional curriculum were of the view that Anatomy educators need to improve their teaching methodologies. Nearly 55-50% students of integrated curriculum were satisfied that they have mastered the subject and 63-57% were happy about novel and updated learning resources. In comparison, most students 68-42% want improvement in learning environment so that they master the subject and 79-48.5% want attention to be paid on out-dated learning resources.

DISCUSSION

The Anatomy Education Environment Measurement Inventory (AEEMI) evaluated the perceptions of medical students regarding teaching and learning Anatomy. The study used a valid universal model of AEEMI across public and private medical schools in our country.

Table-I clearly shows that integrated Anatomy teaching via clinical relevance using modern tools of teaching was much favoured by students producing satisfaction and subject mastery. All five domains of AEEMI are showing positive areas in case of those who are studying Anatomy via modern means. in contrast, students studying via traditional means have negative perceptions about their teachers & want improvement in learning resources and teaching methods.

The Anatomy Education Environment Measurement Inventory (AEEMI) evaluate the perception of medical students of educational sphere with regard to teaching and learning anatomy. The study aimed to validate the AEEMI, and proposed a valid universal model of AEEMI across public and private medical schools in our country. These results confirmed that variability exists within variable factors of the anatomy education environment among medical colleges. Hence, with integration of internal structure and composition, the proposed model of the AEEMI can be considered applicable in our country's medical curricula context and thus can be utilized as one of the tools for auditing and benchmarking the anatomy curriculum.

This research examines how undergraduate students perceived the anatomy education environment in medical colleges. All factors of the anatomy education environment were positively viewed by the respondents, except few practical facilities, which may need further improvement, as shown by the analyses. Nevertheless, significant perceptions were observed by final year respondents in five domains of anatomy education environment.

In a study that assessed the learning atmosphere among first-year Malaysian medical students at University Kebangsaan Malaysia, the majority of students had

Students in both first- and second-year in this study acknowledged the significance of methods of integrated learning of anatomy in their medical study. This is in line of a study that reported the medical students viewed anatomy as an integral part of their medical education before starting the course in their first year, after completing the course in their second year and even in their final year of medical school. (ref; Medical Students' Perception of Anatomy Education Environment in University Putra Malaysia Siti Aisyah Mohd Jalani,[1] Muhammad Aliff Aiman Rushlan[1] , Shyeanne Gunn Shian Yen[1] , Siti Nurma Hanim Hadie[2] , Halimatus Sakdiah Minhat[3] , Razif Abas).

Another study assessed the relationship between academic motivation, grade expectations and academic performance of integrated method of learning over a two year cycle in their research.[16] Thus, it is important to implement teaching and learning strategies that prevent students from feeling demotivated. Students need to maintain their motivation as the medical study requires them to focus on study and do clinical workloads at the same time.

Nowadays, the method of learning anatomy has changed exponentially over the years as students have unlimited access to e-textbooks, lecture notes, anatomy software and apps that can be accessed from the internet. It should be recognised that no single method (i.e., lectures, dissection/prosected specimens, templates, technology, or living anatomy) can meet all of the teaching objectives, so a multimodal approach is recommended.

It was postulated that the students had limited exposure to clinical applied anatomy, and thus were motivated by exam factor. This postulation was based on the classification by Beatty and Feldman, (ref; Teacher Learning of Technology-Enhanced Formative Assessment Ian D. Beatty, Allan Feldman, William J. Leonard, William J. Gerace, Karen St. Cyr, Hyunju Lee, Robby Harris) who divided students into two categories: integrated learning-orientation of students who see the classroom as a place where they can discover ideas and knowledge that are important to them, and grade-oriented and contemporary method

of learning of students who see the classroom as a place where they will be evaluated and assessed to obtain a certificate.

Another study was conducted regarding students' perception of existing histology teaching methods (20). In this study, they found that 5.15% of the students reported of not being able to achieve better scores due to poor slide quality. Fortunately, second-year students were able to experience histology laboratory sessions adequately during their first year of study. However, some of them realised that there was a shortcoming during their histology sessions, such as poor histology slides resulting in them choosing "not sure" for the same item in the AEEMI. Hence, it is noteworthy to accentuate the significance of virtual microscopy in histology teaching to overcome the problem of poor quality of histology slides and learning anatomy. (ref; Anatomy Education Environment Measurement Inventory (AEEMI): a crossvalidation study in Malaysian medical schools)

The applicability of these results is applicable to medical educational environment and can be extrapolated to different institutions. Since AEEMI is a validated inventory, the findings can be used to compare the anatomy education experience at different institutions if the same method. The current study clearly assess the perception of medical students to the extent they need and require change and introduction of integrated method of teaching and learning to have better knowledge of subject and comprehension.

CONCLUSION

The data reveals that out of 163 students, 56(34.22%) had a positive perception of the constructs of the anatomy learning environment. Total 67(61%) students who were studying Anatomy via integration had positive perceptions about their Anatomy teachers, whereas 80(49%) students of traditional curriculum were of the view that Anatomy educators need to improve their teaching methodologies. Nearly 55(50%) students of integrated curriculum were satisfied that they have mastered the subject and 63(57%) were happy about novel and updated learning resources.

Conflict of Intrest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

KQ: Supervision, conception design, acquistion of data & final apporval of the version to be published.

AAM: Drafting of article, acquistion of data & final apporval of the version to be published.

FK: Conception design, interprection & final apporval of the version to be published.

WAY: Acquistion of data, analysis & final apporval of the version to be published.

MA; LK; AAN: Conception design, acquistion of data & final apporval of the version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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