

MEDICAL EDUCATION

PERCEPTION OF DENTAL STUDENTS ABOUT PBL METHOD FOR CONSTRUCTIVE LEARNING

Mehwish Feroz Ali¹, Saima Akram Butt¹, Maryam Basim¹

¹Department of Oral Pathology, College of Dentistry, Ziauddin University, Karachi, Pakistan.

ABSTRACT

Background: Problem Based Learning (PBL) is a widely used constructive teaching approach for undergraduate Medical and Dental students for many years. This is an effective teaching tool which integrates students' prior knowledge which he/she has obtained in their initial years and applies it for solving actual clinical cases which they usually encounter in the clinical rotations. This exercise broadens their thinking and learning capacity and makes them active, self-directed and vigilant learners. They also learn how to work in a team and collectively come up with the best possible answers of the given clinical scenario.

Objectives: The main objective of this study is to evaluate dental students' perception regarding Problem Based Learning (PBL), which is a fruitful teaching strategy for student's effective professional development and also to assess the extent students benefit from this teaching method and to help them develop professional skills and attitude.

Method: A cross sectional study was conducted amongst the Dental students of all (four) years of Bachelors of Dental Surgery (BDS) from Aug to Sep 2017 at Ziauddin University (College of Dentistry), Karachi, Pakistan. A Verbal consent was taken from all the students and each student was asked to fill a 21-item questionnaire for evaluating their perceptions about PBL teaching methodology. The students' response about PBL was measured by a 5 point Likert scale. The statistical analysis of data was calculated by SPSS version 20. Percentage and frequencies were calculated for qualitative data and Mean/SD for quantitative statistics. ANOVA was applied to suggested strong association between PBL and development of professional attitude and skills. The p-value of > 0.05 was statistically significant.

Results: Students' thoughts regarding PBL as an effective teaching strategy were assenting. They positively benefited from this learning method which is represented by mean scores of ≥ 3 in the study. The mean score of 1.85 (< 2) indirectly highlights that students are not wasting their time by performing this exercise. There is a significant association between PBL method and development of professional attitude and skills by p-value of < 0.00001

Conclusion: It aids the medical educators to perform internal evaluation to record students' progress in every module for marking their final assessment.

KEYWORDS: Teaching strategies, dental students, perception, learning, ongoing assessment

Corresponding Author

Dr. Mehwish Feroz Ali

Department of Oral Pathology, College of Dentistry

Ziauddin University

Email: mgalmani@live.com

INTRODUCTION

Problem Based Learning (PBL) has been a widely used constructive teaching approach for undergraduate Medical and Dental students for many

years¹. Many Medical and Dental colleges and universities in Pakistan are also inculcating this innovative teaching strategy as an integrated part of their curriculum. This is an effective teaching tool which integrates students' previous knowledge

which they had obtained in their initial years and apply for solving actual clinical cases which they commonly encounter in the clinical rotations. This critical exercise broadens their thinking and learning capacity and makes them active, self-directed and vigilant learners. They also learn how to work efficiently in a team and collectively come up with the best possible answers of the given clinical scenario². Wood D. F in 2003 stated that Problem-based learning is defined as "an instructional (and curricular) learner-centered approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem"^{3,4}.

As an emerging teaching strategy, PBL is bringing a transformation especially in the dental education system by providing students an effective learning opportunity, where students can invest their professional knowledge and skills on a given clinical problem along with their peers and sketch a road-map of information on which new knowledge and understanding can be built⁵. Students are further encouraged for independent studies not only limited to text books but also from recently published articles and different studies in order to acquire novel information and thorough understanding of respective topic⁶. It assists educationists in all fields to bring a change in education system

from solely assessment driven to ongoing formative learning².

