



## Effect of Problem Based Learning Among First Year Under Graduate Medical Students of India in Anatomy

### KEYWORDS

Problem based learning, medical students, teaching, learning

**Dr.Amudha Govindarajan**

Professor Department of Anatomy PSG Institute of Medical Sciences and Research Coimbatore -641004

**Dr.Jamuna Meenakshisundaram**

Professor Department of Anatomy PSG Institute of Medical Sciences and Research Coimbatore -641004

**ABSTRACT** *Problem based learning is andragogical teaching method which has been followed globally. But it is not a regular teaching method in India. The literature states that PBL method of teaching improves student's understanding, self learning skills and problem solving skills. This study was done to study the effect of PBL when introduced early in the curriculum among the first year undergraduate students in anatomy. 100 first year undergraduate students participated in the PBL sessions. Materials required for PBL sessions were developed. After sensitizing the students and faculty of anatomy department, four PBL sessions were conducted using Fishbowl technique. The feedback from students and faculty were collected and analyzed. The analysis showed that PBL helped the students to learn anatomy better and improved their self study skills. They also felt that PBL improved interaction with peers and faculty. Students also felt that lectures and seminars too were necessary to learn anatomy. This shows that PBL cannot be used as a single teaching methodology. PBL as one of the methodologies of teaching will definitely help the students to learn better.*

### Introduction:

Problem based learning is an andragogical teaching method where students are made to apply their theoretical knowledge in clinical context. It is an educational strategy where students take active part in learning. (1) The problems which are posed to stimulate student's interest will act as 'lid openers'. It acts as a challenge which makes the starting point of active learning. (2) The problems posed can be clinical case scenarios or reports of investigation or a problem in the community. Depending on the specialty, different clinical problems can be used. The problems will trigger independent self directed learning before they take part in group discussions. When the students are given real life situations where basic sciences matter, they will understand the importance of it in future and learn better. (3) For an effective PBL session, the students should take part actively in the learning process with proper group dynamics. Here faculty members act as facilitators for which they need sensitization.

Studying medicine is quite stressful for the students because there are numerous facts and data which have to be memorized. Learning and memorizing them without proper reasoning is a herculean task. A dry teaching learning approach like didactic lectures and dissections may not be effective to motivate students. Problem based learning which was introduced by McMaster's University in 1969, has been followed as a teaching learning method globally. But it is not a regular teaching method in India. The first year undergraduate medical students, who are fresh from schools where the teaching learning method is more of pedagogy, find anatomy as a dry and boring subject. They also struggle a lot to understand the concepts in anatomy. The struggle to learn de motivates the students. When the students enter the clinical years, they have difficulty in applying the anatomical facts in clinical context. Introducing PBL early in the curriculum will stimulate interest and orient them better towards the subject. Rankin JA's study on library usage concluded that PBL increased the usage of library and other learning resources by the students (4). As per the Medical Council of India's Vision 2015 document, an Indian Medical Graduate is expected to have self directed learning skills and problem solving skills where stu-

dents should know to use the learning resources. There is also a shift in the focus from teacher to students. It is also proved that PBL improves the problem solving skills and also motivates students to learn by learning things with a specific purpose for which it has to be learned. (5) This study was taken up to introduce PBL as a teaching learning methodology and to analyze the effectiveness of it among first year undergraduate students in anatomy.

### Materials and Methods:

The feasibility of introducing PBL and the time were discussed among the faculty of department of anatomy, PSG Institute of Medical Sciences and Research. The topics for PBL sessions with appropriate clinical case scenarios and required data like photographs and radiological images were discussed and collected from Departments of surgery and orthopedics. The questionnaire to collect feedback from Faculty of department of anatomy and from students were designed and validated. The faculty feedback form was an open ended questionnaire asking for their opinion regarding student's participation and conduction of PBL sessions. The student feedback form contained different styles of questions like some with 5 point Likert scale and some yes or no type to make students reflect and answer.

After getting permission from the Head of the institution and Institutional ethical committee, consent from first year undergraduate medical students who were the participants of the study, was taken. A faculty sensitization discussion on group dynamics and PBL was done. The students were sensitized about PBL process by a demonstration session. 100 students participated in PBL sessions. They were divided in to 10 groups, 10 in each group. Four topics were selected for the sessions. The case scenarios with other required data were displayed in student's notice board one week prior to the PBL sessions. The PBL sessions were conducted using Fishbowl technique on four different days as five parallel sessions with faculty of anatomy department acting as facilitators. Each group had participated in two PBL sessions and witnessed two PBL sessions. At the end of the sessions, feedback was collected from students and faculty and analyzed.

