

EFFECTIVENESS OF CASE BASED LEARNING VERSUS DIDACTIC LECTURE AS A TEACHING LEARNING TOOL IN CLINICAL BIOCHEMISTRY AMONG FIRST YEAR MBBS STUDENTS

Medical Education

Dr. Gondi Aruna	Professor of Biochemistry, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, Andhra Pradesh.
Dr. Suchitra Kavuri	Associate Professor of Biochemistry, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, Andhra Pradesh.
Dr. Kamma Sai Divija	Final year post graduate in dermatology, NRI Medical College, Vizag.

ABSTRACT

Background: Case based learning as a teaching learning tool will help in developing an activity on the part of a learner, gains a new insight, improves creative thinking, helps in conceptual clinical based approach in clinical biochemistry, resulting in the retention of knowledge as compared to the didactic lecture. **Objectives:** To compare the effectiveness of case based learning versus didactic lecture as a teaching learning tool in clinical biochemistry among first year MBBS students and to assess and compare the effectiveness of case based learning on start day & after 15 days versus didactic lecture on start day & after 15 days as a teaching learning tool. **Materials And Methods:** The study was conducted in ASRAM Medical College and the participants were First MBBS [n=60] who attended the CBL and DL sessions. The viva voce conducted on start day & after 15 days of the sessions by validated questionnaire. The data was analyzed by unpaired and paired t test. **Results:** The mean viva voce score of CBL was 8.233 ± 0.77 and DL was 6.233 ± 0.97 on Start day. After 15 days the mean viva voce of CBL was 9.533 ± 0.63 and DL was 5.667 ± 0.88 which showed highly significance with p value <0.0001 . **Conclusion:** The study indicates better understanding of concepts through case based learning when compared to didactic lecture and this can be implemented as a teaching learning tool among first year MBBS students in Clinical Biochemistry.

KEYWORDS

Didactic lecture (DL), Case Based Learning (CBL).

INTRODUCTION:

Case based learning as a teaching learning tool will help in developing an activity on the part of a learner, gains a new insight, improves creative thinking, helps in conceptual clinical based approach in clinical biochemistry, resulting in the retention of knowledge as compared to the didactic lecture.

The DL method has been shown to be effective for knowledge transfer in large group teaching, but it does have inherent limitations. It is frequently difficult for teachers to keep students' attention throughout the lecture delivery period¹. The case-based learning (CBL) approach improves subject understanding and clinical comprehension. Traditional didactic lecture-based teaching has typically been a 1-hour class in which the teacher delivers the content and is frequently one-sided, with little participation from the students. Thus using innovative methods to train medical students, such as CBL, that promote problem-solving ability, enhance analytical thinking, and elicit interest in learning, should be used as an adjunct to traditional methods². Case based learning type of learning can enhance knowledge, improves team work, clinical skills and patient outcome³. Case based learning method showed a significant improvement in knowledge of students⁴. Case-based learning has many advantages over traditional lecture format. Teachers in didactic lectures are merely information providers. The majority of didactic lectures lack interactive discussion. Case-based learning helps students become interested in the subject. Additionally, it provides them with an idea of how to comprehend the subject and put it into practice. As a result, the purpose of this study was to determine whether case-based learning is more effective than lecture for teaching undergraduates.

OBJECTIVES:

1. To compare the effectiveness of case based learning versus didactic lecture as a teaching learning tool in clinical biochemistry among first year MBBS students.
2. To assess and compare the effectiveness of case based learning on start day & after 15 days versus didactic lecture on start day & after 15 days as a teaching learning tool.

