Application of PBL Teaching in Human Anatomy of Seven-year Medical Program

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Abstract: In order to stimulate the interest of students in human anatomy, further improve their comprehensive abilities, a diversity problem-based learning (PBL) curriculum was established for preclinical education in the seven-year medical program. The grade had 8 classes with 22-24 students in each class, divided into 32 groups, 5-6 people for each group. Through this course's emphasis on PBL, students acquire creative thinking skills and professional skills as they tackle complex, interdisciplinary and real-situation problems.

Keywords: human anatomy, seven-year medical program, problem-based learning

1 Introduction

In China, the students take the national admission test, the applicants for the seven-year program must have a higher score than those applying for the five-year program. Furthermore, admission to the College of Medicine is highly competitive. Fujian Medical University is striving to build a professional training system, emphasizing on high-level education ready for the 21st century.

As a basic course, human anatomy is the science on the structure and function of human body and relations of its various parts. Traditional teaching paradigm was historically fixed and inflexible, neglected of creative thinking skills and professional skills training. Problem-based learning (PBL) is defined as an educational format in which learning takes place in a small, self-directed group and in which actual problems and experiences form the beginning of the session[1]. Further, through this course's emphasis on problem-based learning, students acquire creative thinking skills and professional skills as they tackle complex, interdisciplinary and real-situation problems[2].

2 The Implementation of PBL Teaching Mode

At first glance the study of human anatomy seems to be complex and overwhelming. It is true that anatomical education, which took place during the second year of a basic science course is difficult. With an emphasis on laboratory experience, anatomy dissection is very important. Johnson's study find that hands-on dissection enhances learning and confidence in the subject matter, because examination performance as well as personal satisfaction was enhanced on the extremity that was dissected[3].

In each chapter of the learning process, typical cases were selected, and PBL teaching was full penetration in anatomy teaching step by step.

2.1 Background

Human anatomy textbook edited by Yang Huijun "Practical Anatomy" was chosen. Being a core subject, an effective course design of Chinese-English bilingual education was adopted. The purpose of this one-semester course was designed to prepare students to undertake programs in theoretical and experimental human anatomy. Theoretical lessons 18, the basic theory of human anatomy was systematically introduced by professors in a big classroom; and experimental lessons 126, dissections were carried out by students in laboratories. PBL curriculum was established, followed by a class dicussion being taken up every 3 weeks.

2.2 Objects

The grade of seven-year medical program had 8 classes with 22-24 students in each class, divided into 32 groups, 5-6 people for each group, the proportion of boys and girls in each group was basically the
same. For free combination, each group was small but members friendly and helpful. During PBL teaching, discussion focused on some specific cases, group members were respectively responsible for finding information, preparing discussion outline, producing PPT slide, and summarizing, etc. Finally, a student who should be able to express their opinions was selected to make a statement (Rotation ensured that students were exposed to all of these roles).

2.3 Methods
Generally, PBL is conducted in the following five steps. 1) Problem is presented and read by group member. 2) Students discuss what is known. 3) Students discuss what they think and identify the broad problem. 4) Students identify their learning needs. 5) Students share research findings with their peers[4]. Our PBL placed students in small groups and provided a means by which they could investigate real problems. PBL did not present a new curriculum but rather the same curriculum through a different teaching method actually.

2.3.1 Determine the teaching program
Every regularly scheduled classroom course must have a syllabus. According to the anatomy syllabus of seven-year medical program, course goals and PBL programs were well-prepared. Teaching plan was drawn up in accordance with the lessons, including lower limb, upper limb, chest, abdomen, pelvis and perineum, neck and other sections. Furthermore, teaching focus and difficult chapters were presented before class.

2.3.2 Best case scenario
According to the teaching focus, coordinate with bilingual education requirements, the relevant content of the typical clinical English cases were selected. The cases had a broad distribution, covering almost all chapters. Sub-themes were identified under each major theme, such as: knee joint damage, posterior leg muscles damage, humerus fracture, carpal tunnel syndrome, breast cancer, mitral stenosis, gastric perforation, appendicitis, cervical cancer, prostatic hyperplasia, recurrent laryngeal nerve injury, congenital torticollis and so on.

