

To Compare the Effectiveness of Case-Based Learning with Didactic Learning in the Clinical Instruction of Orthopaedics

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Abstract

Aim: To compare the effectiveness of case-based learning with didactic learning in the clinical instruction of orthopaedics.

Material and Methods: A retrospective study was conducted in the Department Of orthopedics, Patna medical college and Hospital, Patna, Bihar, India for one year. 100 students of final year M.B.B.S part II were enrolled into the study after obtaining Informed consent. Inclusion criteria: 8th semester Students of Final year M.B.B.S Part -II. Exclusion criteria Students who were not interested to participate and who were absent in any one of the classes. By lottery method Students were divided into group A and group B with 50 students each. Group A was given case-based learning (CBL) and Group B was given power point aided didactic lectures (DL). Both groups were given three sessions of Case based learning (CBL) and Didactic lectures (DL) on orthopedics topics at two different venues simultaneously.

Results: A total of 100 students have participated in this study and they were divided in to group A (CBL group) and group B(LBL group) with 50 students each. with respect to gender and age there was no statistical difference between the two groups. The information that the mean examination scores of the CBL group were significantly higher than the LBL group. ($p < 0.01$). After the completion of CBL session, Perceptions of students about CBL was assessed by pre-validated questionnaire using a five-point Likert scale. 94% of the students felt that method is interesting, 94% of the students felt that it motivated to read more. 94 of the students felt that it helped better understanding. 90% of the students that motivated to read more, 90% of the students felt that it motivated critical thinking, 90% of the students felt that it helped in the management of disease.88% of students felt that it has increased group interaction. 90% of the students felt that it gives them confidence in bedside.

Conclusion: Result from Post-test and the positive perceptions of students indicate that CBL was an effective teaching learning method in orthopedics. It helps the students to apply knowledge in solving the clinical cases.

Keywords: Case-based learning, Didactic learning, Clinical instruction, Orthopaedics.

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Introduction

Case-based learning (CBL) and didactic learning are two distinct pedagogical approaches utilized in medical education, each with its unique advantages and challenges. In the clinical teaching of orthopaedics, integrating these methods can enhance the learning experience and improve educational outcomes. CBL is an active learning strategy where students engage with real-life or simulated patient cases, fostering critical thinking, problem-solving, and the application of theoretical knowledge to practical scenarios. This method aligns well with the complexities and hands-on nature of orthopaedic education, allowing students to explore diagnostic and therapeutic processes in a contextual

framework. Studies have shown that CBL promotes deeper understanding and retention of knowledge compared to traditional lecture-based methods [1]. For instance, a study by Thistlethwaite et al. (2012) highlighted that CBL enhances clinical reasoning and decision-making skills among medical students [2]. Didactic learning, on the other hand, involves structured, instructor-led sessions where foundational knowledge is delivered systematically. This method ensures that students acquire essential theoretical concepts and principles necessary for clinical practice. In orthopaedics, didactic sessions often cover anatomy, pathology, and the biomechanics of musculoskeletal disorders,

providing a solid knowledge base that students can later apply in clinical settings [3]. A study by Singaram et al. (2012) emphasized that didactic learning remains a crucial component of medical education, ensuring that students grasp fundamental concepts before engaging in clinical practice [4]. The integration of CBL and didactic learning in orthopaedic education offers a balanced approach, combining the strengths of both methods. This hybrid approach can enhance students' engagement and learning outcomes by providing a comprehensive educational experience. For example, didactic sessions can introduce core orthopaedic principles, while CBL can be used to apply these principles to patient cases, thereby reinforcing learning and promoting the development of practical skills [5]. A study by Srinivasan et al. (2007) demonstrated that combining didactic lectures with case-based discussions significantly improves students' clinical competencies and confidence in handling real-world scenarios [6]. Moreover, the integration of these methods can be facilitated by advancements in educational technology. Online platforms and simulation tools enable the effective delivery of CBL and didactic content, making learning more accessible and interactive. The COVID-19 pandemic has accelerated the adoption of such technologies, highlighting their potential in medical education. For instance, virtual cases and interactive modules can complement traditional lectures, offering students flexible and engaging learning opportunities [7].

