10.18686/frim.v2i3.4240

Construction and Practical Analysis of Preventive Medicine Teaching Mode based on PBL-CBL Joint Situational Simulation

Xiaoming Niu[1], Luyu Jin[*], Hong Li[2], Weijia Wang[3], Hui Li[4]

Xingtai Ninth Hospital, Xingtai, Hebei Province, 055250, China

Abstract: Objective: to construct and practice a new model of preventive medicine teaching based on problem-based learning (PBL) and case-based learning (CBL) combined with situational simulation, and to analyze the effect of its application in actual teaching. ***Methods:*** 20 preventive medicine interns interned in our hospital from January 2022 to December 2022 were selected as the traditional group to receive the traditional teaching method; another 20 preventive medicine interns interned from January 2023 to December 2023 were selected as the exploratory group, and the teaching method based on the joint PBL-CBL scenario simulation was adopted. The teaching effects of the two groups were compared. ***Results:*** The level of theoretical knowledge acquisition as well as teaching satisfaction of the inquiry group was higher than that of the traditional group (P<0.05). ***Conclusion:*** PBL-CBL joint situational simulation teaching method has significant advantages in preventive medicine teaching, and can effectively improve the theoretical knowledge mastery level and teaching satisfaction of interns.

Keywords: Preventive medicine; PBL teaching method; CBL teaching method; Situational simulation; Teaching mode construction; Teaching practice analysis

Preventive medicine is an important part of the medical field, which focuses on the study of the law of occurrence, development and distribution of diseases as well as the influencing factors, so as to formulate countermeasures and measures to prevent diseases, promote health and prolong life. In the current context of global health governance, the importance of preventive medicine is becoming more and more prominent, and it is particularly important to cultivate high-quality preventive medicine talents. With the continuous development of medical education, the teaching mode of preventive medicine is also under constant exploration and innovation. Although traditional teaching methods can impart knowledge, they have certain limitations in cultivating students' practical ability and innovative thinking. In recent years, Problem Based Learning (PBL) and Case Based Learning (CBL) have gradually attracted the attention of the educational community.PBL is student-centered, learning new knowledge by solving practical problems; CBL allows students to learn and apply knowledge in real situations through the analysis of typical cases; situational simulation, as a teaching tool, can simulate the real work environment and help students to combine theoretical knowledge with practice [1-3]. combination of theoretical knowledge and practice [1-3]. The purpose of this study is to explore the application of the teaching model based on PBL-CBL combined with situational simulation in the teaching of preventive medicine.

1. Information and Methods

1.1 General information

Twenty preventive medicine interns who were interned in our hospital from January 2022 to December 2022 were selected to be included in the traditional group, and 20 preventive medicine interns who were interned in our hospital from January 2023 to December 2023 were selected to be included in the exploratory group. The traditional group was 9/11 male/female, aged 19-24 (22.27±1.46) years; the exploratory group was 12/8 male/female, aged 20-25 (22.38±1.37) years. There was no difference in the data of the two groups (P>0.05) and they were comparable. Inclusion criteria: willing to accept the new teaching mode and sign the informed consent; able to participate and complete the teaching tasks throughout the internship. Exclusion criteria: interns who could not participate in the whole process during the internship for some reasons; interns who had obvious resistance to the new teaching model.

1.2 Methodology

The traditional group received traditional teaching method. Teachers systematically taught the basic theoretical knowledge of preven-

tive medicine in class according to the content of the textbook and the syllabus, including the principles of epidemiology, disease prevention strategies, public health management and so on. Students, on the other hand, mastered these knowledge points by listening to lectures, taking notes and reviewing after class. In addition, the instructor organizes regular classroom discussions to allow students to focus on specific topics to deepen their understanding of the knowledge.

The inquiry group adopts a joint PBL-CBL-based scenario simulation teaching method. (1) Case and problem design: Teachers carefully select and design problems and practical cases that are both educational and stimulate students' desire to explore the core concepts and practical applications of preventive medicine, which not only cover the knowledge of the discipline, but also focus on cultivating students' logical thinking and problem-solving ability, so as to guide them to think deeply about the practical significance and social value of preventive medicine. (2) Group discussion and preliminary exploration: students are divided into several groups, and each group carries out in-depth exploration around the assigned problems or cases. At this stage, students need to make full use of library resources, online databases, etc., to extensively review relevant literature, meticulously analyze data, and distill key points from cases. Through group discussion, students form preliminary solutions or opinions, which not only exercises their information collection and analysis skills, but also promotes the cultivation of teamwork spirit. (3) Scenario Simulation Preparation: On the basis of group discussion, the teacher instructs students to prepare for the upcoming scenario simulation, including assigning clear roles to each student, such as disease prevention and control specialists, community residents, government officials, etc., as well as carefully arranging simulation scenarios according to the needs of the simulated scenarios, such as simulating an epidemic outbreak, a public health incident, and so on. These preparations aim to ensure the authenticity and educational effect of the scenario simulation. (4) Scenario simulation implementation: In the simulated real environment, students apply their knowledge of preventive medicine according to their roles to solve practical problems. For example, in the simulation of an epidemic outbreak, students need to make decisions quickly and take effective preventive and control measures to control the spread of the epidemic. This process not only tests students' resilience and decision-making ability, but also gives them a deeper understanding of the application of preventive medicine in practical work. (5) Results Presentation and Communication: After the scenario simulation, each group has the opportunity to present their simulation results, including the introduction of their decision-making process, measures taken, and effects achieved during the simulation. At the same time, they receive questions and comments from the teacher and other groups. This interaction and exchange not only helps students learn from each other and complement each other's strengths, but also further consolidates and expands their knowledge system. (6) Summarize and reflect: In the final stage of teaching, the teacher guides students to summarize and reflect on the whole teaching process, including reviewing what they have learned, analyzing their performance in the scenario simulation and making suggestions for improvement. Through this link, students can not only consolidate the learning results, but also provide more targeted suggestions for the next teaching, so as to continuously optimize the teaching process and improve the teaching effect.

