Efficiency of Problem-Based Learning in Medical Education: Views of Tutors and Students

Tıp Eğitiminde Probleme Dayalı Öğrenmenin Etkinliği: Eğitim Yönlendiricisi ve Öğrencilerin Bakışı

Erol Gürpınar, M. Kemal Alimoğlu, Yeşim Şenol, Sümer Mamaklı
Akdeniz University Faculty of Medicine Department of Medical Education Antalya, Turkey

Özet

Amaç: Bu çalışmanın amacı, Probleme Dayalı Öğrenime (PDÖ) katılan eğitim yönlendiricisi ve öğrencilerin, belirli becerilerin geliştirilmesi konusunda PDÖ ve klasik eğitimin katkısı hakkındaki görüşlerini ve PDÖ eğitiminden duyulan memnuniyeti belirlemektir. Gereç ve Yöntem: Araştırma Grubu, 2012-2013 eğitim öğretim döneminde PDÖ oturumlarına katılan 228 eğitim yönlendiricisi ve 195 tıp öğrencisinden oluşmaktadır. Mayıs 2013 tarihinde tüm katılımcılara bir anket uygulanarak araştırma gerçekleştirilmiştir. Bulgular: Eğitim yönlendiricilerinin %78'i (n=178) ve öğrencilerin %80.5'i (n=157) anket sorularına yanıt vermiştir. Eğitim yönlendiricilerinin %89.8'i "PDÖ öğrenciler için genel anlamda yararlı bir uygulama mıdır?" sorusuna ve %65.9'u "PDÖ den memnun musunuz?" sorusuna evet yanıtı vermiştir. Öğrencilerde bu soruya evet yanıtı %82.5'dir. Eğitim yönlendiricisi ve öğrencilerin görüşlerini saptamak amacı ile ankette yer alan ve PDÖ'nün belirli konu başlıklarındaki katkısını saptamayı amaçlayan kapalı uçlu sorulardan, "katkı sağlamıştır" şeklinde en fazla yanıt verilen başlık eğitim yönlendiricilerinde "PDÖ bilgilerin karşıdakine aktarmaya katkı sağlıyor" öğrencilerde ise "iletişim becerisin geliştiriyor" şeklinde olmuştur. Tartışma: Eğitim yönlendiricilerinin ve öğrencilerin çoğunluğunun PDÖ uygulamasından memnun oldukları ve PDÖ'nün belirli konu başlıklarında klasik eğitime göre olumlu yönde katkısı olduklarını düşündükleri belirlenmiştir.

Anahtar Kelimeler

Probleme Dayalı Öğrenme; Eğitim Yönlendiricisi; Tıp Öğrencisi; Tıp Eğitimi

Abstract

Aim: The aim of the study was to determine the opinions of tutors and students participating in Problem-Based Learning sessions regarding the extent to which PBL contributed to certain skills in comparison with the traditional curriculum and to clarify whether they are satisfied with PBL or not. Material and Method: The research population consists of the 228 tutors and 195 medical students participating in PBL sessions during the 2012-2013 academic years. A questionnaire was sent to the participants in May 2013. Results: Seventy-eight percent of the tutors (n=178) and 80.5% of the students (n=157) completed the questionnaire. Of the tutors, 68.8% answered "yes" to the question, "In general, is PBL beneficial to the student?" and 65.9% of the tutors answered "yes" to the question, "Are you satisfied with PBL?" This question was answered "yes" by 82.5% of the students. Among the closed-ended questions aimed at determining the opinions of the tutors and students about the extent of PBL's contribution in certain subject headings, the tutors marked the option "it contributed" for the subject headings of "PBL helps pass knowledge to other people," while the students marked this option for the subject heading of "developing communication skills". Discussion: A majority of the tutors and students were satisfied with PBL and indicated that PBL considerably contributed to the students in the areas in which PBL is regarded as superior to the traditional curriculum.

