

## Is case based learning (CBL) an effective tool for clinico-biochemical correlation among undergraduate medical students? Perceptive evaluation of students and faculty

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### Abstract

**Aims and Objectives:** Aim of this study is to create interest in medical students towards the subject of biochemistry and making them understand the clinical topics in biochemistry better. Objective of this study is to incorporate CBL teaching in “schedule time limit” assigned to teach a topic in biochemistry and assess the perception of student and faculty after teaching them a clinical topic in CBL mode.

**Materials and Methods:** After getting informed written consent total 64 students enrolled for the study. Total 4 days were allotted to teach “Calcium and Iron metabolism” as per curriculum plan of Biochemistry. Didactic lecture was delivered on Tues/Wed /Thu. One CBL module was given to each group students were motivated to do self-directed learning (SDL). On consecutive Monday one student from each group was randomly selected to present the CBL in 10 minutes. Faculty then asked relevant question regarding the topic of CBL and all students were encouraged to respond. Each CBL was thus presented turn wise and faculty guided the discussion as to streamline the thought process of students. Next to presentation and discussion feedback form were distributed and were collected after 5 minutes. Data analysis was done.

**Result:** Majority of students were of opinion that teaching biochemistry in CBL mode is more interesting and more satisfying. They feel more confident and motivated to do SDL. Even faculty were of opinion that student participation was more in CBL mode of teaching. Lesser percentage of faculty felt that extra effort and time required for implementing CBL in routine teaching.

**Conclusion:** Large majority of students found that incorporation of CBL is an interesting approach to learn biochemistry. Faculty found that CBL can be introduced for certain selective topics and felt that students will be more oriented towards the subjects. It can be very well incorporated in teaching biochemistry within the specified time limit and can be quite effective as shown in this study.

**Keyword:** Case Based Learning, Biochemistry, Medical Education.

### Introduction

In the present scenario an average medical student fails to understand the importance of learning biochemistry in 1<sup>st</sup> year of medical curriculum when majority of the subject is taught in traditional didactic lecture format. Case Based Learning (CBL) is a student centred approach where he/she is able to understand the subject better and is able to correlate the knowledge of biochemistry in diagnosing and treating the diseases effectively. Learning biochemistry in CBL mode for clinical topics in biochemistry develops a positive approach of students towards this subject. They feel more interested and are inclined towards Self Directed Learning (SDL).

Previous research done on this topic have certainly proved the importance of incorporating CBL in pre-clinical as well as paraclinical subjects but most of such studies have concluded that the incorporation of CBL in routine teaching needs extra time and effort.<sup>1,2</sup> Time constraint is an important criteria which deters the use of CBL in routine teaching practice in medical colleges for pre clinical and para clinical subjects.

With this concern in mind, this study is planned in such a manner that CBL is incorporated in teaching a clinical topic of biochemistry in schedule time frame itself and analyse the student and faculty perception to this teaching learning method.

### Materials and Methods

The study was conducted on MBBS undergraduate students during 1<sup>st</sup> and 2<sup>nd</sup> semester after obtaining ethical clearance from the institutional research and ethics committee.

After obtaining informed written consent, 64 students were enrolled for the study. Sensitization of students and faculty was done regarding Case Base Learning (CBL).

Total five CBL modules were prepared with the help of core committee comprising of Head of the department and fellow colleagues of the Department and was validated by the medical education unit (MEU) of the institute. Qualitative feedback questionnaire with Likert scale having open and close ended question was prepared to assess the perception of students and faculty regarding CBL.

Total 4 days were allotted to teach “Calcium and Iron metabolism” as per curriculum plan of Biochemistry. Dept of Biochemistry is scheduled to take lectures on Mon/Tues/Wed/Thu in a week. For conducting this study the days chosen were Tues/Wed / Thu of a week and Monday of consecutive week. Didactic lecture was delivered on Tues/Wed / Thu on topic “Calcium and Iron metabolism”. During lectures certain information were deliberately reserved for future discussion during CBL sessions so as to avoid repetition and save time.

At the end of 3<sup>rd</sup> day lecture, 20 minutes of the lecture time was reserved for dividing the class in 5 groups (Gr A = 12 Students, Gr B to E = 13 Students). One CBL module was given to each group and students were motivated to do Self Directed Learning (SDL) and were instructed to present

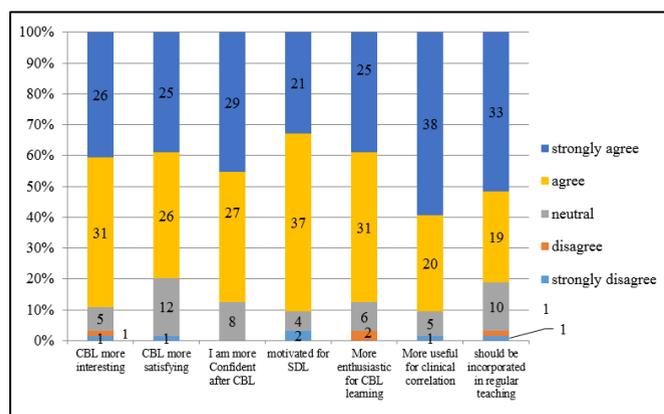
the CBL module on Monday. A time period of three days was given to the students for preparation that helped in fostering SDL.

On Monday one student from each group was randomly selected to present the CBL in 10 minutes time. Faculty then asked relevant question regarding the topic of CBL and all students were encouraged to respond. Each CBL was thus presented turn wise and faculty guided the discussion as to stream line the thought process of students. After the presentation and discussion, feedback form were distributed and collected after 5 minutes.

