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Early clinical exposure as an adjunct in learning anatomy among first-year medical undergraduates

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ABSTRACT

Introduction : Early clinical exposure (ECE) is a new teaching method introduced in the first year of medical school to bridge the gap between pre-clinical and clinical subjects. The impact of ECE on learning anatomy has not been extensively studied.

Objectives: To examine the perceptions of first-year medical undergraduates towards ECE in learning anatomy.

Methods: 197 first-year MBBS students who attended 30 hours of ECE sessions were surveyed through a Google form with closed and open-ended questions. Categorical data was represented by frequency and percentage, and continuous variables by mean ± SD.

Results: 94.6% of the respondents agreed that ECE was an interesting method of learning anatomy compared to traditional lectures, while 5.4% disagreed. 95.1% of students agreed that ECE motivated them to read more on the topics covered, while 4.9% felt ECE showed no impact on their motivation to study. Students strongly believed that ECE helped them understand the topics taught in Anatomy better (36.5%, n=72), retain information (35.5%, n=70), correlate with clinical scenarios (48.2%, n=95) 95.6% students opined that the frequency of ECE sessions should be increased and incorporated along with regular lectures in Anatomy.

Conclusion: ECE sessions were well appreciated and accepted by students. ECE helps in understanding concepts in anatomy better, makes correlation with clinical aspects easier, and retaining information learned through ECE sessions is possible. ECE may serve as a great tool in imparting quality medical education.

KEYWORDS: Early clinical exposure, MBBS, MCI, medical, NMC, undergraduates.

INTRODUCTION

Early clinical exposure (ECE) is an innovative teaching-learning method to ensure the exposure of medical students to a clinical setting, initiating from the first year of medical school life. [1]The rationale behind ECE is to form a bridge between preclinical subjects and clinical subjects, thus, helping fresh medical undergraduates to understand the clinical relevance of basic science subjects, improving clinical as well as communication skills and making them more confident. [2]

The Medical Council of India (MCI) first recommended ECE in a reformed medical curriculum in 2015. [3] Although ECE was already adopted as a teaching-learning strategy in few universities in India, the widespread implementation of ECE across the nation happened when the National Medical Commission (NMC), erstwhile MCI, made it an essential component of the medical curriculum in 2019, as part of the competency-based medical education (CBME).

The main objectives of the ECE module laid down by NMC are to understand the relevance of basic sciences in diagnosis, patient care and treatment, to enhance learning, to motivate oneself to learn, to recognize the doctor-patient relationship and understand the socio-cultural aspects of various diseases. [4]

Prior to the implementation of ECE in medical schools, first-year students were only accustomed to medical learning in classrooms, laboratories and dissection halls. Clinical subjects were introduced in the second year of medical school, in the form of hospital postings.

Anatomy, one of the core basic science subjects, serves as a foundation for several clinical subjects. A comprehensive knowledge of Anatomy is essential to understand the intricacies of several clinical disciplines. [5] Such as Medicine, Surgery, Obstetrics and Gynaecology, ENT, Ophthalmology and others. Taking this into account, NMC recommends ECE and skill development training to be initiated from the first year of medical school for medical undergraduates.

ECE can be implemented by either conducting visits to the hospital where they can interact with live patients or bringing a consenting patient to the classroom for discussions. Besides patients, other clinically relevant materials such as case histories, laboratory reports, radiological films or reports, etc. can be used to make students aware of various conditions. Medical students can also be taken on community visits to ensure clinical exposure. [2] The current study aims to explore and describe the first-year medical undergraduate students' perception of ECE as a learning adjunct in Anatomy.

There is limited data available regarding the perception of first year students towards ECE in Anatomy in India. By understanding how students perceive and experience ECE, faculties and medical curriculum developers can modify their teaching methods and curriculum to improve the quality of medical education and the overall learning experience for the students.

METHODS

The cross-sectional study was carried out among first-year medical students in the Department of Anatomy, A.J. Institute of Medical Sciences and Research Centre in collaboration with Yenepoya Medical College (Yenepoya Deemed to be University) and Father Muller Medical College, Mangaluru, Karnataka, India between February-March 2023.

