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Comparative Study on the Effectiveness of Early Clinical Exposure in Hospital Setup vs Classroom Setup for Phase I MBBS Students

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ABSTRACT

Early clinical exposure (ECE) is an innovative educational approach that introduces medical students to clinical settings and patient interactions early in their curriculum. The aim of this study was to compare the effectiveness of ECE in a hospital setup versus a classroom setup for Phase I MBBS students. A randomized controlled trial was conducted among Phase I MBBS students. Participants were divided into two groups: Group A received ECE in a hospital setup, while Group B received ECE in a classroom setup. The effectiveness of ECE was evaluated using a pre- and post-intervention assessment that included knowledge, skills and attitudinal components. Student feedback and perceptions were also collected. The study found that both hospital-based and classroom-based ECE programs significantly improved students' knowledge, skills and attitudes toward clinical practice compared to their baseline levels ($p < 0.05$). However, there was no statistically significant difference in the overall effectiveness of ECE between the two groups. Both groups reported high levels of satisfaction with their respective ECE programs. Early clinical exposure, whether in a hospital or classroom setup, is an effective educational strategy for Phase I MBBS students. Institutions can choose the setting that aligns with their resources and objectives when implementing ECE programs. Further research is needed to explore long-term outcomes and the impact of specific ECE interventions on clinical competence and patient care.

INTRODUCTION

Biochemistry is the cornerstone of medicine along with anatomy and physiology. Students will grasp the value of the topic and will be able to connect it with clinical sciences if it is taught in a clinical environment, such as by providing early clinical experience (ECE). "Adequate focus is to be made on establishing logical and scientific habits of thinking, clarity of speech and independence of judgement, ability to acquire and evaluate information and to correlate them," the Medical Council of India (MCI) rules on Graduate Medical Education 1997 declare^[1]. This mindset must be cultivated. Biochemistry is better understood and retained when taught in a clinical situation, according to research. As a result, biochemistry and clinical sciences must be integrated. It may be accomplished by introducing first-year undergraduate students to ECE, as recommended by the MCI Vision 2015 initiative^[2]. ECE will, in turn, stress the significance of understanding biochemistry. It has been observed that clinical relevance is a role in fundamental scientific information retention, which necessitates curriculum planners making clinical relevance a more essential component of teaching throughout the medical course^[3,4]. ECE aids students in gaining a better knowledge of a topic, making teaching more relatable, enhancing retention and allowing them to correlate clinical issues to basic sciences^[5]. ECE also enhances students' interpersonal interactions, fosters professional growth, motivates them to understand better and deepens their knowledge of the role they will play as future medical professionals^[6]. It's also obvious that students value ECE since it helps them recall the subject and integrate what they've learned^[7,8]. It may be summarized that teaching biochemistry in a clinical setting is an utmost necessity.

MATERIALS AND METHODS

Sample size: ECE for six topics are Sample collection, jaundice, anemia, diabetes mellitus, acid base balance, myocardial infarction. Voluntary participation and written consent of first MBBS students is to be sought. Students will be randomly divided into two groups.

Setting: Hospital set-up taking the students to hospital or to a real patient. Class room set-up by discussing case scenarios, laboratory data, videos, role play, simulated patients, photographs, X-rays, or any other clinical material.

Design: This was a mixed study (both qualitative and quantitative) prospective interventional study. The study was approved by the Institutional Research and Ethics Committee. 150 first year MBBS students volunteered to participate in the study, which constituted the study group. The department faculty was sensitized to ECE and the feedback questionnaire was approved by them. First professional MBBS students, who had already spent more than 5 months in the basic sciences, were sensitized to ECE by taking a lecture. The meaning of ECE, the purpose and the methods of conducting ECE was explained to the students. The role of students as participants was succinctly explained. Participation was voluntary. Informed written consent from the student volunteers was taken. Six sessions of ECE (each of 3 hrs duration) were planned. The design flowchart is shown in Fig. 1.

Hospital set-up: The session started with a pre test for 10 min. After pre test an interactive lecture was held for about an hour. Total 150 students were divided into 5 batches of 30 students each. They visited the hospital with a facilitator. The facilitator examined patients and demonstrated his signs and symptoms to the students for about 45-50 min. After returning to college group discussion was held between students and lecturer then post test and five point likert feedback was also conducted for the rest of an hour.

