

Comparative Study of Outcome of the Teaching Methods for Early Clinical Exposure in 1st Professional MBBS Students: Ward Side Patient Demonstration Method *vs* Video and Dummy Patient Demonstration Method

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Background: Early clinical exposure (ECE) is a newer concept of teaching-learning methodology that provides clinical perspective and relevance to learning of basic sciences. ECE also orients toward actual clinical scenarios and helps medical students to correlate their theoretical knowledge with real-life situations right from the first year of medical college.

Aims and Objectives: This study aimed to compare the outcome of teaching methods for ECE in 1st professional MBBS students and to assess the effect and efficiency in their performance.

Materials and Methods: This prospective comparative study was carried out with a sample population of 50 students of MBBS 1st Prof. 2021 batch who were selected by random allocation method and divided into two groups of 25 students each, one acting as the bedside ECE group and other as Virtual ECE group. Pre-training evaluation was performed at the beginning of the study and post-training evaluation was performed after three months. The student's feedback was taken regarding advantages, disadvantages, and suggestions for further improvement.

Results: A statistically significant difference was observed between the Bedside ECE and Virtual ECE group at post-training in theory ($t = 15.682, p < 0.001$), practical ($t = 12.671, p < 0.001$) and total ($t = 17.460, p < 0.001$) marks of the students after 3 months training. The mean scores of participants were significantly improved in the Bedside ECE group (39.92 ± 3.23) as compared to the virtual ECE group (23.04 ± 3.60). Analysis of students' feedback revealed that Bedside ECE was found to be a more interesting method of teaching as compared to virtual methods and helped to develop empathy towards the patients as well as motivated them to read more about the topic and helped in retention.

Conclusion: Direct contact with patients has been seen to play a crucial role in the development of clinical reasoning, communication skills and professional attitudes. The concept of Bedside Early Clinical Exposure goes a long way in helping young minds grasp clinical and theoretical concepts better by involving all domains of learning.

Introduction

Early Clinical Exposure (ECE) was mandated by the National Medical Council in 2019 as a part of Competency-based Medical Education for Indian medical graduates as a type of vertical integration between basic sciences and clinical subjects.^{1,2} It is a methodology, that exposes the medical students to patients as early as the first year of medical college and eventually makes them academically strong, increases confidence and improves their clinical skills.^{3,4}

In ECE students can play four types of roles; as passive observer, active observer, actor in rehearsal and actor in performance.⁵⁻⁷ According to the University of Vanderbilt's Center for Teaching, a learning style is how we "gather, sift through, interpret, organize, come to conclusions about, and 'store' information for further use." It's an individual's natural preference for acquiring and processing new information.⁸

There are three primary types of learning styles, as defined by Neil Fleming: visual, auditory, and kinesthetic. Some may prefer visual aids like charts, while others will learn better through listening (auditory) or doing things

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physically (kinesthetic). Most people learn best through one or two of these methods, but there are ways to use all three learning styles to your advantage. There is also the read/write aspect of learning, which completes Fleming's VARK method.⁹

Auditory learning is a type of learning used when people use verbal communication to understand something better. Auditory learners typically enjoy gathering information through things like; podcasts, lectures, audio books, conversations/discussions, etc. Visual learning is when people use diagrams, color-coordination, pictures, and other visual elements to understand something better. Visual learners enjoy reading textbooks or attending lectures where the material is presented on slides (including charts/graphs). Kinesthetic learning is a type of learning used when people use their physical senses (touch, movement, and feeling) to understand something better. These learners enjoy hands-on activities, experiments, practical exercises, and role-playing.⁹

When the students get bored, their focus drops, and they are less likely to remember what they have learned. So finding new and exciting ways to learn will keep them engaged while helping them stay on track. For years medical students have spent their first year in classrooms and laboratories and learnt theoretical knowledge without contact with the patient in a clinical context. Moreover, in clinical fields they cannot recall important basic science concepts; therefore, parts of their academic education become impractical. ECE act as a bridge between pre-clinical disciplines and clinical disciplines.⁶

Irrespective of what form of ECE is chosen it provides a "spiral integrated model," i.e., a consistently graduated clinical and preclinical exposure throughout the time a student is in the medical college.⁶ Incorporating Kolb's Learning Theory in ECE promotes active learning through self-reflection and participating in case discussions. Direct involvement of students in learning processes develops their ability to possess and use analytical skills to conceptualize experience and to utilize their decision-making skills when presented with cases during their clinical practice as suggested by Lisco and O'Dell.¹⁰

There have been few studies to compare the effect of different teaching methods of early clinical exposure on the performance of students. This study aims to do this.