Keywords

Problem-Based Learning; Tutor; Medical Students; Medical education

DOI: 10.4328/JCAM.4778 Received: 06.08.2016 Accepted: 29.08.2016 Printed: 01.06.2016 J Clin Anal Med 2016;7(suppl 3): 243-6
Corresponding Author: Erol Gurpinar, Department of Medical Education, Akdeniz University School of Medicine, 07040 Antalya, Turkey.
T.: +90 2422496189 F.: +90 2422274482 E-Mail: eg@akdeniz.edu.tr

Introduction

Problem-based learning (PBL) was introduced into medical school curricula by McMaster University in Canada in 1969 and has since been adopted by many medical schools worldwide [1]. The benefits provided by PBL are one of the prominent reasons for its popularity in medical education [2]. This education method furnishes students with skills including logical problem-solving, analyzing, synthesizing, accessing information, and interpretation. It ensures that the student develops his/her knowledge and skills simultaneously, synthesizes and analyzes information, and acquires the skill of continuous, self-directed learning [3-5]. It also gives hints to the students about the use of the acquired information in real life. The student learns how to learn effectively through discussions and by asking questions, and appreciates the importance of team work [6-10]. PBL ensures that the student relinquishes his/her passive receptor role and instead learns actively through asking questions, researching, and feeding their curiosity. It helps the student acquire skills that are vital for medical education, such as problem-solving, producing alternative hypotheses in the face of problems, accessing new information in order to explain those hypotheses, searching information resources to access new information, using and evaluating the accessed information, and teamwork and communication skills [11-12]. Because of all these benefits, PBL is becoming more and more widespread in medical education.

Faculty members (tutors) and students are the two most important stakeholders in PBL [14-15]. Therefore, determining the opinions of both the tutors and the students regarding PBL may be beneficial both in evaluating PBL and also in detecting and subsequently improving deficits in medical education programs. In the literature, there are many studies of PBL; however, there are a limited number of studies investigating the opinions and thoughts of both the tutors and the students [16-20].

The aim of this study was to determine opinions of the tutors and students participating in PBL sessions about the extent of the contribution of PBL to certain skills in comparison with the traditional curriculum and to clarify their level of satisfaction with PBL.

Material and Method

This is a cross-sectional and descriptive study. The research population consisted of the 228 tutors in charge of PBL sessions during the academic year of 2012-2013 and all of the first-year medical students (n=195) in Akdeniz University School of Medicine

A questionnaire was sent to the study population in May 2013, the final month of the academic term. Questions included in the questionnaire ascertained the department where the tutor is employed, whether he/she thinks that PBL is a beneficial application for the students, and whether he/she is satisfied with PBL. Additionally, a literature review identified the areas that are generally accepted to be better served by PBL than by the traditional curriculum. Twelve subject headings were identified and questions related to these were included in the questionnaire [21]. These questions were directed to the tutors under the main question, "To what extent has PBL contributed to the students in the subject headings mentioned below?" and to the students under the main question, "To what extent has PBL contributed to you in the subject headings mentioned below?" In both questionnaires, the participants were asked to answer the questions using a 5-point Likert scale (it never contributed, it did not contribute enough, I am indecisive, it contributed, it contributed well enough). During the statistical analyses, the choices, "it never contributed" and "it did not contribute enough" were combined into "it did not contribute" and the choices, "it contributed" and "it contributed well enough" were combined into "it contributed".

Results

78% of the tutors (178 tutors) and 80.5% of the students (157 students) responded to the questionnaire. 68.8% of the tutors gave the answer "yes" to the question, "In general, is PBL beneficial to the student?" It was determined that this answer was most frequently given by the tutors employed in departments of basic sciences (78%) (Table 1).

As for the question, "Are you satisfied with PBL?" 65.9% of the tutors responded "yes." The ratio of these respondents was the highest in the departments of basic sciences (80.5%) (Table 2). Of the students, 82.5% gave the answer "yes" to the same question (Table 3).