**Results:**

Students participated enthusiastically in the PBL sessions.

**Figure 1: Extent of PBL's help to learn anatomy**

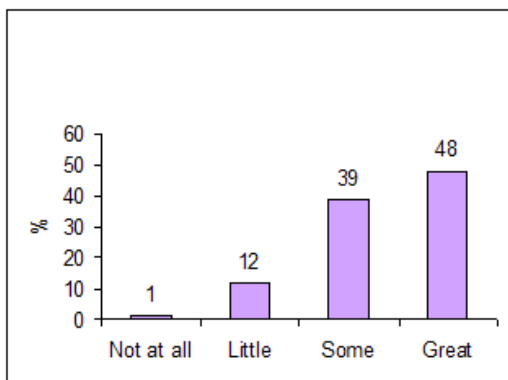


Figure: 1 shows the student's response about the extent of PBL's help to learn anatomy. 48% of the students felt PBL helped them to learn anatomy to a great extent. 39% of the students answered as some extent and 12% as little extent.

**Figure 2: Rating of PBL to learn anatomy**

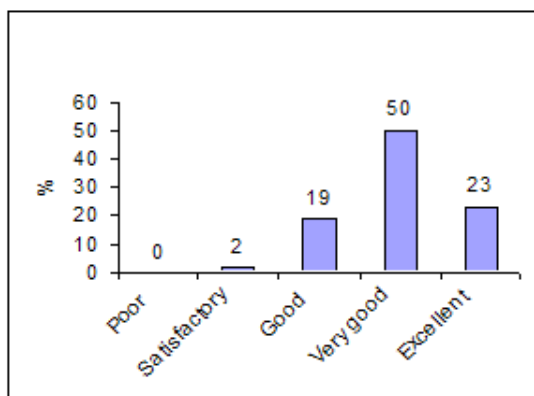


Figure: 2 show the student's rating of PBL as a way to learn anatomy. The students rated PBL as very good way of learning anatomy. 23% of them felt it was an excellent way to learn anatomy. No one rated it as a poor method.

Students also felt that they interacted better and could learn from their peers. 75% of the students had discussions with their class mates. 40% of them had with their seniors and postgraduates. 22% of the students discussed with the faculty. 82% of the students felt that their interaction with the faculty was better during the session.

**Figure 3: Rating of different teaching methods**

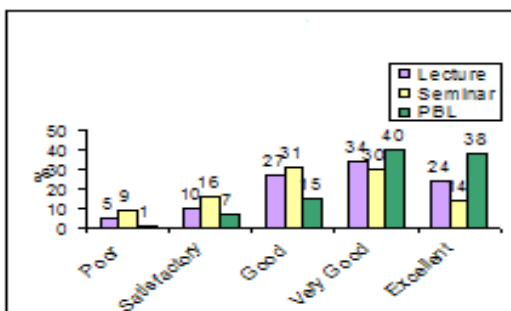


Figure: 3 shows that among the different teaching learning methods which are followed in teaching anatomy, majority of them preferred all the three methods.

**Figure 4: Improvement in Self study skills**

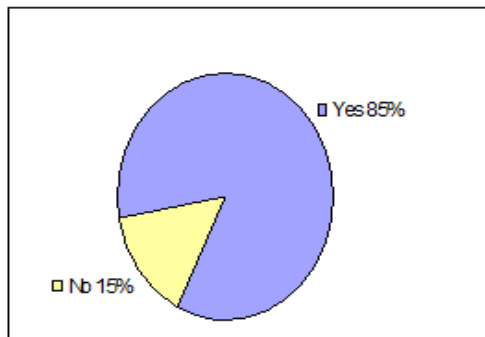


Figure: 4 show that 85% of the students felt that PBL improved their self study skills. They also used learning resources to search for answers. 78% of the students felt that the PBL process helped them to understand the relevance of learning anatomy to a great extent.

The faculty of department of anatomy felt that student's participation was very good and the way of presenting anatomical facts in clinical context was excellent. But some of them felt that it was a time consuming process and some students were silent spectators. They also pointed out that students tend to deviate from the topic of discussion and the contribution by faculty was very less. The faculty also conveyed that PBL could be used as one of the methods to teach anatomy.

