The PBL-based Practical Research of Medical Education Mode Reform

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Abstract: With the development and transformation of the medical model of medical technology, people's demands of medical services is increasing, the overall quality of community health workers put forward higher requirements for medical education also presents new challenges. The overall quality of health workers are required more higher by community, it also give medical education a new challenges. Limitations of traditional medical education is exposing increasingly, it's difficult to adapt to the rapidly changing needs of society, an urgent need to explore and reform medical education model. According to differences between groups of students in different education levels, we analysis the feasibility of the introduction of PBL to the teaching of medical students, PBL teaching method is an effective means to improve the quality of our medical students train. Application of PBL teaching is quilt mature; it has obvious advantages in improving students' ability to solve practical problems of cooperation and self-learning training innovative thinking ability has obvious advantages. In recent years, the PBL has become a model of medical education on a wide international concern, some of our medical colleges have also launched PBL teaching practice, but still in the exploratory stage, the gained experience still don't have too much.

Keywords: PBL, clinical medicine, medical education mode, reform, evidence-based medicine.

1. INTRODUCTION

With the social development and technological progress, the medical model from the biomedical model into a biopsychosocial medical model, marking a healthy and disease-centered medical science, has entered a new period of development, which promote the transformation of medicine fields to accelerate prevention, updated diagnosis and treatment technology, which shows that medical science has undergone a fundamental change. The development and transformation of the medical model of medical technology, people increasing demands of medical services, the overall quality of community health workers put forward forward higher requirements for medical education also presents new challenges. Limitations of traditional medical education increasingly exposed, difficult to adapt to the rapidly changing needs of society, an urgent need to explore and reform of medical education model [1].

PBL is Problem-Based Learning, usually translated as "problem-based learning." In medical education, PBL concept is often used as a teaching method, teaching mode or teaching philosophy to use. "Classic" PBL refers to medical students by solving ill-structured problems clinical cases to learn a learning strategy preclinical curriculum. PBL is a more advanced teaching methods and concepts, and advocated by our current educational ideas and goals of quality education is consistent. PBL student-centered around the "problem" team teaching, teachers provide guidance only. It has the advantage of changing the traditional teaching mode passive learning to active learning, group members mutual division of labour, through various channels to find their own solution to the problem of information, students learn the necessary knowledge in the process of solving problems, helping to train medical students independent the ability to learn and lifelong learning, communication skills, teamwork, spirit of humane care and practical application of the ability to solve difficult clinical problem.

In recent years, with the advancement of education reform, education and more attention from the perspective of culture clinicians were practicability knowledge education of medical students. Education has changed from "cramming" the traditional teaching to the "issue-based" PBL teaching methods [2, 3]. PBL this new teaching model has been affirmed in the world of medical education, and gradually become the new direction of clinical medical education mode reform. Therefore, the problem how to apply this model to our national clinical practice teaching effectively, improve the exist problems in the implementation of PBL teaching is worthy of thinking for every medical educators.

Early in the 1920s, the US medical community found in the presence of bias in medical education and the crisis that continues to enrich with medicine and medical knowledge, and medical students greatly increased load, easy to overlook the ability to memorize and practice ethics training, how to train and strengthen the capacity of medical students active learning become the most important problems of modern medical education. Application of PBL teaching more mature, it is to improve students' ability to solve practical problems of cooperation and self-learning training innovative thinking ability has obvious advantages, but in teaching, most teachers focus only on the results of students to solve problems, and utilization of the search results are not very...
stressed, this information capabilities of students is very unfavourable. Information capabilities should also include capacity utilization of information and in access to and use of the process information, the ability to analyse information more plays a key role [4-5].

The current principal contradiction in our medical education is no longer a shortage of medical personnel quantity, but the quality of the medical personnel to improve. Whether it is from our social, economic, scientific and technological development and higher requirements for the proposed health, or from the enhanced competitiveness of international cooperation and urgent medical needs, all we need to improve the quality of medical education, training medical talents. As a country in the world of higher medical education more popular, with the development of foreign exchange, China's medical education gradually internationalized [6].

