

# Comparative Study to Evaluate the Role of Problem Based Learning Method Vs Conventional Teaching Method in Medical Education

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## Abstract

**Background :** Problem based learning (PBL) is well established method to promote integrated teaching, self-directive learning, early clinical exposure. **Objective:** The Comparative Study was done to evaluate the role of Problem Based Learning Method Vs Conventional Teaching Method in Medical Education. **Method:** In descriptive Observational study 150 second MBBS students participated in this study after valid informed consent. The participants were ascertained into two groups with 75 students each in both the group as group A & B. Group A was subjected to problem based learning module of 20 minutes on 5 different modules at five different times and sittings. Group B was subjected to 20 minute standardised conventional teaching module five different times and sittings. **Results:** PBL to be more interesting, interactive, easy, exciting and active learning method. PBL was supposed to increase attention span and keep students alert and focused and promoting conceptual learning. PBL was suggested to be more helpful in gaining confidence, managing real life situations. It was also found to be more promoting in problem solving and critical thinking. This method was also rated high in understanding the subject and improving the patient consultation skills. This method was found to display solid base of subject content knowledge, promoting constructive, collaborative and cooperative learning opportunities and links subject matter within and across disciplines. **Conclusion:** PBL is more effective teaching learning method overall in comparison to conventional teaching method.

## Key Words

Problem Based Learning, Conventional Teaching, Skill, ATECOM, Medical Curriculum

## Introduction

PBL is well established method to promote integrated teaching, self-directive learning, early clinical exposure and thus helps to attain the skills amongst Indian medical graduates during their medical curriculum. [1] Various studies regarding Problem Based Learning have been widely conducted world-wide [2-4], but the implementation of this learning method is limited in our set up.

Further, to conduct such studies evaluating the role of PBL in second professional MBBS students in the stream of pharmacology, shall surely help the department and

the institution to develop various competencies aligned with widely proposed ATCOM model. Hence, the current study was undertaken to study the effectiveness of Problem Based Learning method in medical education and to understand the subject and to give early clinical exposure to medical students at an early stage.

## Material and Method

After necessary permission from the Institutional ethics committee of the Medical Education Unit and Curriculum

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unit of the institution (vide no. IEC/GMC/2020/06), 150 second MBBS students participated in this study after valid informed consent. The participants were ascertained into two groups with 75 students each in both the group as group A & B, representing problem based learning group and conventional teaching method group. Conventional teaching module of 5 clinical problems and its treatment standardised after peer group inputs from the standard text book of Pharmacology and Medicine. Similarly, problem based learning module, based on the same teaching subject content was prepared and standardised after necessary training of the helping teaching staff.

**Group A** was subjected to problem based learning module of 20 minutes on 5 different modules at five different times and sittings.

**Group B** was subjected to 20 minute standardised conventional teaching module five different times and sittings.

Both the Teaching learning modules were, pre-structured, peer reviewed, pretested in a preliminary.

Every individual in a group was subjected to five competency modules framed by PBL method and conventional teaching method as per their allocated groups amongst the undergraduates. Both quantitative and qualitative data was retrieved and for the sake of comparison and statistical evaluation, the data for individual 5 competencies retrieved from all undergraduates (n=75) each, were clubbed in both the groups group A and group B and the values quantitatively and qualitatively were compared between PBL method and conventional teaching method separately.

The self created quantifiable pretested and validated assessment scale was utilized for the current study to evaluate student response (undergraduate) to the new teaching module in comparison to conventional teaching method.

### **Statistical Analysis**

The data was expressed in n (%) and mean  $\pm$ SD. The chi square test and student-t test was applied respectively to prove the statistical significance. P value  $<0.05$  was considered significant. Both quantitative and qualitative data was retrieved and for the sake of comparison and

statistical evaluation, the data for individual 5 competencies retrieved from all undergraduates (n=75) each, were clubbed in both the groups group A and group B and the values quantitatively and qualitatively were compared between PBL method and conventional teaching method separately. For the sake of convenient statistical comparison for the quantitative analysis data at the score of 4 and 5 was clubbed and counted.