The tutors from the departments of surgical sciences are least satisfied with PBL. In their responses to the open-ended question regarding opinions and suggestions about PBL, this group mentioned several problems: the time-consuming nature of PBL, the difficulty of allocating time for PBL while being busy with routine work, the burden of acting as tutors in a topic in which they are not competent, and not believing in the benefit of PBL. In this open-ended question, the tutors requested identification of topics that are suited to self-directed learning and appropriate for comprehensive discussion and for better construction of PBL scenarios. The students requested the tutors

Table 1. Answers of tutors to the question "Is PBL a beneficial practice for the students in general?" according to their department

Department of tutors	Is PBL a beneficial practice for the students in general?							
	Yes		I am indecisive		No		Total	
	Number	%	Number	%	Number	%	Number	%
Basic sciences	32	78.0	5	12.2	4	9.8	41	100.0
Medical sciences	54	72.0	11	14.7	10	13.3	75	100.0
Surgical sciences	35	58.3	13	21.7	12	20.0	60	100.0
Total	121	68.8	29	16.5	26	14.8	176*	100.0

Table 2. Answers of tutors to the question "Are you satisfied with PBL?" according to their department

Department of tutors	Are you satisfied with PBL?							
	Yes		I am indecisive		No		Total	
	Number	%	Number	%	Number	%	Number	%
Basic sciences	33	80.5	4	9.8	4	9.8	41	100.0
Medical sciences	49	64.5	14	18.4	13	17.1	76	100.0
Surgical sciences	34	57.6	16	27.1	9	15.3	59	100.0
Total	116	65.9	27	15.3	33	18.8	176*	100.0

Table 3. Answers of both tutors and students to the question "Are you satisfied with PBL?"

Research population	Are you content with PBL?							
	Yes		I am indecisive		No		Total	
	Number	%	Number	%	Number	%	Number	%
Tutors	116	65.9	27	15.3	33	18.8	176	100.0
Students	127	82.5	18	11.7	9	5.8	154	100.0

to attend the classes well-prepared and have a participation standard (the students mentioned that some tutors participated more and some participated less in the sessions) and better selection of topics.

Among the closed-ended questions aimed at determining the opinions of the tutors and the students about the extent of PBL's contribution in certain subject headings, the tutors marked the option "it contributed" most frequently for the statements covering the subject headings of "skill of telling the information gained to the others," "using information sources like library and the internet to access information," and "interpersonal relationships, adaptation to teamwork," while the students most frequently marked this option for the statements covering the subject headings of "developing communication skills," "using information sources such as library and internet to access information," and "skill of telling the information gained to others" (Table 4).

When the mean scores obtained from the responses to the above-mentioned questions were compared, a significant difference was observed between the mean scores given by the tutors and the students to the items rating the contribution of PBL to the skills of decision-making, integrating obtained knowledge, increasing the motivation for learning, problem-solving, critical thinking, and development of the skill of approaching the patient as a biopsychosocial whole. The students gave higher scores to these items except for the skills of communication and self-directed learning (Table 5).

When mean scores obtained from responses to 11 items that were included in both of the student and tutor questionnaires were compared, the students gave significantly higher scores to all items except for "using resources such as library or internet to access information".

Table 4. The percentage of the tutors and the students who say "I agree" with PBL's contribution in certain subject headings

Subject heading	Tutors		Students	
	Number	%	Number	%
Skill of telling the information gained to the others	135	76.3	132	84.6
Using the information sources like library and internet to access information	123	69.4	96	61.1
Self-directed learning and use of learning resources	121	68.4	135	85.9
Developing critical thinking skills	121	68.3	129	82.7
Increasing motivation for learning	117	66.1	126	81.3
Developing communication skills	113	63.9	141	90.4
Problem-solving skill	113	63.9	127	81.4
Integrating obtained knowledge	104	59.1	121	77.5
Developing decision-taking skills	98	55.6	128	82.0
The development of the skill of approaching the patient as a biopsychosocial whole	89	50.6	118	75.7
PBL helps life-time learning	83	46.9	112	71.4

