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ORIGINAL ARTICLE

Attitude and Perception of Undergraduate Medical and Dental Students towards Problem-Based Learning in Karachi

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ABSTRACT

Objective: The goal of this study is to assess students' attitudes and perceptions of problem-based learning sessions.

Methods: A cross-sectional survey study was conducted at Medical College of Karachi from February to May 2022 with preclinical medical and dental students. Students' attitudes towards and perceptions of problem-based learning sessions were examined using an electronic questionnaire.. SPSS 21 was used to analyze the data.

Results: Overall, the students had a positive attitude towards all of the items, including self-directed learning, critical thinking, integrating basic concepts into clinical science, identifying knowledge gaps, and improved problem-solving skills. Despite the fact that PBL took a lot of time, the majority of students found PBL interesting.

Conclusion: Most of the preclinical students favored PBL and believe it should be included in the curriculum alongside other teaching methods.

Keywords: Problem-based learning (PBL), Medical students, Dental students, Perception, Attitude

INTRODUCTION

Problem based learning (PBL) was first introduced by Barrows at McMaster University in Canada in the 1960s. Since then, it has now been introduced by many medical and dental colleges around the world, assisting in the transition of the medical program from a conventional teacher-centered to a student-centered learning strategy in mechanism incorporated by medical education (1).

Problem-based learning is a revolutionary method of learning used in medical education that has many benefits, such as better comprehension of basic science concepts, integration of basic and clinical sciences, and enhancement of problem-solving abilities (2, 3). It also encourages self-directed learning (SDL), fosters communication and interpersonal abilities, presentation skills, and increases students' enthusiasm and motivation in learning and understanding (4).

PBL is a small-group learning activity in which the students tackle open-ended issues that resemble actual clinical cases. Along with the knowledge that students learn in PBL, some abilities like continuous learning, critical thinking, and teamwork also appeared as an important characteristic when compared to traditional, lecture-based instruction (5). Another highlighted aspect is an interactive and stimulating educational environment in PBL using clinically-oriented cases that empowers learners to identify their needs and learn how to solve those problems. The students' confidence in interacting within the group and their capacity for expressing themselves are closely related to self-concept, which is defined as an individual's perception of himself as well as his capacity for evaluating his own strengths and weaknesses which empower student attitude towards learning (6).

However, despite all the benefits, the biggest challenge in PBL is to ensure that small groups function properly. Recognizing the variables that lead to positive and goal-oriented group dynamics is thus important. Medical educators have initiated topics such as learning styles (7), morality, professionalism (8), and the doctors' responsibilities and identity to broaden students' learning and enhance the standard of future physicians (9). Moreover, according to a few research findings also, PBL as a teaching approach is time intensive and has no prominent impact on knowledge acquisition (10, 11). The tutors assist the students to accomplish their goals by preserving them focused on their work. PBL sessions include distinct roles for every participant in the group, well-defined steps of discussion, and the identification of learning objectives from the addressed problem (12). As a result, a skilful tutor is vital for the achievement of the PBL session.

Multiple studies conducted around the world have found that PBL improves learning. However, a few research on medical and dental students' attitudes and perceptions of the PBL session have been conducted in Asia, particularly in Karachi. A study on nursing students in Peshawar found that PBL improved their understanding and interpersonal skills. As a result, the current study was designed to investigate students' perceptions and attitudes towards PBL sessions at the medical and dental college of Karachi, Pakistan.

MATERIAL AND METHODS

The cross-sectional study was conducted at Medical and Dental College of Karachi using an anonymous and self-administered questionnaire on perceptions and attitudes towards PBL learning.

During the six-month semester course, a PBL case was presented each week, with a two-hour tutorial of two sessions facilitated by a trained tutor. In between tutorial sessions, there was a one-hour self-study period. The PBL case was then concluded in a second session. Each PBL session consisted of 10 to 12 students. At the end of the semester, information was gathered from first and second year male and female medical and dental undergraduate students. However, uncompleted questionnaire survey were excluded.

Before the study began, all students were briefed about the study objective, and information on the survey questions was clearly explained. Participants in the study were informed that the information gathered would be published and presented. Before distributing the questionnaires, participants provided written informed consent.

