

Problem Based Learning versus Traditional Lecture Method: A Comparative Study among Second Year Medical Students

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Abstract

Background: The medical curriculum in most colleges is taught in a traditional, subject-wise fashion predominantly through didactic lectures. PBL is an effective way of delivering medical education in a coherent, integrated manner. **Aim and Objectives:** To compare PBL with traditional learning method. **Type of Study:** comparative study. **Materials & Method:** 96 medical students from Dr. Vasant Rao Pawar medical college, Nashik were recruited during second term of their second year. Ten topics from the 2nd term syllabus of second year were selected. Out of these 10 topics, 5 were covered under PBL method and remaining under traditional lectures. For PBL sessions, all students were grouped into 12, with each group consisting of 8 students. At the end of study, prestructured and pretested questionnaire consisting of items pertaining to the process of PBL was filled from students and also performance of students was assessed in post session examination. **Results:** Out of the 96 students, 84(87.5%), 87(90.6%) and 75(78.13%) students said PBL increased their motivation to participate in class, to attend class and to do well in the course respectively. Also, 90 (93.75%) students said that PBL enhanced their communication skills and 88(91.67%) students said that PBL has enhanced their retention of course content. In PBL Covered Topics, 68.75% students scored above e"75% while in Traditional Lecture Covered Topics, 44.79% students scored e"75%. Average attendance in PBL session was 89.79% while in traditional lecture method it was 78.95%. **Conclusion:** In institute with packed curriculum, introducing more PBL sessions is not feasible as it is time consuming, though it is more effective method of learning. So the hybrid method i.e. combination of these two methods will be more effective than any of them alone.

Key Words: Problem based learning (PBL); Traditional teaching methods (lecture-based); Medical education; Integrated teaching.

Introduction

There is a growing concern among medical educators that conventional modes of teaching medical students (lecture-based curricula) neither encourage the right qualities in students nor imparts a life-long respect for learning. Fundamental reforms in undergraduate medical education have been advocated for 100 years. In 1899, Sir William Osler realised that the complexity of medicine had already progressed beyond the ability of the teachers to teach everything that students would need to know. This can be brought about only by freeing medical education from

some of its present rigidity and uniformity, by reducing classroom overcrowding, and by adapting medical education to more closely meet the educational needs of students [1].

The shift in emphasis from traditional teaching to an emerging method like Problem based learning (PBL) is largely triggered by the changing external environment that is the 'global' workplace for which institutions are preparing their students [2].

PBL is an effective way of delivering medical education in a coherent, integrated manner. It is based on principles of adult learning theory, including motivating the students, encouraging them to set their own learning goals, and giving them a role in decisions that affect their own learning [3].

Medical colleges in India have been following a traditional curriculum, characterized by "discipline wise model" with a high degree of compartmentalization into subjects of basic sciences, paraclinical and

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clinical branches. Several areas of redundancy, repetition and overlapping along with the observation of a gap between the qualitative and quantitative advancement in medical education and achievements in the field of health care prompted the Medical Council of India to adopt a need based curriculum for undergraduate medical education in India. "Regulations on Graduate Medical Education, 1997" recommend a teaching approach characterized by maximal efforts to encourage integrated teaching between traditional subject areas using a problem based learning approach and de-emphasize compartmentalization of disciplines so as to achieve both horizontal and vertical integration in different phases [4].

Switching to PBL requires teachers to alter their role from a didactic teacher to that of a facilitator. However, not many medical colleges in India have incorporated PBL as the sole or one of the teaching methods. This could be because of a lack of awareness regarding PBL or negative perceptions about the role of a teacher in PBL. Faculty development is crucial to the success of medical education programmes and must be a continuous process adapted to the needs of an educational environment and its teachers [5].

Therefore present study is conducted to compare old traditional teaching methods with PBL in view of introducing this new method in teaching curriculum.

What is traditional teaching and what is problem based learning?

The medical curriculum in most schools is taught in a traditional, subject-wise fashion predominantly through didactic lectures. Assessment continues to mainly test factual knowledge and recall [6].

In the conventional curriculum, teaching is tutor-centred and comprises large group lectures, tutorials, structured laboratory experience, and periodic tests of achievement. Students passively absorb information rather than actively acquire knowledge [1]. This is the problem solving method i.e. arriving at

decisions based on prior knowledge and reasoning. The focus is on preparatory learning prior to exposure to the problem. Learning environment is passive and teacher centred while PBL is self directed and student centred.

