Bedside Teaching with Case-Based Discussions and Flipped Classroom in Undergraduate Medical Students

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ABSTRACT

OBJECTIVE: The study's objective is to look into the impact of combining case-based learning and bedside teaching on motivation, critical analysis, and cognitive development in final-year MBBS students.

METHODOLOGY: The participants of this longitudinal study were final-year medical students placed in a surgery unit for clinical rotations. The research was conducted on 52 students who were placed between August and October 2022. Earlier, an MCQ-based pretest was performed at the start of the rotation. For one hour, students were taught the contents using a case-based learning method, which was shared through flipped classroom before the session, and then they were shown relevant clinical examinations on the bedside. The skills related to the case were performed in front of the teacher by the students, which was then followed by the post-test and questionnaire.

RESULTS: This strategy was deemed motivating by 91% of students. It enhanced critical thinking according to 82% of students. 70% of students improved their pre-test and post-test scores by more than 40%.

CONCLUSION: Integration of case-based learning with bedside clinic was correlated with increased motivation of final-year MBBS students and the enhancement of critical thinking skills in students.

KEY WORDS: Integration, case-based teaching, bedside teaching, surgery

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INTRODUCTION

From traditional large-class lecture formats to bedside teaching, medical education is evolving. In the past few years, new teaching and learning strategies have been tested [1]. Arranging bedside teaching sessions for undergraduate students has remained a foundation of medical education because it transmits knowledge, promotes an appropriate attitude, and can be administered effectively to teach clinical skills [2]. Bedside teaching takes a substantial amount of time (approximately 3 hours per day), but unfortunately, bedside teaching is entirely dependent on the teacher's talent and expertise [3,4]. Inappropriate comments, inadequate preparation, a lack of student participation, fewer patients in the ward, and an alarming number of students can all have an impact on clinical teaching quality [5]. In addition, due to a lack of training, the bedside sessions are becoming challenging for junior faculty members.

Case-based learning (CBL) is a recent teaching method introduced in medical colleges. CBL entails preparing students for clinical practice by utilizing real-life clinical scenarios and may be useful for undergraduate students to grasp real-life problems, with the purpose of the Medical Council of Pakistan being to produce medical graduates who are locally and globally aware and relevant and who are prepared to see actual patients [6]. CBL provides benefits such as employing collaborative learning, promoting learning integration, improving students' intrinsic and extrinsic determination to learn, and incorporating knowledge and skill [7]. This strategy appears to help undergraduate medical students build critical thinking skills and improve their talents [8].

In education, motivation is the technique by which targeted activity is initiated and teachers can successfully engage the students-[1-2]. It can be either intrinsic motivation or extrinsic motivation'(3). The self-determination theory proposes that

motivation can be intrinsic, which entails learning out of real interest and for one's own happiness[4]. Studying for money, or compliance with external regulations are examples of extrinsic motivation. Hence, the students can gain knowledge from the integration of various instructional methods [5,6].

According to Kulkarni et al., the expert's approach to diagnosis differs from that of the student[6]. To ensure that the students fully comprehend the subject, it is crucial for them to first view the big picture. Because of this, sending students for case studies and bedside discussions alone sometimes does not result in such a useful learning because the students are unaware of the numerous examination options and techniques that they should be familiar with and have used before'. This can be a limitation of bedside instruction as it is currently practiced. The purpose was to provide a complete and realistic picture initially before doing bedside instruction[8,6]. In consideration of this, a study was conducted to evaluate the impact of combining in-bed instruction with case-based learning among undergraduate students.

The objective of this study is to examine the effect of case based and bedside integrated teaching on final year MBBS students' cognition, critical thinking and motivation.

METHODOLOGY

This quantitative longitudinal study was conducted in University College of medicine and dentistry, the group of participants consisted of 52 final-year MBBS undergraduate students (52% males and 48% females) through convenient sampling who were allocated for surgery clerkship in the surgery ward between August and October 2022.

Seven case-based, clinically relevant scenarios on important aspects of surgery were constructed. The scenarios were peer reviewed and modified by two associate professors of surgery; pre-test and post-test MCQs were constructed and evaluated by the associate professors of the department. A questionnaire by Pintrich et al.[6] was used to study the motivation (intrinsic and extrinsic) of students.

Second questionnaire, which was used to assess the perception of students about critical thinking was based on ASSIST inventory by Entwistle et al.[9] this consist of ten questions which were to be answered on Likert scale. The ERB committee of the college approved this study and a consent from the students was obtained prior to the survey administration.

In the surgery clerkship rotation, a flipped classroom approach was used in case-based sessions; relevant reading material and cases were shared with the students two days before the scheduled topic, and students were asked to come prepared in the ward. At the start of the session, a pre-test based on five

MCQs was conducted, then the students were taught by the case-based learning method for one hour. The teacher was prepared, and relevant real-life scenarios were discussed and questions were asked. After that, a patient was assigned to the students, and they were asked to prepare the case in the ward for an hour.

