

Teaching Reform Conception and Practice of Developing Medical Students' Scientific Research Ability Based on Epidemiology

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Abstract: Objective: To evaluate the effect of practice teaching mode of epidemiology course in clinical medicine. Methods: The students who take elective course of epidemiology in Qinghai University were selected as the objects of investigation. The PBL epidemiological teaching and questionnaire were conducted to analyze the effect of PBL teaching on the cultivation of students' scientific research ability. Results: 98.8% of the students thought that PBL teaching in epidemiology could improve students' scientific research ability. Conclusion: The design and application of epidemiology teaching should be paid attention to in the process of improving the scientific research ability of medical students, and the students should be guided to analyze and explore.

1. Introduction

By studying epidemiology, the students of clinical medicine can strengthen the concept of prevention, group and environment so as to make students better adapt to the change of medical model, understand and accept epidemiology and its thinking methods, cultivate basic scientific research ability, and better meet the needs of social development. Because the difference of medical specialty, the ability of designing, measuring and solving problems in clinical research process are weak, the consciousness of group view is not high and the insufficiency of group medicine research is more obvious. Therefore, the research group has developed a new practical teaching model with the core of PBL teaching by making use of the strong practical characteristics of the subject and innovating the practical teaching and examination methods.

2. Objects and Methods

2.1 Research objects.

The clinical medicine students who take foundational course of epidemiology in Qinghai University were selected as the research objects.

2.2 Research methods and contents.

A self-designed questionnaire appended in test paper was used to test the students after taking the course. The contents of the research include the influence of epidemic PBL teaching method on students' innovation ability of scientific research, and the satisfaction of teaching reform and the mastery of knowledge. The influence of PBL teaching on students' innovation ability of scientific research includes the innovation ability of scientific research and six aspects that reflect the innovation ability of scientific research, namely, scientific research thinking, scientific research topic selection, scientific research design, data analysis, result explanation and paper writing; teaching satisfaction includes the degree of difficulty, importance and interest of the selected content, the interest and importance of this course, the selection of teaching materials, teaching methods, the number of teachers and the number of hours of studying; the mastery of knowledge is reflected by the students' report on the problem of how much they have learned.

The teaching reform includes the innovation of teaching method, teaching content, teaching method and so on. PBL teaching is used in teaching method; the supplement textbook was updated

to the second edition of *Clinical Epidemiology*, edited by Professor Liu Aizhong and Professor Huang Minzhu. The content of the textbook was revised and supplemented as a whole. "Epidemiology Measurement", "Measurement and Evaluation on Health-related Quality of Life", "Reading, Evaluation and Application of Medical Literature" and "Common Comprehensive Evaluation Methods in Clinical Research" were added. And each chapter of the textbook has added practical cases and so on. The teaching method is the combination of theoretical teaching and case discussion, and the number of class hours is increased from 12 to 32. Additionally, the graduate textbook of the third edition of *Principles and methods of epidemiological research* which was edited by Professor Luan Rongsheng was used as methodological supplement. A total of 200 questionnaires were sent out, and 200 were recovered, so the recovery rate was 100 percent.

2.3 Statistical analysis.

Epi Data3.02 was used to input data and SPSS17.0 software package was used to describe the frequency.

3. Results

3.1 Influence on innovative ability of medical students.

Students agree that epidemiology can help improve the innovation ability of scientific research in different degrees. Among them, 168 (84.5%) students thought that epidemiology was of great help to improve the innovation ability of scientific research and none thought that epidemiology was not helpful to the innovation ability of scientific research. In terms of the specific effects of epidemiology on students' scientific research thinking, scientific research topics, scientific research design, scientific research analysis, interpretation of results and writing of papers, more than half of the students thought that epidemiology can help to improve the ability of 6 aspects, especially on the ability of scientific research topics: 98.8% of the students thought that epidemiology can improve the ability greatly in this field, but none thought that epidemiology is not helpful to the innovation ability of scientific research in these six areas. See table 1 for details.

Table 1 Impact of Epidemiological Teaching on Innovation Ability of Scientific Research of Medical Students (Number / %)

Various Aspects of Innovation Ability and Scientific Research	Big	A Little	helpless
Thinking Ability of Scientific Research	167(83.3)	33(16.7)	0(0)
Topic Selection Ability of Scientific Research	198(98.8)	2(1.2)	0(0)
Design Ability of Scientific Research	167(83.3)	33(16.7)	0(0)
Data Analysis Ability	179(89.3)	21(10.7)	0(0)
Result Interpretation Ability	133(66.7)	67(33.3)	0(0)
Paper Writing Ability	176(88.1)	24(11.9)	0(0)

3.2 Assessment of teaching content.

The results showed that the most difficult three chapters were the common error and control in clinical research (55.4%), clinical decision analysis (46.4%) and analytical research (37.3%). The most important three chapters were the common error and control in clinical research (59.5%), clinical trial (57.1%) and clinical test and screening test (54.8%). Clinical trials (56.0%), medical research papers (50.0%) and analytical studies (44.0%) were considered to be of most interesting parts. For the whole course of epidemiology, all students are interested in the course to varying degrees and consider that the course is important.

3.3 Satisfaction, practicability and difficulty of textbook by textbook evaluation.

The results showed that 98.8% of the students were satisfied with the textbooks, and only 2

students (1.2%) were not satisfied. 100% of the students thought the textbook was practical to some extent, and none thought the textbook was unpractical, among which 169 (84.5%) students thought it was practical. 190 students (95.2%) thought that the textbook used in this course was of moderate difficulty, and only 4 students (2.4%) reflected that the textbook was difficult.

