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Original Article

Research on the "Problem-Centred Theory" Pedagogy to Improve the Clinical Thinking Ability of Medical Students

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ABSTRACT

With the advent of the era of a knowledge economy, the teaching model of the problem-centred theory is widely concerned. This paper applies this teaching mode, takes the typical "abdominal pain" case as the problem centre, carries out the scenario design and teaching analysis, and explores the mode and way to improve the clinical thinking ability of medical students. Based on discussing the principles of problem situation design (including inspiration, vitality, conflict and interest), five modules of the application of problem-centred theory are innovatively proposed. 1. Create a situation, throw problems, find problems, and catch problems. 2. Grasp the main aspects of the contradiction, grasp the stipulations of the matter, and clarify the crux and essence of the problem (what disease the patient has) 3. Determine the severity and difficulty of the problem. 4. Under the teacher's guidance, propose the solution, implement and draw conclusions. 5. Probe and trace the source, get to the bottom of the problem, and study the root cause of the problem.

Keywords: Problem-centred theory, Diagnosis, Clinical thinking, Medical education.

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INTRODUCTION

People spend their whole lives in solving problems, especially doctors and teachers. The diagnosis and treatment process of clinical medicine is a typical process of discovering and solving problems, which can best reflect the problem-centred theory. Therefore, for those medical college students who are in the education stage and shoulder the major mission of curing diseases and saving lives, it is very important to cultivate their ability to identify and solve problems. All activities in teaching are inseparable from "problems". From realizing the existence of a problem, or raising an issue, to exploring the problem until the "problem" is solved, it is a process of seeking answers. Therefore, the simulation of the diagnosis and treatment process of clinical medicine in the education stage of medical students can have a multiplier effect on training their thinking ability, and improving this ability will help their future career development.

At present, many educational models and educational theories are widely circulated. For example: "student-centred theory",[1] "subject-centred theory",[2] "parenting- centred theory",[3] and "problem-centred theory",[4] among which "problem-centred theory" is quite distinctive and extraordinary competitiveness. That is to be problem-oriented, place learning in real problem situations, learn the knowledge hidden behind the issues through analyzing, exploring and solving problems, so as to improve students' ability of independent learning and solving problems.[5-7] In recent years, the author has been researching and promoting the "problem-centred theory", aiming at applying this teaching mode to the teaching practice of various disciplines.[8]

In the teaching mode discussed in this article, teachers' "teaching" and students' "learning" are centred on solving a series of clinical problems. The in-depth design of the issues are directly related to the quality of classroom teaching, which in turn affects the learning effect of students. Therefore, the teachers skillfully design a series of appropriate situations for the selected problems, which can well improve the students' learning enthusiasm.The paper designs five steps to improve the clinical thinking ability of medical college students taking abdominal pain as an example,. Figure 1 is a schematic diagram of the design and implementation of this research project.

The design scheme of the project research shown in the figure shows the three main points of the problem-centered theory, what,how and why, which fully reflects the teacher-led and student-dominated problem scenario setting scheme.

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Create a situation, throw problems, discover problems, and capture problems

Abdominal pain refers to the lesions of internal and external organs in the abdominal cavity caused by various reasons, which manifests as abdominal pain. It is the most common symptom of organic and functional gastrointestinal diseases and can manifest as pain and discomfort of different natures. Abdominal pain is one of the symptoms complained of by patients, which is a subjective feeling constrained by both pathology and psychology. Abdominal pain is closely related to digestive disorders and may also be a concomitant symptom of systemic disease. The pathogenesis and aetiology of abdominal pain are complex and diverse. Only by fully understanding the inducement, attack time, rhythm, location, nature and degree of abdominal pain, whether it radiates to other parts, and whether there are accompanying symptoms can a correct diagnosis and treatment plan be made. Research studies have shown that 99% of us have experienced abdominal pain, which has a variety of symptoms and complex causes. There are about more than 50 diseases that can cause abdominal pain, many of which have similar symptoms. For example, appendicitis in the acute abdomen, ectopic pregnancy, intestinal obstruction, gastric ulcer perforation, acute gastritis, urinary tract stones and gallstones can all cause severe pain in the right lower abdomen. Figure 2 lists the triggers, characteristics, symptoms, and possible diseases of abdominal pain.

