RESEARCH ARTICLE

# Perception of Indian medical students regarding introduction of early clinical exposure

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Abstract: The Medical Council of India (MCI) has stressed the necessity of Early Clinical Exposure (ECE) for a better understanding of preclinical medical subjects. However, its implementation at the medical college level in the current Indian scenario is a big challenge due to the large classroom strength and smaller number of faculty in preclinical subjects. The aim of this study to introduce ECE in physiology at our medical college, we planned an ECE session on anaemia and recorded the students' perceptions regarding the same. We conducted an ECE session on Anemia designed by the subject experts of the Physiology and Medical Education Unit (MEU) faculty of our institute. We conducted a cross-sectional survey among MBBS students of 2019 batch using a pre-validated questionnaire via online Google form to capture their perceptions regarding the ECE session. After exclusion, a total of 127 responses from medical students were included for data analysis. The majority of the students responded that the overall format of the ECE session was appropriate and that the session was helpful to them in the clinical application of their knowledge about Anemia. More than 75% of students opined that the ECE session made basic science learning more interesting and they felt motivated to read further on the topic. About 80% of students preferred ECE over traditional teaching. In conclusion, Students find ECE to be interesting, motivating, and helpful for the clinical application of basic science knowledge into clinical practice. Hence, ECE should be conducted more frequently and more topics should be taught by ECE at all medical colleges.

**Keywords**: anaemia; early clinical exposure; medical student; perception; physiology

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## Introduction

Early Clinical Exposure or ECE can be defined as “A teaching and learning methodology which fosters exposure of medical students to patients (actual human contact) as early as the first year of medical college, in a social or clinical context that enhances learning of health, illness or disease, and the role of the health professional” (Verma, 2016). Most medical educationists suggest that such ECE is valuable as it enhances the relevance of basic science subjects to clinical practice for the medical students (Ganguly et al., 2019; Savitha et al., 2018; Spencer et al., 2008).
ECE is active, experiential learning gained through contact with patients and clinicians, designed to be 'the beginning of a lifetime of patient-focused learning (Dehghan et al., 2017). Several studies have concluded that ECE is direct contact with people in a social environment (community/family) or clinical context that can improve teaching about health, illness and/or disease from health professionals. carried out at the beginning of education (Ewnte & Yigzaw, 2023). It has been implemented since the first year at the academic stage, where Students are exposed to clinical problems from an early age. The approach expressed will create a sense of self-confidence for students and they are expected to immediately integrate it with the knowledge they are studying (Govindarajan et al., 2018). Medical students would be exposed to patients and clinical environments in the first year of their course which will help them to acquire few basic clinical skills, communication skills, and understanding of humanities in addition to correlating the basic medical science concepts to clinical application (Velou & Ahila, 2020).

Important clinical skills for prospective doctors can be identified from the achievement of learning outcomes which are based on clinical and technical knowledge, physical examination, and solving medical problems (Ferreira-Padilla et al., 2015). In fact, most doctors believe that basic skills that cannot be learned require new educational methods to begin to develop based on training in those skills. Many medical schools worldwide have modified their curricula in preclinical subjects (Govindarajan et al., 2018; Velou & Ahila, 2020) and show the relevance of basic medical science subjects to clinical practice, to improve basic science knowledge retention, and to effectively correlate the basic and clinical science subjects (Akter & Khalid, 2019; D'Eon, 2006; Rawekar et al., 2016). The Medical Council of India in new educational reforms made ECE sessions compulsory from 2019 in the undergraduate medical curriculum (Tayade & Latti, 2021).

The Medical Council of India (MCI) for the undergraduate curriculum has also emphasized the necessity of ECE for better comprehension of medical subjects among students (Kalusopa et al., 2023). Although efforts at implementation of ECE in India have been done previously (Kalpana et al., 2011; Savitha et al., 2018) still there is a felt need to implement ECE more frequently and extensively.

Even though ECE is suggested to be implemented, its practical application at medical college level in the current Indian scenario is still a big challenge, due to large classroom strength of almost 150-200 students per MBBS batch, and relatively small number of trained faculty, especially in preclinical subjects. However, it is prudent that ECE implementation is not discouraged or diluted due to such hurdles. As an initial step to start ECE in physiology curriculum at our Medical College (class strength-200 students), we planned an ECE session on Anaemia. The objectives of this session were to jump start an ECE program which could be well integrated in the physiology teaching later on, and to record students' perceptions about the role of ECE in enhancing the comprehension of the theoretical concepts in Physiology and better recognition of the practical implications and applications of physiology in clinical practice.