### **Results**

Over all data from the table 1 retrieved from undergraduates showed that PBL to be more interesting, interactive, easy, exciting and active learning method. PBL was supposed to increase attention span and keep students alert and focused and promoting conceptual learning. PBL was suggested to be more helpful in gaining confidence, managing real life situations. It was also found to be more promoting in problem solving and critical thinking. This method was also rated high in understanding the subject and improving the patient consultation skills. This method was found to display solid base of subject content knowledge, promoting constructive, collaborative and cooperative learning opportunities and links subject matter within and across disciplines. Majority of the parameters are marked with score of 4 .

Highest score recorded in the PBL was  $4.05 \pm 0.75$  for parameter representing PBL as a method helping in applying knowledge and learning in actual clinical practice viza viz low- average rating was recorded in favour of conventional teaching method ( $2.55 \pm 1.05$ ) for the same parameter when compared. This was followed by  $4.03 \pm 0.68$  in PBL group, suggesting PBL method as highly promoting clinical based learning viza viz in comparison to conventional teaching method with score of  $2.70 \pm 0.84$  for same parameter. This was followed by score of  $3.97 \pm 0.68$  given to parameter representing PBL as an interesting method and score of  $3.66 \pm 0.65$  was given for conventional teaching method for the same parameter. Even the least score recorded in PBL group was  $3.70 \pm 0.72$  given to parameter representing PBL as an interactive method was found to be higher than score of  $3.41 \pm 0.67$  given for conventional teaching for the same parameter. This was followed by least score of  $3.71 \pm 0.80$  given to parameter representing PBL as an easy method

**Table 1. Showing Mean  $\pm$ SD Response of all 5 Competencies Clubbed of PBL versus Conventional Teaching Method by Undergraduates**

S. No.	Parameters	Group A (PBL) (N=75)	Group B (Conventional teaching method) (N=75)	Statistical inference P value
1	Interesting Method	3.97 $\pm$ 0.68	3.66 $\pm$ 0.65	P < 0.0001 ***
2	Interactive Method	3.70 $\pm$ 0.72	3.41 $\pm$ 0.67	P < 0.0001 ***
3	Easy Method	3.71 $\pm$ 0.80	2.83 $\pm$ 0.85	P < 0.0001 ***
4	Increasing Attention Span	3.81 $\pm$ 0.78	2.44 $\pm$ 1.01	P < 0.0001 ***
5	Applying Knowledge and Learning in actual clinical settings	4.05 $\pm$ 0.71	2.55 $\pm$ 1.05	P < 0.0001 ***
6	Active Learning process	3.92 $\pm$ 0.71	2.68 $\pm$ 0.98	P < 0.0001 ***
7	Promotes conceptual Learning process	3.97 $\pm$ 0.71	2.60 $\pm$ 0.86	P < 0.0001 ***
8	Promotes clinical based Learning	4.03 $\pm$ 0.68	2.70 $\pm$ 0.84	P < 0.0001 ***
9	Keeps Alert and Focused	3.80 $\pm$ 0.77	2.40 $\pm$ 0.89	P < 0.0001 ***
10	Level of Satisfaction	3.75 $\pm$ 0.78	2.56 $\pm$ 0.86	P < 0.0001 ***
11	Improves Understanding of subject	3.87 $\pm$ 0.65	2.79 $\pm$ 0.99	P < 0.0001 ***
12	Exciting Teaching Learning Method	3.83 $\pm$ 0.78	2.83 $\pm$ 0.77	P < 0.0001 ***
13	Consistent alignment to local, state or national standards	3.81 $\pm$ 0.67	3.03 $\pm$ 0.65	P < 0.0001 ***
14	Improves patient Consultation Skills	3.91 $\pm$ 0.71	2.39 $\pm$ 0.87	P < 0.0001 ***
15	Helpful in gaining confidence	3.85 $\pm$ 0.70	2.54 $\pm$ 0.82	P < 0.0001 ***
16	Helpful in managing real life clinical situations	3.90 $\pm$ 0.71	2.44 $\pm$ 0.82	P < 0.0001 ***
17	Promoting problem solving , critical thinking and creative thinking	3.81 $\pm$ 0.72	2.78 $\pm$ 0.65	P < 0.0001 ***
18	Help Displaying solid base of subject content knowledge	3.71 $\pm$ 0.65	2.67 $\pm$ 0.73	P < 0.0001 ***
19	Promotes constructive, collaborative Learning , cooperative opportunities	3.71 $\pm$ 0.68	2.36 $\pm$ 0.66	P < 0.0001 ***
20	Integrates basic and clinical science	3.76 $\pm$ 0.70	2.54 $\pm$ 0.83	P < 0.0001 ***

