

## INTRODUCTION OF PROBLEM BASED LEARNING AS A TEACHING LEARNING TOOL IN ANATOMY TEACHING

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### ABSTRACT

**Introduction:** Problem Based Learning (PBL) is preached and practiced throughout the world in medical teaching. In India this method of teaching is gaining the ground. We tried to take the opinion of our students how they perceive the PBL as a teaching learning tool.

**Materials and Methods:** A semi structured closed ended questionnaire was distributed in participants after the PBL session and their opinions were evaluated in the percentage scale.

**Results:** more than 85 percent of our participants were of opinion that PBL increased their understanding of the subject, it helped in the understanding the clinical applications of the complex anatomical concepts. Time required conducting the PBL session remained the main obstacle in conduction of PBL.

**Conclusion:** PBL is novel teaching –learning tool appreciated by our participants but less faculty strength and limited time in the first MBBS for First year students raises a question mark on implementing it on a larger scale. So, a mixed approach where traditional Teaching –Learning methods are mixed with PBL can benefit students and teachers both.

**KEY WORDS:** Problem based learning, First MBBS, Anatomy curriculum.

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### INTRODUCTION

In year 1969 McMaster University pioneered to adopt the Problem-based learning (PBL) based curriculum. It was adopted as a teaching-learning method by almost 50 medical schools in next 20 years, it was educational revolution in itself [1]. PBL as a teaching learning method is gathering lot of importance now a days. There are studies which state that PBL contributes significantly to some cognitive elements. Knowledge which is acquired in relevant context is

easy to remember. Knowledge acquired by using clinical examples helps in pattern recognition [2]. Krischner et al. [3] however, contradicted the statements that there is elaboration of knowledge at the time of learning in PBLs; they advocated that problem solving approach places load on the working memory. Mayer et al. [4] in review on instructional methods also concluded that the tutor guided approach would be more beneficial for learning.

In the medical curriculum teaching of anatomy occupies a unique place. Unlike other discipline, it constantly gives rise to great debates and surveys concerning what exactly should be taught and how. It is a science which is highly influenced by the concepts introduced in other areas of medicine an important task assigned to the teaching anatomy department consists of balancing modern and traditional basic anatomy while still providing the foundations of a medical education. Thus, the anatomy curriculum requires regular updates in terms of presentation and content. However, there has been a lack of consensus regarding the way these changes in the curriculum should be performed.

It has been a challenge to increase the student’s exposure to clinical situations and continue to prepare them to be current and up-to-date physicians [5]. We hypothesized that PBL is a good tool to encourage such analytical thinking and using higher domains of learning especially in anatomy teaching of first MBBS students. So, we took the opinions of the students and evaluated their perception of problem based learning in medical education especially in anatomy. The perception of medical students is important as they are the final beneficiaries of change in curriculum.

**MATERIALS AND METHODS**

This cross sectional questionnaire based study was conducted in Chalmeda Anandrao Institute of Medical Sciences in the department of anatomy. Total intake capacity of Chalmeda Anandrao Institute of Medical Sciences is 150 per year. This study was approved by institutional ethical committee. Participation in the study was voluntary and an informed consent was taken from all the participants.

All the students were sensitized to the PBL process and instructions were given in the classroom. Then they were divided in the small groups of 10 participants a facilitator was assigned for each group. In the first session a part was dissected and discussed as in regular teaching module then they were asked to sit in their groups. Sitting arrangement was made in circles to increase eye to eye contact and ensure the group dynamics. A clinical scenario in relation to anatomy of the dissected part was given to

them and they were given an orientation to that particular problem by facilitator and a primary discussion was conducted. After five days second session was conducted where they were asked to discuss the problem after reading it from various resources. Facilitator given the directions to the discussion and moderated it. An anonymous feedback in the form of closed ended questionnaire was distributed to students as in table-1 and their responses were evaluated in percentage. All the students participated in the study and there was no control group [6,7].

