SHORT REPORT

Assessment of problem-based learning in dental education and exploring barriers to its implementation: theory to reality

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Abstract

There are 59 dental colleges in Pakistan out of which 17 are in the public sector and 42 in private. However, only a few use problem-based learning methods, though it is a popular strategy in dental education all around the world. This study aims to assess problem-based learning model in dental education and explore the barriers of its implementation in a private dental college of Karachi. Qualitative case-study approach was employed. The philosophical stance used was critical realism. Qualitative data was collected by participant observation, video recorded observation and video elicited semi-structured in-depth interviews of five faculty members and 15 students. Results showed that students were more interested in interactive sessions while faculty members were in favour of problem-based learning sessions. Thematic analysis was done to generate themes. This research applies reproduction method to explain the necessary and contingent relations and causal powers. Lack of motivation among students and lack of faculty dedication are causal mechanisms of barriers in the implementation of problem-based learning.

Keywords: Problem-based learning, Faculty, Students.

DOI: https://doi.org/10.47391/JPMA.7890
Submission completion date: 03-10-2022
Acceptance date: 27-05-2023

Introduction

Practices in higher education recommend stimulation and authentication for more competent graduates. Lecture-based teaching method is good for creating cognitive knowledge in medical students but for inculcating skills and attitude student-centred learning, such as problem-based learning, is needed.[1-3] There are few studies that relate PBL to students stress and burnout.[4] Many studies have addressed PBL perception and effectiveness in medical education but only a few were done on dental education. Most studies conducted in Pakistan focus on its theoretical conception and students' learning outcomes.[5-7] Effects and barriers to implementation were hardly identified and critical realism stance was never used in qualitative research. However, one researcher addressed it in terms of how problem-based learning is feared in Pakistan but the author was unable to identify specific barriers to its implementation.[1] Barriers to PBL were also identified in one of the researches on teaching and learning by PBL in nursing course.[8] In another research, problem-based learning was considered an important tool to improve research trends in undergraduate medical education.[9] Various models of PBL have been developed and implemented according to specific instructional need but there are variance in all methods so it is difficult to justify comparative PBL studies. Critical realist paradigm is used to explore the effects and barriers in the implementation of problem-based learning in a dental college. (Figure-1) Critical realism stance combines positivist as well as constructivist views but argue that there is actual causal mechanism responsible for all real events and mechanisms.[10] Most studies done on problem-based learning were quantitative so qualitative research for in-depth exploration of phenomenon was required.

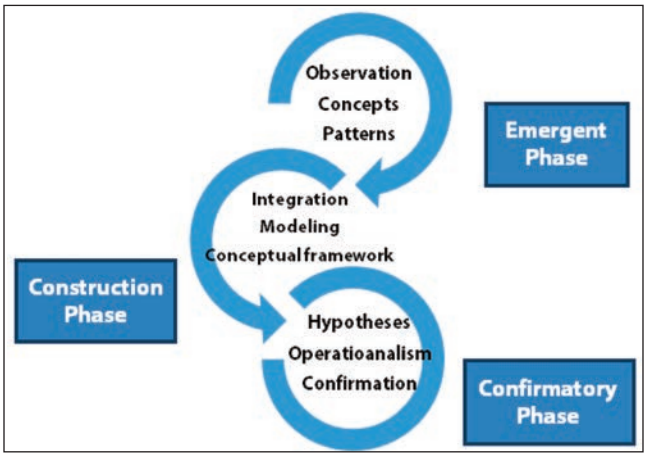

Figure-1: Explanatory Framework.

Methods and Results

A qualitative case study was done at Bahria Medical and Dental College, Karachi, for the duration of six months from June 2021 to December 2021. Random purposive sampling technique was used. Inclusion criteria were: dental faculty

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and first and second year BDS students and, faculty members involved in PBL co-ordination or conduction who consented to participate in the study. Exclusion criteria were: faculty members who were not involved in PBL co-ordination or supervision and those who were not willing to participate. Semi-structured interviews were done using video elicitation approach. Qualitative approach was employed using interpretative phenomenological analysis. Triangulation of qualitative tools was done. Qualitative tools used were Participant Observations (in-person observation and video-recorded observation) and semi-structured interviews using video elicitations. In person participant observation and video-recorded observation were used. Semi-structured interviews were done using video elicitation approach. Video elicited interviews produce different kind of in-depth information as it evokes feelings and memories. Thematic approach uses interpretative phenomenological analysis.

Knowledge of the Faculty: The majority of faculty members are of the opinion that since they have in-depth knowledge of the subject, they know how to summarise a topic and emphasise on important aspects.

One faculty member said, "*Teachers know what is important and how much you have to teach*."

One of the students replied, "*As we have subject experts to summarise the content for us, we should rely on them, instead of exploring aimlessly into the content*."

Students have confidence in faculty members for better content knowledge delivery.

Freedom to Explore: Students find it interesting to explore and study the learning objective they identified themselves but they feel it wastes their valuable time.

One of the students stated, "*It's really interesting to explore and link different topics*."

Another student said, "*It's interesting to explore content but it is not worth the time*."