METHODOLOGY:

An interventional study was carried out at the Department of Biochemistry at ASRAM Medical College and Hospital in Eluru, Andhra Pradesh, India. The study lasted four months and included students from the first year of their M.B.B.S. enrolled in the study. Brainstorming sessions with two faculty from department of

biochemistry was carried out to develop the CBL module, including the patient cases/clinical scenarios. The NMC guidelines and listed competencies and topics to be taught as clinical syndromes were followed. The principal investigator also being a medical education faculty sensitized the faculty and students of this innovation. CBL module includes the case content of patient history, symptoms, laboratory findings and questions to be discussed were framed. Brainstorming with undergraduate students what CBL is and how it will be conducted was done. Implementation of the CBL module as part of CBME- study in addition to the classroom lectures the CBL sessions were conducted. Single topic was chosen for CBL, to be taught first as didactic lectures and then as case-based scenarios. The topic was Liver Function Test (LFT) and was taught traditionally as centric approach by a didactic one-way lecture using a power point presentation over a period of two hours for 30 students. The same topic was taught as case-based scenario to remaining 30 students. The same was then repeated with student participation 15 days later. Evaluation of performance of CBL as an innovation and adjunct to lectures. The students were assessed by given questionnaire & viva voce. The questions were framed to assess the students' perception of CBL and the traditional way of lecture based teaching. The responses collected were compiled in a Microsoft excel sheet and the data was analyzed statistically. Ethical Clearance Approval no: IEC/ASR/Approval 032/2021

RESULTS:

The study included 60 participants, 30 in DL and 30 in CBL. During all sessions, all students were present. The viva voce was conducted immediately after the respective sessions on Liver Function Tests. It is found that the marks of the viva voce after the respective sessions CBL group scored better than the DL group with statistically significant results of $p < 0.0001$.

Table 1: DL Vs CBL on Start day

	DL on Start day	CBL on Start Day
Mean	6.233 ± 0.97	8.233 ± 0.77
t value	8.8201	
p value	< 0.0001	

The comparison of marks of viva voce on start day of DL and CBL were given in Table 1.

The mean of the marks of viva voce were 6.233 ± 0.97 for DL group and 8.233 ± 0.77 for CBL Group (out of 10 marks). The results were

statistically significant for CBL group with p value of < 0.0001 . ($p < 0.05$ is taken as significant).

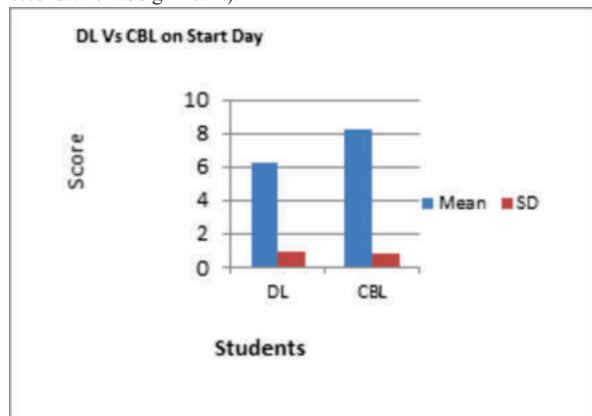


Figure 1: Graphical representation of DL Vs CBL on Start day

Table 2: DL Vs CBL after 15 days

	DL on 15day	CBL on 15 Day
Mean	5.667 ± 0.88	9.533 ± 0.63
t value	19.5212	
p value	< 0.0001	

The comparison of marks of viva voce on 15th day of DL and CBL were given in Table 2.

The mean of the marks of viva voce were 5.667 ± 0.88 for DL group and 9.533 ± 0.63 for CBL Group (out of 10 marks). The results were statistically significant for CBL group with p value of < 0.0001 . ($p < 0.05$ is taken as significant).