Research question

Will Bedside Early Clinical Exposure improve the performance of 1st Prof. medical students more than Virtual Early Clinical Exposure?

Research hypothesis

Bedside Early Clinical Exposure is a better teaching method than Virtual Early Clinical Exposure.

Aims and Objectives

- To compare the outcome of teaching methods for Early Clinical Exposure in 1st professional MBBS students (Bedside vs. virtual)
- To assess effect and efficiency of rational methods of Early Clinical Exposure in their performance.

Materials and Methods

This prospective comparative study was done by joint collaboration of the Department of Physiology and the Department of Medicine at RD Gardi Medical College, Ujjain, Madhya Pradesh. It was carried out in the classrooms as well as clinical wards. The study was undertaken after obtaining permission from the Institutional Ethics Committee (IEC Ref No-101/2021) and written consent from the participants.

Sample Size

- Random selected 25 students of 1st Prof MBBS as Bedside ECE group
- Random selected 25 students of same batch of 1st Prof MBBS as the virtual ECE group

Inclusion Criteria

- MBBS 1st prof Students as Bedside ECE and Virtual ECE group
- Both genders
- Age between 18 to 20 years
- Providing written informed consent

Exclusion Criteria

Declining consent for study

Methodology

The study population consisted of the MBBS 1st Prof. (2021 batch) of 150 students. A sample population of 50 students was selected by random allocation method. Out of the selected 50 participants, two groups of 25 students each were formed, who gave voluntary informed consent for the study, one acting as a bedside ECE group and the other as a virtual ECE group (Table 1).

- Pre-training evaluation for theory and practical was performed
- Bedside ECE groups were provided with classes aimed for early clinical exposure in the clinical wards with actual patients.
- Virtual ECE groups were provided with classroom teaching enhanced by video and dummy patients.

- For both these 2 batches equal duration of classes, with 5 topics appropriately distributed to 15 hours in total teaching, having a weekly class of one and a half hours every week in the Department of Physiology and Medicine.
- After three months post training evaluation for theory and practical was performed.
- After a sensitization program for Reflection writing, the student's feedback was taken regarding advantages, disadvantages and suggestions for further improvement.

Topics proposed

Some of the ECE modules as proposed by the National Medical Council were taken viz:¹¹

- General Examination
- Acute MI with special attention on Basics of ECG interpretation
- Post myocardial infarction counseling
- Clinical examination of abdomen with special reference to chronic alcoholic liver disease with ascites

Observations and Results

The present study included 50 students of 1st prof. MBBS, both male (34) and female (16).

A statistically significant difference was observed between the Bedside ECE and Virtual ECE group at post-training in theory (t = 15.682, p < 0.001), practical (t = 12.671, p < 0.001) and total (t = 17.460, p < 0.001) marks of the students after 3 months training; whereas no significant difference was observed at pre-training in theory, practical and total marks between the Bedside ECE and the virtual ECE group (Table 2).

Table 1: Reflection writing: Student's feedback on ECE

| | |
|--|-------|
| Please tick (✓) the most appropriate option. | |
| 1) ECE is an interesting method of teaching compared to traditional lectures | |
| 2) ECE motivates me to read more about the topic | |
| 3) ECE boosts my confidence | |
| 4) ECE helps in retention of topic | |
| 5) ECE helps to develop Empathy towards the patient | |
| 6) ECE helps in correlating the topic with clinical case | |
| 7) ECE helps to understand the importance of topic | |
| 8) ECE helps to increase attention | |
| <hr/> | |
| 1) Write one Advantage of ECE | |
| <hr/> | |
| 2) Write one disadvantage of ECE | |
| <hr/> | |
| 3) Give one Suggestion for further improvement | |

