

RESEARCH LETTER

Bridging early clinical exposure in basic science with clinical years to reinforce medical education

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Medical education in India is currently undergoing a significant transformation. There is a need to align it with international standards, improve healthcare outcomes, and address challenges like the imbalance between patient and doctor ratios [1]. Historic reforms like Flexner Report and Hopkins Circle laid the groundwork for medical education [2,3]. However, quality of education and patient care has since declined [4]. To address this, the Medical Council of India, under Vision 2015, introduced early clinical exposure (ECE) as a foundational component of competency based medical education. This initiative was further institutionalised by the National Medical Commission in 2019 [5,6]. Although the strategy by the National Medical Commission regarding ECE is clear, concerns still remain among the teaching community regarding its implementation and effectiveness in achieving desired goals. Consequently, there is a lack of clarity and acceptance of this teaching-learning methodology in medical education.

ECE is a student-centric teaching-learning method that encourages medical students to bridge the gap between theoretical and clinical knowledge by exposure to actual patients/ human exposure as early as the first year of MBBS [7]. It facilitates cognitive, psychomotor, and affective domain development [8]. This study aims to assess the effectiveness of ECE in enhancing the knowledge and attitude of first year MBBS students. It will increase the confidence of students and faculty members to implement and utilise ECE in their curriculum.

The quasi-experimental study was conducted at a tertiary care teaching hospital after obtaining ethical clearance and written informed consent. A total of

244 first year professional MBBS students were randomly divided into two groups: A and B. Group A participants underwent ECE sessions on Parkinson's disease, which included video clippings, case scenarios, and clinical inputs from a neurologist. A teacher-centered didactic lecture was given to Group B students on the same topic by a neurologist. Both groups underwent pre-and post-tests with validated case-based MCQs administered via Google Forms to assess the knowledge domain. Additionally, a five-point Likert scale-based questionnaire was used to evaluate student perceptions and attitudes towards teaching methodologies. In the subsequent week, roles of both groups were reversed for the second clinical topic, cerebellar disorders, to ensure equal exposure. Data were analysed using SPSS version 28. Paired and independent *t* test were conducted, and *P* < 0.05 was considered statistically significant.

Knowledge level of post-test scores showed statistically significant improvement in the ECE group compared to the traditional teaching group for both topics (*P* < 0.001). For cerebellar disorders, the mean (standard deviation) post-test score of the ECE group was 6.4 (1.4), compared to 2.8 (1.0) in the traditional group. Similarly, for Parkinson's disease, the mean (standard deviation) post-test score of the ECE group was 6.0 (1.3), compared to 1.9 (0.7) in the traditional group (Table 1). Feedback from students revealed overwhelmingly positive responses as 92% felt confident in handling clinical cases, 93% reported increased motivation to study basic sciences, 95% found ECE helpful for recalling theoretical knowledge, 84% felt reduced anxiety in clinical assessments, and 92% reported a better understanding of disease physiology.

Key messages

Early clinical exposure improved recall, understanding, and clinical application compared to traditional teaching methods. It was also a more acceptable teaching method by the students. Early clinical exposure is an effective teaching strategy that should be integrated across institutions to strengthen foundational learning and foster competent, patient-centered medical professionals.

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Table 1 Knowledge pre and post-test scores of two teaching methods (n=122)

Topic	Teaching method	Pre-test score	Post-test score	Difference (post minus pre-test scores)	P
Cerebellar disorder	Traditional teaching	1.2 (0.9)	2.8 (1.0)	1.6	<0.001
	ECE	1.2 (0.9)	6.4 (1.4)	5.2	<0.001
Parkinson's disease	Traditional teaching	1.2 (0.9)	1.9 (0.7)	0.7	<0.001
	ECE	1.2 (0.9)	6.0 (1.3)	4.8	<0.001

ECE indicates early clinical exposure. All values expressed as mean (standard deviation)

Traditional didactic lectures in medical education often lack clinical relevance, leading to fragmented learning experience. In contrast, the present study demonstrated that ECE significantly enhances post-test knowledge compared to pre-test levels. This aligns with Kolb's theory, where learners cycle through observation, reflection, conceptualisation, and application. Thus, it fosters deeper insight and real-life application, enhances higher-order thinking and bridges the gap between theory and clinical practices. It motivates student to learn standardized skills to examine and communicate with a patient in a professional manner. Our findings indicate that ECE significantly improved knowledge comprehension, clinical reasoning, recall, and student motivation. Findings are consistent with previous studies by Tayade and Warkar [9], which reported enhanced learning outcomes and student satisfaction with ECE [10,11]. Exposure to clinical cases created an opportunity to make the theoretical classes interesting and understand concepts of knowledge for more extended periods and enhanced higher-order thinking within the students.

ECE, the teaching-learning methodology introduced by National Medical Commission in 2019 as an essential component of the medical curriculum, improved the relevance and understanding of basic science concepts. ECE ensured a student's patient-centric and behavioural attitude towards the patient and facilitated clinical skill development, confidence, and competence in communicating with the patient in future clinical classes. To optimise ECE effectiveness faculty members should focus on improving case presentation and discussion methods to ensure clarity and student engagement. This study will encourage other institutions willingness to adopt this new teaching-learning method for the betterment of students.

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Author contributions

Conception or design of the work; or the acquisition, analysis, or interpretation of data for the work: ED, DM, SSM, MB, TM. *Drafting the work or reviewing it critically for important intellectual content:* ED, DM, SSM, MB, TM. *Final approval of the version to be published:* ED, DM, SSM, MB, TM.

Accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved: ED, DM, SSM, MB, TM.

Conflict of interest

We do not have any conflict of interest.

Data availability statement

We confirm that the data supporting the findings of the study will be shared upon reasonable request.

Supplementary file

None

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