The questionnaire survey was created after a thorough search of the literature using the web-based search engines PubMed, Medline, and Google Scholar. We used terms like "problem-based learning," "medical and dental students," "PBL and learning skills," "PBL and self-directed learning," and "PBL and faculty role."

The questionnaire was divided into three sections. The first section covered the demographics of the participants. The second section included eight items that assessed students' perceptions towards PBL implementation and processes (appropriate running of PBL sessions). The third section included three items that assessed the students' attitudes towards the PBL session. On a 5-point Likert scale, these items were scored as strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree.

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clearly explained. Participants in the study were informed that the information gathered would be published and presented. Before distributing the questionnaires, participants provided written informed consent.

To improve the validity of the anonymous questionnaire, a pilot study involving 10 students was conducted. By using Cronbach's alpha reliability test, the internal consistency of all ten items were evaluated. Out of 151 total participants, 101 from MBBS and 50 from BDS completed the questionnaires completely. The data was coded and entered into Microsoft Excel software before being analysed with SPSS version 21.0. The five-point Likert scale responses were merged into 3 different categorical variables: "agree" (strongly agree plus agree), "neutral," and "disagree"(strongly disagree plus disagree) since the concurred related items highlighted the score for a group of statements.

Statistical Analysis: SPSS version 21 was used to analyze the data. For each individual item, the results of the descriptive analysis were tabulated as a percentage, mean, and standard deviation. A five-point Likert scale was used to determine satisfaction. To compare differences between male and female students, the chi-square test was used. At $p < 0.05$, the results were deemed significant.

RESULTS

This study included 151 undergraduate medical and dental students (males 39.1% and females 60.9%). The participants' average age was 20.34± 1.14 (19-21) years. 101 medical and 50 dental students participated in the study as shown in **Table I**.

There were no gender-specific differences in the responses to the statements. The students' perceptions and attitudes towards PBL sessions were generally favorable. According to 85% of students, PBL is an interesting and engaging method of teaching and learning, while only 5% disagree. In terms of improving problem-solving skills, 72.8% were optimistic, 12.6% were unsure, and 14.6% simply disagreed. Approximately 53% of students reported that this approach required less time than traditional lecture, while the remaining 31% thought it required more time, and 15% were unsure. Nearly 81% of the students agreed that PBL promotes better content and knowledge retention through active participation in the learning process. Another significant aspect is that 92.7% of students agreed that PBL stimulates critical thinking and 78.8% agreed that it integrates clinical knowledge with basic science. According to 82.1% of undergraduate students, PBL motivated their self-directed learning, but 12.6% are unsure and 5.3% disagree. Only 51% of respondents observed that PBL was useful in identifying knowledge gaps, with the remaining 35.8% were unsure. Moreover, 82.1% of students believed that PBL promoted communication skills and contributed to equal participation in group discussions. There was no statistically significant difference between male and female undergraduate medical and dental students in terms of perception and attitude.

Table 1: Demographics of the study participants

Demographics	No of students' n (%)
Age (years)	151 Mean ± S.D 20.34 ± 1.14
Gender • Male • Female	n (%) 59 (39) 92 (61)
Undergraduate • Medical • Dental	n (%) 101 (67) 50 (33)
Year at Medical College • Medical ➢ First Year ➢ Second Year • Dental ➢ First year ➢ Second Year	n (%) 51 (50.5) 50 (49.5) 25 (50) 25 (50)

Table 2: Perceptions and Attitude of Undergraduate Medical and Dental Students toward PBL (n=151)

