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AN AMALGAMATION OF TIME TESTED TEACHING AND RECENT CASE BASED LEARNING (EARLY CLINICAL EXPOSURE (ECE) IN HUMAN BIOCHEMISTRY-COMPETENCY BASED APPROACH IN MEDICAL CURRICULUM

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Abstract

Aim: The objective of the study was to incorporate time based and case study based learning in biochemistry in medical training.

Methods: The protocol for Early clinical exposure (ECE) in biochemistry was designed after approval from institutional ethical committee. The questionnaire was prepared and validated from faculties and students. The protocol was distributed to 191 1st- year MBBS students and then collected and analyzed.

Results: The data collected from students revealed that the ECE session was enjoyable, effective and satisfactory with improvement in attention, knowledge, information, motivation and retention. It was requested by the students that this teaching methods should also be implemented in other subjects for first year course.

Conclusions: The ECE protocol was satisfactory by the students and it can be implemented for professional courses. It can be helpful in improving the knowledge and understanding of clinical subject.

*Keywords**:** Teaching, clinical practice, questionnaire, lectures, MBBS*

Introduction

Medical biochemistry is a complex but ever evolving subject, where students get aware and understand biochemical reactions, various pathways, enzymes and regulations in clinical context [1]. However, the didactic lectures in biochemistry make it very difficult to the student to retain the knowledge and applications of study contents in practice [2]. Its like a container-dispenser type of teacher-centered teaching. Thus, only few students are attentive in the classrooms even they are unable to understand the relevance of biochemistry in clinical practice. Unfortunately, due to old method of teaching having long classroom hours and minimal laboratory teaching with less clinical exposure arises an urgent call for revising the present curriculum of teaching [3].

Medical Council on India (MCI) has developed new competency-based curriculum with an objective to train and prepare students with universal standards through curricular reforms [4]. Early clinical exposure (ECE) with integrated teaching may develop correct attitude and communication skills. ECE is based on focusing to clinical aspect for particular subject including patient handling and doctor-patient communication at the very first year [5]. This new policy will help in improving all three domains i.e. affective, cognitive and psychomotor for a medical student that is the need of present education system for transforming a medical undergraduate to a physician in the community. The research is going to explore the impact of ECE in present education system among medical student and trying to make teaching effective from traditional theoretical pattern. ECE helps in improving performance of fresh medical students, relieving their stress related to study, producing good learning outcomes and developing good clinical reasonings [6]. Thus, incorporation of ECE to present education policy may improve the outcome and benefit to the students, society and economy.

Methods

Data collection and analysis

The study was observational, perspective and questionnaire-based study conducted in department of biochemistry, Government medical college Aurangabad during July 2019 to July 2020. The protocol of the study was approved by institution ethical committee. It was designed after discussion with the faculties, Government medical college Aurangabad during July 2019 to July 2020. This protocol was validated after peer-review and feedback questionnaire for students and faculties were validated by experts.

The first year students of MBBS were informed about ECE and after their consent 191 students were participated in the study. ECE session was on biochemical profile of antioxidant enzymes in the body based on laboratory reports, pictures, videos, and case studies delivered to students in the batches of 100-91 in the department of biochemistry. The session was followed by collecting feedback questionnaire from students at last. Feedback was also collected from the faculties involved [2]. The students were divided into two groups i.e. case based study group and conventional didactic lecture group. The test containing MCQs with one best answer was conducted for both the groups. The test score was recorded for both groups.

