



ASSIMILATION OF KNOWLEDGE AND PERCEPTION TOWARDS EARLY CLINICAL EXPOSURE IN 1ST YEAR MBBS STUDENTS.

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ABSTRACT

INTRODUCTION- Early clinical exposure (ECE) introduced in competency-based medical education by National Medical Commission (NMC) allows students to understand basic sciences from an applicative perspective. The ability to learn concepts with their future application will generate interest and provide greater retention and comprehension in the learner. Early exposure to patients and their families will have great impact on the professional growth of students. It also incorporates some aspects of social contexts of patient care into undergraduate teaching program.

OBJECTIVE- To assess learning of students after ECE session and collect the feedback from students and analyse their perception and attitude towards ECE session.

METHODOLOGY- A prospective experimental study was conducted in Department of Biochemistry, AIMS, Mohali to assess the learning of students after they attended ECE session. To collect data from students, the questionnaires consisting of multiple-choice questions from the topic of IEM (Inborn Errors of Metabolism) that was taught during this session (pre and post ECE session questionnaires) were shared to analyse students' learning. Another questionnaire was for feedback with five-point Likert scale to assess the students' perception and attitude toward ECE; along with two open ended questions. Satisfaction index (SI) was calculated to know the effectiveness of the session as number of participants who agree and strongly agree to the feedback questionnaire. The

Assimilation Of Knowledge And Perception Towards Early Clinical Exposure In 1st Year MBBS Students. quantitative data was analysed using paired student's t-test. The P-value less than 0.05 was considered as significant.

RESULT- A total of 88 students of MBBS first professional attended the session. The differences in marks of each student in pre and post-test were analysed. It was found that there was significant improvement in the performance of students in the test after attending ECE session. In the students' feedback questionnaire, 79.5% of the students agreed ECE correlated applied aspects of Biochemistry, 73.9% got motivated to learn the applied aspects, 69.3% found ECE an effective learning tool. ECE encouraged 68.2% students to participate more in such type of teaching methods and will help them in lifelong learning of the topics when integrated with applied aspects. **CONCLUSION-** For first-year medical students, the ECE program was presented as an alternate strategy to support didactic teaching in biochemistry. According to the study, it was worthwhile and students also enjoyed it. Other basic topics might also benefit from this approach. Conducting multi-institutional studies with larger and more diverse student populations would enhance the relevance of the findings. Longitudinal studies tracking students' academic performance, clinical skills, and professional development over multiple years would help determine the sustained benefits of ECE, particularly in areas like lifelong learning and patient care.

Keywords: Competency-based Medical Education, Early Clinical Exposure, Inborn errors of Metabolism.

INTRODUCTION

Early clinical exposure (ECE) is introduced in competency-based medical education by National Medical Commission (NMC). ECE is an educational approach where medical students are introduced to clinical settings and patient interactions early in their curriculum, typically in the first or second year. Unlike traditional medical education, which focuses heavily on theoretical learning in the initial years, ECE integrates clinical experiences with basic science learning to bridge the gap between theory and practice. Its component allows students to understand basic sciences from an applicative perspective. The ability to learn concepts with their future application will generate interest and provide greater retention and comprehension in the learner. Early exposure to patients and their families will have great impact on the professional growth of students. It also incorporates some aspects of social contexts of patient care into undergraduate teaching program⁽¹⁾.

It provides the stimulus and encouragement required for the learner to focus on the task ahead. It can be achieved in many ways such as hospital visits of first year students, interaction with patients and discussion on clinical cases in classes, etc.⁽²⁾. Improvement in the understanding of students of various competencies by introducing ECE can lead to the better learning experiences for both students as well as teachers. Also, it can minimise the line of demarcation between basic and clinical specialities⁽³⁾.

AIMS AND OBJECTIVES

- To assess learning of students after ECE session.
- To collect the feedback from students and analyse their perception and attitude towards ECE session.

REVIEW OF LITERATURE

The negative aspects of the traditional system of medical education, especially in basic subjects, have been addressed in a plethora of previous studies. The lack of motivation amongst the undergraduates towards the medical education has been grossly noticed and this leads to compromised learning and ultimately, health care services get deteriorated. Moreover, due to the stress to finish the vast syllabus, the incidences of depression and suicidal ideation have also been witnessed for years. The lack of interest in basic subjects of the initial two years can be considered as one of the causative factors^(4,5). That is why, new competency-based curriculum focuses on developing interactive teaching-learning methods to make the medical education interesting. These include foundation course, small group

discussions, hospital visits, problem-based learning, case-based learning and planned integrated sessions related to communication skills ⁽⁶⁾.

