

## **Research Article**

### **Evaluation of acceptance for case based learning in the undergraduate medical curriculum**

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**Abstract:** Case based learning is an interactive, learner-centered and effective approach that motivates students to understand and correlate clinical problems with theoretical knowledge. The present questionnaire survey investigated student perception of case based learning (CBL) in the undergraduate medical curriculum. 235 students were randomly selected and exposed to CBL sessions. Respondents used a structured six-point Likert scale questionnaire (1 = strongly disagree, 6 = strongly agree) on items 1–10 to rate their attitudes anonymously. 97.39% students agreed that CBL facilitated the learning process.

**Keywords:** case based learning, didactic lecture, physiology, biochemistry, medical education.

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#### **INTRODUCTION**

Biochemistry and Physiology serves as foundational subjects for future clinical sciences. In the past several years, these subjects have continued to be taught traditionally with didactic lectures, textbook and laboratory. In a 60 minute lecture the teachers used to reveal enormous number of facts, several interrelated biochemical/physiological pathways including a lot of complex diagrams/structures. It's been known from past research that a student can't perceive complex information continuously for more than 20 minutes in a continuous one way lecture [1]. Conventional teaching leads the students to perceive the curriculum as disjointed and fragmented resulting in their loss of interest in pre-clinical subjects.

To increase the active engagement of students in professional schools, discussion of a clinical case relevant to the lecture plays an essential role [2]. It has been found that motivation of future clinicians through case based learning (CBL) encourages independent learning, develops an environment of critical thinking, enhances analytical and problem solving power [3,4,5,6]. CBL allows students to develop a collaborative, team based approach to their education.

A case-based approach, resembling real-world examples, engages students in discussion of specific scenarios that shifts the focus of learning away from memorization of facts to the application of concepts [7,8,9]. This method is learner-centered with intense interaction between participants as they build their

knowledge and work together as a group to examine the case. The instructor's role is that of a facilitator while the students collaboratively analyze and address problems and resolve questions that have no single right answer.

In CBL, a case, problem or inquiry is used to stimulate and underpin the acquisition of knowledge, skills and attitudes. Cases place events in a context that promote authentic learning [10]. Cases are generally written as problems that provide the student with a background of a patient or other clinical situation. Supporting information is provided, such as latest research articles, vital signs, clinical signs and symptoms, and laboratory results.

The aim of the present questionnaire survey was to investigate the student perception of case based learning (CBL) in the undergraduate medical curriculum.

#### **MATERIAL AND METHODS**

First year of the undergraduate medical degree course "Bachelor of Medicine and Bachelor of Surgery" (MBBS) affiliated to the Rajasthan University of Health Sciences, Jaipur at Dr. S. N. Medical College, Jodhpur requires 12 months. This period includes teaching and training in the three pre-clinical subjects viz. Anatomy, Biochemistry and Physiology, internal assessment, university examination and results.

Six case scenarios of relevant clinical disease conditions were prepared in consultation with a clinician. During the sessions, the cases were presented along with discussion on the disease process and related biochemistry / physiology.

We developed a 10-item survey to evaluate the students' perception towards the approach of CBL. Respondents used a structured six-point Likert scale [11] questionnaire (1 = strongly disagree, 6 = strongly agree) on items 1–10 to rate their attitudes anonymously. Students were encouraged to participate actively.

Someone other than the instructor administered the attitude survey during the next class period after the sixth case was discussed. 235 students participated in the study and filled the feedback forms. Among them, 5 were rejected due to some errors, the students committed while filling the forms. The remaining 230 were accepted for further analysis and research.

The questions were designed to obtain information whether the CBL sessions facilitated the learning process, helped to retain the subject for a longer duration, created interest in the subject, enhanced active engagement in the classes, improved problem solving ability, makes the difficult topics easy to understand, stimulated independent learning, etc.

**RESULTS**

Table 1 shows the students attitude towards the technique of CBL in enhancing the learning process. Item number 1 in the Likert Scale showed that all the 230 students (100 %) agreed that the cases selected were relevant to the lecture. Among these 28.7% strongly agreed, 70.43% agreed and 0.87% slightly agreed. Item number 2 concluded that 224 respondents (97.39%) agreed that CBL facilitated the learning process. Among these 49 (21.30%) strongly agreed, 154 (66.96%) agreed and 21 (9.13%) slightly agreed.