The practical process of this project designed with abdominal pain as an example is as follows

A total of 2 classes, 4-6 hr; 40 students, divided into five groups. The teacher selected 5 cases of right lower abdominal pain caused by different diseases (ureteral stones, ectopic pregnancy, appendicitis, intestinal obstruction, colitis) in advance. In class, firstly, he used PPT to show the patient's chief complaint to the students and let them analyze and discuss. Instruct them to recreate the diagnosis situation and think about it like a doctor in a hospital treats a patient with clinical abdominal pain.

The chief complaint is the first step in writing a medical record. "Inquiry" is the primary way of diagnosis and treatment for patients with abdominal pain, which requires specific skills and experience. Abdominal pain is a chief complaint, and many of its contents depend on the description of the patient or family members. In order to ask for the accurate information we want in the shortest time, there must be a reasonable method of inquiry. In general, the big "problem" about abdominal pain in the main complaint can be broken down into four sub-questions or includes four aspects: current clinical manifestations (how long has it been? Have you taken medicine? etc.); precipitating factors (eating what is dirty? Is it the next day's spoiled food? Or toxic substances? etc.); Is the abdominal pain characterized by constant or intermittent pain? Tingling or dull pain?; Accompanying symptoms (such as diarrhea or vomiting). At the same time, these factors are also related to sex, disease season, etc. So the conclusion on this issue is significant. If the disease is a kidney stone, which is wrongly judged as an ectopic pregnancy, and then given to ovarian removal, it will be a major medical accident. The proper treatment plan is based on the correct diagnosis. Different students may make different judgments, so teachers should let most students in each group speak and express their ideas to exercise students' ability to identify, analyze and solve problems. Teachers can ask students to review the most typical problem-solving patterns of doctors when they go to the hospital. Experienced doctors can give a preliminary diagnosis of the disease type through consultation and physical examination such as blood pressure measurement, visual touch and listening), and then they can draw conclusions assisted by scientific instruments. If it is traditional Chinese medicine, watching the tongue and feeling the pulse are also necessary for diagnosis. Students make a preliminary diagnosis of the disease by collecting clinical data (medical history, physical examination, laboratory and other tests), analyzing, evaluating and organizing the data. From a philosophical point of view, characterizing the internal cause of abdominal pain is a fundamental problem, Students may make different judgements.

As seen from Figure 3, teachers both presuppose problems and solve problems in the teaching process in the teaching mode of the problem center. Students not only need to answer the questions raised by the teacher, but also put forward new questions for teachers and students to solve. Knowledge is presented as problems, and students creat new knowledge by solving problems. In solving the problems, the students can not only acquire latest knowledge, but also help to improve their ability, and, in turn, sublimate the students' understanding of the problem. Teachers teach students the methods and key points

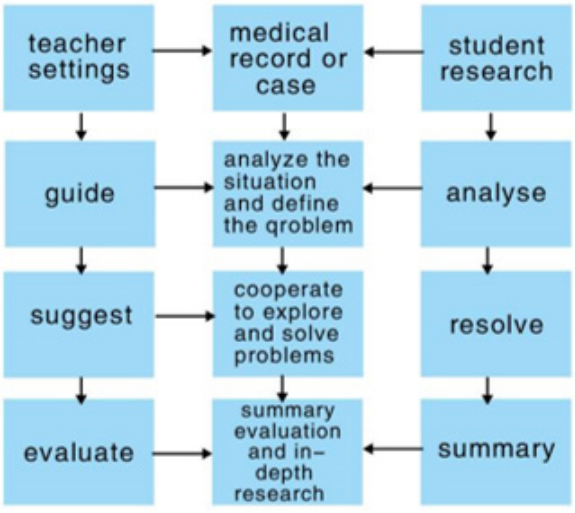

Figure 1: Design and implementation of problem scenarios in the teaching mode of "problem-centred theory".