According to various studies, the students who attended early clinical exposure session were significantly more satisfied than those who did not attend ⁽⁷⁾. The main focus of ECE is to introduce material in the first phase that has clinical relevance as it improves learning skills of medical students and fosters professional development, including the cultivation of effective communication skills. In several studies, newer methods like ECE, small group teaching, problem-based learning, case-based learning, jigsaw activity or puzzle activity supplement the traditional methods such as didactic lectures, textbook-based learning, and laboratory demonstrations, thereby improving the performance of students in subjects during the initial phases of the curriculum.

Sathish Kumar et al. (2007) reported that ECE session in endocrine physiology was valuable and students enjoyed the experience ⁽⁸⁾. The similar results were found during ECE session in respiratory physiology by Das P et al, ⁽⁹⁾. Although, according to some authors, it is more time consuming and requires a lot more effort than the conventional teaching for the faculty yet for the students, it helps in relieving the stress that students face while dealing with patients during their initial days in the hospital wards. Moreover, it develops the talent of clinical reasoning in students which later on helps in treating the patients. Hence, ultimate outcome will be the advantage to medical graduates, public and economy ^(10,11).

The choice of clinically important topics for delivering ECE sessions will be appropriate to make the sessions more impactful and students will understand the value of studying biochemistry in medicine. This is an evolving subject where students learn biochemical reactions, enzymes and related diseases. It has been observed that teacher-centered didactic lectures are difficult to be retained and understanding the concepts and applications of biochemistry by exclusively this method are not possible. Hence, the students tend to develop a lack of interest in the classroom, an inability to understand the significance of biochemistry in health, and inefficiency in applying the knowledge of the subject in clinical settings. This limits student's thinking, often restricting it to intense competition, which is not very beneficial for them or society in the long run ⁽¹²⁾. This indicates the urgent need for reforms in the old curriculum, including better alignment across various phases of the course ⁽¹³⁾.

METHODOLOGY

A prospective experimental study was conducted in Department of Biochemistry, AIMS, Mohali. The permission was granted by the Institutional Research Committee, , AIMS, Mohali (AIMS/IRC-study22/2023) and Institutional Ethics Committee- Human Research, AIMS, Mohali (No. AIMS/IEC-HR/2024/28). A convenience sample population of the first phase students, who were enrolled in undergraduate medical course, were included in the study after obtaining informed consent from them. We assessed the learning of students after they attended ECE session.

The clinical topic 'Inborn Errors of Metabolism' was discussed during the ECE, as sharing real experiences with students in the form of clinical scenarios can make learning and understanding more impactful and interesting. This topic had not been covered in theory class before to know the impact of ECE in understanding the novel topic. The faculty directly involved in patient care participated in the study. In this way, the aim of conducting the ECE in an integrated manner was also achieved. Multiple-choice questionnaires on the topic of IEM, which was taught during this session, were shared (pre- and post-ECE session questionnaires) to analyze student's learning. Another questionnaire of feedback questions on a five-point Likert scale to assess student's perceptions and attitudes toward the ECE, along with two open-ended questions: (A) What were the positive aspects of the ECE session? (B) What changes would you suggest to improve the ECE session? (Table 1). Hence, this study involved following steps:

- Collection of Pre-session Questionnaire Data in Google Form (10 minutes)
- Delivery of ECE Session (60 minutes)
- Collection of Post-session Questionnaire Data in Google Form (10 minutes)
- Collection of Feedback Questionnaire Data in Google Form (10 minutes)

• Analysis of data

Statistical Analysis: In the collected data, pre- and post-ECE scores (quantitative data) was analysed using paired student's t-test. The P-value less than 0.05 was considered as significant. The perception and attitude of students towards ECE session was analysed using satisfaction index (SI) that was calculated as number of participants who agreed and strongly agreed to the feedback questionnaire.

RESULT

A total of 88 MBBS first-year students attended the session. The protocol included a brief introduction to IEM, its classification, examples, biochemical and clinical features, diagnostic tests performed, and management. The students were also exposed to various case scenarios of phenylketonuria, homocystinuria, alkaptonuria, etc., and were asked to deduce the provisional diagnosis. In the end, the efficacy gained by the students regarding IEM before and after the ECE session was evaluated through a questionnaire. The results are presented as the percentage of correct responses in the pre- and post-session tests (Table 1, Fig. 1).