**Table 1:** Responses of the students to the questionnaire in percentage.

Q. No	Question	Agreed (%)	Neutral Response (%)	Disagreed (%)
1	PBL is more useful in understanding particular topic as compared to didactic lecture.	89	3	8
2	PBL can be conducted along with lectures.	70	6	24
3	Clinical scenario given in PBL was interesting.	90	1	9
4	PBL session was interactive.	87	4	9
5	PBL module is helpful in development of critical thinking.	91	4	5
6	PBL is important for independent learning and developing communication skills.	92	0	8
7	Role of facilitator in PBL is important.	85	4	11
8	PBL can be recommended for future batches	92	1	7
9	PBL will be help to perform better in formative as well as summative examinations.	85	2	13
10	PBL is useful in terms of future application of knowledge in medicine.	87	4	9

As shown in the table 1. - 89 percent of our participants opined that the PBL is better than didactic lectures for understanding the topic and 70 percent students were in favor of conducting didactic as well as PBL in the classes. From the result it was highlighted that more than 85 percent of our students who participated in the study were of the opinion that PBL is interactive, it increases the critical thinking, develop communication skills, it helps in examination and it is an useful tool to future application of knowledge (Table No-1).

**DISCUSSION**

Our study was conducted to know the opinion of students towards the PBL. In India medical education is experiencing a rapid shift from traditional teaching learning method to the new methods advocated and practiced in the other countries in the world. PBL is one such method. Results affirmed that PBL as a teaching

learning method was accepted by the students in our college and they were of opinion that PBL increases the understanding of complex concepts of anatomy. It further highlighted that in general students preferred PBL over Didactic lectures and they recommended inclusion of this method in the regular teaching for them as well as future batches.

Present study results were in agreement with the study conducted by Chen. C et al. they conducted a questionnaire based study in Peking University Health Science Center, Beijing, China. In their study more than 90 percent of the students were in favor of the PBL and they opined that PBL benefits a lot for the students in the study of gross anatomy despite of the existing problems. They further advocated implementation of PBL in the curriculum along with traditional teaching of anatomy [8].

Another study conducted by Singh PR and Bhat R. [9] in India had similar result like ours in their study percentage of students agreeing to the various questions regarding the PBL as teaching learning method were between 51-87 percent. In their study approximately 62,69 and 72 percent students agreed upon the statement that PBL was able to problem solving along with the theoretical classes, it increases the problem solving ability and improved communication skills. Our study is in agreement with the study conducted by Dope SA et al [10] they concluded that PBL 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.

In contradiction to our result a study by Becker et al [11] showed that certain aspect of integration is difficult in a PBL system. In this study the students indicated that the subjects were not related, and the scenarios were not realistic. Prince et al conducted a study in 4<sup>th</sup> year medical students in 6 medical schools of Netherland. To know the perceived knowledge. They found out that PBL does not result in a lower level of anatomy knowledge than more traditional educational approaches [12].

In our study students opined that they enjoyed

the PBL and they were of opinion that it helps in the deep learning of clinical concepts of Anatomy and applications of Anatomy they further advocated that it is a better way of learning anatomy. Our approach in this study was a hybrid approach. We first given a didactic lecture and then dissected the part it was followed by the PBL session. So we are in agreement with the results of earlier educational researchers who advocated this approach.

PBL is a novel method of teaching anatomy, but given the faculty strength of the medical colleges in India it is difficult to implement this method for complete curriculum but it can be integrated in the curriculum with present mode of instruction in the medical colleges. This was an outcome of the observations made during conducting this study as a researcher. We observed few of the limitation of implementing PBL in the curriculum. First and most important is time; PBL demands a lot of time from the students as well as teacher. For teachers they have to design the module and make the necessary arrangements for group activities. This preparation increases their working hours and with decreases faculty strength of 4 qualified faculty for 100 students it become practically difficult to conduct such session frequently. Secondly first MBBS curriculum in India is of one year duration. Students are admitted up to September end and they appear in the examination by the end of June- July. So, effectively students get only 9- 10 months to complete their study. PBL to be effective students must dedicate enough time on researching the topic. This time they cannot give in the first year. Thirdly the group activity and group discussions are new things for our students they need to be trained in group dynamics. Many time the group is dominated by one or two members and others become passive, this might be due to the educational background of our students, they come from both urban and rural areas and from English and non- English medium schools so proficiency in English is a problem. Many students after the study opined that they knew the answers but they are not proficient in English do they could not talk. Constrain of resources to research topic was another issue which limits the implication

