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Original Research Article

Introducing Problem Based Learning for First MBBS Anatomy Students

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ABSTRACT

As medical education continues to evolve, educators are attempting to prepare students for their professional lives. Anatomy is an important basic science that if deficient in, the student may feel inadequately prepared for clinical courses thus, pinpointing the best teaching method warrants investigation. In recent years many researchers worked on Problem Based learning and found that PBL inculcates better understanding, self-directed learning and analytical skills in students. So we felt need of PBL as an innovative teaching learning method in anatomy. We introduced problem based learning (PBL) for sixty first MBBS students in 2012 batch, keeping in mind to generate interest for learning process, to make teaching learning method more interactive & student centered and to enhance knowledge by integration of basic and clinical sciences. A Paper & image based PBL module was posed to students of all groups. A Pre test was taken before the first session to assess students' knowledge on the topic. The first session comprised of small group discussion amongst the students in presence of a facilitator. In subsequent sessions various groups presented their discussion outcome. A post test was taken to assess knowledge achieved. An anonymous feedback was also taken after the end of session & analysed. The percentage of students agreeing to various questions was in range of 58% to 90%. Overall conclusion about PBL is, it drives students centered learning & incorporates integration and practical application of the knowledge of basic science, simultaneously helping students become lifelong learner .It helps in development of self directed learning, problem solving attitude & analytical skills.

Key Words: problem based learning, group discussion, curriculum, medical education, anatomy.

INTRODUCTION

Problem-based learning (PBL) was first developed by Howard Barrows at McMaster University in Canada in the mid 1960's. [1] Problem-based learning (PBL) has been proposed as a method of introducing clinically relevant material and encouraging students to conduct independent studies as well as to develop beneficial life-long learning habits. [2, 3] In contrast to the lecture-listener format of education, PBL is student centered on the student being the active participant. The

student recognizes the problem, researches the problem, and presents an interpretation of the solution. Incorporated in this process is gathering information from pertinent sources (experts in the field, books, journals, etc.), analyzing the information, developing hypotheses, and then sharing labors and thoughts with colleagues. [4]

Information gained in PBL is important and most likely will be retained longer by the student because he or she has been active in producing the information. The most important aspect of PBL is the process of developing a skill that can be utilized when the student is actually confronted with a clinical problem that does not fit the "textbook."

The PBL experience used in this study is a variation of the more rigidly defined experience by Barrows and Tamblyn. [2, 5] During this experience, students defined learning issues, used resources, and presented their findings. Emphasis was not placed on hypothesis formation, testing, and revision. One of the current trends in medical education is to integrate basic science knowledge with clinical application of that knowledge. [5, 6, 7] The challenge has been to increase the students' exposure to clinical matters and continue to prepare them to be current and up-to-date physicians throughout their careers as they face an ever increasing amount of information in the medical sciences. [8]

Basic science like anatomy would be better understood, remembered and subsequently applied if learned in a clinically relevant format. [9] Nurturing these needs, in recent years, PBL is being widely used in Medical Education all over the world. [10, 11] It is well appreciated that anatomy should be learned as a dynamic subject for problem solving & application in the clinical practice towards delivery of quality health care. [12]

So this study is undertaken as a pilot project to introduce PBL as an innovative teaching learning method in curriculum of anatomy at Govt. Medical College, Latur.

Aims and Objectives:

Aims of present study:

1. To generate interest for learning process in the student and to make teaching learning method more interactive & student centered for to enhance knowledge.
2. To enhance problem solving attitude, analytical skills and knowledge of the students.
3. To enhance the integration of basic and clinical sciences.

The study is done with the following Specific Objectives:

1. Increase satisfaction among students about teaching learning process.
2. Increase acquisition of knowledge in to students.
3. To develop habit of self directed learning for better understanding of key topics.

MATERIALS & METHODS

Present descriptive study was carried out over a period of six months for first MBBS 2012 batch in the Department of Anatomy, Government medical College, Latur.

Permission from Dean, Head of department & Ethical committee approval was taken. The anatomy faculty and students were oriented and introduced to the concept of Problem Based Learning. All willingly participated students taken for the study and no control group were formed due to ethical issues. Informed written consent was obtained from all the students. Participated students randomly divided in to 10 groups.

A Problem based on applied aspect of abdominal region was constructed by consensus of all anatomy faculties. Specific

learning objectives were set by consensus of all anatomy faculties. Then the Problem was posed to all groups. A Pre MCQ test was taken to assess student's knowledge on the topic.

The first session was based on discussion of the given case and the students brainstormed what they needed to know to understand the problem. Groups discussed and extracted learning areas for study from the given problem. After the first session students studied different learning areas, they have identified during discussion on problem from different sources like textbooks, subject experts. This was followed by second session after three or four days with presentation of the learning during group discussion by each student. They analyzed if there was any learning area which still require more study. Again they read about learning areas newly identified and again discussed after few days. They repeated the procedure till they satisfied about solution of the problem.