Based on the study by Aggarwal N. and colleagues, 58.3% (n=81) of the study participants strongly agreed that ECE helped them understand the applied anatomy of the topic taught.[6]

The sample size for the study was computed to be 97, assuming p=58.3% [% of students said it helped them], 10% allowable error(L)]. Further, assuming 10% non-response rate, the final size estimated for the study was 107.

Ethical clearance was obtained from the Institutional Ethics Committee before the commencement of the study. (AJEC/REV/241/2022)

Students who appeared for the first-year MBBS examination, based on the current CBME curriculum, in February 2023 were included in the study. The exclusion criteria for the study were students who did not give consent to participate and those who belonged to the supplementary batch. The supplementary batch includes students who did not pass the previous first-year MBBS examination and are attempting the exams once again along with the regular batch of students. A total of 197 students volunteered to participate and informed written consent was obtained.

The first-year medical undergraduates participating in the study were already introduced to ECE. They were briefed about the principles and objectives of ECE during the Foundation Course at the commencement of the MBBS course.

The Foundation Course in the Indian medical curriculum is of one-month duration which is carried out at the beginning of the MBBS course to sensitize the newly joined medical students with the necessary information, knowledge and skills required to help him/her acclimatize to the MBBS course. [6, 7]

During the first year of medical school, students enrolled for the academic year 2021-2022, attended ECE sessions in Anatomy in the form of either basic science correlation or clinical skills training. Basic science correlation involved lectures and case-based group discussions. Clinical skills training involved hospital visits and patient interaction in the hospital ward based on the topics covered in basic science correlation. The total duration of ECE conducted over one academic year was 30 hours, including 18 hours of basic science correlation and 12 hours of clinical skills. The time allotted for ECE has been prescribed by NMC. [7]

After the successful completion of their first-year professional examinations, students' perceptions of ECE were recorded with eleven-closed ended questions (based on a five-point Likert scale) and one open-ended question. The questionnaire was sent to the study participants via Google Forms (Table 3).

The questionnaire was designed after reviewing previous questionnaire-based surveys on ECE in various subjects. The questionnaire was reviewed by the teaching faculty members in the Department of Anatomy and their suggestions were incorporated. The questionnaire was further reviewed and validated by expert members of the Medical Education team at the Institution, including a community medicine physician who has experience in designing and validating questionnaires. The reliability of the questionnaire was assessed with the help of 35 students, who were not included in the main study. The reliability was found to be acceptable, with an overall Cronbach's alpha of 0.83.

The online questionnaire was made available to the students through a link which was shared via social media groups. The purpose of the study was explained on the first page of the survey. The questions could be viewed and accessed only if the students consented to participate in the study, by choosing the "I agree" option. The students were allowed to answer the questionnaire only once.

The responses obtained from closed-ended questions are represented as frequencies and percentages. An open-ended question was evaluated by screening and extracting key points.

Statistical analysis was done using SPSS version 21. Categorical data is represented as frequency and percentage. Continuous variables are represented as mean ± SD. Graphical data representation such as pie charts and bar charts was done using Microsoft Excel.

RESULTS

The study comprised 197 first-year medical undergraduates. Among the 197 study participants, 35.5% (n=70) were males and 64.5% (n=127) were females.

The age of the study participants ranged between 18-24 years with a mean age of 20.21 ± 1.067 years. Majority of the study participants (32.9%) were 20 years old.

The perceptions of the first-year medical undergraduates are shown inTable 1. A large percentage of students agreed (88.3%) that ECE is an interesting teaching-learning method compared to traditional lectures in Anatomy. A notable percentage of students expressed the view that ECE served as a motivation for increased reading, enhanced their comprehension of Anatomy, and aided in the retention of the topics covered. A strong consensus was evident among 48.2% of the students (n=95), who firmly expressed the view that ECE played a significant role in facilitating the connection between Anatomy and real-world clinical scenarios. Furthermore, students held the perspective that the integration of ECE into regular lectures for Anatomy and other first year subjects was essential.

The students were also asked to list three good points about ECE.Table 2 The most frequent insights gathered from open-ended responses of students regarding the positive aspects of ECE in Anatomy indicated that ECE provided them with an enhanced grasp of anatomy and its practical applications, rendered Anatomy more captivating, ensured substantial clinical exposure, and contributed to better topic retention.

