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Case-Based Learning's Influence on Peshawar's Medical Education: Unleashing Potential

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ABSTRACT

Intro

CBL as a knowledge delivery system The Case-Based Learning (CBL) has grown to be a common pedagogy in medical education as it focuses on the key problem-solving skills, synthetical understanding of the theoretical concepts and knowledge application. This work also found out that traditional lecture-based formats (LGF) as prevalent as they are, restrict students' opportunity to apply knowledge in practice. The present research aims at assessing the impact of CBL in improving cognitive skills, problem solving ability and knowledge acquisition of final year MBBS students of Peshawar.**Methodology:**In the present study, we used a quantitative, cross-sectional questionnaire-based survey from January to June, 2024, across five medical schools. In the stratified random sampling technique, the last year 300 MBBS students were selected for the CBL and LGF groups, which were equally divided into the two groups. The students of the CBL group participated in the weekly seminars in form of case presentation, while the LGF group in the form of lecture presentations on the same cases. Evaluation of data collection included pre and posttest and a structured questionnaire that assessed the satisfaction and engagement. Repeated measures SPSS t-tests and chi-square tests were used to compare performance.**Results:**The findings highlighted better outcome on the CBL group by scoring higher a post-test (79.8% by 66.4 %, p > = 0.001), superior knowledge retention (86.7% by 73.2%, p > = 0.001), better performance on problem solving (88.5% by 69.7%, p > = 0.001) and critical thinking skills (80% by The CBL group recorded better satisfaction ratings than the control group 4.6/5 and 3.3/5 respectively on the Likert scale.**Conclusion:**The studies presented here provide clear evidence of CBL's effectiveness in medical education from the viewpoint of cognitive and psychomotor competencies prerequisite to practice. Of course, there are still problems like faculty training, CBL structures and constraints and the like but if weighed against advantages, the end result is a clear nod in favor of CBL. If properly implemented with institutional support, CBL has the capability of transforming the whole system of medical education so that the students are well equipped to face heath demands in the societies.

Introduction

Teaching practices that promote critical thinking, problem-solving, and practical application are essential in medical education, which is a foundation of healthcare. The standard approach to education has always been lecture-based learning (LGF). Having said that, students' capacity to use theoretical knowledge in clinical practice is frequently hindered by its passive nature (1). An innovative and engaging pedagogical approach known as Case-Based Learning (CBL) has recently come to the fore as a remedy to these restrictions. Clinical scenario-based learning (CBL) encourages student engagement and allows them to apply what they have learned in a real-world setting (2).

Medical schools in Pakistan, and Peshawar in particular, are embracing CBL in order to keep up with the demands of contemporary healthcare. This change is in line with current worldwide trends in medical education, where CBL is praised for its capacity to connect theoretical knowledge with practical application (3,4). Quantitative studies assessing CBL's efficacy in local settings are few, despite the method's apparent promise. To address this information gap, this study will examine how CBL affected the critical thinking, problem-solving, and knowledge retention of Peshawar medical students.

This research adds to the increasing amount of evidence that CBL is a successful educational technique for producing competent and self-assured medical professionals by offering empirical proof of its effectiveness.

Methodology

Study Design

From January to June of 2024, researchers at five different Peshawar medical schools used a quantitative, cross-sectional design to compile their findings.

Sample Size

Stratified random sampling was used to choose 300 final-year MBBS students for the study. Diversity and reduced selection bias were achieved through equal representation from each college.

Study Groups

Students were divided into two groups:

1. **CBL Group (n=150):** Participated in weekly CBL sessions featuring clinical case discussions.
2. **LGF Group (n=150):** Attended traditional lectures covering the same topics.

Inclusion Criteria
• **Final-year MBBS students enrolled in clinical rotations.**
• **Students with at least 75% attendance in sessions.**

- **Participants who consented to the study.**

Exclusion Criteria

- **Students with prior exposure to the clinical cases used in the study.**
- **Students failing to complete both pre-and post-tests.**
- **Participants with inconsistent attendance.**

Data Collection Tools

- Pre- and Post-Test Evaluations: o Checked for understanding, ability to solve problems, and critical thinking.
- Used a 5-point Likert scale to measure student satisfaction, engagement, and perceived learning results in the structured questionnaire.