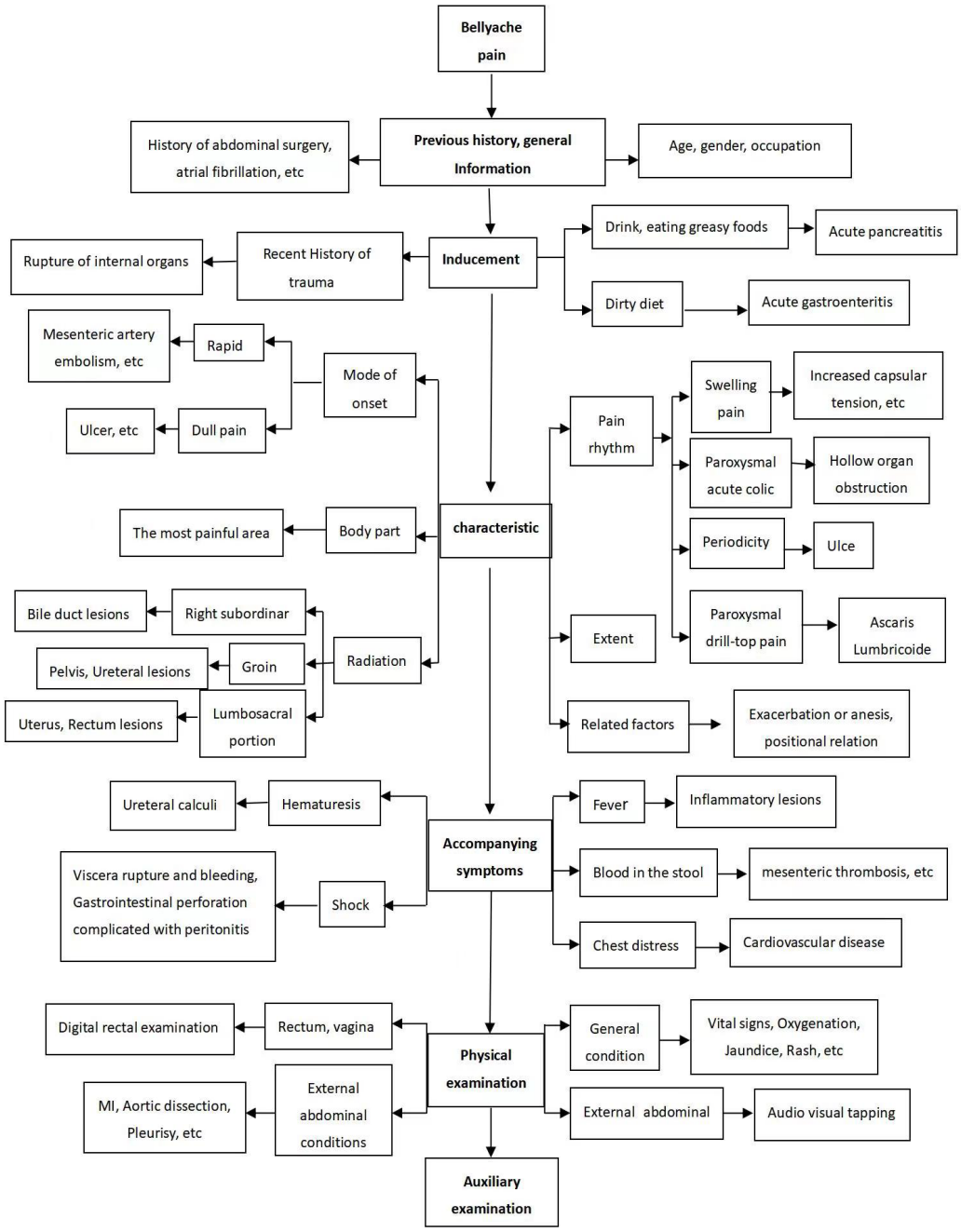

Figure 2: List of symptoms and causes of abdominal pain.