After which bedside teaching was scheduled, the same teacher in the ward demonstrated a clinical examination, and the students participated actively in the discussion. In the last hour, students were given the chance to examine and practice the skills on patients in the presence of the teacher. In the end, students were given the posttest and the questionnaire to assess their critical thinking and motivation. Similar activities were carried out during seven surgical sessions, and the outcomes were examined.

RESULTS

The partitioning around medium (PAM) algorithm was used to cluster the results on 10 questions to determine perception of motivation, with k = 3. The R package "cluster" was used to implement K-means clustering. Silhouette analysis was used to select the value of k. Based on the box plot of the overall score of the test for motivational perception, a cutoff of 55 (75% of the total marks) was established. 91% of students scored more than 55 in the survey on motivation.

According to the box plot, a cutoff of 60% of total marks (30 marks) was set for the analysis of student perceptions of deep thinking. The partitioning around medium (PAM) algorithm was used to cluster the results on 10 questions to determine perception of motivation, with k = 4. The R package "cluster" was used to implement K-means clustering. Silhouette analysis was used to determine the value of k. In the critical thinking survey, 82 percent of students scored higher than 30.

The Wilcoxon signed rank test for paired samples is used to determine whether there has been a big difference in the students' average grades because the marks in the pre- and post-tests were measured on an ordinal scale. The p-value measured was 0.006, and 70% of students showed more than 40% improvement in their scores between the pretest and the posttest.

DISCUSSION

The bedside method of teaching is a beneficial but neglected aspect of medical education. From traditional to integrated journey there have been several new teaching models put forth that take into account-targeted teaching and team dynamics, all of which can contributed to enhance bedside teaching[10].

According to Pakistan Medical and Dental Council (PMDC), the

undergraduate medical curriculum must be designed to prepare students to carry out the duties of a physician in real life setting. In general, lectures alone are not a sufficient training strategy[4]. Therefore, it is important to make sincere efforts to promote the use of active teaching and learning methods that involve demonstration and hands-on experience. Small group's discussions, flipped classroom, case based teaching should be incorporated in the schedule. The use of an integrated, problem-based approach should be encouraged, starting with clinical and real-life situations. Faculty members should be encouraged to use the interactive teaching and learning methodologies.

According to the study, case-based learning combined with one-on-one instruction helps students become more motivated. This can be the truth because related clinical scenario discussion simulates actual practice. The learning process becomes more enjoyable for the students and motivate the students to participate with more enthusiasm in the skill practice and discussions.

The fact that they are more accustomed to using screens and like group activities may have contributed to the students' liking of the teaching style. In medical education, student motivation to learn is essential. In this study 91% of the students showed motivation because of the bedside teaching and case base learning together in one session.

Peter et al[11] observed that case based learning helped to increase the motivation in undergraduates. Gong[12] found significant results in his study, which shows improvement in the scores of students. The students through the updated techniques learn to update their knowledge, and engage themselves in collaborative learning , Kulkarni et al[16] used case based learning to teach clinical situations which helped them to think on higher order level. A.Sultan et al[13] assessment showed significant improvement in learning of students using case base discussions.

In a study by Mahdi (4,14) case-based learning helps to improve the critical thinking skills in students. The high level of inquiries, which also aimed to gauge performance, may, however, be the cause. Zhu et al[15] also noted a statistically significant difference between pre- and posttest scores (p value 0.0001), indicating an increase in cognition in case based teaching. Students' cognitive abilities were found to significantly improve when using integrated teaching and case-based learning, according to Gajanan et al[16]. Similarly, in this study, the pre and posttest difference in scores was present in 70% student, which shows motivation and encouragement for the students and it is noticed that case-based learning significantly helped the students to improve their scores [17].

CONCLUSION

This study concludes that the integration of bedside teaching with case-based learning enhances the motivation of final-year MBBS students. Because of the combination of case-based learning and bedside clinic, students' critical thinking abilities improved. Hence, pre- and posttest results also proved that the final MBBS students' cognitive learning significantly changed because of the integration between case-based and bedside teaching.

Limitations: This study had a small sample size and only three study sessions were included. For the continuation of this study, we would suggest that cases would be designed for complete rotation.

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AUTHORS CONTRIBUTIONS

KJ: Conception, Design of the work, Data collection, and Drafting, Reviewed, Final approval, Agreement to be accountable.
UBN: Conception, Design of the work, Acquistion, Data Analysis, and Drafting, Reviewed, Final approval, Agreement to be accountable.
ZM: Conception, Design of the work, Interpretation of data for the work, and Drafting, Reviewed, Final approval, Agreement to be accountable.