Item No.	Statement	Category	n (%)	Male (n)	Female (n)	Mean ± S.D	P-value
1	The PBL session is interesting and engaging.	Agree Neutral Disagree	129 (85.4) 14 (9.3) 08 (5.3)	50 05 04	79 09 04	1.19 ± 0.51	0.78
2	Enhance problem solving skill	Agree Neutral Disagree	110 (72.8) 19 (12.6) 22 (14.6)	41 09 09	69 10 13	1.41 ± 0.73	0.22
3	PBL take less time than traditional lecture	Agree Neutral Disagree	81 (53.6) 23 (15.2) 47 (31.1)	27 12 20	54 11 27	1.77 ± 0.89	0.69
4	PBL is more effective in fulfilling the learning objectives of the topic	Agree Neutral Disagree	92 (60.9) 46 (30.5) 13 (8.6)	33 21 05	59 25 08	1.47 ± 0.65	0.53
5	PBL imparts better content and retention of knowledge on the topic	Agree Neutral Disagree	123 (81.5) 18 (11.9) 10 (6.6)	47 08 04	76 10 06	1.25 ± 0.56	0.87
6	PBL stimulate my critical thinking	Agree Neutral Disagree	140 (92.7) 09 (06) 02 (1.3)	55 04 00	85 05 02	1.08 ± 0.32	0.49
7	PBL promotes my self-directed learning on the topic	Agree Neutral Disagree	124 (82.1) 19 (12.6) 08 (5.3)	47 08 04	77 11 04	1.23 ± 0.53	0.76
8	Integrates basic science with clinical knowledge	Agree Neutral Disagree	119 (78.8) 27 (17.9) 05 (3.3)	45 12 02	74 15 03	1.24 ± 0.50	0.81
9	Identifies knowledge gaps	Agree Neutral Disagree	77 (51.0) 54 (35.8) 20 (13.2)	27 24 08	50 30 12	1.30 ± 0.68	0.55
10	PBL help to contribute equal participation in group discussions and also promotes my communication skill	Agree Neutral Disagree	124 (82.1) 08 (5.3) 19 (12.6)	47 04 08	77 04 11	1.62 ± 0.71	0.76
Abbreviation: PBL, problem-based learning, p-value: < 0.05 = significant, percentage and frequency was used, chi-square was applied (male and female)							

DISCUSSION

PBL has been initiated in many medical colleges and universities worldwide, and medical educators are trying to promote its establishment in response to a set of viewed issues associated with medical education. These issues include a prominence on fact memorization over problem-solving skills, a lack of direct alignment of basic scientific education to clinical careers, and the need to cultivate life - long learning habits (13). Some investigations have recognized PBL as one of the leading educational strategies for

assisting students in the health sciences in developing higher cognitive, communication, and analytical thinking (14-16).

Medical education in Pakistan needs constant enhancement in order to keep up with the evolving demands of the modern era. Because of the reported benefits of PBL, most local and regional medical colleges have shifted their curricula to this instructional approach (17).

Students' perceptions and attitudes towards PBL have become the bottom line for its accomplishment in growing in popularity among medical colleges. According to our findings, PBL was interesting to the vast majority of students (85%) who were involved in PBL sessions. Furthermore, the reason for their piqued interest in the PBL sessions might be due to the thoughtfully planned PBL scenarios, which help cultivate the students' interest in their career field from the beginning of their professional lives. This is consistent with recent research on the recognition of PBL in Saudi medical schools (18). In another study, medical students regarded and represented a more optimistic perspective and contentment with the PBL approach (19, 20). These findings, combined with our findings obtained, provide compelling evidence of the interesting perspective of PBL in medical colleges from the students' viewpoints.

In the current study, 72.8% of students believed that PBL improved their problem-solving skills and expressed satisfaction with the PBL learning strategy. According to a study conducted at Qassim University's Faculty of Medicine, the PBL system improved the problem-solving skills of 81.4% of educators from the first to the final year (20). In contrast, College of Medicine, Princess Nourah bint Abdulrahman University (PNU), Riyadh, showed a slightly lower positive impact on problem-solving skills. The identified problem-solving score may be a representation of the program's regularity of PBL implementation, which is only biweekly (21).

Approximately 53% of students in our study reported that this approach took less time than traditional lecture. Similarly, a Thai study discovered that the majority of students (76.8%) praised PBL despite the fact that it was time - consuming process (48.9%) and challenging (44.8%).

The students in the current study found PBL to be more effective in meeting the learning objectives of the topic, which is similar to a study conducted in Nigeria, where the majority of participants felt that PBL sessions were preferable at meeting learning objectives, providing better fact based understanding of anatomy, and encouraging better student involvement in the educational process (22). This study revealed a more notable result when compared to our study, which could be attributed to the fact that it only included the results of one subject.