Educational reform in developed countries focus on the reform of teaching methods, and reforms in developing countries is mainly reform of teaching content. Currently, the United States as a typical representative of the North American medical education has a leading position in the world, after 200 years of rapid development and several major medical education reform, has been completed and an effective mechanism and outstanding medical education of medical personnel education model is rest of the world in medical education reference point [7].

Next, we describe the data and methodology used in more detail.

2. MATERIAL AND METHODS

With the social development and technological progress, the medical model from the biomedical model into a biopsychosocial medical model, marking a healthy and disease-centered medical science, has entered a new period of development, promote the transformation of medicine all fields to accelerate prevention, updated diagnosis and treatment technology, so that the whole of medical science fundamentally changed the face of occurrence. Each branch of medicine continue to expand and lead to mutually cross between disciplines continue to rise to a large number of interdisciplinary and multidisciplinary medical curriculum Division is getting smaller, new technologies are emerging, problems encountered when doctors are increasingly confronted with a patient diversification, to cultivate medical health personnel put forward higher requirements, medical education is facing new challenges [8].

PBL is problem-based learning. PBL medical education and the traditional model of medical education are taught based learning (Lecture-Based Learning, LBL) that is very different. PBL in the late 1960s produced in Canada McMaster University School of Medicine, in the late 1980s in North America gained rapid development. 1991, 70 percent of US medical schools have adopted varying degrees PBL mode of teaching. Since the 1990s, parts of school of medicine in European have begun to experiment PBL curriculum. Uni-

Table 1. Comparison of different clinical stages teaching mode.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Contents</th>
<th>Place</th>
<th>Feature</th>
<th>Exam</th>
<th>Put in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional clinical teaching mode</td>
<td>Teaching the theory observation, explain cases centralized</td>
<td>school</td>
<td>Teacher-centered, Emphasis theoretical knowledge</td>
<td>Close examination</td>
<td>Save time and money</td>
</tr>
<tr>
<td>US and European clinical teaching mode</td>
<td>Stay in the hospital all day, each teacher teaching 2-3 pupils</td>
<td>hospital</td>
<td>Student-centered, PBL teaching, Practice-oriented, emphasizes self learning</td>
<td>SP OSCE MSE</td>
<td>Spend a lot</td>
</tr>
<tr>
<td>Ningbo University bedside teaching mode</td>
<td>Students participate in a variety of medical activities in the hospital, then intensive classes</td>
<td>hospital</td>
<td>Student-centered, Practice-oriented, Ethics and Education</td>
<td>Department Examination, Students' Evaluation</td>
<td>Spend a lot</td>
</tr>
</tbody>
</table>
versity of Hong Kong in 1997 and started teaching PBL, PBL teaching currently account for 60% of all medical school education, and Harvard Medical School have all been substituted LBL application of PBL teaching.

\[ \Phi = 1.79d^2f_c^2 \]

(1)

The formula preformed the main failure mode of PBL bond shear failure of concrete joints. Thus, although the formula is based on the test results with rebar specimen presented, but not directly reflect the impact of rebar.

By comparing the two at home and abroad widely used in clinical teaching model: clinical teaching model of clinical teaching mode of traditional domestic medical education in Europe and America and other developed countries and widely used (Table 1), we can find: bedside teaching mode absorbed the traditional model and strengths of European and American models, basically meet the modern medical model requirements for medical students.

Bedside teaching changed in the past from old books to clinical teaching model, through direct contact with patients, receive extensive clinical information. In the doctor's inspired teaching guide, combined with the knowledge learned books, coupled with comprehensive analysis, or for certain clinical problems, read the information back to the past, so from books to clinical, from clinical to books, to deepen the disease understanding that a disease, from the classroom to get a secondary education and wards [9].