as follows: listen carefully to the complaints of patients and their families, do not interrupt easily, find key content in a short period, and record them; when patients think about unrelated topics, they can remind them in time. Don't use overly technical terms and pay attention to age, gender, and the patient's living environment and a family situation. Finally, what needs remind the students is that they should be good at grasping the key points to ask, inspire and induce, and cannot ask patients to accord to their wishes. For critical patients, it is concise and to the point, and it is not necessary to cover everything, which is convenient for timely rescue and treatment.

Grasp nature of a matter, and clarify the essential attributes of the problem

Students should be guided to analyze and solve problems using the viewpoint of dialectical materialism. In this paper, we put the quality, quantity and degree of the matter, They correspond to the essential priority of the disease so as to complement each other. The basic principles of dialectical materialism guide specific science; concrete science is proof of the basic law of dialectical materialism. After the consultation and physical examination, there will be many questions in the doctor's mind. "What kind

of disease does the patient have? (The type of disease whether can be cured), The cause of abdominal pain is what? How to treat it?". At this stage, after seeing, hearing, asking, and describing, ask students to judge the type of disease. For example, if the pain is a stomach problem, then it is necessary to further clarify whether it is superficial gastritis, atrophic gastritis, gastric ulcer or gastric perforation through gastroscopy, X-ray barium meal fluoroscopy, gastric juice analysis and other means. For example, pain is a problem of the stomach, so it is necessary to further clarify the superficial gastritis, atrophic gastritis through gastric ulcer or X-ray barium meal fluoroscopy, gastric juice analysis, or gastric perforation. But also to find out whether the lesion site is in the cardia, stomach bottom, stomach body, stomach small bend, or pylorus or duodenum, and whether there is *Helicobacter pylori* and other problems, in order to suit the disease, is conducive to the complete cure of the disease. Put students in a specific clinical situation to simulate and rehearse the whole process of diagnosis, let them learn to think comprehensively, Further improve their clinical thinking ability. To clarify the essential attributes and key of the problem, can be described by key words, in general is the disease name in medicine. For example: is it cancer, inflammation or trauma? The essence of the key word method is to try to transform complex problems into simple statements, which helps doctors to grasp the essence of the problem and make accurate judgments. In the case of abdominal pain, if the keywords are: "intercostal neuralgia" or "stomach cramps", it means that the problem is not very serious, it is not kinds of disease, and the treatment drugs are considered; The word, which is like a bolt from the blue, means that the cruel consequences are "cannot be cured completely", "can only prolong the life of the patient"; if the keyword is "perforation", it means that surgery must perform as soon as possible. These keywords not only describe the nature of the problem, but also reflect the severity of the problem. A simple statement can keep out odds and ends of the mind, stereotypes, and other unreliable information. And without being swayed by the seemingly complex situations, get straight to the essence of the problem.

Figure 3: Schematic diagram of the relationship between problems and the knowledge and ability of teachers and students.

Grasp the stipulation of the quantity and degree of things, and determine the severity and difficulty of the problem

When we make clear the essential properties of the problem, before solving the problem, there should also be a fairly clear goal to help solve the problem. For example, if you encounter appendicitis in acute abdomen, you must first determine which type it is.

1. Simple appendicitis. This type of appendicitis is also called early appendicitis. The symptoms are relatively mild and manifest as ulcers of the appendix mucosa, swelling of the appendix, and loss of luster of the serosa of the appendix.