In this study, students believed that preparedness improved their confidence in teaching others because it encouraged them to activate and revise previous knowledge and discover knowledge gaps to construct new knowledge, all of which inspired them to learn the topics, which is consistent with the findings of a study by de Jong and colleagues (23). The majority of students in this study also agreed that PBL improved knowledge retention by involving them in the learning process. Despite the fact that PBL has been found to be very effective at encouraging long-term knowledge retention, the meta-analysis study stated that the evaluation contradicts the proof of using PBL as the primary method of teaching to foster increased performance and long-term knowledge retention. (24).

PBL can help transform teaching from simply reproducing things and topics learned to self-development and critical thinking (25). The current study emphasizes the significant role of PBL in promoting students' critical thinking and literature search. This was in line with the results of another Ugandan study (26).

The students in this study agreed that PBL improves their self-directed learning. This was consistent with previous research (27, 28). Several studies have shown that there is no complete agreement on the validity of PBL in the development and advancement of self-learning abilities (29).

Our findings are consistent with those of Callis et al., who found that students enrolled in a hybrid PBL curriculum showed a stronger capacity to apply basic science fundamentals to a clinical scenario and improved communication skill when compared to conventional lecture-based students, resulting in an improvement in communication and making inferences skills. These are skills needed for students to interact with other healthcare professionals (30).

CONCLUSION

In conclusion, the rising popularity and implementation of PBL is a need of time. The method for evaluating the efficacy of PBL is ongoing, and the results reflect only the first stage of analysis because we are still in the process of standardizing the method for gathering outcome data, especially from college graduates who are doing their internship. However, there is proof that PBL has an impact on student performance, learning perspectives, and effective teaching. The students' perception and attitude towards PBL was positive. Positive perception was highest for self-directed learning, knowledge retention, basic science integration into clinical knowledge and critical thinking, and lowest for knowledge gap identification and time consumption in PBL sessions. The majority of participants praised the PBL system for improving communication skills and fostering positive interpersonal relationships.

REFERNCES

1. Barrows HS, Wilkerson L, Gijselaers WH. Bringing problem-based learning to higher education: Theory and practice. New directions for teaching and learning series. 1996;68:3-11.
2. Amaize MRA, Useh U, Maselesele M. Inter and intra professional collaboration in the implementation of Problem-Based Learning in nursing education: lesson for South Africa. Life Science Journal. 2012;9(4).
3. Azer SA, Peterson R, Guerrero AP, Edgren G. Twelve tips for constructing problem-based learning cases. Medical teacher. 2012;34(5):361-7.
4. Kalwant CK. Implementation of Problem-Based Learning in the Senior Secondary Liberal Studies Curriculum in Hong Kong: Nottingham Trent University (United Kingdom); 2022.
5. Schmidt HG, Rotgans JI, Yew EH. The process of problem-based learning: what works and why. Medical education. 2011;45(8):792-806.
6. Barrett T, Cashman D. A practitioner's guide to enquiry and problem-based learning: case studies from University College Dublin. UCD Teaching and Learning; 2010.
7. Buşan A-M. Learning styles of medical students-implications in education. Current health sciences journal. 2014;40(2):104.
8. Mueller PS. Teaching and assessing professionalism in medical learners and practicing physicians. Rambam Maimonides medical journal. 2015;6(2).
9. Vivekananda-Schmidt P, Crossley J, Murdoch-Eaton D. A model of professional self-identity formation in student doctors and dentists: a mixed method study. BMC medical education. 2015;15(1):1-9.
10. Emerald NM, Aung PP, Han TZ, Yee KT, Myint MH, Soe TT, et al. Students' perception of problem based learning conducted in phase1 medical program, UCSI University, Malaysia. South East Asian Journal of Medical Education. 2013;7(2):45-8.
11. Hartling L, Spooner C, Tjosvold L, Oswald A. Problem-based learning in pre-clinical medical education: 22 years of outcome research. Medical teacher. 2010;32(1):28-35.
12. AlHaqwi AI. Learning outcomes and tutoring in problem based-learning: how do undergraduate medical students perceive them? International journal of health sciences. 2014;8(2):125.
13. Virk A, Mahajan R, Singh T. Conceptualizing problem-based learning: an overview. International Journal of Applied and Basic Medical Research. 2022;12(1):1.
14. Roche M, Adiga IK, Nayak AG. PBL trigger design by medical students: An effective active learning strategy outside the classroom. Journal of clinical and diagnostic research: JCDR. 2016;10(12):JC06.
15. Mumtaz S, Latif R. Learning through debate during problem-based learning: an active learning strategy. Advances in physiology education. 2017;41(3):390-4.
16. Costa JRB, Romano VF, Costa RR, Gomes AP, Siqueira-Batista R. Active teaching-learning methodologies: medical students' views of