Table 5. The mean scores obtained from the responses of both tutors and the students to the suggestions of PBL's contribution in certain subject headings

Subject heading	Tutors		Students		Statistical analyses	
	Mean	SD	Mean	SD	p	t*
Skill of telling the information gained to the others	3.95	0.92	4.22	0.79	0.00	-2.92
Self-directed learning and use of learning resources	3.90	1.00	4.024	0.85	0.00	-4.22
Using the information sources like library and internet to access information	3.87	0.99	3.61	1.24	0.04	2.05
Problem-solving skill	3.71	0.98	4.17	0.88	0.00	-4.53
Developing critical thinking skills	3.69	0.96	4.20	0.87	0.00	-5.01
Developing communication skills	3.68	1.06	4.64	1.13	0.00	-2.99
Increasing the motivation for learning	3.64	1.01	4.09	0.93	0.00	-4.15
Integrating obtained knowledge	3.55	1.01	4.07	0.93	0.00	-4.88
Developing decision-taking skills	3.49	1.04	4.16	0.86	0.00	-6.29
PBL helps life-time learning	3.36	1.06	3.94	0.92	0.00	-5.34
The development of the skill of approaching the patient as a biopsychosocial whole	3.35	1.10	4.07	0.93	0.00	-2.99

Discussion and Conclusion

Similar results have been obtained in the studies found in the literature aimed at determining the opinions of tutors and students about PBL in medical education. In a study performed with faculty members employed in faculties of medicine who were tutors in charge of PBL sessions between 1992 and 1993, it was determined that the majority of the tutors thought that PBL's contribution to the students was greater than that of the traditional curriculum [16]. Similar results have been obtained in the faculties of medicine in different countries and it has been determined that both the students and tutors were satisfied with PBL [17-19].

Similarly, we determined that the majority of tutors in charge of PBL sessions think that PBL is a beneficial application for the students and are satisfied with PBL. Additionally, the majority of tutors think that PBL offers a significant contribution to the students in the areas in which PBL is regarded as superior to the traditional curriculum.

It is a striking finding that the numbers of tutors who are satisfied with PBL and think that PBL is beneficial to the student are higher in the departments of basic sciences compared to the other departments. This finding is especially important since PBL is a model used in medical education. Additionally, the high rate of students (74.5%) who are satisfied with PBL is an eminently important finding to ensure that the PBL method continues to be used. Regarding skills that are better acquired through PBL than through the traditional curriculum, the mean scores given by the students were higher for eight items. This finding shows that the students think that PBL makes positive contributions in terms of the skills mentioned in those items. In

light of these findings, it may be concluded that PBL is especially useful in teaching basic sciences in medical education. It helps the students acquire skills such as problem-solving, communication, critical thinking, decision-making, approaching the patient as a whole, integrating basic and clinical knowledge, self-directed learning, and increasing the motivation for learning, all of which are crucial components of medical education.

We think that the preparation of a suitable scenario for the selected topic, characteristics of the faculty members who previously had followed PBL curricula and who are still involved in PBL sessions, the adoption of PBL by the students and tutors, the gradual improvement of the students' access to information and the infrastructure (the library, the number of computers, internet connections etc.) all positively impacted the opinions of the participants.

Some attempts were made to solve the problems identified in the responses to the open-ended question. For example we assign the tutors to PBL sessions only once in every term to decrease workload. Also, we assign them to modules that are closely relevant to their fields to decrease preparation time and effort. In order to better select the topics and build better scenarios, a committee was assigned to check and advise for the scenarios. We acknowledge that the duration of PBL sessions can vary substantially depending on the tutor. In order to cope with this problem, we decided to give short "refresher" courses to faculty members.

All of the suggestions are being taken into consideration as we continue the process of planning and developing educational and instructional activities in our school of medicine.

Competing interests

The authors declare that they have no competing interests.

