

## COMPARATIVE STUDY OF CASE BASED LEARNING WITH TRADITIONAL TEACHING METHOD IN PATHOLOGY FOR SECOND YEAR MEDICAL STUDENTS

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### ABSTRACT

**Background:** Case based learning (CBL), is a learning method aids learner to reorganize, elaborate their information and provide connection between current and new information. Moreover CBL is student centered, taken in small groups where teacher acts as facilitator or guide. This study was planned to perceive the need for initiating CBL, this study aimed to compare the pathology teaching among second year medical students with that of traditional teaching. **Methods** This is an observational study conducted from September 2016 to April 2017. This research study was conducted on all 98 students of II MBBS students. Ten ideal case scenarios on the topic of myocardial infraction and diabetes mellitus were prepared, and pre validated by the faculty of pathology and medical education department. CBL was introduced and total three sessions were conducted and compared with traditional teaching. **Results** The mean ( $\pm$ SD) value of the score of gain in knowledge was  $3.99 \pm 1.88$  (n=98) for the batch of students who attended case based learning while the mean ( $\pm$ SD) gain in knowledge for the batch who underwent TL was  $2.63 \pm 2.31$  (n=98). A paired t-test comparing didactic lectures with self-directed learning showed that the scores following didactic lectures were more compared to SDL and the results were statistically significant. An unpaired t-test comparing case based learning to SDL also showed statistically significant gain in knowledge following didactic lectures. **Conclusion** This study clearly showed that CBL is more effective over traditional teaching for our second year MBBS students and for covering a wider area.

**Key words :** Case based learning, pathology, traditional learning

### INTRODUCTION

The quality of medical education depends upon various factors like curriculum, college administration, infrastructure, patient exposure, faculty expertise in the subject and their

knowledge, exposure and training in teaching-learning methodology. Moreover medical education in the past decade is witnessing a paradigm shift and is now becoming student

centric from teacher centred mode. Therefore, student opinion and preferences matter the most before introduction of any additions, deletions or modifications in the way the course is conducted. At the same time students differs in age, place, ethnicity, level of preparedness, learning styles and preferences etc(1-3). Therefore it becomes a responsibility of any medical teacher to meet the individual educational need of the students regarding the knowledge, attitude, and the skill. One of the most important ways to strengthen the medical education at content delivery level is to assess student perception about teaching-learning methodology (4-6).

Numerous teaching-learning methods are practiced throughout MBBS course, to increase involvement, participation and interest of students, so that learning is facilitated and it appeal to students with different learning styles. The challenges of medical education in India are similar to other developing nations. Further, the curriculum is still taught discipline based, teachers lack skills in teaching-learning methods and student assessment. Thus, students lack opportunities for active and self-directed learning. Case based learning (CBL); a very well-known teaching learning method, adopted by many especially in medical teaching is very valuable. It helps learner to identify what they already know and to restructure, elaborate their information and provide bond between existing and new information (7, 8). Moreover CBL is student centered, taken in small groups where teacher acts as facilitator or guide. Problems are the vehicles for development of problem solving skills. New information is acquired through self-directed learning (10-12). Also group discussion which is the part of CBL if effectively practiced develops a range of soft skills such as self-expression, listening, collaboration and problem solving. Learner can be given some challenging task, which they could solve independently and work with teachers and others. As they develop the abilities required, they shall receive less assistance and work more independently. Learning should be closely related to the understanding and solution of real world problem. It has been described that medical

graduates in India generally possesses rationally sound knowledge of medical science but they are often create lacking in the presentation of clinical skills and problem solving, which form the core of clinical capability(13-17). CBL is one method where students are driven to learn on their own so as to teach the habit of self-learning and integrating knowledge from different subjects to resolve problems. It is a small-group method in which both students and faculty members contribute to discussion, learning issues are pre identified, and preparatory readings are assigned while student discussion and guided inquiry around clinical problems is promoted. The challenges in front of students of pathology are increasing day by day. The subject of pathology is introduced to the II MBBS students, which also involves clinical exposure for them. In CBL, a real world scenario with the supporting data and documents is given with open ended questions and the case content is closely aligned with the overall instructional goals and objectives. The learner is asked to read, identify, establish, discuss, and reflect on these goals and objectives. Regarding CBL, Wilkerson and Gijselares documented that the teacher is facilitator rather than disseminator, observer rather than actor. They coach from the side lines providing constructive feedback and challenging students to excel. Many times, medical teaching gets restricted to didactic lectures, seminars, practical and most of the time teacher centered. As per Jena Vellas outlook "Adult learners have shown that they are willing, eager to learn in safe learning environment. Allowing small groups to find their voices enhance the power of safety. Trust in the sequence of activities builds safety where CBL is used". CBL can be defined as a process in which by deliberating a clinical case related to the topic taught, students evaluated their own understanding of the idea using a high command of cognitive. This procedure reassures active learning and crops a more productive result. Undergraduate medical students at our institute in their feedback of pathology sessions have commented on the difficulty in applying the knowledge learnt during lecture classes in actual clinical postings. Hence we perceived the need