**Table-1: Student response to CBL (n = 230)**

Item Number in Likert Scale Questionnaire	Number of students who Strongly Disagreed (%)	Number of students who Disagreed (%)	Number of students who Slightly Disagreed (%)	Number of students who Slightly Agreed (%)	Number of students who Agreed (%)	Number of students who Strongly Agreed (%)	Total Number of students who Agreed (%)
1.	0 (0.0)	0 (0.0)	0 (0.0)	2 (0.87)	162 (70.43)	66 (28.7)	230 (100.00)
2.	0 (0.0)	4 (1.74)	2 (0.87)	21 (9.13)	154 (66.96)	49 (21.30)	224 (97.39)
3.	1 (0.43)	6 (2.6)	3 (1.30)	42 (18.26)	128 (55.65)	50 (21.74)	220 (95.65)
4.	0 (0.0)	0 (0.0)	3 (1.30)	14 (6.09)	192 (83.48)	21 (9.13)	227 (98.7)
5.	4 (1.74)	2 (0.87)	5 (2.18)	34 (14.78)	149 (64.78)	36 (15.65)	219 (95.22)
6.	1 (0.43)	3 (1.30)	2 (0.87)	37 (16.09)	173 (75.22)	14 (6.09)	224 (97.39)
7.	1 (0.43)	2 (0.87)	1 (0.43)	25 (10.87)	138 (60.0)	63 (27.39)	226 (98.26)
8.	0 (0.0)	2 (0.87)	3 (1.30)	24 (10.43)	49 (21.30)	152 (66.09)	225 (97.83)
9.	2 (0.87)	4 (1.74)	1 (0.43)	17 (7.39)	142 (61.74)	66 (28.7)	223 (96.96)
10.	1 (0.43)	0 (0.0)	3 (1.30)	28 (12.17)	112 (48.7)	86 (37.39)	226 (98.26)

**APPENDIX-1: Feedback from using Likert Scale**

**Instructions to candidates: Tick marks✓ the option that best matches your view on Case Based Learning (CBL).**

S.No.	Case Based Learning (CBL)	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1.	Cases selected were relevant to the course/lecture						
2.	Facilitated the learning process						
3.	Helped us to retain the subject for a longer duration						
4.	Created our interest in the subject & enhanced our active engagement in the classes						
5.	Improved our problem solving ability						
6.	Makes the difficult topics easy to understand						
7.	Stimulated my ability to learn the subject independently						
8.	Whether facilitator was present to clarify & answer questions?						
9.	Helped us to correlate the clinical problems with theory lectures.						
10.	Whether more time should be devoted to CBL?						

Item number 3 proved that 220 respondents (95.65%) agreed that CBL helped the students to retain the subject for a longer duration. Among these 50 (21.74%) strongly agreed, 128 (55.65%) agreed and 42 (18.26%) slightly agreed. Item number 4 showed that 227 respondents (98.7%) agreed that CBL created interest in the subject and enhanced active engagement of students in the classes. Among these 50 (21.74%) strongly agreed, 128 (55.65%) agreed and 42 (18.26%) slightly agreed.

Item number 5 concluded that 219 respondents (95.22%) agreed that CBL has the potential to improve the problem solving ability. Among these 36 (15.65%) strongly agreed, 149 (64.78%) agreed and 34 (14.78%) slightly agreed.

Item number 6 proved that 224 respondents (97.39%) agreed that CBL makes the difficult topics easy to understand. Among these 14 (6.09%) strongly agreed, 173 (75.22%) agreed and 37 (16.09%) slightly agreed. Item number 7 proved that 226 respondents (98.26%) agreed that CBL stimulated the ability to learn the subject independently. Among these 63 (27.39%) strongly agreed, 138 (60.0%) agreed and 25 (10.87%) slightly agreed. Item number 8 proved that 225 respondents (97.83%) agreed that facilitator was present to clarify and answer questions. Among these 152 (66.09%) strongly agreed, 49 (21.30%) agreed and 24 (10.43%) slightly agreed. Item number 9 proved that 223 respondents (96.96%) agreed that CBL helped us to correlate the clinical problems with theory lectures. Among these 66 (28.7%) strongly agreed, 142 (61.74%)

agreed and 17 (7.39%) slightly agreed. Item number 10 proved that 226 respondents (98.26%) agreed that CBL helped to correlate the clinical problems with theory lectures. Among these 86 (37.39%) strongly agreed, 112 (48.7%) agreed and 28 (12.17%) slightly agreed.

**DISCUSSION**

Research in the field of education psychology has shown that during didactic lectures, students get very less opportunity to relate theory with actual clinical concepts. Knowledge of basic medical sciences learned in the context of clinical cases is actually better comprehended and more easily applied by medical students than learned through didactic lectures [12].

CBL has been proved as a teaching learning method which enhances the analytical and problem solving skills in the students [13]. CBL is an interactive, learner-centered approach that helps medical students to appreciate clinical applications of theoretical knowledge as it uses a guided inquiry method [14]. It is considered that CBL offers an appealing student centric approach that encourages questioning and critical inquiry [15]. The instructor acts as a facilitator in the overall learning process.

**CONCLUSION**

The majority of evidence outlined in the results concluded that the learners enjoyed learning through CBL which has the potential to help them learn better by creating interest in the subject through active learning. Enjoyment leads to increased and effective learning.

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