References

1. Finucane P, Nicholas F, Gannon B, Runciman S, Prideaux D, Nicholas T. Recruiting problem based learning (PBL) tutors for a PBL-based curriculum. The Flinders University experience. Medical Education 2001;35:56-61.
2. Elliott M. Are we going in the right direction? A survey of the undergraduate medical education in Canada, Australia and the United Kingdom from a general practice perspective. Medical Teacher 1999;21:53-60.
3. Cole CR. Differences between conventional and problem-based curricula in their students' approaches to studying. Medical Education 1985;19(4):308–9.
4. Newble DI, Clarke RM. The approaches to learning of students in a traditional and in an innovative problem-based medical school. Medical Education 1986;20(4): 267–73.
5. Dolmans D, Schmidt H. The advantages of problem-based curricula. Postgraduate Medical Journal 1996;72(851):535–8.
6. Blumberg P, Michael J. The development of self-directed learning behaviours in a partially teacher-centred, problem-based learning curriculum. Teaching and Learning in Medicine 1992;4:3–8.
7. Hill J, Rolfe IE, Pearson SA, Heathcote A. Do junior doctors feel they are prepared for hospital practice? A study of graduates from traditional and non-traditional medical schools. Medical Education 1998;32(1):19–24.
8. Moore GT, Block SD, Style CB, Mitchell R. The influence of the new pathway curriculum on Harvard medical students. Academic Medicine 1994;69(12): 983–9.
9. Senok AC, Pipan C, Edan Y, Botta GA. Internet and computer use by medical students in traditional and Problem Based Learning systems. Kuwait Medical Journal 2008;40:196-201.
10. Dolmands D, Gijselaers W, Moust J, Grave W, Wolfhagen I, Vleuten C. Trends in research on the tutor in problem-based learning: conclusions and ımplications for educational practice and research. Medical Teacher 2002;24:173-80.
11. Davis MH, Harden RM. AMEE Medical Education Guide No.15: Problem-based learning: a practical guide. Medical Teacher 1999;21:130-40.
12. Barrows HS. A specific, problem-based, self-directed learning method designed to teach medical problem-solving skills, and enhance knowledge retention and recall. Tutorials in Problem-Based Learning 1984;16-32.
13. Norman GR, Schmidt HG. The psychological basis of problem-based learning: A review of the evidence. Academic Medicine 1992;67:557-65.
14. Azer SA. Challenges facing pbl tutors: 12 tips for successful group facilitation. Medical Teacher, 2005;27(8);676-81.
15. Dolmands DH, Ginns P. A short questionnaire to evaluate the effectiveness of tutors in PBL, validity and reliability. Medical Teacher 2005;27(6): 534-8.
16. Vernon DT. Attitudes and opinions of faculty tutors about problem-based learning. Academic Medicine 1995;70(3):216-23.
17. Khoo HE, Chhem RK, Gwee MC, Balasubramaniam P. Introduction of problem-based learning in a traditional medical curriculum in Singapore--students' and tutors' perspectives. Ann Acad Med Singapore 2001;30(4):371-4.
18. O'Neill PA, Morris J, Baxter CM. Evaluation of an integrated curriculum using problem-based learning in a clinical environment: the manchester experience. Medical Education 2000;34(3):222-30.
19. Kaufman DM, Holmes DB. Tutoring in problem based learning: perceptions of teachers and students. Medical Education 1996;30(5):371-7.
20. Gurpinar E, SenolY, Aktekin M. Evaluation of problem based learning by tutors and students in a medical faculty of Turkey. KMJ 2009;41(2):123-7.
21. Gurpinar E, Alimoğlu MK, Guzeller CO. Developing A Scale For Both Students And Facilitators To Evaluate Problem Based Learning Efficiency. Journal Of Clinical and Analytical Medicine 2016;7(5):595-600.

How to cite this article:
Gürpınar E, Alimoğlu MK, Şenol Y, Mamaklı S. Efficiency of Problem-Based Learning in Medical Education: Views of Tutors and Students. J Clin Anal Med 2016;7(suppl 3): 243-6.