for initiating CBL for large group teaching. Hence this project aimed to motivate knowledge acquisition by case centered learning and compare for teaching pathology among second year medical students and also to assess the perception and preference among the two learning methods by the students.

## **METHODS**

Study Design- Comparative study.

Study Population- Second year medical students of Santhiram Medical College, Nandyal, and Andhra Pradesh.

Inclusion Criteria: All 2nd year (5th semester) MBBS students who gave consent and participated in the sessions were included in the study. Exclusion Criteria: Students with specific learning disabilities or who were unable to attend the programme.

This is an observational study conducted from September 2016 to April 2017. This research study was conducted on all 98 students of II MBBS after seeking permission from institutional ethical committee. Understandable idea of the research project was given to all the students and consent was taken from students who were willing to participate in this project. Ten ideal case scenarios on the topic of myocardial infarction and diabetes mellitus were prepared, and pre validated by the faculty of pathology and medical education department. Specific learning objects (SOL) were decided. The topics for study involved application of pathology of the cardiovascular system and diabetes to clinical scenario. The questions were intended that the students can correlate the clinical manifestations with the pathological aspects. The students involved in the study had not received lecture classes on the same topics previously. Cases were displayed during the session and students were given 8 minutes time to read, discuss and analyzed among the group. Later the questions were projected and students were given an opportunity to respond. Faculty facilitated the learning process, discussed relevant points and summarized towards each case scenario.

### **First intervention**

Three sessions each of one hour using TTM were taken on the topic of myocardial infarction and diabetes mellitus. Pre and post-test was taken on the traditionally taught topic, consisted of short answer questions (SAQ) of 20 marks within the time period of 30 minutes.

### **Second intervention**

CBL was introduced and total three sessions were conducted. During 1<sup>st</sup> session, cases studies on myocardial infarction and diabetes mellitus. They were introduced to the students and relevant study material references were given. 2<sup>nd</sup> session was given to the students for reading to find the learning trigger, establish connection, discuss, explore, compose and finally reflect. In the groups there was one leader, one time keeper, one scribe, and teacher as facilitator. In 3<sup>rd</sup> session there was discussion, briefing by faculty, followed by post-test. Feedback by using 5 point Likert scale was obtained from the students in the form of pre validated questionnaire, consisted of both close ended as well as open ended questions. Unpaired t-test was applied for comparison between the scores obtained in post-test of both teaching methods.

## **RESULTS**

Even though, there was a statistically significant gain in knowledge with both methods of learning, didactic lectures edged over self-directed learning methods. For the purpose of analysis, the marks of students who underwent traditional lectures on both days were grouped together while the marks of students who attended the self-study sessions on both days were also grouped together.

### **Assessment of Knowledge Gained by Different Teaching Methods**

After conducting the two types of teaching methods, the gain in knowledge was assessed by pre-test and post-test for each batch. The mean ( $\pm$ SD) value of the score of gain in knowledge was  $3.99 \pm 1.88$  (n=98) for the batch of students who attended case based learning while the mean ( $\pm$ SD) gain in knowledge for the batch who

underwent SDL was  $2.63 \pm 2.31$  (n=98). Independent t-test done for the same showed statistical significance (Table 1).

#### Comparison of Both Teaching Methods

A paired t-test comparing didactic lectures with self-directed learning showed that the scores following didactic lectures were more compared to SDL and the results were statistically significant (Table 2).

An unpaired t-test comparing case based learning to SDL also showed statistically significant gain in knowledge following didactic lectures (Table 3).

#### Student Feedback

Student feedback was collected according to Likert's scale. Results showed SDL had significant positive feedback for lectures compared to tradition learning.

