



## RESEARCH ARTICLE

### CASE BASED LEARNING: AN EFFECTIVE TOOL FOR LEARNING BIOCHEMISTRY TO DENTAL STUDENTS"- A CROSS SECTIONAL STUDY

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#### ABSTRACT

**Objectives:** To assess the influence of case based learning (CBL) as a teaching-learning tool over the traditional method, with respect to increase understanding, development of interest and improvement of performance in the subject Biochemistry in first year Dental students.

**Methodology:** Selected volunteers from first year were divided into 'Control Group' (N=22) and 'CBL group' (N=26), which were subjected to three hours of traditional didactic lecture and CBL methods respectively. An assessment of both groups was performed immediately after the lectures and feedback on CBL method was acquired by distributing questions to CBL group using 2 point likert scale.

**Result:** Average marks obtained and percentage of passing (>50%) were more in CBL group than the control. In feedback analysis, 96.15% found CBL more interesting and also helped them in understanding the subject better. 84.6% felt it will help score well and 92.3% suggested implementing it in regular first year curriculum.

**Conclusion:** CBL method showed positive influence on interest and understanding of first year dental students in the subject of biochemistry. Further large scale studies will be helpful to implement CBL in regular first year learning curriculum.

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## INTRODUCTION

The incorporation of advanced tools in teaching- learning has become popular in recent years in medical and allied sciences. Extensive training is now being imparted to health educators in the field of Medicine, Dentistry, Physiotherapy and Nursing by University and various Medical schools. Even though conventional method of learning is still popular in India, it imparts the knowledge in a traditional passive manner. In country like India the traditional method is convenient for large group of learners while considering the teacher student ratio. Especially in dental curriculum the First year students (First BDS) have been learning the basic medical sciences like Anatomy, Physiology & Biochemistry generally by the same traditional method. The application of such basic knowledge later in their clinical set up becomes difficult for them. Addressing such problems in learning method and finding solution are important responsibilities for every medical and dental teaching professional (Dario, 2006).

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The case based learning (CBL) method provides solution for such discrepancies in teaching learning methods. The major advantage of CBL is an early exposure of students to clinical set up. It also encourages complex cognitive thinking of students though which they can attain new heights in their career. After introduction of advanced teaching -learning methods like problem based learning (PBL) in the curriculum in The McMaster University School of Medicine in 1969, many medical schools have adopted this approach with some modifications to suit their needs (Robert, 1997). Pakistan medical and Dental council has recently revised and implemented CBL as a part of their integrated undergraduate curriculum (Hashim, 2015). Similar study by Du *et al* in China (Du, 2013) and Vaughan (Vaughan *et al.*, 1998), found CBL as a more effective tool than traditional lecture based learning in teaching Dental subjects. In spite of being one of the most important fundamental sciences in medical curriculum, Biochemistry is considered as a subject of confusing pathways and complex reactions by the students. Because of such attitude, teaching biochemistry to first year Dental students always remains as a major challenge for preclinical/basic medical science teachers. But mean time, knowledge of Biochemistry is mandatory for the students in later stages for

diagnosing various diseases by correlating the results of biochemical investigations with clinical findings. It is also useful to understand the mode of action of various drugs on human body in different circumstances. Implementing modern learning methods like CBL so becomes important for subjects like Biochemistry for the students to get better applied knowledge and understanding in the concerned field. The effect of such integrated teaching with CBL in Biochemistry for undergraduate medical curriculum (Beeley, 1974), showed improved academic performance of the students and the innovative method also train them to expertise in self-learning skills. But so far very little literature is available on the use of Case based learning to teach Biochemistry for first year dental (BDS) students. Hence the overall goal of this study is to evaluate the effectiveness of case based learning for first year dental teaching curriculum in developing interest in order to improve their understanding and performance in the subject of Biochemistry.

## MATERIALS AND METHODS

This study was conducted amongst the first year Dental (First BDS) students who were enrolled for the academic year (2014-15) to a Private Dental College affiliated with Maharashtra University of Health Sciences, Pune. Forty eight (N=48) volunteers from first year were selected as participants for the study. Then the study participants were divided into two groups by drawing lots. Group I (Control Group) comprising of 22 students was subjected to traditional lecture method and Group II (CBL Group) comprising of 26 students was subjected to case based learning method. Case based scenario from the topic of 'Gout and Nucleoprotein metabolism' for Group II was designed with the help of a peer group. Three sessions of one hour each were conducted for both the groups. An assessment test consisting of multiple choice questions and short answers was conducted for the participants of both the groups. Then a feedback on CBL method was acquired using a 2 point Likert scale containing 4 questions from CBL group. The performances of controls and CBL groups were then evaluated and analyzed.

## RESULTS

Figure 1. The results of the feedback of participants who were subjected to case based learning were as shown in figure 1.