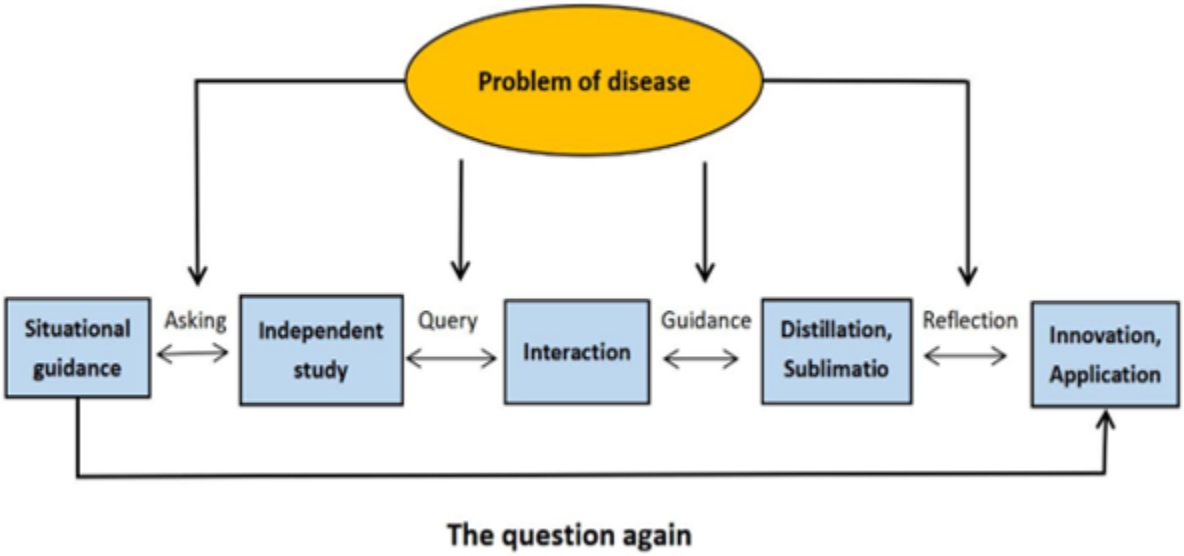

Figure 4: Classroom teaching process centred on clinical disease problems.

2. Suppurative appendicitis. Equivalent to mid-term appendicitis, most lesions progress to the submucosa or muscularis.
3. Gangrenous appendicitis. Or called perforated appendicitis, this line is a severe appendicitis, due to the appendix ischemia, the appendix tube wall necrosis or partial necrosis, is dark purple or black. The patient has a very severe pain and can develop a high fever.
4. Abscess around the appendix. Equivalent to advanced appendicitis, as the disease progresses, abscesses can occur in the tissue around the appendix, and severe patients can lead to shock. There are a lot of questions to dig up here: For example, what bacteria caused the infection? Will it develop into diffuse peritonitis or sepsis? And other issues. In this process, it is necessary to determine the amount and degree of disease.

Grasp the main aspects of the contradiction and determine the best solution to the problem

Consider and select treatment options. According to the priority of the disease, choose conservative treatment or surgery. If you decide conventional treatment, it is to take drug therapy, nutritional therapy, physical therapy, exercise therapy or dietary supplement therapy for treatment. There are also options to use Western medicine or Chinese medicine or intramuscular injection, infusion and other methods. With the development of modern medicine, surgical operations include traditional surgical methods, as well as minimally invasive surgery, as well as laser and gamma knife, ultrasonic knife, etc. Compared with traditional open surgery, minimally invasive surgery has less trauma, small scars and quick recovery. Despite many treatment options, the best treatment plan needs be selected according to the patient's condition and the patient's wishes. If you are a cancer patient, even if there is an indication for surgery, a doctor should consider the patient's wishes, because surgery may not completely solve the problem. Most patients can only be prolonged their lives through surgery, but cannot be cured entirely. Teachers are not only the designers of the problem, but also guide students to ask questions in the process of teacher-student interaction in the classroom. The so-called teaching and learning mean that teachers and students learn from each other and improve together in the process of problem-solving. Sometimes the problem needs to be decomposed into several parts to arouse the students' interest in exploring. When students encounter a more complex clinical medical problem, sometimes feel heavy fog, can not find a clue. At this time, it is crucial to guide students to grasp the main aspects of the contradiction to solve the problem. Clarifying the purpose of the question is equivalent to finding a bullseye for the question, highlighting the key points, and helping to define the scope and boundaries of the answer. Many medical problems have lots of options and answers, and the best solution often varies from person to person. For example, for acute appendicitis, the first choice is surgery and non-surgery. If conservative treatment is used, which drug is the most effective? Will the patient be allergic? How about tolerance and toxic side effects? Allowing students to experience simulations early can tap into their problem-solving potential. Because there is enough time and energy to ask questions, analyze problems, and solve problems during the school period, it is not as tense and hasty as a doctor goes to work. Therefore, careful simulation exercises are beneficial and effective means of education.