In sessions they were made to sit in a circle to maintain eye to eye contact and to ensure that they followed the rules of group dynamics. In all groups there was one leader, one time keeper, one recorder, one reporter and a teacher as a facilitator. The group leader ensured participation of each member of the group. The role of facilitator was not to lead the group but to keep the discussion on the right track by observing the whole process.

The same MCQ test, which was taken before PBL session, was repeated after PBL session to assess the knowledge gained. Feedback was taken from the students by providing pretested and validated questionnaires. Feedback included constructed response with open ended question and selected response with Likert Scale and Overall Global Rating Scale. This was done to know their perceptions towards group discussion (In PBL) as a method of enhancing learning. The responses were measured in terms of agreed, disagreed or remained neutral.

OBSERVATION

Total 60 students participated and gave their feedback. Obtained data was analyzed using SPSS 21.00 Version. Paired't' test was applied for comparing pre PBL and post PBL test scores of students and descriptive analysis using bar diagrams was done for the feedback questions.

A] Values of Paired't' test was applied for comparing pre PBL and post PBL test scores of students.

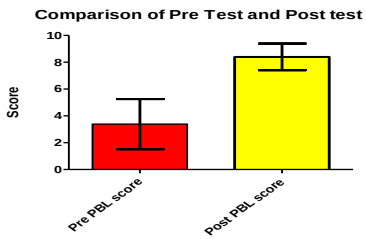
Table 1:-Showing paired't' test.

Paired 't' test analysis for comparison between Pre PBL score and Post PBL score					
	Mean	N	S. D.	S. E. M.	P value
Pre PBL test score	3.383	60	1.869	0.2413	< 0.0001
Post PBL test score	8.400	60	0.9949	0.1284	

Where N is number of student, S.D.is Standard Deviation & S.D.M. is Standard Error Mean.
As P value < 0.0001 of Paired't' test is significant.

B] Descriptive analysis using bar diagrams was done for the feedback questions.

Graph 1:- Showing comparison of scores before & after test of PBL session.



Where PBL Pre and Post test on X-axis & Score values on Y-axis.

Inference: There is significant difference in scores of students before and after PBL session. Descriptive analysis of students responses collected through feedback questionnaire was performed. Response of the participants on Global Rating Scale showed maximum score from 7-9 towards high side. The internal consistency of feedback questionnaire was found to be very good. Participants reported no disadvantage of the new method.

C] Students perspectives on different aspects of PBL

Table 2:-Showing Students response on different aspects of PBL

Student's perception towards Problem Based Learning				
No	Question	Agreed	Neutral	Disagreed
1	Method used in teaching PBL in anatomy was useful.	41 (68.3%)	13 (21.6%)	06 (10%)
2	Helped in improving understanding further.	37 (61.6%)	15 (25%)	08 (13.3%)
3	Process encouraged student responsibility for learning objectives.	35 (58.3%)	18 (30%)	07 (11.6%)
4	Brought in more interaction.	52 (86.6%)	02 (3.3%)	06 (10%)
5	Can be used along with lectures.	49 (81.6%)	03 (5%)	08 (13.3%)
6	Improve problem solving ability.	40 (66.6%)	14 (23.3%)	06 (10%)
7	Conducted in systematic manner.	35 (58.3%)	16 (26.6%)	09 (15%)
8	Facilitators were helpful.	50 (83.3%)	05 (8.3%)	05 (8.3%)
9	Presentation helped to learn better.	36 (60%)	12 (20%)	12 (20%)
10	Opportunity to express.	40 (66.6%)	12 (20%)	08 (13.3%)
11	Teach other topic as well by this method & can be continued for further batches.	48 (80%)	08 (13.3%)	04 (6.6%)
12	It Will help to perform better in university exam. & will help to perform better in later days of clinical course.	54 (90%)	03 (5%)	03 (5%)

Feedback also included open ended question as follows

Q.1 What aspects of PBL contributed most to your learning?

Q.2 What aspects of PBL should be changed to make it better for you?

Q.3 Have the skills learned during PBL made a difference in your other academic or social situations? If yes How?

Q.4 General Comment on PBL session.

Sixty eight percent participants opined that method used in teaching PBL in anatomy was useful. Sixty two percent participants opined that PBL helped in improving understanding further. Process encouraged students' responsibility for learning objectives agreed by fifty eight percent. Eighty seven percent participants opined that PBL brought in more interaction .Method can be used along with lectures agreed by eighty two percent. Sixty seven percent participants opined that improve problem solving ability. Need to conduct in systematic manner agreed by fifty eight percent. Role of Facilitators were helpful agreed by eighty three percent. Presentation helped to learn better and opportunity to express agreed by average sixty three percent. Eighty percent participants opined that teaching other topic as well by this method can be beneficial & can be continued for further batches. It will help to perform better in university exam & in later days of clinical course agreed by ninety percent student. Surprisingly there was neutral opinion by few on questions.