In problem based learning (PBL) students use "triggers" from the problem case or scenario to define their own learning objectives. Subsequently they do independent, self directed study before returning to the group to discuss and refine their acquired knowledge. Thus, PBL is not about problem solving per se, but rather it uses appropriate problems to increase knowledge and understanding. The process is clearly defined, and the several variations that exist all follow a similar series of steps [3].

Aim and Objectives

To compare the PBL with traditional learning method.

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Type of Study

Comparative study

Study Period

The present study was carried out in December 2011 to June 2012.

Study Population

Ninety six students from second year of MBBS course from Dr. Vasantrao Pawar Medical College, Nasik.

Method

Ethical clearance from the institutional Ethical Committee was obtained and consent was taken from each participants. The participants were recruited during second term of their second year considering that they

have basic knowledge and good sensitization about the microbiology. 10 topics from the 2nd term syllabus of second year were selected. Out of these 10 topics, 5 were covered under PBL method and remaining under traditional lectures.

For PBL sessions, the total 96 students were grouped in to 12, with each group consisting of 8 students. In the 1st session all students have given some lectures and information related to the topic of interest. Afterwards all the groups have given same problem/scenario/case and they have asked to formulate their own hypothesis and learning objectives within their group after discussing and involving each member of the group. For this purpose they have given one hour.

Then students were given one weeks of preparation time for the presentation during which they were supposed to study all their learning objectives with the help of study material, references provided by the facilitator.

The next session was organised after one week and all the students were reviewed and encouraged to discuss the given scenario covering each and every aspect. The pre-structured and pre-tested questionnaire consisting of items pertaining to the process of PBL was designed, after an extensive literature review. This proforma was filled from the students. Also, the objective type of examination (50 marks) was conducted for the evaluation of the students at the end, which consist of two sections, section A (25 marks) & B (25 marks) based on the topics covered under PBL and traditional lecture method respectively. Analysis was done by using Z test.

Results

Table 1 shows the comparison of student's perception about PBL and traditional lecture method. When students were asked some questions pertaining to, how PBL impact motivational factors on which process of learning is dependant; like motivation to attend, participate and do well in the class.

Out of the 96 students, 84(87.5%), 87(90.6%) and 75(78.13%) students said PBL enhanced their motivation to participate in class, to attend classes and to do well in the course respectively whereas only 25(26.04%), 36(37.5%), and 43(44.79%) students gave corresponding response to these question in relation to traditional lecture method.

And the difference between the two methods was found to be statistically significant (Table-1).

While 90 (93.75%) students said that PBL enhanced their communication skills, compared to this only 21(21.88%) students had given response in favor of traditional lecture method. 88(91.67%) students said that PBL has enhanced their retention in-course content whereas 50(52.08%) said the same about traditional lecture. Regarding the understanding of course content, both the methods were equally effective as 82(85.42%) students identified PBL while 80(83.33%) students identified traditional lecture method as effective modality.

Table 2 shows Comparison of performance of students in post session examination. In section A (Based on PBL Covered Topics), 68.75% students scored above e"75% while in section B (Based on Traditional Lecture Covered Topics), 44.79% students scored e"75%. This difference was found to be statistically significant.

Table 3 shows comparison between attendance of students in PBL sessions and traditional lectures. Average attendance in PBL session was 89.79% while in traditional lecture method it was 78.95%. This difference in attendance was found to be statistically significant.

Discussion

PBL was chosen as an effective method to assist students in learning concepts of Microbiology course. After some didactic lectures were replaced by PBL sessions in a large classroom setting, it soon became

Table 1: Comparison of student’s perception about PBL and the traditional lecture method

Questions	Students With The ‘Yes’ Response				Z Value	P Value
	PBL		Traditional lecture method			
	No of students (N=96)	%	No of students (N=96)	%		
Question 1. Increased my motivation to participate in class	84	87.5%	25	26.04%	10.96	<0.05
Question 2. Increased my motivation to attend class	87	90.6%	36	37.5%	9.20	<0.05
Question 3. Enhanced my communication skills	90	93.75%	21	21.88%	14.70	<0.05
Question 4. Increased my motivation to do well in the course	75	78.13%	43	44.79%	5.05	<0.05
Question 5. Enhanced my retention of course content	88	91.67%	50	52.08%	6.79	<0.05
Question 6. Increase my understanding of course content	82	85.42%	80	83.33%	0.40	>0.05