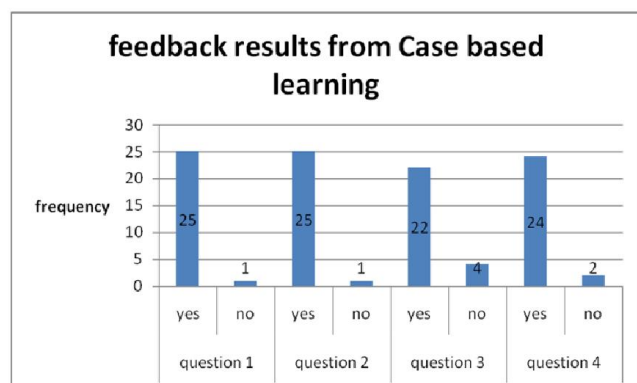


Fig. 1.

**Question 1:** Twenty five out of twenty six (96.15%) participants were of the opinion that there was better understanding by CBL method.

**Question 2:** Twenty five out of twenty six (96.15%) participants were of the opinion that the topic taught by CBL method created more interest.

**Question 3:** Twenty two out of twenty six (84.6%) were of the opinion that CBL helped score better.

**Question 4:** Twenty four out of twenty six (92.3%) were of the opinion that CBL should be implemented in future for applied topics.

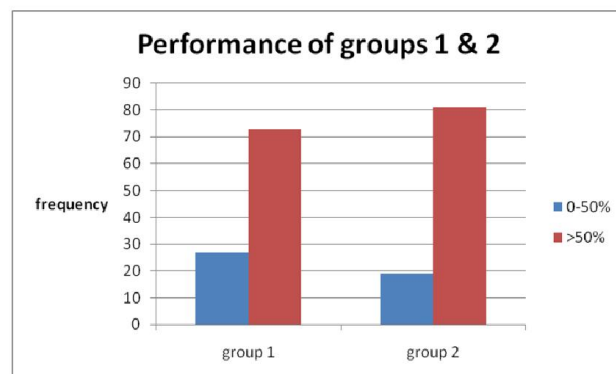


Fig. 2.

Figure 2: The results of performance of group I and Group II were as shown in figure 2. Amongst participants of group I (Traditional learners), 27% scored below 50% marks and 73% participants scored more than 50% marks in the test comprising of MCQ's and SAQ's. However, amongst group II participants (case based learners) 19% scored below 50% marks and 81% scored above 50% marks.

## DISCUSSION

The subject of biochemistry is introduced to the dental students in the first year of their curriculum. For the last few decades teachers in dental colleges have been following the same traditional didactic lectures, practical classes and demos to educate the students in the first year. As the students are not exposed to clinical sciences in first year it becomes difficult for the teachers to educate the importance of such basic medical sciences in their clinical practice. Being unaware of its future application the students also find biochemistry very complex to understand and remember and in result they lose interest. So it is always a big challenge for the teachers to generate interest for such subjects in first year of medical and dental curriculum. In this study almost 96 % of the dental students agreed that the CBL method was easier to understand and more interesting than the traditional learning methods. Similar outcomes were observed in other studies where CBL was used as a learning tool in undergraduate medical students (Hashim, 2015; Burrowers, 2003; Nair, 2013; Shubhada Gade, 2013). Majority of the students (93 %) recommended this method further to incorporate into regular teaching schedule. More over many of them (84.6%) recognized this method a better option for scoring more marks in the examination. It is clearly reflected in their scores of the assessment conducted after the session. Almost 8 % more participants had taken more

than 50 % of marks in CBL group than traditional group. Probably it is because of the clinical aspect of their routine biochemistry lecture which might have improved their understanding which further helped them to remember for longer duration. Although the improvement was not significant, it provides a positive scope of increase in performance after similar successive CBL sessions.

The results of the feedback obtained (Figure1) from participants showed significant insight into the topic taught by case based learning .from the feedback it becomes obvious that the students who were taught by CBL agreed felt that there was better understanding by CBL and also found this type of learning more interesting. They also felt that this type of learning will help them score better and should be implemented for applied topics. Our study results were supported by various studies on CBL (Vaughan, 1998; Burrowers, 2003; Nair, 2013; Supraneni, 2010). The results of the test conducted after CBL session was also encouraging. It showed improved performance in participants who were subjected to CBL. Although there was slight improvement in the performance of participants in first ever CBL session conducted, there is always a scope of increase in performance after successive CBL sessions, which we are planning to implement in future. The test was conducted immediately after CBL session as well as traditional didactic lecture because of which only their short term recall could be tested which may also account for slight improvement in CBL learners as compared to traditional learners. Because of the time constraint we could not study the recall of the knowledge after the time gap but the results of feedback as well as performance of participants in present study definitely showed improved understanding, interest and enhanced performance in the subject. This study also implicated that CBL should be implemented to teach applied topics of Biochemistry in future. Our study showed that CBL is a more effective tool for teaching Biochemistry to first year BDS students when compared to traditional learning methods.

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