The literature extensively supports the benefits of ECE. ECE plays a vital role in introducing individuals to the field of medicine, facilitating a seamless shift from being a layperson to becoming a student physician. It offers students the chance to imbue their studies with social significance, connecting their foundational scientific knowledge to real-world contexts. Additionally, ECE contributes to the acquisition of fundamental clinical skills, boosts student motivation, and fosters the development of professional conduct among students (Moir et al., 2018; Miglani & Arora, 2020; Littlewood et al., 2005; Tayade & Latti, 2021).

The primary goals of previous research endeavors were to encompass two key objectives. Firstly, to establish a comprehensive protocol that outlines the seamless integration of ECE into the undergraduate medical training curriculum. Secondly, to execute this protocol effectively by introducing ECE to first-year MBBS students and subsequently gauging their perceptions and feedback. This dual-pronged approach seeks to not only design a structured framework for ECE implementation but also to validate its suitability and relevance within the context of medical education. By assessing student reactions and viewpoints, these efforts aim to enhance the quality and efficacy of ECE experiences for aspiring medical professionals, ultimately contributing to a more robust and responsive medical training system (Gupta et al., 2017; Kane et al., 2021; Rawekar et al., 2016).

# Method

## Ethical aspects

Our study was approved by the institutional ethics committee of our medical college. Firstly, the students were explained in detail about the ECE session, and their informed consent was sought. As students are a vulnerable population, participation was made completely voluntary and no undue coercion or any form of advantage was given for participation. The principles of the declaration of Helsinki (World Medical Association, 2015; Kalusopa et al., 2023; Paul, 2019) and ethical guidelines for internet-mediated research (Kaye et al., 2021) were adhered to throughout the study.

## Study design and Sample size

We conducted an online cross-sectional survey among MBBS students' of 2019 batch who participated in the implementation of ECE module at our institute. All first year medical (MBBS) students (n=209) aged 18–20 years (n=200) and 21–25 years (n=9) were invited to participate in the study. Out of 209 students, 40 students did not give consent to participate in the study, 14 students were absent during the ECE session, and 28 students responded incompletely or incomprehensibly and hence were excluded from the study. Finally, responses from 127 students were included for data analysis.

## Methodology

The ECE session on anaemia was designed by the subject experts of Physiology with the help of Medical Education Unit (MEU) faculty of our institute. It was planned and implemented in such a way that it did

not hinder the routine physiology teaching and was concurrent with anaemia teaching in the theory classes. Table 1 gives the details of ECE session, timings and objectives.

Table 1. Details of the ECE session on anaemia

| | |
|---|---|
| **Objectives of the session** | At the end of the ECE session, first MBBS student shall be able to:<br>1. Describe the relevant physiology of RBC, haemoglobin and erythropoiesis.<br>2. Define anaemia.<br>3. Describe different types of anaemia.<br>4. Identify the clinical manifestation in anaemia.<br>5. Recollect the relevant history and examination points in a patient of anaemia.<br>6. Explain the physiological basis of clinical manifestation seen in anaemia.<br>7. Interpret the laboratory test done in anaemia.<br>8. Explain the physiological basis of management in case of iron deficiency anaemia and megaloblastic anaemia.<br>Counsel the patient of iron deficiency anaemia for the diet and medication. |
| **Setting** | Classroom |
| **Learning experience** | Total time (180 minutes) –<br>1. Introductory lecture using PowerPoint regarding relevant physiology of RBC, haemoglobin and erythropoiesis. (20 minutes)<br>2. Exposure to an audio-visual case discussion on anaemia showing laboratory findings and clinical examination of a patient of iron deficiency anaemia (60 minutes)<br>3. Writing the observation guide, Group discussion and interaction (30 minutes)<br>4. Summary and conclusion (10 minutes)<br>5. Reflection writing (30 minutes)<br>6. Assignment (20 minutes)<br>7. Feedback (10 minutes) |
| **Observation Guide given to students** | 1. Note down the important points of History which will be helpful to diagnose the case anaemia.<br>2. Observe the clinical examination carried out in the patient of anaemia.<br>3. Note down alterations in laboratory test.<br>4. Note down the important points in the management of anaemia.<br>5. Prepare a summary (History, Examination, Investigation, Treatment). |
| **Assignments given to students** | A. Prepare notes on Iron deficiency anaemia and Megaloblastic anaemia, definition of anaemia, causes, clinical features, investigation, management). – written<br>B. Give Physiological diagnosis in given cases. (which system is affected and which main function is altered) – viva-voce<br>C. Scenario based MCQ – online |
| **Reflection writing** | ▪ What happened? (What did you learn from this experience)<br>▪ So what? (What are the applications of this learning)<br>▪ What next? (What knowledge or skills you need to develop so that you can handle this type of situation?) |

The perception and feedback of students was collected by a pre-validated, semi-structured questionnaire consisting of 5-point qualitative Likert scale as well as open-ended questions. The questionnaire was prepared using online Google form and the link was circulated to all participants via WhatsApp group and email.