of PBL in our medical college. Resources like free access to internet facility and reference books after office hours proved to be an obstacle for research to be done by students in order to participate in the group discussion.

A systematic review of 15 studies to analyze the effectiveness of PBL was conducted by Harling et al [13] in 2010. He concluded that the students taught with PBL were having more positive attitude towards clinical practice while non-PBL students were better in consultation skills. He also concluded that there were limited high quality studies to analyze the effectiveness of different types of PBL's in different contexts.

In a workshop conducted in UK, PBL based ten medical school, one dental school and one veterinary school conferred the implementation, strengths and weaknesses of their PBL based medical curricula, there was a general agreement amid the groups that if PBL is conducted well than it is an effective instructional instrument [14].

### **Advantages and disadvantages of PBL**

**Advantages:** PBL is justified by many researchers on the basis of following points many agreed that it is compatible with adult learning principles, it is said to be relevant, stimulating and in its compatibility with modern theories of adult learning, together with evidence of efficacy in some areas. It increases the student teacher contact and it enhances teaching learning environment and make it more convenient as traditional barriers between teacher and students are lowered [2,15].

**Disadvantages:** One of the most common disadvantage of PBL voiced in the research articles is the time and cost of running the PBL program effectively. Most medical colleges need to import expertise to help initiate, develop and sustain PBL. PBL curriculum can be demanding of staff time; Des Marchais JE et al [16] estimated that the introduction of PBL at Canada's University of Sherbrooke increased the teaching load by 30%. The teaching cost increases with the class size and to breakeven the cost between traditional and PBL based curriculum the class size recommended by

Berkson L [17] was 30 students and by Donner RS [18] was 40 students per class in India the class sizes are double the recommended class size.

PBL can also be stressful for both students and staff, at least until they become familiar with the process [17]. Most students come to PBL from educational backgrounds where teachers direct learning. By contrast, PBL does not limit what students may choose to learn, and the process may provide little guidance on the best ways of achieving learning goals. Students may be concerned that their learning strategies are misdirected or inefficient. These concerns should be anticipated and addressed within PBL tutorials where students develop and refine the necessary skills. Yet one study which compared levels of student stress in a traditional and a PBL curriculum found that PBL was less stressful [19]. Some teachers find that PBL is unduly demanding of their time and some are uncomfortable in small-group situations and with their role as facilitators. Tutor training is needed to address these issues [18].

### **CONCLUSION**

PBL is a novel way of teaching anatomy, students enjoyed learning and opined that it increases their understanding of the complex anatomical concepts and its application the clinical sciences, they further advocated integration of PBL in the curriculum for the coming batches. Major limitation for inclusion of the PBL in curriculum was time, availability of resources. So we advocated the mixed approach where the presently practiced teaching methods can be mixed with some sessions of PBL. This will serve both the purposes, students will get the exposure to the novel methods of teaching and their curriculum will also be completed by the traditional teaching format. It will not give additional teaching load on the faculty also. So, PBL with traditional teaching is best suited for Indian medical graduates and if in future the student teacher ratio is justified then the aggressive use of the methods like PBL can be practiced in MBBS curriculum. Training of the faculty in the conduction of PBL is one major issue which needs to be addressed if the PBL is to be incorporated

in the present medical curriculum in India.

**Limitation:** Present study was cross-sectional study conducted at a single institute in a single batch of students a metacentric study might give a holistic picture.

**Conflicts of Interests:** None

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