**Discussion:**

Problem based learning is a very effective educational tool to make students participate actively. As Abraham and colleagues stated, when PBL is adopted early in the medical school, it helps students to take responsibility of their learning. (6) It shifts the focus from the teacher to the student. The students are oriented to the topic when they apply it in real life situations. The PBL process not only motivates the students to learn, it improves their problem solving skills. Dolmans and Schmidt had reported that PBL helped students to work on their self directed learning skills. (7) In this study most of the students agreed that the PBL process helped them to self study. The problems posed will help them to acquire in depth knowledge on the subject. As per the report of Finch, PBL improves the cognitive skills of the students which are related to patient management. (8) The basic concepts of anatomy gets emphasis here which students are indirectly made to identify and apply in clinical context. The students also learn to work in groups which will help them to work as a team in future. PL Nandi and his associates pointed out that PBL curriculum improved teacher student relationship. (9) In our study too, students agreed that the interaction was better in PBL. Mohsen Tavakol's study revealed the importance of preparing clear learning objectives for successful PBL sessions. (10) This needs trained faculty for designing and facilitating the sessions. It was one of the major obstacles we have faced and which we addressed before planning PBL sessions. Though there are problems like time constraints and faculty involvement, PBL as a teaching tool is very effective in conveying the message to the students. Major CH pointed out in their study, PBL could be one of the many pedagogies in teaching. (11) In our study also,

students had voted not only for PBL but for seminars and lectures as teaching methods for better learning. As McAuley RG and Woodward CW pointed out that many teaching faculty around the globe did not accept PBL as only method to teach medical students which was also the view of our faculty. (12) In Indian context, PBL can be used as one of the methodologies for teaching learning process not as an only method. A combination of traditional as well as newer methods will help students to focus and learn better.

#### Conclusion:

Problem based learning is an excellent method to make students understand the relevance of learning anatomy in clinical context which in turn creates interest and motivates them to learn. When it is introduced early in the undergraduate medical curriculum with other traditional teaching methods, it will also help to improve the self learning skills and problem solving skills.

#### Acknowledgements:

This study was undertaken as a part of the Fellowship programme under GSMC-FAIMER Regional Institute. I wish to express my sincere gratitude to the faculty of GSMC-FAIMER Regional Institute and FAIMER Institute, Philadelphia. I also thank the faculty members of PSG Institute of Medical Sciences and Research for their support and participation.

#### References:

1. Diana F Wood. "Problem based learning". *BMJ* 2003; 326:328
2. Burrows HS, Tamlyn RN. "Problem-based learning: an approach to medical education". New York: Springer; 1989.
3. Walton HJ, Mathews MB, editors. "Essentials of problem based learning". *Med Educ* 1989; 23:542-58.
4. Rankin JA. "Problem-based medical education: effect on library use". *Bull Med Libr Assoc* 1992; 80:36-43.
5. Patel VL, Groen GJ, Norman GR. "Effects of conventional and problem-based medical curricula on problem solving". *Acad Med* 1991; 66:380-9.
6. Abraham RR, Ramnarayan K, George BM, Adiga I, Kumari GR, Suvarna N, et al. "Effects of problem-based learning along with other active learning strategies on short-term learning outcomes of students in an Indian medical school". *International Journal of Health and Allied Sciences*. 2012; 1(2): 98.
7. Dolmans DH, Schmidt H. "What drives the student in problem based learning?" *Medical Education*. 1994; 28(5): 372-80.
8. Finch PM. "The effect of problem-based learning on the academic performance of students studying podiatric medicine in Ontario". *Medical Education Oxford*. 1999; 33(6): 411-7.
9. PL Nandi, JNF Chan, CPK Chan, P Chan, LPK Chan. "Undergraduate medical education: comparison of problem-based learning and conventional teaching". *HKMJ* 2000;6:301-6
10. Mohsen Tavakol, Reg Dennick, Sina Tavakol. "A descriptive study of medical educators views of problem-based learning". *BMC Medical Education* 2009, 9:66
11. Major CH, Palmer B. "Assessing the effectiveness of problem-based learning in higher education: Lessons from the literature". *Academic exchange quarterly* 2001, 5:134-140.
12. McAuley RG, Woodward CW." Faculty perceptions of the McMaster M.D. Program". *J Med Educ* 1984; 59:842-3.