

## COMPARISON OF PROBLEM-BASED LEARNING WITH TRADITIONAL LECTURE-BASED LEARNING FOR FIRST MBBS STUDENTS IN BIOCHEMISTRY USING PRE AND POST MCQ TEST OF THE STUDENTS

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### ABSTRACT

**Background:** The traditional learning technique is lecture-based learning (LBL) sessions taught by the faculty to the student without clinical correlation and without integration with other subjects. Problem-based learning (PBL) can be utilized for teaching small groups as well as a large group. It can produce more retention and correlation of knowledge about the topic and clinical condition which is required during the management of real patients. **Objectives:** Comparison of problem-based learning with traditional lecture-based learning techniques for first MBBS students in Biochemistry. **Methodology:** For both learning methods, two diseases were selected. A total of 100 students samples from 1st MBBS are selected randomly and randomly divided into 2 groups of 50 students. The cross-over of each group was done with the clinical case as well as with the teaching-learning method. Pre and Post-expose MCQs test of 10 marks for the students were taken. **Results:** Both the groups show significant differences result in posttest MCQ marks in compare to pre-test MCQ marks with problem-based learning ( $p$  Value  $< 0.05$ ). Also, there is a very significant difference in the result of pre & post-learning MCQ marks in problem-based learning in comparison to traditional learning methods. (Group-1  $p$ -value  $< 0.0001$  and Group-2  $p$ -value  $< 0.001$ ). **Conclusion:** Performance of 1st MBBS students in the subject of biochemistry improved significantly during the MCQ test after problem-based learning but did not improve significantly during the MCQ test after traditional learning.

**Keywords:** LBL (Lecture Based Learning), PBL (Problem Based Learning)

### INTRODUCTION

The traditional learning techniques are lecture-based learning that includes 1 hour of sessions taught by the faculty of biochemistry to the student. In this, the succession of Powerpoint slides has been utilized as an educating strategy. Now that powerpoint slides are prepared without clinical correlation with any case and without integration with other subjects. Problem-based learning (PBL) can be utilized for teaching small groups as well as a large group. It can produce more retention and correlation of knowledge about the topic and clinical condition

which is required during the management of real patients. (1, 2) PBL is a new method of learning and this study is an attempt to see its effect and comparison with traditional learning techniques with its outcome. (3,4) In the long-term, this comparison can guide us to make a choice in learning biochemistry during 1st year of MBBS. Problem-Based Learning (PBL) is a teaching method that is student-centric teaching where clinical problems are used to discuss among the students. PBL helps to improve concepts and principles related to

correlation with the basic subject with the clinical subject. PBL also help to develop problem-solving abilities in a clinical case. It can also provide opportunities for working in groups, finding and evaluating research materials, and life-long learning (5)

### **Objectives:**

1. Comparison of problem-based learning with traditional lecture-based learning techniques for first MBBS students in Biochemistry.

### **Methodology**

For problem-based and traditional learning method two diseases were selected, sickle cell disease and cirrhosis of the liver. For the problem-based learning method, students group were provided drafted clinical feature and investigation with some treatment plan for both clinical diseases. Then the teacher asked them to discuss these problems among the group in co-relation with biochemistry. The student was moderated under the guidance of the faculty. For the traditional learning method, powerpoint presentation was drafted for both diseases including definition, pathogenesis, clinical feature, diagnosis and management of disease in the context of biochemistry.

A total of 100 Student samples from 1st MBBS are selected randomly. They are divided randomly into 2 groups of 50 students in each. Pre-expose MCQ test of 10 marks for students was taken about the understanding of both clinical cases. At the time of the traditional learning method, all 50 students of each group were exposed to lectures together. But for problem-based learning, each group was divided into two sub-groups of 25 students and exposed to the same clinical condition simultaneously. This subgroup is made to facilitated problem based learning within a smaller group.

Each group was exposed to tradition and problem base learning methods for both diseases. Initially, one group is exposed to a traditional learning method for one clinical case while other groups were exposed to a problem-based learning method for the same clinical case. After this, for the second disease, the learning method was changed for the group.