In this learning process, the teacher has an important role to construct a challenging clinical problem, which allows them to think laterally. The teacher, along with the student's own ideas and perspective, then facilitates the students on each stage and helps them in solving the given challenge by proper guidance. Teachers frequently help mentor the students and assess them at each step by giving them active constructive feedback, so that they can reflect on their own learnings and improvise it for good results^{7,8}. PBL provides a platform to students for learning and enhances various skills such as critical thinking, team work, problem solving, inquiry habits, leadership and communication. Students work in collaboration with peers and accept each other's ideas and perspective optimistically to attain a shared vision^{9,10}.

The main objective of this study is to evaluate Dental students' perception about Problem Based Learning (PBL), which is a fruitful teaching strategy for students' effective professional development. To assess at what extent students are benefited from this teaching method and develop professional skills and attitude. It will provide feedbacks in order to improve the Medical and Dental curriculum and achieve best outcomes in near future.

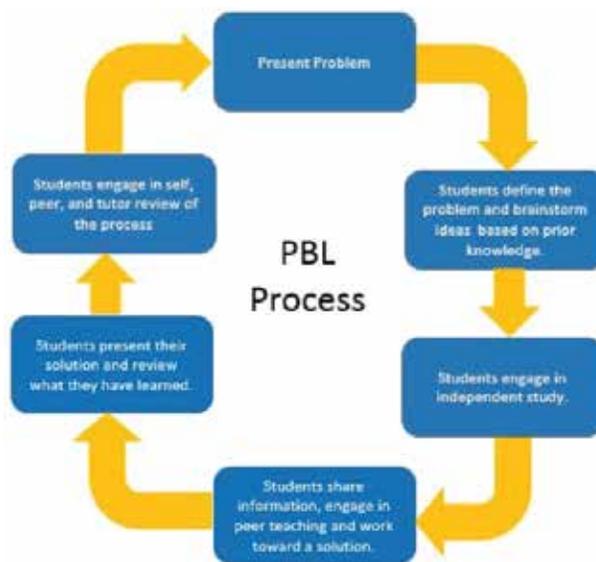


Figure 1: Demonstrating the process of PBL (20)

METHODS

A cross sectional study was conducted amongst 148 Dental students of all (four) years of Bachelors of Dental Surgery (BDS) from August to September 2017 at Ziauddin University (College of Dentistry), Clifton Campus, Karachi, Pakistan. The research objective was clearly explained to each dental student and verbal consent was also taken from them. Data was collected in the form of self-administered questionnaire. The students were asked to fill a 21-item questionnaire for evaluating their perception regarding Problem Based Learning (PBL), as a productive teaching strategy for their effective professional development. The students' response about PBL was measured by a 5 point Likert scale. The Likert scale is an ascending order of score (1, 2, 3, 4 and 5 standing for Strongly disagree, Disagree, partially agree, Agree and Strongly agree respectively) ^{1,6}.

Ethical approval for research was obtained from the Institutional Ethics Committee. The statistical analysis of data was calculated by Statistical Package for Social Sciences (SPSS version 20). For qualitative data percentage and frequencies were calculated. Mean and standard deviation of quantitative statistics were obtained. ANOVA was applied to find association between response and year of study. The level of significance was p-value of >0.05.

RESULTS

In Table 1, data is representing the mean score of ≥ 3 which indicates students' affirmative response on utilization of PBL as a teaching learning strategy in undergraduate curriculum for their professional nurturing. One of the response indirectly highlight's that students are effectively investing their time by performing the PBL exercise.