## Statistical Analysis

For data entry and statistical analysis, we used Microsoft Excel 2013®, and SPSS® (Statistical Package for Social Sciences) for Windows Inc. Version 21. Proportions were expressed as percentages (without decimals) while qualitative data were analyzed using thematic analysis.

# Results and Discussion

Majority of the students (76%) responded that adequate time and relevant Physiological aspects on anaemia were provided during introductory lecture by faculty. Majority (78%) thought that adequate time

and content of clinical case discussions was provided during the ECE session so that students can understand the physiological concepts of anaemia. Most students (about 72-79%) said that observation noting guide had appropriate format and adequate time was allotted for the same. Most (about 72-78%) students said that there was adequate interaction among the students and faculty during group discussion. Most students (about 72-80%) said that observation noting guide had appropriate format and adequate time was allotted for the same. Most students (about 72-79%) said that reflection writing and feedback had appropriate formats and adequate time was allotted for them. Majority of students (72%) responded that the overall format of the ECE session was appropriate and that the ECE session was helpful to them in clinical application of their knowledge about Anemia (65%). About 80% students preferred ECE over traditional teaching, can be observed in Table 2.

Table 2. Perception of students about ECE session.

| Question | Strongly agree | | Agree | | Neutral | | Disagree | | Strongly Disagree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % |
| Do you think that relevant Physiological aspects provided during introductory lecture were adequate? | 93 | 73 | 25 | 20 | 4 | 3 | 4 | 3 | 1 | 1 |
| Do you think that adequate time was allotted for introductory lecture? | 97 | 76 | 24 | 19 | 3 | 2 | 2 | 2 | 1 | 1 |
| Do you think that there was adequate content of clinical discussions to comprehend the physiological concepts of anaemia? | 96 | 76 | 22 | 17 | 6 | 5 | 0 | 0 | 3 | 2 |
| Do you think that adequate time was allotted for clinical discussion to comprehend the physiological concepts of anaemia? | 99 | 78 | 20 | 16 | 5 | 4 | 2 | 2 | 1 | 1 |
| Do you think that adequate time was allotted for writing observations? | 91 | 72 | 21 | 17 | 6 | 5 | 5 | 4 | 4 | 3 |
| Do you think that the format of observation noting guide was appropriate? | 100 | 79 | 23 | 18 | 2 | 2 | 1 | 1 | 1 | 1 |
| Do you think that there was adequate student-student interaction during group discussion session? | 99 | 78 | 23 | 18 | 5 | 4 | 0 | 0 | 0 | 0 |
| Do you think that there was adequate student-teacher interaction during group discussion session? | 92 | 72 | 21 | 17 | 7 | 6 | 5 | 4 | 2 | 2 |
| Do you think that the format of reflection writing was adequate? | 100 | 79 | 20 | 16 | 3 | 2 | 1 | 1 | 3 | 2 |
| Do you think that adequate time was allotted for writing reflections? | 101 | 80 | 23 | 18 | 0 | 0 | 1 | 1 | 2 | 2 |
| Do you think that adequate time was given for feedback? | 91 | 72 | 25 | 20 | 6 | 5 | 2 | 2 | 3 | 2 |
| Do you think that the overall format of the ECE session was appropriate? | 91 | 72 | 25 | 20 | 4 | 3 | 2 | 2 | 5 | 4 |
| Do you think that ECE session was helpful in clinical application of your knowledge about Anemia? | 82 | 65 | 35 | 28 | 5 | 4 | 3 | 2 | 2 | 2 |
| Do you prefer ECE over traditional teaching i.e. physiology lectures without ECE? | 102 | 80 | 24 | 19 | 5 | 4 | 0 | 0 | 0 | 0 |

More than 70% students said that the objectives of the session were largely met and they actively participated in the activity. More than 75% students opined that ECE session made basic science learning more interesting and they felt motivated to read further on the topic as a result of participating in ECE. More than 75% liked the audio-visual case discussion, group discussion and interactions, noting down the observations in observation guide, and reflection writing. Overall, most of the students (79%) enjoyed the ECE session, students' feedback is shown in Table 3.