, which is still higher than the score of 2.83  $\pm$  0.85 given to conventional teaching method for same parameter. The score of 3.71  $\pm$  0.65 given to parameter representing PBL as a learning method helpful in displaying solid base of subject content knowledge and was found still higher than 2.67  $\pm$  0.73 for the same parameter in conventional teaching group. Overall response of undergraduates towards PBL method was superior as compared to conventional teaching method with significant statistical difference (P value < 0.0001) between all parameters. Over all data from the table 2 retrieved from undergraduates suggest that majority of the students marked PBL with scores between 4 to 5. P value was found to be statistically highly significant (< 0.0001) in most of the parameters when compared except for parameter representing teaching module to be interesting

where P value was found 0.008.

### Discussion

Many comparative studies between conventional teaching method and problem based learning method have recommended in favour of implementing problem based learning in medical education as students response was also found to be very encouraging in most of these studies like the results of our current study. [5-12]

In the study of Sangma A M *et al*, 2019 majority of the students admitted that PBL method helped them to apply basic science in actual clinical phenomena & helpful to sharpen their critical thinking and problem solving in accordance to results of our study. [5]

Mohan L *et al*, 2014 conducted the study in which score for PBL was significantly higher than lecture based learning like our study. In their study students agreed

that PBL helped them to apply their knowledge and understand relevance to a clinical scenario and integrating basic science with clinical science.<sup>[2]</sup>

Similarly a study conducted by Thomas E, 2015 also suggested that PBL having higher scores than conventional teaching method and recorded interactive, enhancing better problem solving skills, exciting and least boring.<sup>[6]</sup>

Padmanabha TS *et al*, 2016 found that most of students perceives that the knowledge and understanding could be easily acquired by PBL over lecture based method and PBL was considered better in understanding the concepts for clinical application, this perception of the students in this study was in accordance with our study.<sup>[7]</sup>

Quaiser S & Khan R, 2015 conducted a comparative study between PBL and traditional teaching and in their study it was concluded that majority of the students 61.4% liked PBL, 35.2 % liked lecture based learning and both lecture based and problem based learning method was liked by 71.7% .These results were in accordance to our study over all. <sup>[8]</sup>

Galvao TF *et al*, 2014 in their study concluded that there is need of gradual transition and implementation of PBL in the current medical curriculum.<sup>[9]</sup>

Recently also the study of Zhao W *et al* 2020 suggested that PBL combined with CBL may be an effective method for improving medical students' and residents' performance and enhancing their clinical skills.<sup>[10]</sup>

In contradiction to our results, Tripathi RK 2015, reported students to prefer tutorial mode of teaching more to pass examination over PBL.<sup>[11]</sup>

### Conclusion

Problem based learning is more effective teaching learning method overall in comparison to conventional teaching method as expressed by undergraduates. Further, PBL is more effective in understanding the subject and providing early clinical exposure at an early stage during the medical curriculum of students.

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### Conflicts of Interest

There are no conflicts of interest.

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