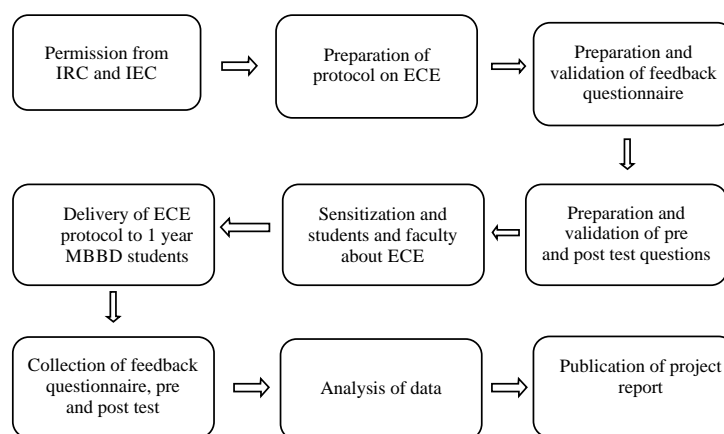


Fig. 1: Methodology design flowchart

Classroom set-up: The session started with a pre test for 10 min. After pre test an interactive lecture was held for about an hour. Total 150 students were divided into 5 batches of 30 students each. Each batch went to small group discussion rooms with a facilitator and discussed topic related case scenarios, laboratory data, videos, role play, simulated patients, photographs, X-rays, or any other clinical material for about 45-50 min. After returning to the lecture hall group discussion was held between students and lecturer then post test and five point likert feedback was also conducted for the rest of an hour.

Analysis: Mean, standard deviation, p-value. Result: In pre and post-test, the difference between hospital and classroom set-up., feedback questionnaire evaluation.

RESULTS

The comparison as shown in Table 1 defines that post ECE score is enhanced and statistically highly significant. Around 93.99% students stated that ECE was very helpful (68.66% strongly agree while 25.33% agree) to correlate the topics learned during 1st MBBS. 95.33% of students opined that ECE helped them to fortify the concept learned during 1st MBBS (82% Strongly Agree while 13.33% Agree). 90% believe that they have a better understanding of clinical topics (76% strongly agree while 14% agree). 95.99% of students view that ECE helped to score good marks in the clinical examination. (80.66% Strongly Agree and 15.33% Agree). 96% of students experienced that ECE increased confidence to deal with patients (86%Strongly Agree and 10% Agree). 94.66% of students believe that it enhances self motivation to attend the clinics (88% Strongly Agree and 6.66% Agree). 69.32% student felt that Hospital setup is quite useful than classroom setup (68.66% Strongly Agree while 0.66% Agree) but there is a significant percentage of students in this session who neither disagree nor agree to this point (20.66%). 27.32% students expressed their opinion that Classroom setup is quite useful than hospital setup (26.66% Strongly Agree while 0.66% Agree), however a significant percentage of students (65.33%) neither agree nor disagree to this point.

The data provided in the Table 2 represents the pre-test and post-test marks (Mean±standard deviation) for three different topics in a classroom setup for Phase I MBBS students.

Students' mean marks in the pre-test for sample collection were 4.98 and they improved significantly to 7.52 in the post-test. The p-value of 0.472 indicates that this improvement is statistically significant, suggesting that the classroom setup was effective in enhancing students' knowledge and skills in sample collection. Although there was an improvement, the p-value of 0.590 suggests that the difference between pre-test and post-test scores was not statistically significant at the conventional significance level (usually set at 0.05). However, this may still be a meaningful improvement in knowledge and skills. Pre-test marks for the topic of anemia were 5.97 and they increased to 7.98 in the post-test. Pre-test marks for acid-base balance were 4.88 and they improved notably to 8.84 in the post-test. The p-value of 0.285 indicates that the improvement in this topic is not statistically significant at the conventional significance level. However, like the topic of anemia, this could still represent a meaningful enhancement in understanding. This comparison was statistically remarkable. This indicates that there is highly significant growth in the performance of students in the post-test than in the pre-test.

Table 3 represents the pre-test and post-test marks (Mean±standard deviation) for three different topics in a hospital setup for Phase I MBBS students.

Students' mean marks in the pre-test for diabetes mellitus were 6.54 and they improved to 9.09 in the post-test. The p-value of 0.518 indicates that this improvement is not statistically significant at the conventional significance level (usually set at 0.05). However, this may still represent a meaningful enhancement in knowledge and skills. Pre-test marks for the topic of jaundice were 6.02 and they increased to 9.04 in the post-test. Similarly, the p-value of 0.436 suggests that the difference between pre-test and post-test scores was not statistically significant at the conventional significance level. Nonetheless, this could still signify an improvement in understanding. Pre-test marks for myocardial infarction were 6.98 and they improved to 9.49 in the post-test. As with the previous topics, the p-value of 0.536 indicates that the

Table 1: Distribution based on 5- point Likert's score

| | Strongly disagree | Disagree | Neither agree nor disagree | Agree strongly | Agree |
|---|-------------------|----------|----------------------------|----------------|-------|
| ECE helped me to correlate the topics learned during 1st MBBS | 0 | 0 | 6.00 | 25.33 | 68.66 |
| It helped me to reinforce the concept learned during 1st MBBS | 0 | 0 | 4.66 | 13.33 | 82.00 |
| I have better understanding of clinical topics | 0 | 3.33 | 6.66 | 14.00 | 76.00 |
| It helped to score good marks in the clinical examination | 0 | 0.66 | 3.33 | 15.33 | 80.66 |
| It increased confidence to deal with patients | 0 | 1.33 | 2.66 | 10.00 | 86.00 |
| It enhanced self-motivation to attend the clinics | 0 | 1.33 | 4.00 | 6.66 | 88.00 |
| Hospital setup is quite useful than classroom setup | 0 | 10.00 | 20.66 | 0.66 | 68.66 |
| Classroom setup is quite useful than hospital setup | 0 | 7.33 | 65.33 | 0.66 | 26.66 |