Table 2: Comparison of mean scores between Bedside ECE and the Virtual ECE group

| | Bedside ECE group (Max Marks 30) Mean ± SD | Virtual ECE group (Max Marks 30) Mean ± SD | t | p-Value |
|-------------------------|---|---|--------|---------|
| Pre-training Theory | 6.64 ± 2.22 | 5.88 ± 1.54 | 1.410 | 0.165 |
| Pre-training Practical | 9.40 ± 1.94 | 9.76 ± 1.79 | -0.683 | 0.498 |
| Pre-training Total | 16.04 ± 4.08 | 15.64 ± 3.12 | 0.390 | 0.699 |
| Post training Theory | 19.12 ± 2.28 | 9.36 ± 2.12 | 15.682 | 0.000** |
| Post training Practical | 20.80 ± 1.50 | 13.68 ± 2.38 | 12.671 | 0.000** |
| Post training Total | 39.92 ± 3.23 | 23.04 ± 3.60 | 17.460 | 0.000** |

**p-value < 0.001 was considered as highly significant

Table 3: Pair wise comparison of mean scores in the Bedside ECE group

| Pairs | Bedside ECE group (Mean ± SD) | t | p-value |
|--------|-------------------------------|--------------|-----------------|
| Pair 1 | Pre-training Theory | 6.64 ± 2.22 | -19.805 0.000** |
| | Post training Theory | 19.12 ± 2.28 | |
| Pair 2 | Pre-training Practical | 9.40 ± 1.94 | -21.292 0.000** |
| | Post training Practical | 20.80 ± 1.50 | |
| Pair 3 | Pre-training Total | 16.04 ± 4.08 | -22.162 0.000** |
| | Post training Total | 39.92 ± 3.23 | |

**p-value < 0.001 was considered as highly significant

Table 4: Pair-wise comparison of mean scores in the Virtual ECE group

| Pairs | Virtual ECE group (Mean ± SD) | t | p-value |
|--------|-------------------------------|--------------|-----------------|
| Pair 1 | Pre-training Theory | 5.88 ± 1.54 | -9.763 0.000** |
| | Post training Theory | 9.36 ± 2.12 | |
| Pair 2 | Pre-training Practical | 9.76 ± 1.79 | -9.610 0.000** |
| | Post training Practical | 13.68 ± 2.38 | |
| Pair 3 | Pre-training Total | 15.64 ± 3.12 | -13.363 0.000** |
| | Post training Total | 23.04 ± 3.60 | |

**p-value < 0.001 was considered as highly significant

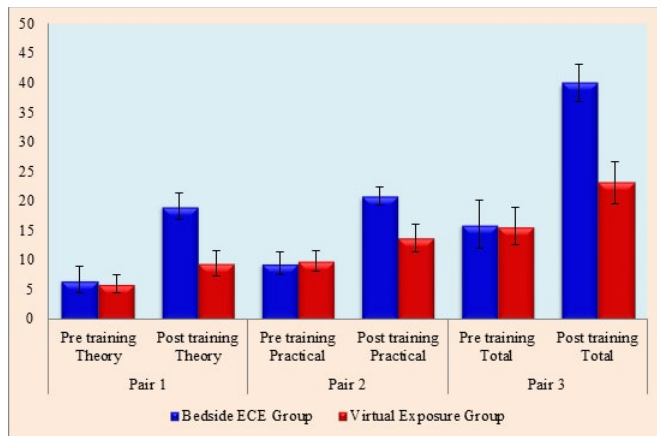


Figure 1: Pair-wise comparison of mean scores in the bedside ECE and the virtual exposure group