Table 3. Students' feedback to ECE session.

| Question | Yes | | No | | Maybe | | Cannot say | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| Did you actively participate in ECE session? | 93 | 73 | 25 | 20 | 4 | 3 | 4 | 3 |
| Do you think that the Objectives of the ECE session were largely achieved? | 97 | 76 | 24 | 19 | 3 | 2 | 2 | 2 |
| Did the ECE module make learning basic science subjects more interesting? | 96 | 76 | 22 | 17 | 6 | 5 | 0 | 0 |
| Are you motivated to read further on this topic as a result of participating in ECE? | 99 | 78 | 20 | 16 | 5 | 4 | 2 | 2 |
| Did you like the audio-visual case discussion? | 91 | 72 | 21 | 17 | 6 | 5 | 5 | 4 |
| Did you enjoy the group discussion and interactions? | 100 | 79 | 23 | 18 | 2 | 2 | 1 | 1 |
| Did you like noting down the observations in observation guide? | 99 | 78 | 23 | 18 | 5 | 4 | 0 | 0 |
| Did you like reflection writing? | 92 | 72 | 21 | 17 | 7 | 6 | 5 | 4 |
| Overall, did you enjoy the ECE session? | 100 | 79 | 20 | 16 | 3 | 2 | 1 | 1 |

As compared to other components of the ECE session, majority students (70%) found the audio-visual case discussion on anaemia to be the most helpful component for better learning about anaemia, can be see in Table 4.

Table 4. Students' response to the question: Which component/s of the ECE session helped you the most to learn about anaemia?

| Component | Occurrence | % |
|---|---|---|
| Prior lecture and explanation by faculty | 12 | 10 |
| PowerPoint Slides | 8 | 7 |
| Audio-visual case discussion | 80 | 70 |
| Group Discussion | 4 | 3 |
| All components | 11 | 10 |

Most of the students (53%) found the ECE session to be adequate. Among the suggestions that students gave, opportunity for direct patient exposure, examination and communication with patient, ECE session to be conducted in hospital setting, and more students to be given chance to interact during group discussion, were some of the important ones, are shown in Table 5.

Table 5. Students' suggestions for improvement in ECE session (Thematic analysis).

| Suggestion | Occurrence | % |
|---|---|---|
| No suggestions (i.e. the session was appropriate) | 70 | 53 |
| Opportunity should be given for direct patient exposure, examination and communication with patient. | 24 | 18 |
| ECE session should be conducted in Hospital setting. | 12 | 9 |
| More students should be given chance to interact during group discussion. | 11 | 8 |
| ECE session should be conducted more frequently. | 5 | 4 |
| More topics should be taught by ECE. | 5 | 4 |
| More videos should be included in rather than theory lecture. | 5 | 4 |
| ECE session should be conducted in Community/PHC setting. | 3 | 2 |
| ECE session should be made more engaging. | 3 | 2 |
| ECE session should be conducted in the morning hours. | 1 | 1 |

As per the guidelines given by the Medical Council of India (MCI) (Paul, 2019), the ECE session on anaemia was implemented in our medical college for MBBS students of batch 2019. Since, this was the first of its kind implementation in our institute, we planned this cross-sectional survey to study the perception of medical students regarding this ECE session at our medical college.

The overall response rate was 65.13% (n=127, total 209 students-14 absent= 195 students). As participation was completely voluntary and this was first of its kind implementation at our institute, the students might be a bit skeptical about the ECE. Also, few students (n=14) remained absent on the day of session and some (n=28) gave incomplete or incomprehensible responses. Hence, we obtained less

than expected response rate.

The results of our study were encouraging with positive responses from most of the students. These findings support the possibility that the Introduction of Early Clinical Exposure in perception offered a creative method of providing clinical experiences. Providing early clinical exposure can enhance students' motivation and understanding of the role they will play in the future as a physician (AkbariRad et al., 2023). Specifically, the students indicated that the ECE session was interesting and motivating for them, and it enhanced their understanding of the theoretical concepts of physiology, and helped them appreciate the relevance of practical applications and thereby understand the purpose of learning the subject. It is worthwhile to note that majority (80%) students preferred ECE over traditional lectures. When medical education begins to shift to a new curricular model, it is necessary to increase competency to higher standards with benchmarks and results and to be more standardized In approach, it is important to understand and set goals for each stage of educational achievement (Govindarajan et al., 2018; Warkar & Asia, 2020).

