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Journal homepage: www.iberoamericanjm.tk

Review

How to Apply Problem-Based Learning in Medical Education? A Critical Review

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ARTICLE INFO

Article history:
Received 13 December 2019
Received in revised form 19 December 2019
Accepted 20 December 2019

Keywords:
Problem-Based Learning
Obstacles
Challenges
Medical Education

ABSTRACT

Problem-based learning (PBL) is a cornerstone of modern medical education. Principles of PBL are the construction of knowledge, prior knowledge activation, organization of knowledge, elaboration of knowledge, stepwise transfer across contexts and cooperation with other learners. It provides the ability to identify the knowledge, generate and analyze hypotheses that lead to the differential diagnosis of the case according to the complaint of the patient by using history taking, physical exam, and investigations. Application of any innovation such as PBL faces many challenges and obstacles that are related to the students, tutors, learning environment and other stakeholders. We can overcome these obstacles by more training sessions for tutors and students. In addition, the construction of PBL curriculum should be based on a community-oriented approach because it depends on the priorization of common health problems in the surrounding community.

1. INTRODUCTION

The traditional system in old medical schools divides the medical education program into two separate parts; the first belongs to basic science and the second for clinical sciences. It is characterized by acquiring irrelevant knowledge, difficulties of knowledge application, lack of collaboration between basic scientists and clinicians [1]. Problem-based learning (PBL) is a new universal trend in medical education. It is consistent with the scope of current human learning especially constructivism which is based on the interaction with the environment, cognitive conflict motivating the learning, social negotiation, and variability of individual understandings to build and understand the knowledge [2]. Implementation PBL represents a major challenge whereas it is different from medical school to another according to the experience of stakeholders and the surrounding environment [3]. Some of the medical schools make a pure model and the other makes modifications to mix between this innovation and traditional system. Therefore, I think that its application method will determine if it is a paradigm shift or it is a fad, which will finish with passing the time.

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http://doi.org/10.5281/zenodo.3585108

2. SCOPE OF PBL

PBL is a new trend in medical education in recent years whereas many medical schools in the world adopt this trend although its usefulness and effectiveness as an instructional technique is still controversial. Some researchers reported that problem-based learning application leads to successful learning while the others confirmed the contrary. In the practice field, the graduate of problem-based learning is creative, more independent, more efficient and better in the interpersonal competencies such as communication with the patient and the leadership [4].

Problem-based learning is considered developed from the constructivist theory which encourages the learner for constructing the relevant knowledge. Therefore, it involves the learner and leads to deep understanding levels; it motivates the learner to engage in the learning process. Consequently, it leads to active learning in contrast to the traditional methods of learning which encourages the learner passivity [5]. Hence, the role of the teacher in problem-based learning is a facilitator or guide that is different from his role in the traditional system as a transmitter of knowledge [6].

PBL is an active and dynamic process because it uses the self-directed learning approach as well as the development of critical thinking and problem-solving skills. Thus, the learners take more responsibility for their learning with more chance for the development of transferable skills such as communication skills, teamwork, and problem-solving [7].

Problem-based learning adopts a formative evaluation of the learner based on continuous feedback between tutor and learner on the contrary to the evaluation methods in the traditional system that is based on a summative approach [8].

Although advocators of problem-based learning application consider it the best in comparison with the traditional system, opponents have another opinion which shows that problem-based learning is less effective and less efficient than traditional system based on the evidence that is obtained from some published articles that support their claim [9]. These articles indicated to overwhelmed learner's memory in problem-based learning because of the leaner cognitive overload. It claimed also that it is an unrealistic enterprise because it needs extra time for the construction of knowledge by the learners. Moreover, some researchers found that learners in the traditional system outperformed on their peers who taught by using problem-based learning. They found also that learners of problem-based learning were less likely for retaining the new knowledge. According to these findings, they consider the problem-based learning is an ineffective approach [10].

With respecting the opinions of opponents which are based on these articles, but we cannot generalize these findings which are limited in comparison with a large number of articles that support problem-based learning efficacy. This sample of these articles was limited because it was depended on a restricted number of learners. Furthermore, there was a gap in the researches on how problem-based learning is used effectively with intermediate and advance learners outside the medical field.