Group, which was exposed to the traditional learning method for the first clinical case, will be exposed to the problem-based learning method for the second case.

Post-expose MCQ test of 10 marks for students was taken about the understanding of both diseases.

Marks of pre and post – exposer MCQ were compared within the group. The difference of marks after exposer to both learning methods was compared with both learning methodology. The conclusion was made from the evaluation of data through paired t-test by using online <https://www.openepi.com> web application.

### **RESULTS**

The pre-learning MCQ test result is compared with the post-learning MCQ result.

As per table-1, there was no significant difference between pre & post-test MCQ marks with traditional learning methods in both groups. But both group shows significant difference results in post-test MCQ marks in compare to pre-test MCQ marks with problem-based learning.

#### **Comparison of Pre & Post-MCQ test**

- Traditional Learning = p' Value > 0.05 (No Significant Difference)
- Problem Based Learning = p' Value < 0.05 (Significant Difference)

In table – 2, in both groups, there is a very significant difference in the result of pre & post-learning MCQ marks in problem-based learning in comparison to traditional learning methods. (Group-1 p-value <0.0001 and Group-2 p-value < 0.001)

There were very significant improvements in the performance of students after problem base learning in comparison to the traditional learning method, which is proved by data shown in table-2 as well as in table-3.

#### **Traditional Vs Problem Based Learning**

- Group – 1 = p' Value <0.0001
- Group – 2 = p' Value <0.001
- Common comparison = p' Value < 0.0000001

**Table: 1** Pre-Learning MCQ Result Vs Post-Learning MCQ Result

	Traditional Learning				Problem Based Learning			
	Group – 1		Group – 2		Group – 1		Group - 2	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
<b>No.</b>	50	50	50	50	50	50	50	50
<b>Mean</b>	4.40	5.08	4.16	5.12	3.84	5.82	4.26	6.02
<b>S.D.</b>	2.76	2.75	2.67	2.76	2.47	3.27	2.17	3.01
<b>p' Value</b>	0.9798		0.8174		<0.05		<0.05	
<b>Interpretation</b>	<b>No Significant Difference</b>				<b>Significant Difference</b>			

**Table: 2** Group Wise Difference of Pre & Post Test MCQ Result with Traditional Learning Vs Problem Based Learning

	Group – 1		Group-2	
	Traditional learning	Problem Based Learning	Traditional learning	Problem Based Learning
	Diff. in Pre & Post	Diff. in Pre & Post	Diff. in Pre & Post	Diff. in Pre & Post
<b>No.</b>	50	50	50	50
<b>Mean</b>	0.68	1.98	0.96	1.76
<b>S.D.</b>	1.00	1.92	0.97	1.57
<b>p' Value</b>	<0.0001		<0.001	

**Table: 3** Common Difference of Pre & Post MCQ Result with Traditional Learning Vs Problem Based Learning

	Traditional Learning	Problem Based Learning
<b>No.</b>	100	100
<b>Common Mean</b>	0.82	1.87
<b>Common S.D.</b>	0.988622141	1.7503535
<b>p' Value</b>	<0.0000001	

## DISCUSSION

With clinical problems for learning in problem-based learning, students think critically about a clinical problem, which improves to collect as well as retain the knowledge and skills. (8) (7) Improved skill and retained knowledge through PBL will help students performance in examinations (9). This was experienced during our study and this might be the

main reason behind the highly significant differences in problem-based learning our students during 1st MBBS in biochemistry subject in comparison to traditional learning.

There is a study which is strongly supporting our results. In the study of Moreno Lopez, on dental students in Bologna, a group of problem-based learning obtained higher scores compared with the

lecture-based learning group (10). In the study of Muhammad A.Zahid, for a Comparison of problem-based learning-driven with traditional didactic lecture-based curricula, they found that students were achieved significantly more grading score with problem base curriculum in comparing traditional didactic lecture-based curriculum. (11)

## CONCLUSION

Performance of 1st MBBS students in the subject of biochemistry improved significantly during the MCQ test after problem-based learning but did not improve significantly during the MCQ test after traditional learning.

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