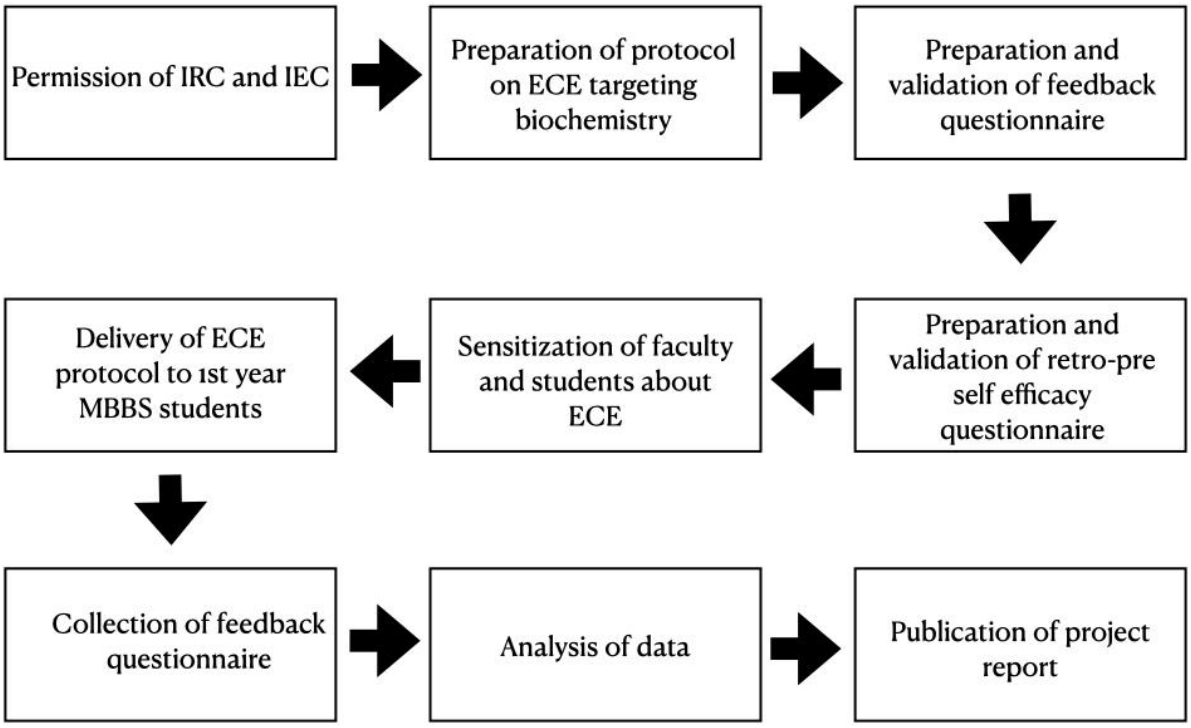

Figure 1 shows the flowchart for adopted methodology.

Figure 1 Flowchart of methodology

Student's feedback

The feedback questionnaire was composed of three types of questions: 1) Five-point Likert scale questions for assessing students perception about the session and to check efficacy of students about biochemistry of antioxidant enzymes before and after the ECE session 2) Open-ended questions for assessing the good things about ECE 3) Open-ended questions regarding any suggestion from students to be added the ECE session [7].

Faculties feedback

Feedback from the faculties was collected informally at the last of the session for administrative and logistics purposes. Formal feedback questionnaire was collected from faculties comprising three types of questions: 1) Five-point Likert scale questions for assessing faculties perception about the session 2) Open-ended questions for assessing the good things about ECE 3) Open-ended questions regarding any suggestion from faculties to be added the ECE session.

Statistical analysis

Date was represented as mean ± SD. Statistical analysis was performed using GraphPad Prism software version 8.01. One-way ANOVA with Tukey's post hoc multiple comparison tests was applied for comparison of all the post test results of case based learning and conventional didactic lecture. The p value of <0.05 was considered to be statistically significant.

Results

Out of 200 participants 191 students gave questionnaire including six faculty members from the biochemistry department of the college. Additionally, two core committee members were also participated in the program. The program features were biochemical analysis of antioxidant enzymes, their role and significance in living beings and its correlation as defensive agents different diseases. The students were exposed of several case studies related to biochemical profile of diseased patients. The validated questionnaires were collected from the students and faculties about the effectiveness of the program at the end of the ECE session. However, retro-preself-efficacy questionnaire was used to evaluate efficacy of the students before and after the session.