Some articles have a weakness point for the applied definition of problem-based learning and then its investigating topic is not considered problem-based learning. Because of a revision of the different views about adoption problem based learning as a new trend in medical education, we can conclude that problem based learning to provide the learner with many opportunities to examine and try out. Moreover, it gives the chance for the learner to discover what needs to learn, develop skills for higher performance achievement, process the information and define positions with the evidence and logic argument, improve communication skills and practical skills. Therefore, problem-based learning is the best in comparison with the traditional system.

3. THE CURRICULUM OF PBL

Community plays an important and active role in student learning in this trend because it is considered as a resource for the learner, therefore curriculum of problem-based learning should be relevant to community health needs [11]. Construction of this curriculum depends on the prioritization of common health problems in the community by using the bipolar theory. This theory has two wings; the first wing is faculty objectives and the second is basic disciplinary topics. Distribution of these common health problems in the curriculum depends on the objectives of each educational phase and module [12]. We face some obstacles during the application of a community-oriented curriculum such as some learning objectives and basic disciplinary topics that are not matched to prioritization of health problems, so we can overcome these obstacles by adding non-priority problems to the curriculum for an educational purpose such as forensic problems.

In the related context, there is a Network: towards unity for health that adopted principles or indicators, which determine the prioritization of common health problems in the community [13]. These indicators are prevalence, preventability, treatability, disability, impending future outbreak, social and economic impact, interdisciplinary input and burden of illness (morbidity and mortality) of health problem with a presence of national control programs and prototype value of the health problem for other similar health problems [14].

4. IMPLEMENTATION OF PBL

There many obstacles and challenges that face the implementation of problem-based learning in many medical schools, which adopts this innovation. Therefore,

at first, I think that the identification of the target educational objectives of problem-based learning will provide a more accurate and successful application for this new system.

The concept of these educational objectives is an acquirement of knowledge that is better retained, usable in a clinical context and integrated. Moreover, good dynamic learning which is relevant to the medical career and related to the student's needs. Beside motivated and student-centered, developing the problem-solving and interpersonal skills, the clinical sense, and promotion the ability to work in teamwork, independent self-directed critical thinking, and the learning skills. Problem-based learning is considered life-long learning based on integration with different disciplines (curriculum, teaching, assessment) [15, 16].

From the previous presentation about the problem-based learning system, I will attempt to list common obstacles that face its implementation in some medical schools according to some research based on sound scientific rules.

The first obstacle is the strategy of education in the pre-university stage (teacher-centered strategy) whereas students adapted on it for long years. I think that this strategy is a major problem for the application of problem-based learning because this innovation depends on a different strategy (student-centered learning).

Furthermore, the selection of students for admission in the medical school depends on academic achievement in a secondary school; it should depend on the ability of student for a professional practice that is detected by structure interview to show life experiences, motivation, empathy, tolerance, interpersonal communication skills, orientation towards the teamwork and enthusiasm.

In addition, the character of students, which depends on memorization, loss of autonomy and missed applicable experiences, is a second major obstacle; it is related to the first obstacle because it is the output of the teacher-centered learning strategy.

Absence of considerable communication between new medical schools, which adopts PBL and old schools in the world that applied it for many years to get the experience of the application. Therefore, the hesitation was the title of application of PBL in many medical schools whereas the repeated curriculum changes were done apart from the time if it is enough or not to judge the experiment. For example, the first batch in one of the medical schools graduated via a curriculum that was different from the curriculum of the second batch in the same medical school although the interval period did not exceed one year.

On the other hand, the learning environment especially the organizing environment is missed. The psychosocial component of the learning environment represents a major obstacle for developing the problem-based learning approach such as freedom of expression and accepting of the differences.

Moreover, concepts of problem-based learning and the philosophical view of constructivism, which adopt how to build and gain knowledge, are vague for students and facilitators. In addition, there are many aspects of the learning process in these medical schools, are still under the umbrella of the traditional system and its formats such as lectures and labs. Besides, all methods of student assessment depend on content acquisition, not on the content application.