It was found that there was an improvement in the students' performance in the test after attending the ECE session. The differences in marks between each student's pre- and post-test were analyzed. The P-value was less than 0.05, indicating that the difference was significant. Students' perceptions of the effectiveness of the program were gathered through a questionnaire (Table 2).

In the students' feedback questionnaire, 79.5% of students agreed that the ECE correlated with the applied aspects of Biochemistry, 73.9% felt motivated to learn the applied aspects, and 69.3% found the ECE to be an effective learning tool. ECE encouraged 68.2% of students to participate more in such types of teaching methods, which they believed would help them with lifelong learning when integrated with applied aspects. Additionally, 63.6% of students agreed that the ECE created interest in the topic. The students were asked for open ended questions:

1. Tell the good things about ECE session.

2. Suggest any changes to improve ECE session.

Some comments by students are mentioned in the table 3.

Table 1: Percentage of correct responses in pre and post ECE session test

Question	Pre- test		Post-test	
	Correct response (88)	Percentage	Correct response (88)	Percentage
1	73	82.9	88	100.0
2	15	17.0	69	78.4
3	64	72.7	82	93.2
4	49	55.7	85	96.6
5	49	55.7	84	95.5
6	73	83.0	87	98.9
7	44	50.0	78	88.6
8	22	25.0	77	87.5
9	58	65.9	82	93.2
10	76	86.4	88	100.0