2.3.3 Guidance on question
Scholars define PBL as "the learning that results from the process of working toward the understanding or resolution of a problem"[5]. As we know, the students learned the content as they tried to address a problem. So that many issues raised during partial dissection, followed by valuable informations made widely accessible through not only textbooks but also libraries and networks. These activities affected students' anatomical knowledge level in a positive way.

2.3.4 Discussion
The teacher should encourage all students to contribute in a broad discussion. Using students' collective information, the cases were discussed from different aspects. Students need to take responsibility for their own learning, as well as their classmates'. Finally, a student was selected standing up in front of class to give a presentation. After then, the students of other groups asked questions until the problems could be solved. The tutor should review the draft PBL submissions such as a presentation or report. Then they should point out any obvious factual errors and provide advice on style and format of the final submission[6].

2.3.5 Summary
The tutor is also responsible for moderating the individual scaling factor generated from the peer review process. This should reflect each individual performance, with consideration given to the feedback from the Peer Assessment Forms completed by all the students at the conclusion of each project, as well as reflecting their own observations recorded on the Meetings Review Form[6]. By the classroom teacher to discuss the final contents for this major and difficult-reviewed. After class, students were required according to their understanding, sharing learning resources, reviewing the sections of anatomy knowledge to help each other understand. After then, a detailed case analysis and summary was submitted to the teacher.

At a subsequent follow-up meeting the tutor should perform a mid-project review, whereby the students were given feedback on their own contributions to the group[6].
2.4 Assessment
PBL tutorial facilitators were partly liberated from their traditional roles and developed additional skills for facilitating. However, conflict arises when PBL-trained students encounter the traditional exam-centered education system. There were two ways to evaluate PBL effects in our teaching, one through discussion, presentation, PPT slides, reports; the other were some questions assessment to measure students' comprehensive ability. Such as: "Try to analysis the following cases with anatomical knowledge".

A 35-year-old woman complains of a 2-month history of hoarseness of her voice and some choking while drinking liquids. She denies viral illnesses. She underwent surgery for a cold nodule of the thyroid gland 9 weeks previously. Her only medication is acetaminophen with codeine. What is the most likely diagnosis? What is the anatomical explanation for her symptoms?

A 32-year-old man is involved in a motor vehicle accident. He used three-point restraints and was driving a sedan. The driver of a pick-up truck ran a stop sign while going at approximately 45 mph and "T-boned" the patient's vehicle on the driver's side. The patient has multiple injuries including a displaced frac-ture of the left humerus. He complains of an inability to open his left hand and loss of sensation to a portion of his left hand. What is the most likely diagnosis? What is likely mechanism of the injury? What portion of the left hand is likely to have sensory deficit?

3 The Effectiveness of PBL Implementation

3.1 Stimulated interest in learning
Typical cases were selected in PBL teaching, which combined knowledge of human anatomy with clinical cases, and then stimulated students' interest and curiosity. Interest is the best teacher, which could cultivate students' learning motivation and boost up the memory; induced them into the "Self-struggle to access knowledge" realm. The students were no longer passive learning, they developed independent thinking gradually, and therefore accessed to information. The application of anatomical knowledge to clinical problem solving, of course, was the solid foundation in clinical thinking and reasoning methods.

3.2 Enhanced self-learning ability
Self-PBL learning process was an important stage. The students of seven-year medical program were generally had a strong self-learning ability, which was a prerequisite for carrying out PBL teaching. The conduct of each PBL course, was a self-strengthening process. The PBL teaching mode was implemented through a series of training: topic introduction, problem statement, hypothesise, research, presenting results. In addressing the "problem", had the sense to train the students' ability to acquire knowledge by themselves.