Themes	No.
Promotes Self Study	7
Increases curiosity toward rare and common clinical conditions	8
Makes Anatomy interesting	36
Clinical exposure ensured	25
Better understanding of anatomy and applied aspects	85
Helps to focus on specific important topics	7
Working in a team	5
Allows revision of specific topics	3
Better retention of specific topics	26
Better teacher-student interaction sessions/ Interactive	17
Increases analytical ability and problem-solving	20
Makes learning fun and effective	11
Practice for entrance exams	1
Positive impact on student's performance and confidence	1
Helpful in the second year while attending clinics	2
Invalid or Non-specific comments/ No comments	38

Table 2: Good points of ECE in Anatomy

DISCUSSION

Early Clinical Exposure (ECE), an important component of medical education, has been adopted by several schools across the globe. Early exposure to clinics and patient interaction enable students to acquaint themselves with clinical diagnosis and treating patients.[8] ECE can also function as a platform for students to enhance their communication abilities and early on, during their medical education, learn the importance of professionalism. This opportunity allows them to develop these skills from the start when they are most receptive.[9]

The CBME curriculum being followed in Indian medical schools recommends a total of 90 hours of ECE in the first year. The allotted duration is divided equally among the three pre-clinical subjects; Anatomy, Physiology and Biochemistry. The curriculum also suggests that ECE should be divided into two phases, namely, basic clinical correlation and clinical skills to be conducted over 18 hours and 12 hours respectively. Basic clinical correlation includes the introduction of clinical concepts through interaction with a real patient, paper-based case discussion, charts, photos, videos, laboratory or radiological reports, field visits to community health centres or hospital laboratories, etc. The phase involving clinical skills includes case demonstration to small groups of students, by pre-clinical staff or clinicians, in outpatient departments, wards or demonstration rooms. Formative assessment of ECE is carried out during periodic internal examinations and university examinations in the form of case-based vignettes, MCQs and OSPE.[4]

There are several interventional studies to assess the efficacy of ECE in improving the learning experience and retention of information.[10–12] However, the literature available on first-year medical students' perceptions and responses toward ECE and its utility in teaching anatomy in India is limited.

Perceptions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
ECE is an interesting method of learning anatomy compared to traditional lectures	79 (40.1)	95 (48.2)	13 (6.6)	0	10 (5.1)
ECE has motivated me to read more about the topics taught during ECE sessions in Anatomy	76 (38.6)	97 (49.2)	15 (7.6)	1 (0.5)	8 (4.1)
ECE helped me to understand the topics taught in Anatomy better	72 (36.5)	105(53.3)	12 (6.1)	0	8 (4.1)
ECE helped me to retain the topics taught in Anatomy	70 (35.5)	96 (48.7)	23 (11.7)	1 (0.5)	7 (3.6)
ECE helped me correlate anatomy with the clinical cases/conditions	95 (48.2)	85 (43.1)	10 (5.1)	0	7 (3.6)
ECE helped me to understand the importance of learning Anatomy	83 (42.1)	92 (46.7)	13 (6.6)	1 (0.5)	8 (4.1)
ECE has made me more interested in Anatomy as a subject	70 (35.5)	97 (49.2)	23 (11.7)	0	7 (3.6)
ECE has played a role in helping me perform better in examinations	57 (28.9)	92 (46.7)	37 (18.8)	3 (1.5)	8 (4.1)
ECE should be incorporated along with regular lectures in Anatomy for medical undergraduates	84 (42.6)	91 (46.2)	14 (7.1)	0	8 (4.1)
ECE should be incorporated along with regular lectures for other subjects in first year of medical school for undergraduates	80 (40.6)	93 (47.2)	16 (8.1)	1 (0.5)	7 (3.6)

Table 1: Perceptions of first-year medical undergraduates towards ECE

Based on the perceptions gathered from the study participants, 94.6% of the respondents (174 out of 184 respondents) agreed that ECE was an interesting method of learning anatomy compared to traditional lectures, while 5.4% disagreed. 95.1% (173 out of 182 respondents) of students agreed that ECE motivated them to read more on the topics covered during ECE while 4.9% felt ECE did not motivate them. Students strongly agreed that ECE helped them understand the topics taught in Anatomy better (36.5%, n=72), retain information (35.5%, n=70), and correlate with clinical scenarios (48.2%, n=95)

Students were asked to mention three good points about ECE. It's interesting to note that the students felt ECE helped them understand anatomy and relevant clinical aspects better, made anatomy interesting to learn and helped them retain topics better.