Material and Methods

A retrospective study was conducted in the Department Of orthopedics, Patna medical college and Hospital, Patna, Bihar, India for one year. 100 students of final year M.B.B.S part II were enrolled into the study after obtaining Informed consent. Inclusion criteria: 8th semester Students of Final year M.B.B.S Part -II. Exclusion criteria Students who were not interested to participate and who were absent in any one of the classes. Institutional Ethical Committee permission was taken to conduct the study. By lottery method Students were divided into group A and group B with 50 students each. Group A was given case-based learning (CBL) and Group B was given power point aided didactic lectures

(DL). Both groups were given three sessions of Case based learning (CBL) and Didactic lectures (DL) on orthopedics topics at two different venues simultaneously. The duration of each session was one hour. The topics taken during three classes were malnutrition of fractures, congenital club feet and osteomyelitis.

After the session, examination was conducted to both groups in the form of multiple-choice questions for 30 marks. at the end of intervention, to assess the student's perception, a questionnaire with seven questions was given to group a students based on a five point Likert scale Statistical analysis The data was analyzed using SPSS 24. Continuous variables were expressed as mean \pm SD. Categorical variables were expressed as count and percentage. Unpaired t test was done for continuous variables and chi-square test was done for categorical variables. p value ≤ 0.05 was considered as statistically significant.

Results

A total of 100 students have participated in this study and they were divided in to group A (CBL group) and group B (LBL group) with 50 students each. with respect to gender and age there was no statistical difference between the two groups (Table 1). All students in the CBL group participated in the discussion of case and questions and fulfilled the questionnaires, and all students in the LBL group completed the course. Students in both groups. submitted the written examination on time. Table 2 is providing the information that the mean examination scores of the CBL group were significantly higher than the LBL group. ($p < 0.01$). After the completion of CBL session, Perceptions of students about CBL was assessed by pre-validated questionnaire using a five-point Likert scale. 94% of the students felt that method is interesting, 94% of the students felt that it motivated to read more. 94% of the students felt that it helped better understanding. 90% of the students that motivated to read more, 90% of the students felt that it motivated critical thinking, 90% of the students felt that it helped in the management of disease. 88% of students felt that it has increased group interaction. 90% of the students felt that it gives them confidence in bedside. Table:3

Table 1: Demographic information of medical students

	CBL (n=50)	LBL (n=50)	Significance test P value
Gender			
Male	29	31	Chi-square test P=0.06
Female	21	19	
Age	21.75 \pm 2.2	21.68 \pm 1.8	Student un paired t test P=0.07

Table 2: Comparison of total score of examination

Groups	Marks (Mean ±SD)	P Value
Group A (CBL Group)	25.12±1.8	<0.01
Group B (LBL Group)	18.56±2.8	

Table 3: Analysis of percentage of student's feedback after CBL

Questions	Strongly disagree	disagree	neutral	agree	Strongly agree
Method is interesting	0	0	0	3 (6%)	47(94%)
Motivated to read more and enhance self-learning	0	0	0	3 (6%)	47(94%)
helped better understanding	0	0	0	3 (6%)	47(94%)
Motivated critical thinking and analytical skill	0	0	0	5 (10%)	45(90%)
Helped fact finding and correlating principles of diagnosis and management of disease	0	0	0	5(10%)	45(90%)
group interaction is increased	0	0	0	6 (12%)	44(88%)
Gives confidence in bed side	0	0	0	5 (10%)	45(90%)

Discussion

The present was conducted to compare case-based learning with didactic learning in teaching orthopedics to medical undergraduates and the student's perception about case-based learning. It was found that students participated in the case-based learning scored better marks than the students who participated in the didactic lecture learning. This proves the point that the CBL group gained better knowledge from the session. The results were consistent with the previous studies. [8] In traditional teaching, students are passive, whereas in CBL, one has to actively participate in group activity by increasing the group interaction. Team work is a principle of adult learning as well as an effective practice. [9] In case-based learning, both construction of cases and instructors' skill are important. [10,11] In this study, after the end of the CBL course the students commented favorably upon development of Interest, motivation to read more, diagnosis and treatment planning. Instructors were supposed to facilitate students' discussion, guide their clinical reasoning method, and help them to summarize key learning objectives.

Conclusion

Result from Post-test and the positive perceptions of students indicate that CBL was an effective teaching learning method in orthopedics. It helps the students to apply knowledge in solving the clinical cases

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