Clinical stage is aimed to train qualified teaching medical students, correct clinical thinking and improve students’ noble ethics, so countries attach great importance to medical education at this stage culture. Learning from passive to active learning process of change is to change the passive indoctrination active participation. This process is conducive to play the initiative of students, help students to logical thinking and analytical skills system diseases develop and improve, help to improve clinical competence.

All along, learn a foreign concept for national education policies and educational services are relatively educators’ research priorities. A country’s education can produce a significant impact education in another country, that’s may affect education system and the macro-policy level, it can be micro-level teaching methods.

After modified external education mode to suit the actual situation in the country, turn the educational practices of other countries into educational practices in another country.

Although in the past 20 years of China’s long-term medical education has achieved remarkable results, training a group of outstanding medical graduates of medical institutions, but should require the internationalization of medical education and medical and health services development.

\[ q = 1.45[(d^2 * d_s^2)f_c + d_s f_y] - 26.1^2 \]

(2)

d_s represents the rebar diameter. The formula preformed that the bearing capacity of PBL by concrete joints and holes in rebar joint control, the formula should reflect the impact of rebar.

PBL teaching model with the traditional model of medical education that is “to teach based learning (Lecture Based Learning, LBL)” teaching model, in terms of the design concept, the steps, the implementation effects are fundamentally different. LBL teaching emphasizes discipline-based, teacher-centred, lecture-based classroom. It is more concerned about the systematic medical science, basic, completeness, logical, step by step, etc., in this teaching mode, students can master the relatively broad and solid foundation of medical knowledge.

Although the teaching methods can systematically and comprehensively impart theoretical knowledge and safely complete the teacher intended target, but it ignores the students learning initiative, weaken the students’ interest and curiosity. The PBL teaching mode is to break the traditional teaching of thinking, it also fundamental teaching and clinical practice, primarily a questions - discussion - Self - Discussion - then self - summarized the process. Students become the subject of learning and teaching, teachers become students of instructor or facilitator. This kind of teaching methods for students’ clinical thinking has obvious positive effect.

\[ Q = 0.6348A_s \sqrt{f_c} + 1.1673A_s f_y + 1.6396A_s \sqrt{f_c} \]

(3)

The formula preformed that the bearing capacity of PBL from the steel outer concrete, steel and concrete joints transverse ordinary common control, the failure mode is a concrete slab in the longitudinal splitting. Consider many factors, but the physical meaning vague. This paper has shown that making inference about the effect of educational attainment on migration can be highly sensitive to age-specific migration patterns.

Fig. (1). Students’ evaluation of the effectiveness and continuity about skill test.
In contrast, PBL teaching method is a more advanced approach to education, has gradually become an important research direction of medical education reform in our country, but also consistent with our advocacy of ideas and goals of quality education. It is also essential to note that differences between the estimated parameters are larger across columns than across rows in the Table 2, which indicates that socio-economic background has a stronger impact on migration than education has [10, 11].

Table 3 shows that: 46 medical students were internal medicine and surgery clinical skills assessment results, overall quite good; teaching students and physicians are also more satisfied. But because this bedside teaching and clinical skills multi-station test method implementation of medical schools in the country have not yet been reported, there is no object for comparison. We can only be evaluated from absolute performance: bedside teaching medical students to master clinical skills are ideal.

Teaching as a promoter of medical education and medical workers agree to open, in-depth teaching mode it does not teach the concept of students' scientific treatment, and promote the practice of evidence-based medical education, to medical records practice clinics, the medical knowledge of scientific capacity for innovation and found that the formation of a special students develop learning habits.

Clinical practice, medical records and case analysis can reflect the students' clinical logic and language, organizational skills, and good communication patients and their families conducive to the smooth conduct of disease diagnosis and treatment. Thus, the students' ability to write medical records and patient medical record analysis and communication skills can reflect their actual ability to solve clinical problems.

\[ Q = \alpha_i \beta_j A_i \sqrt{E_f c} + \alpha_i \beta_j A_i f_y \]  

(4)

Development and popularization of network technology, rich network resources to achieve evidence-based medical education to provide the conditions and students' ability to reflect literature search is a certain self-learning ability of the study results showed that of PBL based applications through
internship in paediatrics certificate of medical education, compared with LBL clinical teaching on students to solve practical problems and improve the ability of having a significant role in promoting, but also to give the students affirmed.