3.3 Enhanced interpersonal skills
Medical students must possess excellent interpersonal skills, as well as flexibility, dedication, and team spirit. Not only surgical operations but also case consultations need collaboration. PBL curriculum improved students' communication skills that the students were very good at listening to one another and picking up non-verbal signs from other members of the group. With the increase of exchange opportunities to learn, good interpersonal skills gradually established. PBL in small-group teaching also provided an effective communication platform between students and teachers, and then drewed "psychological distance" closer.

3.4 Improve student's ability to express
PBL teaching mode effectively enhances the students' ability to express their ideas. Students use multimedia, action language, writing on the blackboard, drawing and other means to give full play to their own advantages, lively and interesting. The topic set out a heated discussion which improve students' adaptability. After the end of each study, a further summarized must be taken in the form of a written report handed over to teachers to improve the analytical expression.
Therefore, PBL students demonstrated better collaboration in discussion by adjusting their individual roles during group discussion, helping their colleagues to clarify ideas/opinions, and participating more in discussion[10].

3.5 Develop comprehensive ability
In PBL, the students have to study and think independently. Divergent thinking is encouraged to generate many different ideas about a topic, which might create more resourceful students. So as to guide students from different aspects to explore the problems and improve problem-solving ability. The students were trained to have an interest in the research of medical problems, perseverance, meticulous, rigorous scientific attitude, and collaborative spirit. Using their heads, organizing problem solving, developing the ability to acquire knowledge self-consciously so that they could obtain competitive advantage, and then further to become high-quality medical professionals.

3.6 Establish self-confidence
PBL was a student-centered instructional strategy which placed the student at the centre. What personality traits would be useful for a doctor? We think that self-confidence, calm, decisive is an excellent doctor should possess personality traits. We had not rigidly limited form of PBL teaching, students could use multimedia, blackboard and otherwise to promote participation. Teachers should discover students' "bright spot ", give them more encouragement and affirmation which help students develop an appreciation of their own behaviors, make it a positive driving force. Successfully demonstrated on a small platform, gain valuable confidence, develop the students' psychological qualities.

4 PBL Teaching Mode Prospects

The training for the students of seven-year medical program, whether from breadth or depth of knowledge, has higher requirements. Due to the teaching's urgent need, a strong emphasis should be placed on curriculum integration and improving teacher quality.

4.1 Interdisciplinary teaching, a growing trend
Anatomy, Histology and Embryology curriculum integration is conducive to students' understanding from cell to body, from occurrence to gross anatomy, learning the various systems and organs of the normal human body' structure, and thus easy to understand and remember, reduce the burden on students, while avoiding duplication or detaching. Mining potential of students, improve teaching efficiency. Collection to a series of typical cases, selected in part, in the integration of courses (anatomy, histology and embryology), gradually promote the PBL teaching.

4.2 To improve teacher quality
PBL teaching mode takes the student as the main body, is emphasized to foster the students' skills in spontaneous study and problem solving and the analyzing and comprehensive thinking ability. Teacher must "offer fish and teach how to catch fish as well " [11]. Meanwhile, the teacher is the most important element in fostering student achievement. He(Sh)e plays an important role as facilitator, organizer, manager in the learning process, arousing the enthusiasm of students, promoting active thinking and comprehension.

Teachers must keep on updating their knowledge about a discipline continuously as new knowledge is being created every second. A teacher must have up-to-date information regarding any issues that are taking place around them as they will be a referring place for the students[12]. All it requires teacher to have excellent quality and good moral character, knowledgeable, with a superb teaching artistic skills. Not only have well-knit professional knowledge and excellent skills in anatomy, but also have relevant cultural knowledge. In short, teacher's personality, academic ability to a new heights can it be in the "moisten things silently" and internalized into the quality of students.
In short, the way to teaching is not fixed. In anatomy teaching process, we will be guided by the advanced teaching philosophy, and constantly improve the art of teaching, possess an in-depth understanding and application of PBL, use various teaching methods to achieve the best teaching effects.

5 Conclusion

PBL is an educational model that makes human anatomy learning an active process. Through this medical course's emphasis on student-centered and teacher-guided instructional strategy, the students of seven-year medical program acquire creative thinking skills and professional skills as they tackle complex, interdisciplinary and real-situation problems.

References