Few responses obtained when asked for additional suggestions were-

- 'I understood that I can "sit" and read for two hours.'
- 'A single day is not enough to grade both.'
- 'The result of lecture class will depend on the teacher while this is not applicable for SDL.'
- 'Self-study is not so effective, because it is very difficult to go through textbook without an overall idea and self-study requires a lot of time.'
- 'Most effective method will be when both methods are combined. Didactic lectures will give an overall idea of what to study while self-learning increases the depth of knowledge. It is easy to learn when we know what to learn, which is best achieved when both methods are combined.'

**Table 1 Comparison of Gain in Knowledge among the Two Lecture Methods (Independent t-test)**

T-L Methods	Number of Students	Knowledge Gain	p value
CBL	98	$3.99 \pm 1.88$	0.001
Traditional Teaching	98	$2.63 \pm 2.31$	

**Table 2 Comparison of Pre-Test and Post-Test Scores (Paired t-Test)**

T-L Methods	Number of Students	Pre-Test Mean $\pm$ SD	Post-Test Mean $\pm$ SD	p value
CBL	98	$6.57 \pm 1.717$	$10.56 \pm 1.393$	0.001
Traditional Learning	98	$6.49 \pm 1.763$	$9.13 \pm 1.552$	0.001

**Table 3 Unpaired t-Tests Comparing Case based learning to Traditional learning**

CBL – TRADITIONAL LEARNING	t value	p value
	4.355	0.000

## DISCUSSION

The present study shows that the gain in knowledge was significant in both groups, more in the group, which attended the lecture classes. This shows that lecture classes are more effective in learning those particular topics. Overall, in the present study, case based learning has proved to be more effective than self-directed learning for understanding certain topics in medical education. This is in contrast to many of the previous studies, which showed a significant advantage for CBL over traditional lectures (17-19).

In a study of self-directed learning in relation to anatomy, gross dissection at the Medical School of the University of Castilla-La Mancha, Spain, and Mdel et al found that an objective-oriented self-learning approach provides maximal autonomy and independence in the achievement of objectives by the students in close association with academic staff. The data obtained from the study indicated that students engaged in self-directed learning through small groups working with faculty staff are able to self-improve their anatomical skills (20).

A study done by Abraham RR et al at Melaka Manipal Medical College to determine the effectiveness of CBL, compared SDL session evaluation scores with case based learning exam scores using Student's paired t-test. Lecture exam scores were significantly lower than CBL exam scores ( $72 \pm 0.40$  vs.  $76 \pm 0.21$ ). These results suggest that CBL may be an effective learning tool. Furthermore, feedback from the students showed more of a positive approach to this strategy even though a few students were negative (21).

Murad et al implied that CBL is more suitable for adult learners who already have a reservoir of knowledge and can apply their learning immediately to their practices and recommended it for heterogeneous groups of learners with different past experiences(8) A study conducted by Grieve C on a group of forty-six students of physiology compared the knowledge increment following three different teaching methods. The three methods assessed were- (a) A lecture with

audio-visual aids; (b) A case based learning and (c) A self-study tutorial. The results indicated a favourable increment for the audio-visually aided lecture and for the self-study tutorial. There was no significant increment for the didactic lecture. A questionnaire completed by the students indicated an overall preference for the audio-visual aided method and a lesser preference for the self-study tutorial. The formal case based learning found no favour with the students(22, 23).

The role of SDL is probably limited in second year as the students are just exposed to clinical postings and it may be difficult for them to integrate the clinical aspects of a disease with pathology. A faculty-guided discussion or a short lecture class, followed by self-study sessions maybe better in this setting.

Limitations: In this study, however, only few topics could be covered from the total content of second year MBBS curriculum. A study of longer duration covering a wider range of topics and preferably integrated into the routine teaching schedule is required to ascertain the efficacy of traditional teaching methods over newer methods.

## CONCLUSION

CBL are more effective over traditional teaching for large group students and for covering a wider area. For any given topic, self-learning will need more time to comprehend and reproduce the topic. From the student's feedback, it can be inferred that a judicious combination of both the methods maybe preferred over implementing either method alone. SDL helps in increasing the depth of knowledge, while lecture covers larger topics in a shorter span of time.

### Implications

- Newer Teaching Learning (T-L) methods have to be adopted so as to sustain student interest in learning.
- With introduction of newer methods, traditional T-L methods should not take a backseat.

- Emphasis has to be laid on a judicious combination of different T-L methods.
- With continually decreasing mandatory staff requirements, lectures certainly will be the most practical tool for a large group setting.

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