Uncertainty: Faculty members are of the opinion that students are uncertain of the content covered in problem-based learning session.

Teacher C: "*Students often come back and ask us which topic was covered in the last PBL session or they will say that a specific topic has not been covered which was actually covered in PBL sessions but students have no clue of it*."

PBL Construction: Majority of the faculty was of the opinion that designing good problem scenario is an art and is time-consuming.

Teacher E: "*The whole process is pointless without good problem construction as it affects the quality of problem-based learning sessions*."

Times constrain: Faculty members find problem-based learning sessions very long and time-consuming.

Teacher A: "*So much time is consumed in designing and conducting PBL that it is better to design a good lecture in the same time and it will be better for students too*."

Learning Objective Clarity: Students find it easy to study when well-defined learning objectives are already given prior to the session as in interactive sessions and in case-based learning sessions.

Student 5 said: "*Quality of objectives made by us in problem-based learning sessions are not good enough and are of low quality as compared to those given by teachers*."

So they feel that if good quality learning objectives is given by teachers it's easier for them to study.

Student 4 said: "*We might miss something while making objectives*."

Students are anxious about missing some important learning objectives during PBL sessions.

Teaching Strategy Aligned with Examination: The most imperative consideration of students is what is important and will be asked in examination as their main focus is on passing the final examination instead of gaining knowledge and understanding the phenomenon.

"*Teachers teach us what is important and that will come in exams!*"

Student Motivation: Students seem to be less motivated for problem-based learning sessions, but as it is a student centred activity it will not be successful without students' enthusiasm. Students' intrinsic motivation is required for successful implementation of PBL sessions.

"*What is the point of searching so many topics which are not related, we don't even know why we are searching?*"

Discussion

Perception of the faculty and students was positive towards PBL sessions as shown by many previous studies.[11,12] But they preferred interactive sessions among small groups. However, they graded PBL sessions better than lectures as did many other studies conducted in Pakistan.[13] Besides limited resources and inadequate number of faculty members, absence of students' intrinsic motivation and lack of dedication among faculty members towards conducting PBL sessions were identified as the main barrier to implementation of problem-based learning strategy.

Results of the study showed a difference in perception of students and faculty; the reason may be the fact that students' knowledge is limited and faculty members have different levels of knowledge on problem-based learning process. Observation and interviews showed that faculty members rate problem-based learning better than lectures and interactive sessions but are not satisfied by problem construction and the conduction process of problem-based learning. On the other hand, students are more interested in interactive sessions than problem-based learning. Many studies justified PBL to be effective in gaining clinical skills and problem-solving.[14-16] But literature revealed that there is no empirical evidence that problem-based learning improves knowledge base and clinical problem-solving skills so resources required for conducting it cannot be justified.[17-19] As it is a new teaching strategy, students have limited knowledge about how it is conducted and its process. Problem-based learning has a group of resilient followers and a group of tough pessimists, too, but most of the medical educationists agree that hybrid curriculum is the best option which includes both traditional lecture-based learning as well as problem-based learning.

Most previous studies focused on the effectiveness of PBL and many aimed to compare it with other small group strategies, various models of PBL are developed and implemented according to specific instructional needs; as there must be variance in all methods, it is difficult to justify comparative PBL studies.[20-23] Although few authors addressed PBL as a problem, they fail to justify how problematic is problem-based learning.[24,25]

Use of critical realism stance to explore barriers in the implementation of PBL is the basic strength of this study. Limitation of the study is that it is a single centre study. Randomised control trial and longitudinal studies should be carried out to understand the effects and barrier to implementation of problem-based learning in dental faculty and students.

Conclusion

At actual level, inadequate resources and limited number of faculty members were identified as barrier to implementation of problem-based learning in medical colleges. At real level, while exploring through retroduction, lack of faculty dedication and inadequate intrinsic motivation in students was identified as barrier to its implementation. (Figure-2) Interpretation was made by integrating quantitative and qualitative data analysis. Lack of students' motivation and lack of faculty dedication are causal mechanisms of barriers to the implementation of problem-based learning.

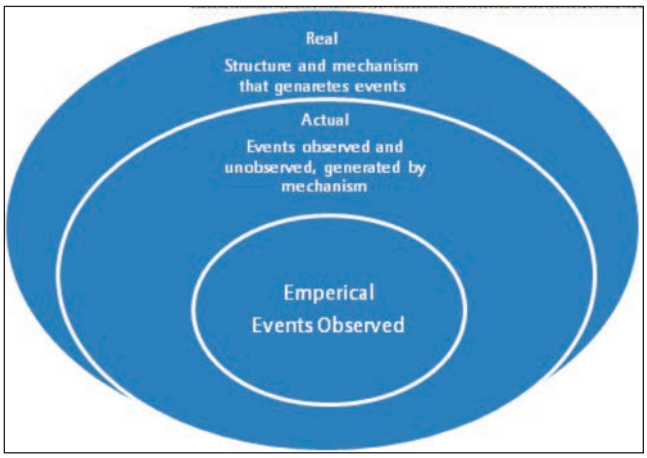

Figure-2: Stratification of critical Realism.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