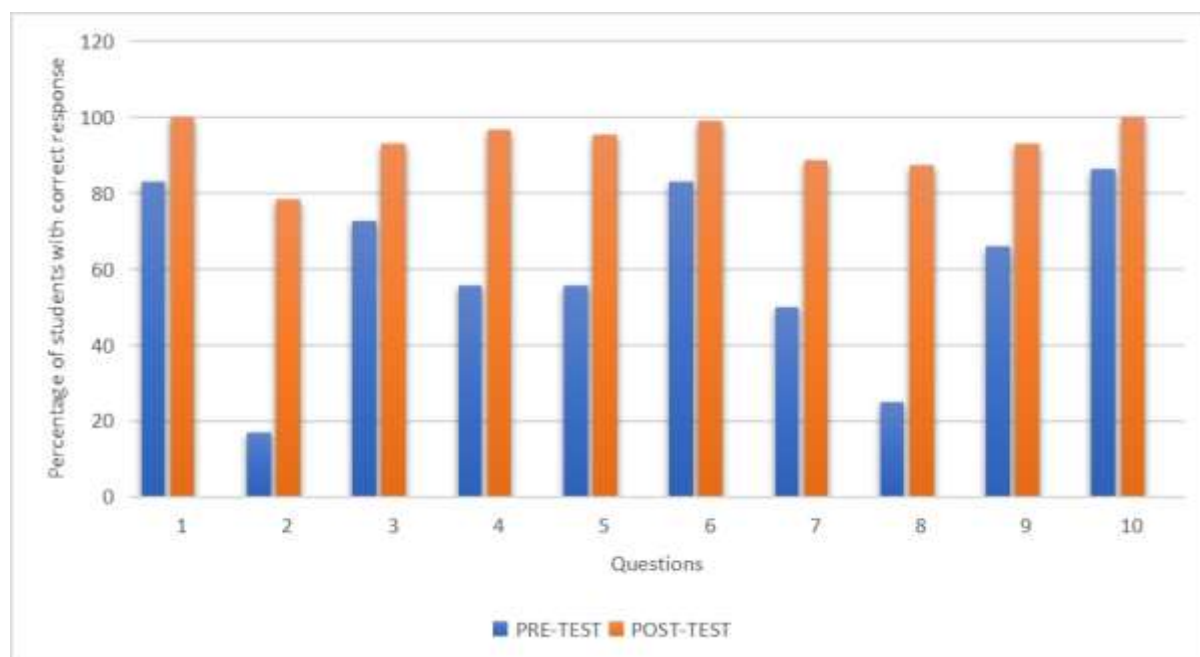


Fig 1: Correct responses in pre and post ECE session test

Table 2: Student's perception with 5 point likert scale in percent

Questions	No. of Students	Percentage
ECE created interest in the topic	56	63.66
ECE motivated me to learn the applied aspects	65	73.9
ECE is an effective learning tool	61	69.3
ECE increased my attention in the class	40	45.5
ECE was more useful in providing relevant subject material	49	55.7
ECE ensured proper utilization of resources (i.e. Clinical Cases)	59	67
ECE will cause better retention of topic than lecture classes	47	53.4
ECE will help me in better recalling of the topic	51	58
ECE motivated me to study the topic in depth	52	59.1
ECE correlated applied aspects of Biochemistry	70	79.5
ECE enabled me to understand the importance of Biochemistry	64	72.7
ECE should be used regularly in Biochemistry	49	55.7
ECE encouraged me to participate more in such type of teaching methods	51	58
ECE will help me in lifelong learning of the topics when integrated with applied aspects	60	68.2
ECE should be used regularly in other subjects of first phase	60	68.2

Table 3: Open-ended questions with students' comments

Open ended questions	Students' comments
Tell the good things about ECE session	• Today's session was on inborn error of metabolism. It was highly informative and add on my knowledge about applied concept. • Good thing was that mam even showed the video how the child presented which helps to understand the things better. • ECE session let's us relate things in reality rather than just knowing things from books and accepting it as it is.
Suggest any changes to improve ECE session.	• The session should be more clinically with more images and videos

DISCUSSION

Several studies support the beneficial effects of ECE program on students' learning. The ECE in medical education is helpful because it aids the students in applying basic science knowledge in clinical problem-solving⁽¹⁴⁾. The findings are consistent with and build upon existing research on the benefits of ECE in medical education. For example, the study by Dahle et al., emphasizes the value of vertical integration, where basic sciences and clinical medicine are taught in tandem to enhance the understanding of foundational principles⁽¹⁵⁾. The current study's results reinforce this, as the significant improvement in test scores suggests that integrating IEM-related biochemical concepts with clinical case scenarios helped students better retain and apply their knowledge.

Similarly, the 63.6% of students in this study who reported increased interest in IEM due to the ECE session corroborate this, highlighting the motivational impact of early clinical exposure. Additionally, the study by Dyrbye et al., underscores the importance of faculty-student interactions for professional development⁽¹⁶⁾. The ECE session's structure, which likely involved discussions with clinical faculty during case scenarios, provided students with opportunities to engage with experts, fostering both knowledge acquisition and professional growth. The study also aligns with Abramovitch et al.'s findings, which suggest that students participating in ECE programs report higher satisfaction compared to those who do not⁽¹⁷⁾. The high percentages of students in this study who found the ECE effective (69.3%) and motivating (73.9%) reflect a similar trend of increased satisfaction. The findings resonate with Duque et al.'s (2003) study, which reported that medical students exposed to ECE found their medical education topics more engaging⁽¹⁸⁾. Furthermore, the Iranian study, describing students' first clinical experiences as "enlightening and fruitful" mirrors the positive feedback from this study's participants, particularly regarding the motivational and practical aspects of the ECE session⁽¹⁹⁾.

CONCLUSION

For first-year medical students, the ECE program was presented as an alternative strategy to support didactic teaching in biochemistry. According to the study, it was worthwhile, and the students also enjoyed it. Other basic topics might also benefit from this approach. Despite the promising findings of this study, several limitations must be acknowledged. The study was conducted at a single institution with a relatively small sample size of 88 first-year MBBS students, which may limit the generalisability of the results to other medical schools with different faculty expertise, or student demographics. The study lacked a control group of students who did not participate in the ECE session, making it challenging to attribute the observed improvements in test performance solely to the ECE intervention, as other factors, such as prior exposure to IEM concepts or student motivation, may have contributed. The pre- and post-session assessments relied on a questionnaire evaluating knowledge acquisition, which may not fully capture the development of higher-order skills, such as clinical reasoning or patient communication, that ECE aims to foster.

Future research should aim to overcome these limitations to strengthen the evidence supporting ECE programs. Conducting multi-institutional studies with larger and more diverse student populations would enhance the relevance of the findings. Including a control group exposed to traditional didactic teaching methods would allow for a more robust comparison of ECE's effectiveness. Longitudinal studies tracking students' academic performance, clinical skills, and professional development over multiple years would help determine the sustained benefits of ECE, particularly in areas like lifelong learning and patient care.

Keywords: Competency-based Medical Education, Early Clinical Exposure, Inborn errors of metabolism.

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