problem-based learning. Revista Brasileira de Educação Médica. 2011;35:13-9.
17. Jahangir M, Inayat F. Implementation of Problem-Based Learning Method of Medical Education to Improve Trends in Undergraduate Medical Research in Pakistan. Journal of the College of Physicians and Surgeons Pakistan. 2018;28(11):894-6.
18. AlHaqwi AI, Mohamed TA, Al Kabba AF, Alotaibi SS, Al Shehri AM, Abdulghani HM, et al. Problem-based learning in undergraduate medical education in Saudi Arabia: Time has come to reflect on the experience. Medical teacher. 2015;37(sup1):S61-S6.
19. Lian J, He F. Improved performance of students instructed in a hybrid PBL format. Biochemistry and Molecular Biology Education. 2013;41(1):5-10.
20. Joseph N, Sharada R, Animesh J, Nelliyanil M, Kotian SM, Rai S, et al. Perception towards problem based learning among medical students of a private medical college in South India. Br J Med Med Res. 2015;9(5):1-10.
21. Al-Shaikh G, Al Mussaed EM, Altamimi TN, Elmorshedy H, Syed S, Habib F. Perception of medical students regarding problem based learning. Kuwait Medical Journal. 2015;47(2):133-8.
22. Saalu LC, Abraham A, Aina W. Quantitative evaluation of third year medical students' perception and satisfaction from problem based learning in anatomy: A pilot study of the introduction of problem based learning into the traditional didactic medical curriculum in Nigeria. Educational Research and Reviews. 2010;5(4):190.
23. de Jong LH, Favier RP, Van der Vleuten CP, Bok HG. Students' motivation toward feedback-seeking in the clinical workplace. Medical teacher. 2017;39(9):954-8.
24. Strobel J, Van Barneveld A. When is PBL more effective? A meta-synthesis of meta-analyses comparing PBL to conventional classrooms. Interdisciplinary journal of problem-based learning. 2009;3(1):44-58.
25. Shrestha E, Mehta RS, Mandal G, Chaudhary K, Pradhan N. Perception of the learning environment among the students in a nursing college in Eastern Nepal. BMC medical education. 2019;19:1-7.
26. Wu D, Xiang Y, Wu X, Yu T, Huang X, Zou Y, et al. Artificial intelligence-tutoring problem-based learning in ophthalmology clerkship. Annals of Translational Medicine. 2020;8(11).
27. Alrashid FF, Khalifah EM, Alshammari KF, Alenazi FS, Alqahtani AS, Alshmmri MA, et al. Medical Students' Perception towards Recently Introduced Problem-Based Learning in Surgery Module: A Case of University of Ha'il. Pakistan Journal of Medical & Health Sciences. 2022;16(02):583-.
28. Al-Naggar RA, Bobryshev YV. Acceptance of problem based learning among medical students. Journal of Community Medicine and Health Education. 2012.
29. Moustaffa NA. Self-Learning Skills and Problem-Based Learning in Medical Education: Case Study. Amazonia Investiga. 2020;9(30):50-9.
30. Callis AN, McCann AL, Schneiderman ED, Babler WJ, Lacy ES, Hale DS. Application of basic science to clinical problems: traditional vs. hybrid problem-based learning. Journal of Dental Education. 2010;74(10):1113-24.