At the same time, evidence-based medicine is the medical model of humane medical practice which effectively combines the patient's values and preferences chosen so that physicians should not only be concerned about the disease can be cured, a number of long-lived, must be concerned about the quality of life of patients pay more attention to comprehensive treatment of rationality.

\[ Q = 4.5ht\sqrt{f_c} + 0.91A_yf_y + 3.3\ln d^2\sqrt{f_c} \]  

(5)

For example: the department has treated two Leigh syndrome, the experimental group of students after the literature review, a comprehensive understanding of the treatment of the disease is mitochondrial disease, no cure for symptomatic conservative therapy in advanced disease. Children breathing gradually slowed down, the parents asked not to intubation and mechanical ventilation, in order to reduce their suffering, quiet death. Therefore, according to the wishes of patients and their families to choose the treatment is part of evidence-based medical practice, students more in-depth understanding of rationality disease treatment.

3. THE ROLE OF PBL IN CLINICAL TEACHING

PBL pedagogy emphasize problem-based learning, students of all learning content around the "problem" This spindle start. It is mainly through "OK Threads -> analysis of the problem -> gathering information -> self discussed-> Establishment Solutions -> summary evaluation and feedback" and other steps will introduce students to the problem situation. Pay attention to inspire and induce students to form a master self-learning ability and ability to solve problems in the whole process of clinical teaching. Based on the completion of each student while addressing the issue of teaching, and also completed the reproduction of knowledge, deepen the knowledge and understanding of the consolidation. Therefore, PBL teaching method has its unique advantages and effects in clinical teaching, mainly as follows:

1). Help to stimulate students' interest in learning, improve learning efficiency

In PBL teaching mode, teachers will introduce students to the problem situation, students become problem-solving real "masters." By the classroom portion of the initiative to the students, not only to provide an opportunity for students to active learning, promote student autonomy, actively speak, to fully express their views, but also to develop independent learning ability to obtain knowledge and discovery issues, pole greatly improves the students' interest in learning.

2). Help improve the overall quality of students

Based on clinical teaching and training by PBL teaching method designed to enable students not only have much to gain in terms of clinical expertise, and through active participation and problem solving can cultivate students' consciousness, innovation, competition and team spirit, in line with institutions of higher learning to implement concepts and requirements of quality education.

As medical oncology, the neck is painless lymph nodes in addition to common clinical manifestations of malignant lymphoma, its need and reactive hyperplasia, lymphatic system, chronic lymph node inflammation, metastasis differential diagnosis of cancer and other diseases. Through the answers to these questions, students in the acquisition of his-tory provide a comprehensive clinical data, avoid misdiagnosis or missed diagnosis, help improve the overall quality of students.

3). Help build a theoretical study and practice cohesive platform

Problem-solving process, you need to curricular and extra-curricular, internal and external, direct and indirect experience closely together, gathering information through various channels, the expansion of knowledge to solve problems. Such training with a problem to solve the problem in training in learning, learning theory and practice can make a good combination of cognitive; improve the ability of students to apply theory to solve practical problems.

4). Contribute to teachers to improve their professional quality and achieve a total growth of teachers and students

PBL teaching mode for the teachers put forward higher requirements, the overall quality of teaching methods of teachers and teachers faced with severe challenges. Teachers must change its role, new ideas, advancing with the times, constantly improve and guide the task of consultants’ quality of their business to really take on the teaching of the organ-izers, resources.
In traditional teaching group, teachers prepare lessons carefully in accordance with the syllabus, combining multimedia courseware for teaching; classroom teacher taught mainly lectures supplemented by outstanding students of the important and difficult chapter in the teaching process.