Table 2: Comparison of performance of students in post session examination

Marks Obtained	Section A (Based on PBL Covered Topics)		Section B (Based on Traditional Lecture Covered Topics)	
	No. of students	%	No. of students	%
= 75%	66	68.75%	43	44.79%
50 -74.9%	25	26.04%	41	42.71%
<50%	05	05.21%	12	12.50%
Total	96	100.00%	96	100.00%

(S.E.P. between section A & section B for e” 75% marks obtained is Z=3.45, P<0.05)

Table 3: Comparison between attendance of students in PBL sessions and traditional lectures.

Type Of Session	Average Attendance (Out of 96 Students)	Attendance in Percentage
PBL	86.2	89.79 %
Traditional lecture method	75.8	78.95 %

(Z = 2.09, P < 0.05)

apparent that PBL was very popular with students. The PBL technique does not require additional tutors or any additional funding; therefore, the use of PBL could be expanded further. However, to do this, we need to demonstrate that this teaching technique in a classroom setting has benefits for student learning similar to conventional teaching method or that this technique is at least no inferior to conventional lecture-based learning. The main objectives of this study was to compare PBL with traditional lecture method in the form of

1. Student’s perception about each of these
2. Comparison of post session examination results
3. Comparison of attendance

In the present study we found that PBL is more effective method than traditional lecture method, when the ability of the method to effect motivational aspect of learning was tested.

As PBL consist of groups with each consisting of only 8 students, each and every student got the chance to participate in discussion, so subsequently students found PBL learning method more retentive and it also improved their communication skill.

The present study showed that students found these both methods nearly equally effective in understanding the course content. Thus traditional teaching method was not inferior to PBL in understanding the course content.

Our results are consistent with a study conducted at the UBC Okanagan campus in Kelowna, BC, Canada by Andis Klegeris et al [7] within a pharmacology curriculum. They have found that students enjoyed PBL-based

programs more than conventional programs because of the enhanced learning benefits, including understanding and retention of the course materials.

In a similar study conducted by Maya Roche et al found that 79% students felt that PBL session motivated them to learn, 92.7% students found PBL method reinforcing their understanding of the subject and 83.9% students felt that PBL facilitates team learning [8].

As shown in table no 2, significantly more students performed well in PBL covered topics than in traditional lecture based topics. This may be because PBL was a student centred method which requires active participation from each student which found to be beneficial in post session examination.

We believe that students “voted with their feet” by attending the PBL portions of the course in higher numbers than the standard lectures. Student attendance can be a reliable parameter measuring student satisfaction with the learning process. The data collected prove that the students were very motivated to attend PBL sessions independent of whether they were being graded for it.

In a study conducted by Andis Klegeris et al [7], attendance during problem-based learning (PBL) sessions was significantly higher compared with standard lectures.

Conclusion

PBL is an effective way of delivering medical education in a coherent, integrated programme and offers several advantages over traditional teaching methods. It is based on principles of adult learning theory, including

motivating the students, encouraging them to set their own learning goals, and giving them a role in decisions that affect their own learning.

PBL is fun for students and tutors, and the process requires all students to be engaged in the learning process. PBL improves the communication skills of the students, as in this method students work in groups. They also get informal education about group dynamics and how to do work in groups.

Students have better knowledge retention with PBL but on the understanding of the course content PBL has no added advantage over traditional lecture method. As we see, in traditional lecture method, students were exposed to some experienced, knowledgeable and inspirational teachers, who can deliver particular topic in more concise, integrated and simple form with less time consumption. Without teachers students may get information overloaded as they may be unsure how much self directed study to do and what information is relevant and useful.

Though PBL is very time consuming process, but students gave better performance in examination and the attendance of students in PBL showed that students liked this method over traditional lecture method.

Thus, in institute like Dr. Vasant Rao Pawar medical college, with packed curriculum, introducing more PBL sessions is not feasible though it is more effective method of learning, so the hybrid method i.e. combination of these two methods will be more effective than any of them alone.

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