References

1. Mahmud W, Hyder O. How Has Problem- Based Learning Fared in Pakistan. J Coll Physicians Surg Pak 2012; 22: 652-6.
2. Albanese MA, Mitchell S. Problem-based learning: a review of literature on its outcomes and implementation issues. Acad Med 1993; 68: 52–81.
3. Ali MF, Butt SA, Basim M. Perception of Dental Students About Problem-Based Learning Method For Constructive Learning. Pak J Med Dent 2019; 8: 91-5.
4. Al-Jehani YM, Althwanay AM, Buainain HM, Abuhaimed AK, Almulhim AM, Abusrir FA, et al. Burnout prevalence and associated stressors in medical students of traditional and problem-based learning curricula in a Saudi University. Saudi J Med Med Sci 2020; 8: 125–32.
5. Aldayel AA, Alali AO, Altuaim AA, Aljasser KA, Bin Abdulrahman KA, Alamri MO, et al. Problem-based learning: medical student perception toward their educational environment at Al-Imam Mohammad Ibn Saud Islamic University. Adv Med Educ Pract 2019; 5: 95-104.
6. Al-Madi EM, Celur SL, Nasim M. Effectiveness of PBL methodology in a hybrid dentistry programme to enhance students' knowledge and confidence:a pilot study. BMC Medical Educ 2018; 18: 270.
7. Al-Drees AA, Khalil MS, Irshad M, Abdulghani HM. Students' perception towards the problem based learning tutorial session in a system-based hybrid curriculum. Saudi Med J 2015; 36: 341-8.
8. Henderson KJ, Coppens ER, Burns S. Addressing Barriers to Implementing Problem-Based Learning. AANA J 2021; 89: 117–24.
9. Jahangir M, Inayat F. Implementation of Problem-Based Learning Method of Medical Education to Improve Trends in Undergraduate Medical Research in Pakistan. J Coll Physicians Surg Pak 2018; 28: 894-5.
10. Bhaskar R, Danermark B, Price L. Interdisciplinarity in action. In: Interdisciplinarity and Wellbeing: A Critical Realist General Theory of Interdisciplinarity. London, UK: Routledge, 2017.
11. Abdalla ME, Eladl, MA. Student perception of the effect of problem familiarity on group discussion quality in a problem-based learning environment. GMS J Med Educ 2019; 36(3).
12. Al-Shehri H, O'haj M, Elsini R, Alharbi H, Jabari M, Al-Qashar F, Rochow

N. Assessment of the implementation of problembased learning model in Saudi medical colleges: a cross-sectional study. Adv Med Educ Pract 2018; 9: 649-55.

13. Barrows HS, Tamblyn RM. Problem Based Learning an Approach to Medical Education. Springer Publishing Company; 1980.
14. Bandy A. Perception of medical students about problem-based learning at Jouf, University. J. Pak Med Ass 2021; 71: 1152–6.
15. Colliver JA. Effectiveness of Problem-based learning curricula: research and theory. Acad Med 2000; 75: 259-66.
16. Ali MF, Butt SA, Basim M. Perception of dental students about PBL method as a constructive learning. Pak J of Med and Dent 2019;8:32.
17. Ibrahim ME, Al-Shahrani AM, Abdalla ME, Abubaker IM, Mohamed ME. The Effectiveness of Problem-based Learning in Acquisition of Knowledge, Soft Skills During Basic and Preclinical Sciences: Medical Students' Points of View. Acta Inform Med 2018; 26: 119-24.
18. Jaganathan S, Ramesh M, Krishnan R. Perception, knowledge, and attitude of problem-based learning among dental college students in India: A closed-ended questionnaire study. J Pharma Bioallied Sci 2020; 12: 340–4.
19. Kim M. Priority analysis of Problem-based Learning. Evaluation Score using Analytic hierarchy process. Journal of Problem-Based Learning 2019; 6: 54-8.
20. Mahmood SU, Syed F, Khan NR, Batool Z, Rehman R.. Comparison of Problem-based learning with case-based learning: A cross-sectional study. Pak J Physiol 2017; 13: 52-56.
21. Oderinu OH, Adegbulugbe IC, Orenuga OO, Butali A. Comparison of students' perception of problem-based learning and traditional teaching method in a Nigerian dental school. Eur J Dent Educ 2020; 24: 207–12.
22. Zhao W, He L, Deng W, Zhu J, Su A, Zhang Y. The effectiveness of the combined problem-based learning (PBL) and case-based learning (CBL) teaching method in the clinical practical teaching of thyroid disease. BMC Me. Educ 2020; 20: 381.
23. Tayyeb R. Effectiveness of problem based learning as an instructional tool for acquisition of knowledge and promotion of critical thinking among medical students. J Coll Physicians Surg Pak 2013; 23: 42-6
24. Neville A, Norman G, White R. McMaster at 50: lessons learned from five decades of PBL. Advances in health sciences education: J Theory Pract 2019; 24: 853–63
25. Zafar U, Ahsan J, Salman H, Ayub R, Zafar N. Problem based learning: Is its blessing or a curse? Rawal Medical J 2017; 3: 101-3.