



## STUDY OF EFFECT OF PROBLEM BASED LEARNING CONDUCTED IN BIOCHEMISTRY FOR FIRST YEAR M.B.B.S STUDENTS AND ITS RELATION TO UNIVERSITY EXAMINATION RESULTS

### Biochemistry

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### ABSTRACT

**Aims and objectives :** Study of effect of Problem based learning as innovative teaching learning methodology to first year M.B.B.S and its relation to its effect on University Examination Results in Biochemistry of first year students.

**Material and Methods :** This prospective study was undertaken in Department of Biochemistry ,MGM'S Medical college ,Aurangabad.Total 1350 students from last 10 batches from 2008 to 2017 were taken for study.We studied average of passing percentage of batches of First M.B.B.S. students in last 10 years and studied the effect of Problem based learning conducted in Biochemistry for first year M.B.B.S students and its relation to University Examination Results.

**Observations and Results :** In our study we compared results of the batches in whom students were exposed to problem based learning as innovative teaching learning methodology in Biochemistry with the earlier batches in which the innovative method was not used.The mean average result of batches in whom innovative innovative method PBL was used was  $91.2 \pm 8.8$  in comparison to  $77.6 \pm 3.07$  in the batches in whom PBL was not used .The difference is statistically significant.

**Conclusion:** This shows that inclusion of PBL as innovative teaching learning methodology in Biochemistry to First M.B.B.S. students helps in better understanding of clinicobiochemical correlation of topics and effectively dispensing of teaching learning process including emphasis on student centric methods such as problem based learning and outcome of the students passing rate of university examination is consistently good. This has been shown by average passing rate above 80 % consistently from last 04 years university results which is definitely correlating to innovative teaching learning method used in Biochemistry of first M.B.B.S.and its successful implementation by Department of Biochemistry,MGM Medical college,Aurangabad.

### KEYWORDS

PBL- Problem Based Learning

### INTRODUCTION

One of the principal objectives of medical education is to produce medical personnel having sound clinical competence and community orientation with proficient communication skills. A combination of these qualities is necessary to solve the formidable health problems (1). However, there is a general dissatisfaction with the prevailing medical practices and one of the main reasons for such dissatisfaction has been identified as the present day medical curricula. This puts a tremendous responsibility on the institutions providing medical education for bringing about the required innovations in the existing systems to meet the defined needs of the societies in their areas of operation (2, 3). Medical Council of India has stressed upon

1. Community oriented 2. Need-based curriculum 3. Stimulate student's interest and 4. Inculcate drive to learn more mainly through an active self-directed approach rather than through didactic teaching. Biochemistry Curriculum should have A. Small-group approach, to enable the students to learn concepts of small-group dynamics and teamwork; B. Problem-based approach, to enable them to find answers to biomedical problems through self-directed learning and use of appropriate resource materials. C. Thoroughly integrated and to the extent possible problem-based, the curriculum incorporates organ-system pattern and encompasses all parameters outlined in the SPICES model (4,5,6).

Problem based learning (PBL) is documented as far back as Plato and the Socratic pedagogy and its manifestations have been varied. The philosophy embodies Alfred North Whitehead's observation that "education means, literally, the process of leading out" (7). PBL was first developed in 1969 at McMaster University's Faculty of Health Sciences in Canada and nowadays it is accepted as very important innovation in medical education in Western countries (8,9). Although PBL is application in medical education that is not free form discovery learning, PBL is rather a rigorous, practical teaching learning process (10). In medicine, PBL is understood to mean a highly structured, student centered, educational methodology, small group and collaborative problem solving activities (11). In PBL students are put in an active learning situation by giving them clinical problems and training them to identify what they need to learn to solve those