Results showed that 65% students were strongly agree with clinical implication of basic biochemistry in medicine. 51% students strongly agree that they learnt new method of learning, 47% student were strongly agree to felt proud to be a doctor after the session, 58% students were strongly agree to learnt about the duties of doctor and their importance human life, 49% students were strongly agree that ECE program encouraged them to think about the problems of health care and incorporation of new skills, 39% students were strongly agree the program increased their interest towards the subject and topic taught, 60% students strongly agree that the prepared module was organized and comfortable with teaching technique, 54% students strongly agree that the session let them know about other departments of the hospital and made them familiar with the medicine, 58% students were strongly agree that the program accompanied with early clinical exposure to medical students, and 68% students were strongly agree that ECE session was integrated with effective teaching than a didactic lecture in biochemistry class (Table 1).

Table 2 shows pre- and post-test score and comparison between case based learning and conventional didactic lecture. Results exhibited that case based learning showed significant ($P<0.05$) score and thus, revealed improvement in learning.

Interestingly, faculties feedback questionnaire, 100% of the faculties strongly agreed that ECE session was well explained and clear. Faculty strongly agreed (SI 73.2) that the session on biochemistry was stimulating and thus, helped in understanding of the topic. Faculty strongly agreed that session increased attention in students (SI 89.33) in comparison to earlier conventional lecture. The response of the students was enthusiastic (SI 92.34). However few faculties were disagreed that the session was time consuming (SI 45.23) and added extra burden in routine

schedule (SI 32.45). However, (SI 94.33) faculties agreed that the ECE should be included in the present curriculum and implemented in the routine basis (Figure 1).

Table 1 Students perception to assess vertical integrated teaching session questions with five-point Likert scale (n=191)

Student's perception	Strongly agree	Agree	Neutral	Disagree	Strongly agree
ECE session enabled me to relate with basic biochemistry with clinical implications in medicine in better way	65	109	12	3	2
ECE is an important learning method introduce in new curriculum	51	128	8	2	2
Made me feel proud to be a doctor; my dream to walk into the hospital as a doctor made true	47	126	17	1	0
ECE helps "Learn duties of doctor and importance of human life	58	99	28	4	2
ECE encourage students to think about the problems of health care and incorporation of new skills	49	110	30	2	0
ECE increased my interest towards the subject and topic taught. It will be easy to revise the chapter	39	113	35	2	2
ECE module was organized and comfortable with teaching technique	60	102	22	5	2
ECE made me to know other departments of the hospital and familiar with medicine	54	121	12	3	1
Early clinical exposure to new curriculum	58	120	12	1	0
ECE as integrated teaching was more effective that a didactic lecture in biochemistry class	68	108	12	3	0