Table 1: Students' Perceptions Regarding PBL as a Teaching Learning Strategy

STATEMENT	Frequency of Responses for each statement (N=148)					Mean/SD
	Strongly Disagree	Disagree	Partially agree	Agree	Strongly agree	
1.1 PBL makes learning more interesting	3 (2.0%)	1 (0.7%)	24 (16.2%)	84 (56.8%)	36 (24.3%)	4.00(0.78)
2.1 PBL is an active learning methodology	2 (1.35%)	3 (2.03%)	25 (16.8%)	87 (58.7%)	31 (20.9%)	3.95 (0.76)
3.1 Helps to identify problem & generate hypothesis	2 (1.35%)	1 (0.68%)	28 (18.9%)	92 (62.1%)	25 (16.8%)	3.92 (0.71)
4.1 PBL helps in defining learning needs	2 (1.35%)	2 (1.35%)	32 (21.6%)	82 (55.4%)	30 (20.2%)	3.91 (0.76)
5.1 PBL stimulates effective discussion	2 (1.4%)	1 (0.7%)	23 (15.5%)	88 (59.5%)	34 (23.0%)	4.02 (0.73)
6.1 Helps in integrated learning	2 (1.35%)	1 (0.68%)	37 (25.0%)	78 (52.7%)	29 (19.6%)	3.86 (0.83)
7.1 PBL is a waste of time	43 (29.0%)	92 (62.1%)	7 (4.7%)	3 (2.0%)	3 (2.0%)	1.85 (0.76)
8.1 Clinical case scenario is better understood	2 (1.35%)	2 (1.35%)	38 (25.6%)	82 (55.4%)	24 (16.2%)	3.83 (0.75)
9.1 Enhances pre-existing knowledge	1 (0.68%)	2 (1.35%)	28 (18.9%)	85 (57.4%)	32 (21.6%)	3.97 (0.72)
10.1 Encourages self-directed learning	2 (1.35%)	1 (0.68%)	33 (22.3%)	85 (57.4%)	27 (18.2%)	3.90 (0.74)
11.1 Overall experience was goods	2 (1.35%)	2 (1.35%)	26 (17.5%)	94 (63.5%)	24 (16.2%)	3.91 (0.71)
12.1 I would like to use PBL as a T-L Methodology	2 (1.4%)	6 (4.1%)	37 (25.0%)	82 (55.4%)	20 (13.5%)	3.73 (0.84)

In Table 2, the calculated mean scores of ≥ 3.5 are demonstrating a beneficial impact of PBL teaching strategy on students' interpersonal skills, problem solving capacity, team work, good rapport with

colleagues and collaborative learning.

Table 2: Students' Perceptions regarding PBL with respect to attitude and professionalism

STATEMENT	Strongly Disagree	Disagree	Partially agree	Agree	Strongly agree	Mean/SD
1.! PBL develops effective interpersonal skills	4 (2.7%)	3 (2.0%)	31 (20.9%)	91 (61.5%)	19 (12.8%)	3.79 (0.79)
2.! Made me understand teamwork and group dynamics	2 (1.4%)	3 (2.0%)	40 (27.0%)	77 (52.0%)	26 (17.6%)	3.82 (0.78)
3.! Helped me realize my shortcomings and ways to over-come them	3 (2.0%)	2 (1.4%)	28 (18.9%)	90 (60.8%)	25 (16.9%)	3.83 (0.71)
4.! PBL helped to develop attitude of providing and accepting constructive feedback	1 (0.7%)	1 (0.7%)	37 (25%)	87 (58.8%)	22 (14.9%)	3.86 (0.68)
5.! Group discussion helped in understanding the best way to put forward my views	2 (1.4%)	1 (0.7%)	42 (28.4%)	80 (54.1%)	23 (15.5%)	3.82 (0.73)
6.! Made me more perceptive and sensitive to the needs of others during group-work	1 (0.7%)	1 (0.7%)	48 (32.4%)	81 (54.7%)	17 (11.5%)	3.76 (0.67)
7.! Gave me an opportunity to understand how to chair a session better	2 (1.4%)	1 (0.7%)	36 (24.3%)	88 (59.5%)	21 (14.2%)	3.85 (0.70)
8.! Made me learn to respect views of other students	2 (1.4%)	2 (1.4%)	29 (19.6%)	91 (61.5%)	24 (16.2%)	3.89 (0.72)
9.! Led to better rapport and friendly behavior among group members	3 (2.0%)	2 (1.4%)	28 (18.9%)	90 (60.8%)	25 (16.9%)	3.89 (0.76)

Table 3: One way ANOVA suggested strong association between PBL and development of professional attitude and skills by p-value of < 0.00001 .