problems. Faculty members go through a tedious exercise to develop a single PBL case. They should be able to determine proper learning resources and subsequently apply what they have learned to solve problems. The tutor's role in PBL is to facilitate this process of active learning by students and foster skills of clinical reasoning and habits of continued learning. PBL is typically carried out in three phases (11,12). Phase one is Problem analysis. This is the phase in the PBL approach where the students develop the cognitive skills necessary for clinical reasoning. In group discussion PBL settings the students evaluate the patient problem presented to them exactly as they would a real patient, attempting to determine the possible underlying anatomical, physiological, biochemical, or behavioral dysfunctions responsible for the patient's problem. The task of the students is to enumerate all possible causal paths that would explain the progression from the enabling conditions to the signs and symptoms in the given problem scenario. Second phase is Self-directed study. In this phase, students work outside the tutorial session, using any relevant learning resources, e.g. literature, laboratories, specialists, to address any open issues identified in the first phase. Third phase is Synthesis and application of newly acquired information. The third phase begins when the students return from their self-study period. They analyze data and evaluate or justify solutions collaboratively and wrap up the problem (11,12). The disadvantage of teacher-center learning is the passive nature of the audience in class and limited opportunity for feedback lead to low receptivity (13). Furthermore, lecturing skills of a high quality are required to hold the attention of students for the commonly prescribed lecture duration of one hour. Very often, the material covered by a lecture can be more easily acquired from a textbook and has little if any clinical application. Many students attend lecture classes because attendance is mandatory or because they do not want to incur the wrath of the teacher who might be their examiner. The shift in emphasis from traditional teaching to an emerging method like PBL is largely triggered by the changing external environment that is the 'global' workplace for which institutions prepare their students. In recent years PBL has taken a greater prominence in tertiary education with curricula directed at independent and team learning (14). PBL studies have reported that this strategy has four main objectives which may be summarized as 1) application of basic knowledge 2) develop reasoning 3) self directed learning 4) promotion of team work (15-17).

## AIMS AND OBJECTIVES

Study of effect of Problem based learning as innovative teaching learning methodology to first year M.B.B.S and its relation to its effect on University Examination Results in Biochemistry of first year students.

**MATERIAL AND METHODS :** This prospective study was undertaken in Department of Biochemistry ,MGM'S Medical college ,Aurangabad.

Students from last 10 batches appeared for University examination from 2008 to 2017 were taken for study. In our study we compared results of the batches from year 2013 to 2017 in whom students were exposed to problem based learning as innovative teaching learning methodology in Biochemistry with the earlier batches from 2008 to 2012 in which the innovative method problem based learning was not used. We studied average of passing percentage in Biochemistry of batches of First M.B.B.S. students in last 10 years and also studied effect of Problem based learning conducted in Biochemistry for first year M.B.B.S students and its relation to University Examination Results.

## RESULTS

**TABLE-1** showing academic yearwise distribution of groups of First MBBS students appearing in final University Examination .

Sr no	GROUP	ACEDMIC YEAR
1	GROUP -A	2013 to 2017
2	GROUP-B	2008 to 2012

**Table 2:** Showing distribution of Groups using PBL as Teaching Learning methodology apart from traditional teaching methods.

Sr no	GROUP	Use of PBL as Teaching Learning Method apart from traditional teaching methods.
1	GROUP- A	YES
2	GROUP-B	NO

**TABLE -3** showing average percentage of yearwise University result of First MBBS Biochemistry MGM MCA'bad.

SR NO	FIRST MBBS -BIOCHEMISTRY REGULAR EXAM YEAR	Average percentage of University Result %
1	2008	73
2	2009	75
3	2010	79
4	2011	81
5	2012	80
6	2013	94
7	2014	86
8	2015	84
9	2016	97
10	2017	95

**Table 4.**

Showing Comparison of average percentage result of successful candidates appeared in first M.B.B.S. University examination in Biochemistry in Group A and Group B. The result is statistically significant.