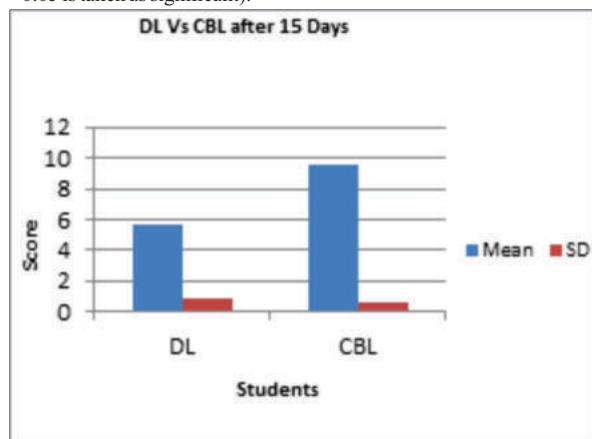


Figure 2: Graphical representation of DL Vs CBL after 15 days

Table 3: DL on Start day Vs DL after 15 days

	Start day	After 15 days
Mean	6.233 ± 0.97	5.66 ± 0.88
t value	2.4815	
p value	< 0.0001	

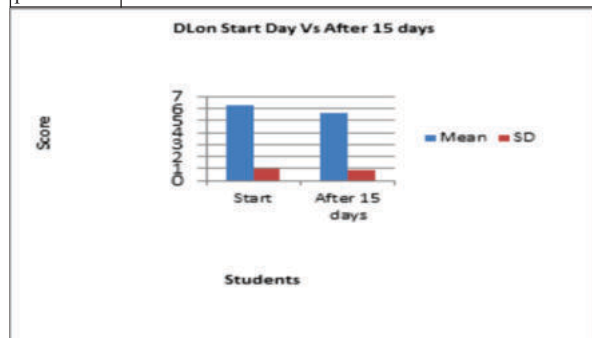


Figure 3: Graphical representation of DL on Start day Vs DL after 15 days

The comparison of marks of viva voce on start day of DL and 15th day of DL were given in Table 3.

The mean of the marks of viva voce were 6.233 ± 0.97 for DL group on start day and 5.66 ± 0.88 for DL Group on 15th day (out of 10 marks). The results were statistically significant for DL group on start day with p value of < 0.0001 . ($p < 0.05$ is taken as significant).

Table 4: CBL on Start day Vs CBL after 15 days

	Start day	After 15 days
Mean	8.233 ± 0.77	9.533 ± 0.63
t value	7.1409	
p value	< 0.0001	

The comparison of marks of viva voce on start day of CBL and 15th day of CBL were given in Table 4.

The mean of the marks of viva voce were 8.233 ± 0.77 for CBL group on start day and 9.533 ± 0.63 for CBL Group on 15th day (out of 10 marks). The results were statistically significant for CBL group on 15th day with p value of < 0.0001 . ($p < 0.05$ is taken as significant).

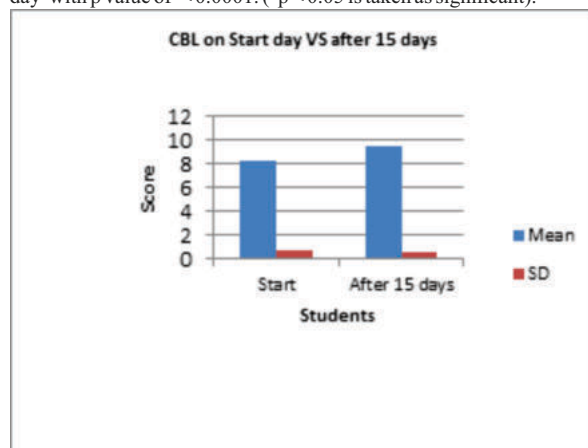


Figure 4: Graphical representation of CBL on Start day Vs CBL after 15 days

DISCUSSION:

The purpose of this study was to compare case-based learning with didactic lectures in teaching biochemistry to first-year medical students. The perceptions of students toward these two teaching learning methods were also compared and analysed.

Newer innovative methods for medical undergraduates are required in this era of Competency Based Medical Education. Case-based problems encourage students to critically analyse problems and find rational solutions. In our study, Case based learning participants outperformed the Didactic lecture group in the viva voce immediately following the session. This demonstrates that the CBL group learned more about the topic than the DL group. The results were consistent with the study of Johnsonston JM et al, Choi E et al & Tack CJ et al showed more satisfaction, critical thinking and self motivation with problem based training than conventional teaching method^{5,6,7}.