Some of the students opined that PBL cannot replace lectures as all the gross anatomy can't be covered in PBL. Instead they suggested there should be a few lecture either at the start of the PBL session or as

concluding the PBL session. In the comments received from students they reported that in PBL each student got equal chance to discuss about their each and every query with peers as well with faculties which made their understanding of the topic better. Some students also pointed out that there is a need of formal training of facilitators for PBL as some of the facilitators were excellent in their job but some facilitators were job dominating group discussions instead of facilitation.

On taking faculty feedback, all of them agreed for this as an useful method, with 80% strongly agreeing towards the group discussion and its facilitation being useful, helping in increased retention & improved problem solving.

DISCUSSION

Question rises about need of Problem Based Learning in basic science departments like anatomy. Faculty members have expressed doubts about the wisdom, effectiveness, and educational efficacy of such a format to teaching the sciences basic to medicine. [13] Experiments by medical teachers have shown that it is possible to introduce a problem-based form of learning into a new course in parallel with more traditional modes of teaching, making it successful to some extent for students who are used to a didactic form of curriculum. [14]

Due to unavailability of much published data the result of PBL in anatomy could not be discussed .A similar study on CBL was done by Wojciech Pawlina etal [15] who got similar response from the students. In their study 82% of the students felt that these sessions were a useful method of providing clinical correlations with gross anatomy compared to study of Praveen R Singh et al [16] about 69 % of students. In our study 68 % of students agreed with this statement.

Rene Yiou et al [17] while analyzing the example of PBL at Harvard Medical school mentioned that to see the long term effect , an evaluation needs to be done latter in the medical curriculum which also should take into consideration the ability to find an anatomical interpretation to a clinical problem. Satheesha et al [18] on doing a similar curricular change noted that teaching learning of anatomy suffered because of this method, although he emphasized the importance of learning occurring through this method, but to increase its effectiveness he suggested a hybrid method. We in our study also used a hybrid method whereby we were not covering the entire syllabus in PBL but few important concepts were taken as PBL .The emerging trend of faculty feedback in our study was similar to that observed by David Vernon. [19] In their experience faculty seem to prefer PBL in most respects though with reservations.

In feedback students commented that PBL enhanced their understanding of anatomy and motivated them to read more. PBL enabled them to remember the subject better and helped to integrate their knowledge. All these outcomes are may be due to active involvement of students and motivation in teaching learning process in PBL. Most of the students expressed desire & a need to continue PBL sessions in future also. On contrary they don't want to replace all the lectures by PBL but suggested a hybrid method. Some of the problem that surfaced during the study as per students perception was that PBL is time consuming which was also felt by faculty. Overall conclusion about PBL is, it drives students centered learning & incorporates integration and practical application of the knowledge of basic science, simultaneously helping students become lifelong learner. It helps in development of self directed learning, problem solving attitude & analytical skills.

SUMMARY AND CONCLUSION

Basic science like anatomy would be better understood, remembered and subsequently applied if learned in a clinically relevant format.The present study Introducing problem based learning for first M.B.B.S. anatomy students was carried out for 60 students of 2012 batch, as an innovative teaching learning method in anatomy at G.M.C. Latur.

The PBL module was posed to students of all groups. A Pre test was taken before the first session to assess student's knowledge on the topic. The first session comprised of small group discussion & in subsequent sessions various groups presented their discussion outcome. A post test was taken to assess knowledge achieved. A anonymous feedback was also taken after the end of session & analysed .Response of the participants on Global Rating Scale showed maximum score from 7-9 towards high side. The percentage of students agreeing to various questions was in range of 58% to 90%.During group discussion of PBL students were able to improve the understanding of theory taught, along with better problem solving & increased interaction as agreed upon by 62%, 67% & 87% respectively. Role of Facilitators were helpful agreed by 83% percent. Will help to perform better in university exam & in later days of clinical course agreed by 90% students.

Students also opined that, during the PBL session, they got increased retention of knowledge, enhancement of integration of basic science concept into clinical problem, the development of self directed learning skills and interest. In view of very good approach & excellent rating from students for PBL, it should be continued in the curriculum of Anatomy. An objective analysis of effectiveness of PBL can be made by comparing students' performances with and without PBL .It can be a very useful method if taken up with traditional teaching method. One difficulty faced by us as PBL is time consuming not able to apply to each topic as tenure of first M.B.B.S. is of one year with three basic subjects.

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