Examination results of the survey show that the students clinical skills and theory examinations satisfaction. At the same time, bedside teaching and department Examination method has been recognized by the vast majority of teachers and students, there are 78.67 percent of the students think bedside teaching help or helpful (see Fig. 1), 89.59 percent of the students think we can proceed, 83.70% of the students on the skills test bed l Lu method positive attitude, 92.39% of students think we can continue.

PBL and CBL is the common model of medical clinical education, we have much in common. PBL and CBL teaching emphasize the initiative of students and teaching continue to mobilize the enthusiasm of the students through the guidance of teachers. PBL teaching most of the problems raised in the form of cases appear, and CBL teaching cases for analysis and deepening is done by asking a question. Fig. (2). In the CBL, because the case at the centre of the teaching process, the teacher's role and the role of different students better way of thinking based on the gradual establishment of medical knowledge and expertise constraints, according to the school's teaching objectives, criteria to select cases Fig. (3).

In PBL teaching methods, problem-driven, integrated practice will not only help students to information sources and information tools to understand and use, and help students information analytical thinking and inquiring mind, to enable students to think independently, initiative exploration, self-discovery opportunities.

Practice runs found because of differences in English reading ability, the experimental group students to master English to retrieve most difficult to retrieve than the Chinese, but to master the Chinese improve the ability to retrieve them also helped Further, since the paediatrics practice time is short, in less time in evidence-based medical education, students grasp the depth and difficulty enough, but less than nothing if the student to be familiar with the basics of evidence-based medicine, such as the concept of authenticity background step evaluation of the implementation, but also basic to teaching results of the study.

4. CONCLUSIONS CONFLICT OF INTEREST ACKNOWLEDGMENT

The study results suggest that the teaching method is worth application, and try to practice teaching generalized to clinical practice as well as specialist training in standardized training; medical students will viewpoints and methods used in medical practice evidence-based medicine, the better for the patient service. In addition, both teaching and learning, teachers in the teaching process, but also with students and common progress, consolidating the old knowledge, learn new knowledge, teaching and clinical skills have been significantly improved.

![Figure 2](image_url)

**Fig. (2).** Comparison between effectiveness and sustainability of teaching methods in inside and outside, women and children's.
From the information collected, summarized the discussions spoke experimental design, preparation and operation of all members of the group of independent division of work completed, cultivate the spirit of teamwork; exchange students get discussions with team members and teachers, and guidance to improve the language skills, analytical and problem-solving skills, and promote the healthy development of relations between students and teachers and students in the process of self-designed experiments, students through their own exploration and hands-on to find ways to solve problems, to stimulate the students innovation, cultivate innovative thinking ability.

Therefore, PBL theory is to guide students in a whole new perspective and ideas to complete their studies a good opportunity, should promote the reform of the teaching model in medical physics or similar professional experiment teaching.

PBL model in recent years in the field of medical education in the country was given a certain amount of development, but all on a small scale applied to a single discipline, yet unable to form a large-scale comprehensive curriculum, but to understand the latest developments of PBL, PBL master the inner essence, is essential. On the basis of the full implementation of these preparations basically completed the combination of their own practice of PBL model, focused on high quality medical talent should become the consensus of medical education, but also must also focus on the development trend of China’s medical education and reform.

In the 20th century, the contradiction between the requirements of the limitations of the traditional model of medical education and a modern bio-psycho-social medical model between the increasingly prominent, reform the curriculum and teaching methods of integration is to implement a number of medical schools, and gradually moving towards a new explore and establish medical education model.

To explore the old model of medical education reform, and create a new model of medical education is a big challenge, we need to overcome many difficulties. Now in the national range the way that is widely used in medical education reform is based on the concept of PBL education reform, it relates to a lot of problems that need to be solved, these issues are not only realistic but also urgent, we need to make a break.

CONFLICT OF INTEREST

The authors confirm that this article content has no conflicts of interest.

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