Source	SS	d f	Mean/S D	f-ratio	P value
Between responses	43222.3556	4	34.51 (6.54)	608.38474	<0.00001 1*
Within responses	710.4444	40	3.83 (.73)		
total	43932.8	44			

The result is significant at $p < .05$

DISCUSSION

In present time, our education system desires innovative, collaborative and student centered approach of teaching instead of the conventional lecture based one way approach. In Pakistan most of the medical and dental institutes lack to implement such interactive and new teaching methods as part of their curriculum. The most common rationale is lack of medical education training to educators^{11, 2}. The traditional way of teaching, only by lectures targets those students who learn best by listening and reading, but is unable to implicate

those students who learn by reading, writing, audio

visual aids and experiential learning. For holistic professional development of students we need integrated methods of learning like PBL which include majority of the learners in the form of readers, writers in the form of scribe who note down the learning point, Chair who direct the group by leadership skills and other fellows who also actively participate in discussion and problem solving^{4, 12}.

Now a day the trend of medical education is increasing in Pakistan, as a result many institutions

are putting enormous efforts to adapt new instructional methods in the curriculum like role plays, simulation, small group discussions, quizzes, projects, survey based researches and problem based learning to improve the quality of medical education¹³. Our study only focused on Problem Based Learning (PBL), as a competent teaching strategy for teaching content, which is a student focused approach to medical education and it caters basic learning needs of all types of learners for effective nurturing and professional development¹⁴. In this study we addressed student opinions only, about PBL, which is an integrated part of their curriculum and did not directly test the level of acquired knowledge among students¹⁵.

In problem-based learning, student learning primarily focuses on a clinical problem which could have multiple reasoning and solutions. Students work in collaboration with peers to read and understand the problem thoroughly in a small group and search the appropriate answers for it independently¹⁶. It helps them to generate a hypothesis via integrated learning of different subjects and through effective discussion they understand the clinical scenarios in a better way. A study by Al-Naggar amongst Malaysian medical students also found that PBL strategy is interesting and stimulates integrated learning⁵. According to our students', PBL strategy made learning more stimulating and interesting for them. It allowed them to participate actively in peer discussion and also become self-reliant and active learners. PBL assisted students to build a bridge between past and present knowledge for finding answers of an assigned problem^{17, 18}. Abraham and colleagues suggested that by integrating problem based learning and other active learning strategies in the curriculum from first year ensured improvement in students' progress and successful achievement of almost all the short-term goals¹⁵.

In PBL the role of Medical educator is very crucial; they observe, facilitate, mentor and reflect the progress of students for constructive feedbacks and ongoing formative assessment¹³. Throughout the process of PBL, the observer constantly assists students' participation, directs them on the right path, motivates every student to participate and records their performances^{4, 16}. The observer tries to keep students focused on the topic, makes learning relevant and exciting for achieving the desired objective. Student participation is a key ingredient in the success of a PBL process, and it would be worthwhile to collect more information on the assessment process and its impact on the overall participation and future performance of the students^{15, 19}.

PBL assists students to develop effective interpersonal skills, team work and group dynamics⁷. Students realize their strengths and short-comings and discover ways to overcome them. It develops lead-

ership skills among students by providing a session to chair, sound rapport with group members, and acceptance of views and perspectives of other students¹⁰. According to Anila Jaleel et al. students perceived that the PBL approach adopted consistently across the curriculum contributed to the development of their information management, critical reasoning, communication and team-linked skills⁸. It gives confidence and sense of responsibility to students to be a contributor in making treatment plans and prepare themselves for future encounters which occurs in clinical rotations¹⁷. Al-Naggar's study reflected that PBL strategy consumes more time than conventional teaching approach, just like the opinion of majority of the students included in our study, who believed that PBL strategy was investment of quality time, therefore agreeing with Al-Naggar's perspective⁵.