The fact that the mean scores of CBL were significantly higher in the 15-day test compared to the DL group. The findings were consistent with the findings of Rehna T et al and Imran et al, who found that the case-based learning group retained more knowledge^{8,9}. These are the studies that demonstrated that case-based learning outperformed didactic lectures.

Case based learning makes the topic interesting and easily understandable as shown in this study. The results were statistically significant with p value < 0.0001 . Case based learning group gained more knowledge and were motivated than the students in traditional didactic lecture group⁸.

In this study it was found that CBL group had better attention span and interest in learning than the DL group. Viva voce scores were good with the CBL group leading to the conclusion that it is better learning method.^{9,10}

In short, our study found that case scenario-based learning was

preferable to didactic lectures as a better way to learn, with a p value of <0.001.

CONCLUSION:

The study indicates better understanding of concepts through case based learning when compared to didactic lecture and this can be implemented as a teaching learning tool among first year MBBS students in Clinical Biochemistry.

LIMITATIONS OF THE STUDY:

This study was carried out only on first year medical graduates at a single institution. As a result, it cannot be applied to the entire student population.

SCOPE OF STUDY:

Innovative teaching tool such as Case based learning must be implemented in teaching to improve learning process.

ACKNOWLEDMENT:

MEU Faculty of St. John's Medical College, Bengaluru

REFERENCES:

- 1) Dr. Shrikant Ashok Shetel, Rakesh K Karnani, Mohmmad hamid, Sapna Kamdar. MBBS 1st year student's perception of "quick case study" in Physiology didactic lecture VIS-A-VIS their performance. *Int. J. Med. Sci. Educ.* April-June 2017;4(2):58-64.
- 2) Mahima Lall, Karuna Datta. A pilot study on Case based learning(CBL) in Medical Microbiology; students perspective. *Medical journal Armed Forces India* 77(2021) S215-S219.
- 3) B Williams. Case based Learning- A review of the literature: is there sc for this educational paradigm in Pre Hospital education? *Emerg Med J* 2005, Aug; 22(8):577-581; 2005.
- 4) Sangeetha Pankaj, Anjali Kumari. Introduction of CBL for teaching common gynecological malignancies in undergraduates. *World Journal of Surgical Medical and Radiation Oncology*, Volume 9, 2018.
- 5) Johnston JM, Schooling CM, Leung GM. A randomised-controlled trial of two educational modes for undergraduate evidence-based medicine learning in Asia. *BMC Med Educ.* 2009;9:63.
- 6) Choi E, Lindquist R, Song Y. Effects of problem-based learning vs. traditional lecture on Korean nursing students' critical thinking, problem-solving, and self-directed learning. *Nurse Educ Today.* 2014;34(1):52-6.
- 7) Tack CJ, Plasschaert AJ. Student evaluation of a problem-oriented module of clinical medicine within a revised dental curriculum. *Eur J Dent Educ.* 2006;10(2):96-102.
- 8) Rehna T., Robin Joseph Abraham. Effectiveness of case scenario-based learning over didactic lectures on teaching pediatric infectious diseases to undergraduate medical students. *Int J Contemp Pediatr.* 2019 Sep;6(5):2137-2142
- 9) Imran M, Shamsi MS, Singh A, Goel S, Sharma P, Panesar S. Problem-based learning versus lecture-based learning in pharmacology in a junior doctor teaching program: a crossover study from northern India. *Int J of Research in Medical Sciences.* 2015;3(11):3296-9.
- 10) Khoshnevisasi P, Sadeghzadeh M, Mazloomzadeh S, Feshareki RH, Ahmadiashar A. Comparison of Problem-based Learning with Lecture-based Learning; *Iran Red Crescent Med J.* May 2014; 16(5):5186.