3.4 Evaluation of teaching methods.

150 (75.0%) students thought that the method of teaching epidemiology was good at present; 167 (83.3%) students thought that it should be undertaken by multiple teachers; 164 (82.1%) students thought that it was necessary to offer the course. 197 students (98.8%) had a good impression of the current teaching. The 2.5 class hours of 85 students (42.9%) were considered to be appropriate. 112 students (56.0%) thought that the number of hours should be increased, and 138 students (69.0%) thought that the number of classes per week should be given twice; 152 students (76.2%) thought that the number of class hours per week was 2 hours.

4. Analysis

4.1 Epidemiology.

The teaching content of epidemiology includes theoretical teaching and practice teaching. Theoretical teaching is arranged behind the basic medicine, clinical medicine and medical statistics. From the angle of macroscopically and multi-etiological factors, combined with pathogenic microbiology and clinical related knowledge, the content of epidemiology is described. In the teaching process, special emphasis is placed on various epidemiological research and investigation methods, which is of great significance to the cultivation of clinical scientific research ability in the future. The practice teaching aims at the related content, and it adopts the ways of questionnaire, the case analysis and the spot practice to launch. Through theoretical study, clinical medical students master the design and evaluation method of questionnaire, and improve the ability of clinical scientific research. Case analysis can improve students' interest in classroom by investigating of interesting items, such as oral health, using and awareness of antibiotics, mental health of college students, risk factions of chronic non-communicable diseases and so on; Field practice can assess students' ability of questionnaire design, survey implementation, interpersonal communication, knowledge gathering and communication skills by small-scale community surveys and face-to-face interviews or questionnaires.

Teaching method of Epidemiology teaching emphasizes the combination of theory and practice. First, teachers should teach the basic theory, research and investigation methods of epidemiology; and then, through a series of practical teaching methods, teachers should let students combine with practice and use the epidemiological theory they have learned to solve practical problems so that to consolidate the content learned; at the same time, they should combine with the sudden public health events and clinical treatment related fields of scientific research to pave the way for future clinical research.

4.2 The function and path of PBL teaching.

The teaching of medical students focuses on training students' ability to acquire knowledge, analyze and solve problems independently, and cultivate students' ability to carry out scientific research and practice independently. This course adopts PBL teaching method, which is popular in the world at present. PBL teaching method is the idea and form of "student-centered", "autonomous learning management" and "group discussion" in Mc Master University of Canada in 1960. At present, PBL has become a kind of teaching mode which has been widely paid attention to internationally in recent years. The PBL teaching method is to construct the knowledge structure system by taking the problem as the center, taking the practical problem as the core, and taking the student as the center to carry out the group discussion teaching, that is to say, the actual problems in the study and scientific research are given to the students, and the students study around the problem and to solve problems by themselves. The teaching process includes five stages of "posing

questions, establishing hypotheses, collecting data, demonstrating hypotheses and summing up". This teaching method is helpful to the integration of clinical medical students' scientific research ability and clinical practice. It is helpful to cultivate students' ability to carry out scientific research practice.

The results show that the reform of "project-based" epidemiological PBL teaching and examination is of great help to improve the innovation ability of clinical medical students, and has reached the expectation. Through the application of the reform, it provides a good platform for cultivating the scientific research thinking of clinical medical students, which enhances the students' interest in the study and participation of scientific research and at the same time fully integrates the knowledge of epidemiology theory with the practice. Integrated capabilities have also been promoted.

4.3 Teaching optimization and perfection.

The new "independent design, autonomous completion, teacher guidance" epidemiology practice teaching model helps clinical medical students become the main role of the practice platform, and help teachers become guardians. Through practice, they mastered and used the basic knowledge, so as to improve the comprehensive ability to solve problems. The "project based" epidemiological practice teaching is not blind, but is the teaching based on knowledge points, aiming at improving practical ability, changing course into platform, and training and improving scientific research ability as the purpose. The results of the survey suggest that there is room for improvement in this reform attempt. The details are as follows:

First, it is the blankness and anxiety of students when learning from passive to active. Because of some students' "nostalgia" for conventional teaching, they know the teacher's "routine", and are proficient in coping strategies and measures; In the face of new things and new demands, there are stress-like "blankness" and "hatred" though students know the benefits of the new model.

Second, during the implementation of the case, it is found that the students' love of conventional teaching and their familiarity with "deep-rooted" and the love-hate intertwined with the new model are "away from each other". After years of study, students have become accustomed to doing homework, even copying homework "routine", so autonomous learning initiative is not enough. Without even a sense of collecting cutting-edge information, vision is extremely limited.

Third, they have a great deal of work in the process of practical teaching and pay more negative and contradictory. The new model will make students spend several times as much time and energy as the conventional practical teaching to complete the related teaching tasks. At the same time, they want to use the random selection model to avoid students' dependence, waiting, asking and copying, so that students can really participate in it and benefit from it. But there are still some students who see these as burdens, resulting in alienation and resistance.

Fourth, the opportunity of full participation and hands-on ability of middle school students in teaching design is still insufficient, and the construction and provision of practical platform is still limited. The students are more approvable to this model, but the similar practical platform is still insufficient in medical education, which should not be the whole reason of the students' increasing scale, the shortage of teachers, and the limited funds and so on.

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