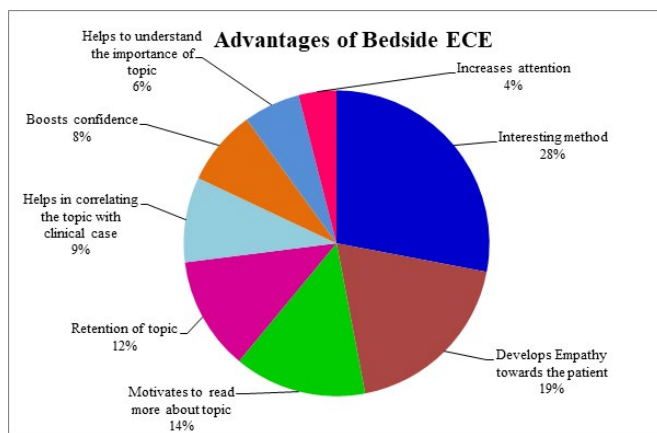


Figure 2: Students' Feedback on Bedside ECE: Advantages

The mean scores of participants after three months post-clinical exposure were significantly improved ($p < 0.001$) in the Bedside ECE group from 6.64 ± 2.22 to 19.12 ± 2.28 in theory, 9.40 ± 1.94 to 20.80 ± 1.50 in practical and 16.04 ± 4.08 to 39.92 ± 3.23 in total (Table 3, and Figure 1).

The mean scores of participants after three months of audio-visual teaching was significantly improved ($p < 0.001$) in the Virtual ECE group from 5.88 ± 1.54 to 9.36 ± 2.12 in theory, 9.76 ± 1.79 to 13.68 ± 2.38 in practical and 15.64 ± 3.12 to 23.04 ± 3.60 in total (Table 4, Figure 1).

Discussion

A statistically significant difference was observed between the Bedside ECE and Virtual ECE groups at post-training in theory, practical and total marks of the students after 3 months of training. The mean scores of participants were significantly improved more in the bedside ECE group indicating widening of their cognitive domain.

In numerous studies, Bedside ECE has been suggested to motivate medical students to develop better insight.⁷

Kar M *et al.* (2017) compared conventional lectures in Neuroanatomy with Ward side demonstration of upper motor neuron and lower motor neuron paralysis patients and reported that the performance of the students significantly improved after Bedside ECE reflecting that it is important to increase their interest in Neuroanatomy.¹²

Another study conducted by Sirsikar *et al.* (2021) showed that the students who were exposed to Bedside ECE benefited more than the traditional learning control group. The student's perceptions were also found more positive towards Bedside ECE than the traditional teaching method.¹³

Analysis of students' feedback (Figure 2) revealed that most students found Bedside ECE to be a more interesting method of teaching as compared to traditional lectures and helped to develop empathy towards the patients. Many students reported that it motivated them to read more about the topic and helped in retention. Having time constraint was a major disadvantage of the study. Regarding suggestions for further improvement, most students wanted Bedside ECE to be implemented in all subjects. Many students also suggested that its time duration and frequency should be increased.

Miglani *et al.* (2020) in a study on Bedside ECE assessed students' feedback which consisted of both open and closed-ended questions reported that most students appreciated the synchronization of classroom knowledge of neurophysiology with clinical exposure and helped them to develop a better understanding of concepts. Most students appreciated the experience as 'inspiring', 'motivating', 'interesting' and 'good way of learning'. They felt it helped them see the relevance of basic science in clinical practice and evoked self-interest.¹⁴

Kumari R and Choudhury N (2021) in a similar study assessed the feedback of students after conducting Bedside ECE on Chronic Kidney Diseases and reported that it was very helpful in building clinical correlation and making the subject interesting.¹⁵ The findings of the present research are in accordance with the study conducted by Chari *et al.* (2015), in which the students were positive about Bedside ECE and were full of enthusiasm.¹⁶ Increased motivation of the students with ECE was also seen in the study conducted by Baheti *et al.* (2015).¹⁷ Tayade *et al.* (2014) reported statistically significant differences in the knowledge, skills and attitude of first-year M.B.B.S students between ECE and Non-ECE group.⁷

Direct contact with patients has been seen to play a crucial role in the development of clinical reasoning, communication skills and professional attitudes. It makes teaching more student-centric than teacher-centric.

Since ECE has been mandated since 2019 only, we do not have any studies in the Indian context that report its longitudinal impact.

Conclusion

The present study therefore revealed that the concept of Bedside Early Clinical Exposure goes long way in helping young minds grasp clinical and theoretical concepts better by involving all domains of learning. More studies in this area are needed to ascertain its importance and to incorporate the changes in policymaking.

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