Data Analysis

We used SPSS version 26 to examine the data. Within and within groups, paired t-tests were used to compare pre- and post-test scores. The results of the questionnaire were summarized using descriptive statistics, and the correlation between CBL and academic performance was evaluated using chi-square tests.

Results

Variables	CBL Group (n=150)	LGF Group (n=150)	p-value
Average Pre-Test Score (%)	57.9 ± 9.3	58.2 ± 9.8	0.452 (NS)
Average Post-Test Score (%)	79.8 ± 7.5	66.4 ± 8.9	<0.001
Knowledge Retention (%)	86.7 ± 6.8	73.2 ± 7.3	<0.001
Problem-Solving Skills (%)	88.5 ± 6.2	69.7 ± 6.8	<0.001
Critical Thinking Improvement	High (80%)	Moderate (55%)	<0.001
Student Satisfaction (Likert)	4.6 ± 0.4	3.3 ± 0.6	<0.001

Key Findings

- The CBL group showed considerably higher post-test results ($p<0.001$). 6.
- By contrast, the CBL group outperformed the LGF group in terms of knowledge retention, problem-solving abilities, and critical thinking.
- The satisfaction ratings of students who participated in CBL were much greater.

Discussion

Based on the findings, CBL is a great tool for medical schools in Peshawar. On every metric, CBL outperformed LGF, thanks to its emphasis on active learning and real-world application.

Improved Knowledge Retention

The results found out that the students in the CBL group had better knowledge retention than the rest of the students because of engagement and collaborative scenarios in the CBL. Using case-based approaches provides the needed interaction with clinical cases that fosters enhanced learning and retention, critical success factors in the practice of medicine (5). However, LGF often has features of massive repetitions which result in the ability to memorize but not understand and lower learning retention level (6).

Enhanced Problem-Solving and Critical Thinking Skills

CBL give students the capacity to handle real life scenarios hence the decision made are informed. These skills are necessary for practice with populations that experience dynamic and changing conditions as clinicians (7). These results are consistent with other research regarding CBL and its ability to develop higher order cognitive skills (8). On the other hand, LGF offers very few chances whereby the user can foster such skills since LGF is mostly a read-only tool (9).

Higher Student Satisfaction

While completing the CBL group was more satisfied, this may well be attributed to the fact that there was a lot of interaction and collaboration in the learning process. CBL was well received by students because of its real life application in clinical practice, which motivated the students and made them more confident (10). Astronomical levels of satisfaction are imperative to create a conducive learning ambiance, and develop lifelong learning behaviour patterns that are meaningful for medical professionals (11).

Challenges in Implementation

However, there are certain limitation when practicing CBL especially when practicing in low income relevant areas like Peshawar. Lack of faculty training, writing of good case transcripts, and structural challenges including large enrollment are major challenges. Solving those problems needs institutional support and strategic planning (12).

Comparison with Global Trends

The results are similar to similar results from across the globe where use of CBL enhances academic and cognitive performance. Research from other parts have also revealed similar advantages and therefore pointed to the ubiquitous nature of CBL in medical education (13). However, localized studies of the kind conducted for this research prove beneficial when determining the success rate of CBL within certain national settings, as that of Pakistan.

Future Directions

For future research about CBL, additional or related questions that could be asked are: In the long-run, to what extent is CBL effective in enhancing the clinical performance of learner's improved patient outcomes. All the same, the use of technology such as virtual simulation as well as contemporary electronic case studies might improve the effectiveness of CBL and at the same time tackle some of the problems related with it. Compared to other forms of teaching innovations including PBL and TBL, more investigations could help in defining the medical education strategies.

Conclusion

This work proves that CBL is helpful in transforming the nature of medical education in Peshawar by increasing knowledge, problem solving, and critical thinking features. There is however evidence that the benefits of CBL far outweigh its drawbacks and thus is a welcome teaching tool in any teaching learning process. If properly implemented after appropriate training of the faculty and necessary reinforcements from the institution, CBL has the potential of transforming the medical education, making the students clinically competent and optimizing the potential of contributing useful and efficient healthcare workforce.

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