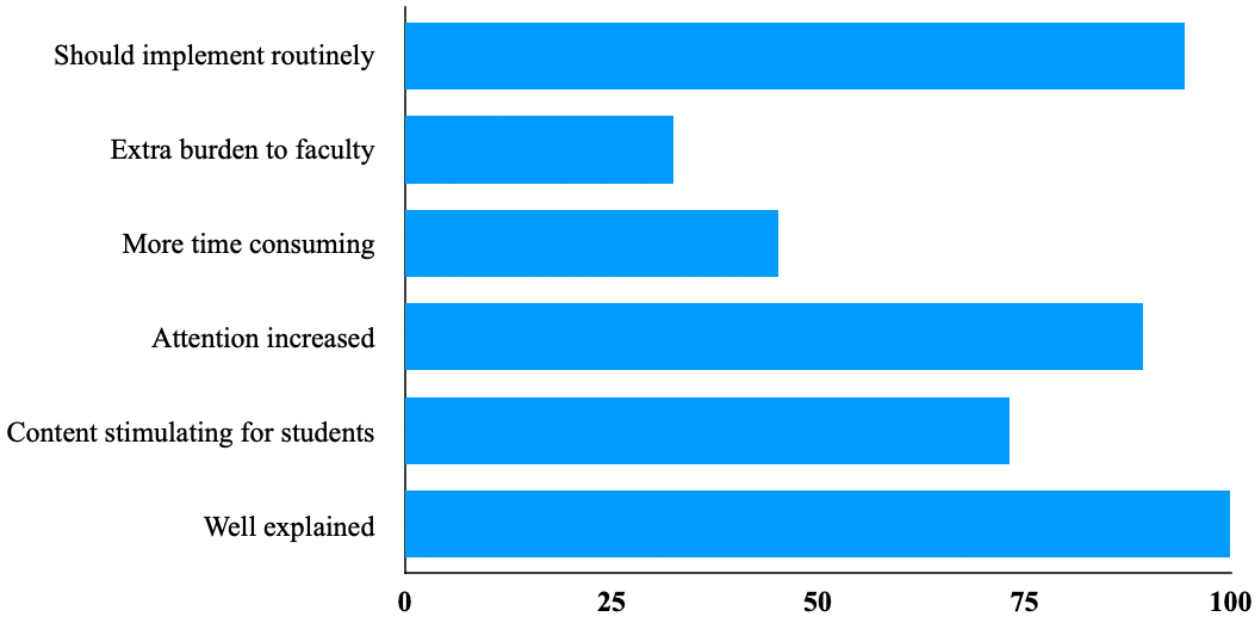

Figure 1 Satisfaction index (SI) of faculties attended ECE session

Table - 2 Pre- and post test score and comparison between case based learning and conventional didactic lecture

Teaching method	Pre test score	Post test score	P value	Significance
Didactic lecture	9.39 ± 1.23	13.23 ± 1.29	<0.0.5	Not significant
Case based learning	9.74 ± 1.40	14.59 ± 1.84	<0.0.5	Significant

Discussion

Didactic lectures are boredom due to unidirectional, teacher-centered and less interactive. The students get passive transmission knowledge and not actively participated in this mode of teaching [8]. Additionally, the students are finding earlier years very tough, ineffectual and dreary. They are unable to understand the basic clinical approach in the studies. This mode of teaching learning pattern have been creating gap between the clinical and pre-clinical years. Therefore, MCI has implement the present scenario by adding clinical approach in conventional medical education [9]. ECE is one of the greatest reform for improving present medical education by focusing on clinical skills, communication and professionalism [4].

ECE works on shifting philosophy from “pedagogy” to “andragogy”. This learning-teaching method fosters students to clinics, patients or patient’s relevant materials in their year of medical college. ECE helps in enhancing the learning of health, illness or disease. It allows high order of thinking and cognitive domain. ECE is a kind of learning enable for medical students to interpret clinical findings of applied biochemistry [10]. Thus, students can correlate their knowledge with laboratory reports and patient’s history that help in understanding of disease and importance of basic science in clinical practice. Students confidence gets boosted and they are motivated for self-directed learning that results in increasing their ability for solving problem.

In our study, we conducted an ECE session for first year medical students on topic related to biochemistry with the help of video clips, case scenarios and laboratory reports. Most of the listeners including students and faculties were finding the session very helpful, effective, satisfactory, and enjoyable as compared to conventional didactic lectures. The students were strongly agreed that ECE session is the need of the present education system. This findings are supported by the work of Rawekar et al., 2016 they also seeking a good feedback about ECE session. Our study is consistent with results reported by Kumar et al., 2007. In their study also, students got motivated towards biochemistry, improved confidence and correlation with clinical

aspect. Thus, addition of ECE in present curriculum will enable students for better understanding of scientific knowledge and principles of clinical medicine.

Conclusion

In the present study, this ECE-targeting biochemistry with a validated protocol was delivered for the very first time in the department of biochemistry. Curriculum innovation in the form of ECE was perceived as a good effort in the field of medical teaching, good intervention, relevance of biochemistry in clinical setup, efforts in implementing and designing the session were applauded and well perceived by the students. Case based learning was effective in encouraging students to take charge of their own learning and learn to work in a group.

Declaration

The authors declared no conflict of interest.

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