Virtually build special scenarios, such as how someone handles abdominal pain while taking public transportation, such as a train or a plane. Then, timely diagnosis and disease problems are significant, because misjudgment may directly affect the decision-making and the patient' life. The author once experienced this situation two years ago: on the express train, he suddenly had a severe pain in the lower right abdomen and desire to vomit, can't to stand instability.. As a teacher with special medical knowledge, he found a passenger carrying the drug "cyclone mountain alkali tablet" through the train radio after preliminarily judging it as urinary stones. After taking it, he was relieved. Meanwhile he found a professional doctor who diagnosed him as not life-threatening. It can be seen that if students usually train properly, they encounter such an emergency, they can exercise the ability to cure diseases and save a life, and carry forward the spirit of benevolence of doctors. In addition, in the clinical practice ability of medical students, we also need to pay attention to a problem, and we must fully pay attention to and understand the psychological state of patients. Many doctors ignore the nervousness, fear, and anticipation that patients see when they see a doctor, leading to unnecessary doctor-patient conflict.

Study the root causes of the emergence or formation of problems

In problem-centred teaching, after the clinical problem is solved, students can be guided to study the why problem, for example, why is stomach pain so widely? How does appendicitis form? How to prevent it? Why do stones produce in the human body such as kidney stones, gallstones, and stomach stones are quite common diseases. How does liver cancer create? And so on. In addition, teachers can also explain some cutting-edge scientific knowledge to students, such as the problem of nocturnal acid breakthrough in duodenal ulcers and the targeting of monoclonal antibodies in tumor treatment. Why is abdominal pain a common disease? Teachers should stimulate students' desire for expertise and make students interested in the causes of issues; they should help students to connect their existing knowledge with the problems they are researching Make them have a rational understanding of the analysis of diseases, learn to analyze and solve problems, guide students to consult some research progress of abdominal pain or appendicitis research progress, urinary tract stone research progress of the literature to read, to broaden their horizons, expand their knowledge. To sum up, in the clinical thinking ability training classroom, problem-centred teaching consists of the following five links: situational guidance,

autonomous learning, interactive communication, refinement and sublimation, and application innovation. Each link takes finding problems and solving problems as the starting point and foothold respectively. The interrelationship between the links is shown in Figure 4.

CONCLUSION

In the practical training we designed, the subjectivity of both students and teachers can be fully reflected In the "problem-centered" teaching process, the problem is the medium connecting teachers and students. By analyzing problems, teachers guide students to gradually penetrate from the understanding to the essence of understanding, so as to cultivate students' clinical thinking abilities. Students change from simply listening to thinking, from accepting knowledge to exploring knowledge, and from knowledge believers to questioners and problem solvers. The problem center theory teaching method provides students with the opportunity to discover and capture the problem, the teachers should guide students to think deeply from both horizontal and vertical perspectives to explore the root of the problem.Problem center theory teaching method can make students master more scientific research skills.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

PCT: Problem-Centred Theory.

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