5. HOW TO DESIGN AN EDUCATIONAL PROBLEM "SCENARIO"?

Finally, I think that one of the important factors that lead to the failure of problem-based learning during its application, it is an imperfect design of the educational problem. Therefore, the involved persons in this discipline should recognize how to construct a successful educational problem and identify its characters that help to achieve its success?

There are many steps that should be done for constructing the educational problem; identification of the learning objectives according to the aims of the educational block should be done at the first and then it should involve these objectives in the problem. Problem design (scenario of the problem) should encourage the student to think, generate and rank hypotheses, integrate knowledge and identify the learning objectives [17, 18]. Designer of the educational problem should construct the case template that it should be built in a systemic, integrated and logical flow problem with authenticity. It should adjust the problem according to the needs of the learners and the stage of the curriculum [19]. The designer should construct the starting point as a trigger point to encourage discussion among the learners with the application of the deductive approach. The problem should be in the present tense; it should contain some information such as age, occupation, and investigations to initiate and moderate the thinking process (brainstorming). It should formulate a tutor guide about how to solve this problem within the target learning objectives for the problem. Moreover, the delicate revision for the problem should be made by the related consultants before its release to the learners. Finally, a feedback system should be created from students and tutors for more qualification of the problem during its teaching in the second time [20].

6. CRITICAL VIEW

Unfortunately, the previous characters of good problem design were missed in many medical schools that apply this discipline besides other related factors and then discussions (brainstorming) in small groups (problem-based learning) did not achieve the desired results and many defects were shown during the implementation.

At the first, there are no ground rules for basic procedures matters such as the respect of starting and finishing time, duration of the discussion, and the rules of individual

participation and effectiveness group evaluation. In addition, the selection of students group is not balanced for the culture and academic background but it depends on the personality knowledge only. Therefore, dysfunctional groups represent a major challenge because of absent the ground rules, which can resolve this problem. Furthermore, group dynamic which means active participation of all students group is missed and also teamwork performance is not present [21].

Moreover, many changes and modifications carried out in many medical schools to modify the discipline of PBL. Some medical schools adopted one session for brainstorming and debriefing depending on creating a handout for students (reading material) as a scientific reference for the students in this session. Other medical schools adopted PBL as two separate sessions, the first is a brainstorming session and the second is debriefing session, and the students become to depend on different books and the internet as references in the debriefing session.

Furthermore, the concept of the tutor (facilitator) of small group discussion sessions is not clear for most of the involved staff members in many medical schools that adopt problem-based learning. The job description of the tutor in this innovative system should be the promotion of student-centered and self-directed learning, and fostering a team approach to solve the target problem and then the tutor should not be a source of the knowledge but he facilitates discussion by posing questions to resolve the problem.

The major obstacle during the implementation of problem-based learning in traditional medical schools is due that some of the tutors sometimes are not oriented, not well trained, and not interested because they were graduated from these traditional medical schools. They resist what is new and any modern issue, so there is a lack of enthusiasm for PBL. They do not know and do not want to know anything except the old traditional learning methods.

Finally, we can treat the above-mentioned obstacles and errors via an accurate selection of tutors who involve in this system with the preparation of training sessions for them and students to adapt to this innovation to lessen the disadvantages of implementation associated with creating a channel for good communication with experiences of other successful medical schools that adopted this new system.

7. CONCLUSION

PBL is a new trend in medical education in recent years. Many medical schools in the world adopt this trend although its usefulness and effectiveness as an instructional technique are still controversial. There many obstacles and challenges that face the implementation of problem-based learning in many medical schools, which adopts this innovation. Transmission of experiences from successful medical schools that adopted this new system to other medical schools that will apply a new curriculum based on problem-based learning will lessen the disadvantages of its implementation. Moreover, more orientation and training for all involved staff members maybe have a helping role to get a successful application for this discipline.

8. DECLARATION OF CONFLICTING INTERESTS

The Author declares that there is no conflict of interest.

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