The faculty feedback form was also collected at a later date to assess the perception of faculty regarding CBL.

**Results**

The perception of the students regarding the utility of CBL is depicted in fig. 1.



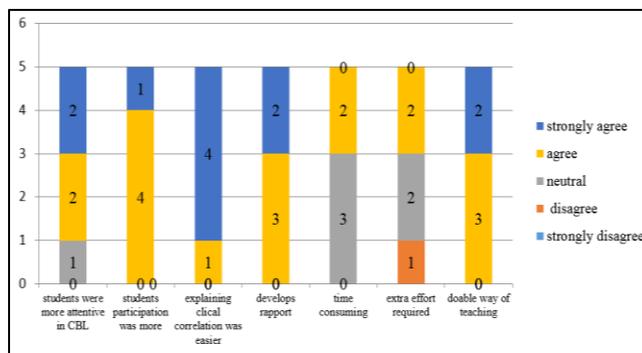
**Perception analysis of the student**

- 89% students found that learning the subject in CBL format is more interesting (SA = 45.6%, A= 54.4%).
- 79.6% students felt that they are more satisfied after learning the topic in CBL format (SA=49%, A=51%).
- 87.57% students felt they are more confident in applying in clinical concepts of taught in CBL format. (SA = 51.8%, A= 48%).
- 90.6% students were motivated to do SDL (SA = 36.2%, A=63.8%).
- 87.5% students were more enthusiastic to learn the subjects in CBL format (SA=44.6%, A= 55.44%).
- 90.6% students realised the value of CBL in learning clinical topics in biochemistry (SA=65.5%, A=34.5%)
- 81.25% students felt CBL should be routinely incorporated teaching. (SA=63.5%, A= 36.5%).

Following are certain comments given by students in open ended questions section of the feedback form:

- Such activities should be conducted after completion of each topic so that clinical application of class to learning is optimally applied.
- CBL is interactive way of teaching.

The perception of the faculty is represented in fig. 2.



**Perception analysis of faculty**

- 80% faculty felt students were more attentive during CBL session. (SA=50%, A=50%)
- 100% faculty felt that the student participation was more when the topic was taught in CBL format (SA=20%, A=80%)
- 100% faculty felt that explaining clinical correlation was easier when CBL module was provided & discussed (SA=80%, A=20%)
- 100% faculty felt CBL develops strong rapport between faculty & students (SA=40%, A=60%)
- 40% faculty felt CBL is a time consuming effort (SA=0%, A=100%)
- Only 40% faculty agreed that extra effort was required to conduct CBL to teach Biochemistry topics.
- 100% faculty felt doable way of teaching (SA=40%, A=60%)

Following are certain comments given by faculty in open ended questions section of the feedback form:

- CBL can be incorporated only for selected topics in biochemistry.
- CBL approach is good which inculcate the subject matter in students mind in lucid and simple way.

**Discussion**

The current emphasis of medical educators is to devise strategies to involve the student actively in the teaching learning process and make education student centric with emphasis on self-directed learning. A major disadvantage of the current medical curriculum is the water tight distribution of subjects in the different semesters with little vertical and horizontal integration. The first two and half years of medical study are devoted to a basic sciences program where most educators place little/ no emphasis on how the knowledge or skills will be applicable/ useful in subjects taught at a later stage. In the absence of such teaching environment, students are more concentrated on gaining good marks, rather than focusing on how the basic science information could be applied in clinical scenarios.

Biochemistry lays the foundation of the concepts necessary for deducing the biochemical pathways involved in the etiopathogenesis of diseases. Hence an in depth understanding of biochemistry is essential for clinical acumen. Currently majority of topics in biochemistry is

taught to medical students in the form of didactic lecture and tutorials, which put the students at passive mode. While teaching biochemistry in most of the medical colleges in India, author has observed that faculties mainly focus on not so important chemical structures and innumerable metabolic pathways without much emphasising on the clinical aspect of it.

This leaves an average medical student puzzled and disinterested in the subject. They start considering this subject as a “nonclinical” subject rather than “preclinical”. Slowly they develop dislike of the subject and consider this subject as an unimportant and boring subject of medical undergraduate curriculum. It is the need of the hour that biochemistry is to be taught to them in a manner which develops their critical and logical thinking, clinical reasoning and diagnostic skill.

Many studies in recent past have reported that the incorporation of CBL promotes active participation of the student in learning biochemistry in context of development of case analysing and diagnostic skills<sup>3-5</sup> but at the same time most of them have narrated that this incorporation of CBL need extra time and effort.<sup>1,6</sup>

This study was conducted with the main objective of conducting CBL in specified time limit and analysing the perception of student and faculty towards this approach. In this study the CBL was incorporated in routine teaching without necessitating extra teaching time. This needed proper planning of time table and CBL modules which demanded extra effort from faculty side.

Result of the study is very promising and most of the students find this approach of teaching clinical subject in biochemistry an acceptable method which makes the subject more interesting and motivates them to do self-directed learning (SLD). The study also demonstrates the positive perception of faculty towards case based learning.

## Conclusion

CBL enhances critical thinking skill of the students and make them more interested to learn the subject and apply the knowledge in solving clinical doubts. It can be very well incorporated in teaching biochemistry within the specified time limit and can be quite effective as shown in this study. For utilising the available time as to incorporate CBL in routine teaching methods, extra effort and wise planning is required from faculty end.

## Conflict of interest

None.

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