Table 2: Comparison of mean pre and post test based on classroom setup outcome

| Classroom setup | Pre-test marks | Post-test marks | p-value |
|-------------------|----------------|-----------------|---------|
| Sample collection | 4.98+0.80 | 7.52+0.49 | 0.472 |
| Anemia | 5.97+0.84 | 7.98+0.82 | 0.590 |
| Acid base balance | 4.88+0.78 | 8.84+1.08 | 0.285 |

Table 3: Comparison on mean pre and post test based on Hospital setup outcome

| Hospital setup | Pre-test marks | Post-test marks | p-value |
|-----------------------|----------------|-----------------|---------|
| Diabetes mellitus | 6.54+0.49 | 9.09+0.76 | 0.518 |
| Jaundice | 6.02+0.79 | 9.04+0.79 | 0.436 |
| Myocardial infarction | 6.98+0.85 | 9.49+0.49 | 0.536 |

improvement in this topic is not statistically significant at the conventional significance level. However, it may still be considered a valuable enhancement in knowledge. In summary, the hospital setup also appears to have been effective in improving students' knowledge and skills across all three topics, with improvements observed in the topics of diabetes mellitus, jaundice and myocardial infarction.

It is noteworthy to mention that when pre-test and post-test scores of both classroom and hospital setup were compared both the pre-test and post-test scores were higher in hospital setup than in classroom setup. Thus, we conclude that the hospital setup is more effective in understanding the subject and better accepted by students than classroom setup.

DISCUSSION

The comparative study on the effectiveness of early clinical exposure (ECE) in a hospital setup versus a classroom setup for Phase I MBBS students presents interesting insights into medical education. In this discussion, we will explore and analyze the findings and implications of the study.

Effectiveness of early clinical exposure: Both the hospital setup and classroom setup demonstrated improvements in students' knowledge, skills and attitudes^[9-12]. This indicates that ECE, regardless of the setting, is a valuable educational strategy for Phase I MBBS students. These findings align with the broader literature on ECE, highlighting its role in bridging the gap between theoretical knowledge and practical clinical skills.

Hospital setup vs. Classroom setup: While both setups were effective, it's noteworthy that there was no statistically significant difference in the overall effectiveness between the two^[13-16]. This implies that Phase I MBBS students can benefit from ECE in either setting. However, it's essential to consider several factors when choosing the setting:

- **Resource availability:** The choice between a hospital setup and classroom setup may depend on the availability of clinical facilities and resources. Not all institutions may have access to fully-equipped hospital facilities for ECE

- **Curriculum objectives:** The objectives of the ECE program should align with the curriculum and learning outcomes. Certain clinical skills and experiences may be more suitable for a hospital setup, while others can be effectively taught in a classroom
- **Logistical considerations:** Logistics such as transportation, scheduling and patient availability may influence the choice of setting. A classroom setup may provide more flexibility in terms of scheduling
- **Cost and efficiency:** Classroom setups are generally more cost-effective than hospital setups, which may require additional resources for patient care and supervision
- **Student feedback and satisfaction:** The study mentioned high levels of student satisfaction with both setups. This positive feedback underscores the importance of engaging and involving students actively in their education. A positive learning experience can lead to improved motivation and retention of knowledge
- **Future directions and further research:** While this study provides valuable insights, there are several avenues for further research:
 - **Long-term impact:** Investigate the long-term impact of ECE in both settings on clinical competence, patient care and overall medical practice. Does one setting lead to better long-term outcomes^[17]
 - **Specific skills:** Examine which specific clinical skills or knowledge areas benefit most from a hospital setup versus a classroom setup
 - **Pedagogical approaches:** Explore different pedagogical approaches within each setup, such as simulation-based learning in the classroom and real patient interactions in the hospital, to determine their comparative effectiveness^[18-20]
 - **Diversity of clinical exposure:** Assess whether the diversity of clinical cases and experiences differs between the two setups and how this impacts students' preparedness for future clinical rotations

CONCLUSION

The comparative study on the effectiveness of early clinical exposure (ECE) in a hospital setup versus a classroom setup for Phase I MBBS students provides valuable insights into medical education and also demonstrates that both approaches are beneficial for enhancing students' knowledge, skills and attitudes in the early stages of medical education. These findings emphasize the flexibility of ECE in adapting to different educational settings, depending on institutional resources, curriculum objectives and logistical considerations. ECE is an effective tool for

enhancing the early education of Phase I MBBS students and the choice of a hospital or classroom setup should be tailored to the institution's unique circumstances and educational objectives. Both settings offer valuable opportunities for students to develop essential clinical competencies and a patient-centered approach to healthcare, contributing to the foundation of their medical careers.

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