Sr no	GROUP	Mean $\pm$ S.D.	P value
1	GROUP -A	91.2 $\pm$ 8.8	<0.05
2	GROUP-B	77.6 $\pm$ 3.07	

## DISCUSSION

Traditional teaching separates the basic science segment from the clinical segment. In the conventional curriculum, teaching is tutor-centered and comprises large group lectures, tutorials, structured laboratory experience, and periodic tests of achievement (18). Problem-based learning is an instructional method in which students learn through facilitated problem solving. In problem-based learning, student learning focuses on a complex problem that does not have a single correct answer. Students work in collaborative groups to identify what they need to learn in order to solve a problem (19). Educational research indicates that this format of teaching is frequently unstructured, the acquisition of skills is left largely to chance and is subject to little quality control, students are inadequately monitored, and feedback is seldom given (20). Recent studies have reported the effects of problem-based learning during medical school

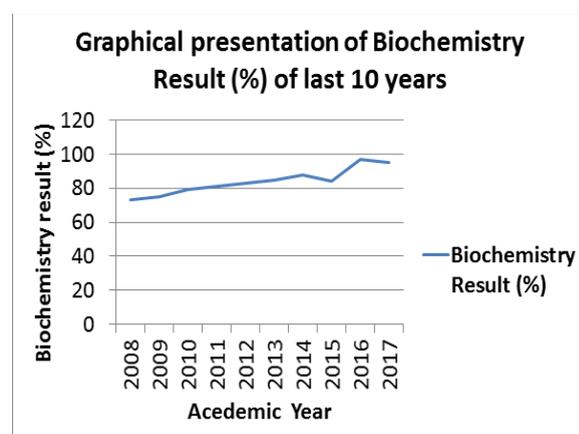
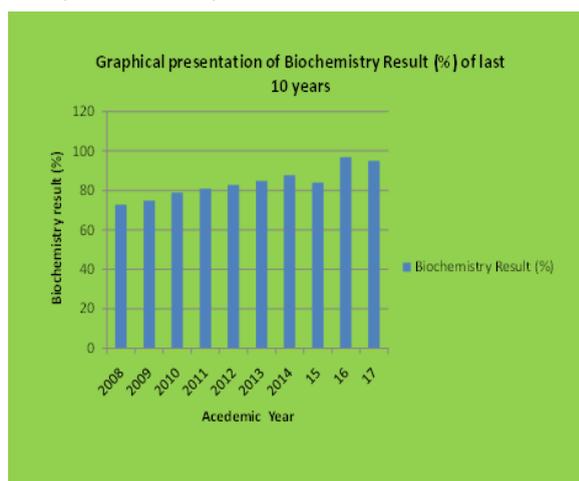
training (20-22). This study was undertaken in Department of Biochemistry, MGM Medical college ,Aurangabad from period of 2008 to 2017. We divided the students in two groups Group A and Group B. The students from 2013 to 2017 were exposed to problem based learning as innovative teaching learning methodology in Biochemistry, MGM Medical college ,Aurangabad were included in Group A as study group and they were compared with earlier batches from Group B 2008 to 2012 in which the innovative method problem based learning was not used. We found average percentage result of successful candidates appeared in first M.B.B.S. University examination in Biochemistry in Group A was **91.2  $\pm$  8.8** and in Group B was **77.6  $\pm$  3.07** . The difference of mean results in Group A was higher as compared to group B and was extremely statistically significant. This shows that there is definite positive effect of PBL conducted in Biochemistry with success rate of the students appearing for university examination in Biochemistry.(Table 4)

The self-directed organ based teaching is supplemented by problem-based exercises, which have been recognized as effective integrated approach to learning medicine through real and simulated health problems.

The problem based orientation was given to this new curriculum in view of reports that medical knowledge can not be considered in isolation from the process of problem solving and that student led discussion groups are superior in learning complex material in term of memory retention (23, 24).

## CONCLUSION

This study shows that at the end of first M.B.B.S. teaching programme the students can correlate clinicobiochemical correlation better with various diseases and that promotes better learning and understanding of biochemical basis of medicine due to innovative changes in curriculum such as problem based learning and integrated teaching. This in turn affects on the overall performance as well in final university examination results of Biochemistry students. This has been shown by average passing rate above 90 % in Biochemistry of last 04 years in university examinations.



## COMPARISON OF TWO GROUPS

AVERAGE % OF STUDENTS PASSED AND FAILED IN GROUP A



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