Students seemed to have enjoyed audio-visual content the most. The topics chosen for ECE from the physiology curriculum, the video cases chosen, and the methodology of implementation seemed optimal and could be continued for future batches. An important outcome would be to know the impact of this ECE session on the level of comfort and attitudes of these students when they pursue their clinical postings in the next academic year. Regulatory bodies of medical education have spelled out clearly that medical education needs to be equipped to train professionals capable of providing holistic care to patients with compassion (Zamanzadeh et al., 2015). ECE and Integrated teaching-learning are two of the curricular reforms recommended by the MCI to be introduced in the first year of undergraduate medical studies to have a holistic approach (Husain & Khan, 2015; Lakshmi et al., 2016). A medical curriculum that has assimilated the health needs of the society as learning outcomes of the medical graduates is the Competency-Based Medical Education (Nathaniel et al., 2018; Velou & Ahila, 2020).

The students came up with many suggestions for improvement of the program such as conducting the ECE session in hospital/community settings providing an opportunity for direct patient exposure, and conducting ECE sessions for more topics and more frequently (Ingale et al., 2023; Tayade et al., 2021). All such suggestions will help improve the future implementation of ECE sessions.

In terms of generalizability of this ECE module, the relatively small number (127) of students was advantageous while introducing such a programme. teaching modules, clinical personnel interactions, and clinical resources available when students arrive for the ECE program (Kumar et al., 2023). However, this model needs further testing and refinement at other medical colleges (both government and private), with larger numbers of students, and in other medical subjects along with appropriate modifications and the leveraging of new technology and teaching methods. The google form that was used in this programme may not be generalizable to other colleges and could be replaced by an oral or written quiz (Bhargava et al., 2016; Simmenroth et al., 2023). A more judicious planning of time-frames, tailored to individual clinical department schedules can be implemented for ECE (Govindarajan et al., 2018).

An ongoing assessment, with multiple-choice questions, designed for each of the ECE, could be conducted after each session. One threat that may become obvious is that preclinical faculty may see this as an erosion of their own subject, or of clinical subjects taking over their importance. However, there is no such threat as effective student learning should be the primary concern of any medical college and it is a challenge for pre and para clinical faculty to stretch the limits of their comfort zones.

The research by Kumar et al., (2023) discusses the efficient implementation of ECE in undergraduate medical education, addressing the challenge of preclinical students failing to appreciate the clinical relevance of basic sciences. The authors draw from their institution's experience, which had previously run a program called "Clinical Observership," to successfully transition to ECE. Manual content analysis of student feedback revealed significant positive impacts, particularly in the affective domain of learning. The authors believe that their five years of experience can provide valuable insights for other institutions planning to implement ECE, as mandated by the National Medical Council.

In a related article by Mafinejad et al., (2016); Sathishkumar et al., (2007), the authors explore the value of ECE in teaching endocrine physiology to medical students. They introduce an ECE program alongside traditional lectures and find that students highly appreciate the ECE component. Feedback from students indicates that ECE increases their interest, understanding, and clinical context, with the majority rating the program as good to excellent. This suggests that ECE can be a valuable alternative approach to teaching basic science topics and holds potential for broader application in medical education.

Also, research findings indicate that early clinical exposure stands out as a critical educational tool for enhancing both attitude and professional skills within the present Indian medical education framework. This study underscores the positive impact of early clinical exposure as a valuable learning approach. The effectiveness of its implementation is influenced by factors such as educators' dedication to their roles, adequate preparation, and the curriculum's role in delivering clear learning objectives and relevant case studies for each session. On the flip side, challenges like a heavy workload and insufficient program

orientation may hinder the successful execution of early clinical exposure initiatives (Tayade et al., 2021; Ewnte & Yigzaw, 2023).

## Conclusion

ECE is an important element of undergraduate medical curriculum. Students find ECE to be interesting, motivating, and helpful for clinical application of basic science knowledge into clinical practice. Hence, ECE should be conducted more frequently and more topics should be taught by ECE at all medical colleges. We could survey a relatively smaller number of students. Similar study conducted on larger student sample and across different medical schools can give more detailed and reliable insights about students' perception of ECE. Due to feasibility issues, we could not conduct ECE session in hospital/community setting and could not provide direct patient exposure. Such clinical exposure if provided could give better perception of ECE. Also, we did not study the perception of faculty members involved in the program which could have given useful information on their perception and overall improvement of the ECE session. Hence, similar research is warranted in hospital/community setting and on a larger student and faculty population.

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## Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

## Author Contributions

**K. Vidja:** methodology. **J. Patel:** analysis. **J. Parmar:** writing original draft preparation. **P. Akhani:** review and editing.

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