CONCLUSION

By vigorous planning and effective implementation of PBL teaching strategy, we make students active, independent and analytical learners in diagnosing, preventing and treating diseases. Through this process, students develop the ability of problem solving, team work, inquiring abilities and build sound relationship with colleagues and patients which enhance their professional competencies. They learn to keep themselves updated by reading recent researches and articles along with text books to diversify their knowledge and understanding to take out their best learning outcome

REFERENCES

1. Manisha Jindal, S. S. Perceptions regarding Problem-Based Learning as a Teaching Learning Strategy among medical students. *NJIRM* 2016; 7(4): 87-91.
2. Awan, Riffat-Un-Nisa. Effects of Problem Based Learning on Students' Critical Thinking Skills, Attitudes towards Learning and Achievement. *J Educ Res* 2017; 20(2): 28-41.
3. Andrew Elbert Walker, H. L.-S. *Essential Readings in Problem-based Learning*. Indiana: Purdue University Press (2015).
4. Wood DF. ABC of learning and teaching in medicine. *BMJ* 2003; 326 (7384): 328-30.
5. Al-Naggar R. A, B. Y. Acceptance of Problem Based Learning among Medical Students. *J Community Med Health Educ* 2012; 2(5): 1-6.
6. Downing K, Kwong T, Chan S-W, Lam T-F, Downing W-K. Problem-based learning and the development of metacognition. *Higher Education*. 2009; 57(5):609-21.
7. Hmelo-Silver, C. E. Problem-based learning: What and how do students learn? *Educ Psychol Rev* 2004; 16(3): 235-66.

8. Jaleel A, Rahman M.A, Huda N. Problem-based learning: What Problem-based learning in biochemistry at Ziauddin Medical University, Karachi, Pakistan and how do students learn? *Biochem Mol Bio Educ* 2001; 29(1): 80-4.
9. Khan I, Fareed A. Problem-based learning variant: transition phase for a large institution. *J Pak Med Assoc* 2001; 51(8): 271-4.
10. Klimoski R & Benjamin A. Practicing Evidence-Based Education in Leadership Development. *Acad Management Learning Educ* 2012; 11(4): 685-702.
11. Mahmud W, Hyder O. N. How has problem based learning fared in Pakistan? *J Coll Phys Surg* 2012; 22(10): 652-6.
12. Millan L. P, Semer B. Traditional learning and problem-based learning: self-perception of preparedness for internship. *Rev Assoc Med Bras* 2012; 58(5): 594-9.
13. Toni Ungaretti, K. R. Problem-Based Learning: Lessons From Medical Education. *ACAD Manag Learn Edu* 2015; 14(2): 173-86.
14. Nanda B, Shankarappa M. Indian medical students' perspectives on problem-based learning experiences in the undergraduate curriculum: One size does not fit all. *J Educ Eval Health Professions* 2013; 10(11): 1-22.
15. Abraham RR, Ramnarayan K. Effects of problem-based learning along with other active learning strategies on short-term learning outcomes of students in an Indian medical school. *Int J Health Allied Sci* 2012;1(2): 98-103.
16. MIN SWE, K. M. Perception and usefulness of problem based learning among medical students. *Int Archives Med* 2015;8(229): 1-8.
17. Mohammad Hadi Imanieh, S. M. Evaluation of problem-based learning in medical students' education. *J Adv Med Educ Prof* 2014;2(1): 1-5.
18. Wiznia D, Korom R. Enhancing problem-based learning through increased student participation. *Med Educ Online* 2012; 17(17375): 1-16.
19. Onyon C. Problem-based learning: a review of the educational and psychological theory. *Clin Teach* 2012; 9(1): 22-6.
20. <http://intranet.ecu.edu.au/learning/teaching-and-learning-support/teaching-strategies/problem-based-learning>