A similar observation was made in a cross-sectional study carried out by Aggarwal N. and colleagues on medical students in Punjab, India. In their study, 61.9% (n=86) strongly felt that ECE was enjoyable compared to traditional lectures. 33.8% (n=47) of the students were highly motivated to study the topics taught in ECE. 58.3% (n=81) of the students agreed that ECE helped them understand the applied anatomy of the topic taught during the ECE session. [10]

Overall, the ECE sessions were well appreciated and accepted by the students. As part of the questionnaire, 95.6% (175 out of 183 respondents) opined that the frequency of ECE sessions should be increased and incorporated along with regular lectures in Anatomy, while 4.4% disagreed. At present, there are 30 hours of ECE sessions prescribed by NMC to be conducted in Anatomy for first-year medical undergraduates. ECE can be time-consuming if incorporated in every theory or dissection class, considering that the Anatomy syllabus is extensive. [13]

ECE is far more effective when delivered after a conventional lecture on a related topic. In a study carried out by Kar M and colleagues, significant improvement in the performance of the group that was exposed to conventional lectures followed by clinical exposure was seen. (p=0.019) The other study group which comprised of students who were subjected to clinical exposure first, followed by conventional lectures, did not show significant changes in performance.(p=0.679) [14]

There are certain challenges posed by ECE which include an increased requirement of trained faculty, infrastructure and efforts put in by the faculty to make the ECE sessions impactful. Moreover, the faculty involved in conducting ECE

Items with responses "Strongly agree | Agree | Neutral | Disagree | Strongly disagree"
ECE is an interesting method of learning anatomy compared to traditional lectures
ECE has motivated me to read more about the topics taught during ECE sessions in Anatomy
ECE helped me to understand the topics taught in Anatomy better
ECE helped me to retain the topics taught in Anatomy
ECE helped me correlate anatomy with the clinical cases/conditions
ECE helped me to understand the importance of learning Anatomy
ECE has made me more interested in Anatomy as a subject
ECE has played a role in helping me perform better in examinations
ECE should be incorporated in regular lectures in Anatomy for medical undergraduates
ECE should be incorporated in regular lectures for other subjects in first year
Mention any three good points about ECE as a teaching-learning method in Anatomy

Table 3: Questionnaire to assess the perception of first-year medical students towards ECE

is required to delineate relevant core content, frame essential learning objectives and plan teaching-learning activities systematically. [12] This can be achieved with adequate faculty sensitization and training. Coordination with clinical departments, getting clinical staff to conduct ECE sessions for first-year students and the availability of cooperative patients to interact are a few obstacles that the department organizing ECE sessions may also encounter.

A cross-sectional study, carried out by Ewnte B. and Yigzaw T., uncovered various obstacles to the effective implementation of ECE. The most frequently cited barrier, mentioned by 78.6% of medical students, was the demanding workload contributed by other learning activities involved in medical school. Other challenges included a weak collaboration between academic and healthcare institutions (59.5%) and insufficient guidance during the implementation process (35.7%). The academic staff acknowledged the value of ECE in acclimating students to the clinical environment, emphasizing the importance of staff commitment for successful implementation. Furthermore, the study revealed that the heavy workload, limited curriculum assessment dedicated to ECE, and inadequate staff orientation hindered program's implementation. [15]

Nevertheless, ECE is a valuable educational tool, allowing the first-year medical students to orient themselves to the clinical aspects of Anatomy. ECE can help students understand concepts and retain information better. If implemented correctly, ECE can serve as a great mode of imparting quality medical education.

CONCLUSION

The study participants appreciated the ECE sessions and believed that ECE is an interesting learning method compared to traditional lectures in Anatomy.

ECE is an effective method in helping students grasp clinical concepts of Anatomy, increase student engagement, help in the retention of topics taught and augment clinical reasoning abilities. Through this exposure, first-year medical undergraduates are provided with opportunities to observe and interact with patients. In this way, they gain a better understanding of the human body and the ways in which it can be affected by disease and injury.

It is essential for medical schools to prioritize and organize ECE sessions in the medical curriculum for undergraduates to ensure that their students are well-equipped to provide the best possible care for patients.

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