1.3 Observation indicators

(1) Theoretical knowledge mastery level. Apply our own theoretical knowledge mastery level scoring scale, including basic theoretical knowledge, health detection and supervision ability, disease epidemiological pattern analysis ability, community health service ability, epidemic prevention work ability of 5 dimensions, each dimension 0~20 points, the higher the score the higher the knowledge mastery level.

(2) Teaching satisfaction. Very satisfied: rich and in-depth teaching content, novel and effective teaching methods, frequent teacher-student interactions, great learning gains, high evaluation of the teaching mode; Satisfied: moderate teaching content, appropriate teaching methods, a certain degree of teacher-student interactions, learning gains, basic recognition of the teaching mode; General: teaching content basically covers the knowledge points, teaching methods are traditional, teacher-student interactions are limited, learning gains are general, no significant evaluation of the teaching mode; No significant evaluation of the teaching mode. teaching mode; Dissatisfaction: teaching content is thin, teaching methods are boring, teacher-student interaction is small, learning gains are small, dissatisfaction with the teaching mode. Teaching satisfaction = percentage of very satisfied + percentage of satisfied.

1.4 Statistical methods

SPSS22.0 was used for standardized statistics, count data were described by (%), and x^2 test was performed; measurement data were described by ($\bar{x}\pm s$), and t-test was performed, and $P<0.05$ indicated that there was a difference.

2. Results

2.1 Level of knowledge mastery

The level of theoretical knowledge mastery of the inquiry group was higher than that of the traditional group ($P<0.05$). See Table 1.

Table 1 Level of knowledge mastery ($\bar{x}$±s, points)

Group	Number of people	Basic Theoretical Knowledge	Ability of health testing and supervision	Ability to analyze the pattern of disease prevalence	Community health service ability	Epidemic prevention work ability
exploratory group	20	18.67±0.12	18.75±0.14	18.67±0.27	18.59±0.34	18.57±0.28
Traditional Group	20	17.44±1.52	17.53±1.33	17.38±1.45	17.68±1.36	17.68±1.11
t		3.608	4.080	3.911	2.903	3.477
P		0.001	0.000	0.000	0.006	0.001

2.2 Teaching satisfaction

The teaching satisfaction of the inquiry group was higher than that of the traditional group (P<0.05). See Table 2.

Table 2 Teaching satisfaction

groups	number of people	Very satisfied (n)	Satisfaction (n)	General (n)	Unsatisfactory (n)	Total satisfaction (%)
Observation Group	20	13	7	0	0	100.00
Traditional Group	20	8	6	6	0	70.00
X2 value		-	-	-	-	4.902
P-value		-	-	-	-	0.027

3. Discussion

Preventive medicine, as an important branch of modern medicine, the innovation of its teaching methods and modes has always been a research hotspot in the field of medical education. With the transformation of the medical model and the updating of people's health concepts, the teaching of preventive medicine is also keeping pace with the times, aiming to cultivate medical talents with critical thinking and innovation ability. In recent years, the research on preventive medicine teaching has made remarkable progress. The traditional lecture-based teaching model has gradually given way to more interactive and student-engaged teaching methods. Among them, PBL and CBL have attracted widespread attention for their unique advantages.PBL emphasizes problem-guided learning to stimulate students' independent learning and problem-solving ability, while CBL focuses on the use of real-life cases to help students apply their theoretical knowledge to real-world problems. The combination of these two approaches, i.e., PBL combined with CBL teaching model, further enhances the effectiveness of medical teaching.

In this study, the application of PBL-CBL joint scenario simulation teaching method in preventive medicine teaching was explored. The results showed that the exploratory group using this joint teaching mode had significantly higher levels of theoretical knowledge mastery and teaching satisfaction than the traditional group (P<0.05), which indicates that this teaching mode has significant effects in promoting students' understanding and mastery of theoretical knowledge and enhancing teaching satisfaction.The mechanism of action of the PBL-CBL joint situational simulation teaching method is that it fully stimulates students' learning The mechanism of PBL-CBL combined with situational simulation teaching method is that it fully stimulates students' learning initiative, and through the guidance of problems and cases, it enables students to deeply understand and master the theoretical knowledge of preventive medicine in the process of solving practical problems. At the same time, the application of situational simulation enables students to practice theoretical knowledge in a simulated real environment, which improves their practical ability and resilience [1-3]. The applied research part of this study shows that this joint teaching mode can not only enhance students' theoretical knowledge mastery, but also cultivate their clinical thinking ability and problem solving ability, laying a solid foundation for their future practical work in the field of preventive medicine.

In summary, the PBL-CBL joint situational simulation teaching method has significant advantages and effects in the teaching of preventive medicine, and this teaching mode is worth promoting and applying in a wider scope to cultivate more preventive medicine talents with innovative thinking and practical ability.

References

[1] Jiang Fei. Practice and feedback of online PBL teaching in preventive medicine course teaching[J]. Innovation and Entrepreneurship Theory Research and Practice, 2023, 6(12):178-180.

[2] WEN Jing, LI Jiangping, ZHAO Yu, et al. Evaluation of the effect of PBL teaching method in the teaching practice of health statistics in preventive medicine[J]. China Continuing Medical Education, 2023, 15(07):34-38.

[3] YIN Dehui, XU Lichun, ZHANG Meirong.Current status of the application of PBL teaching method in the core curriculum of preventive medicine[J]. China Continuing Medical Education, 2023, 15(02):48-52.

Projects:

1. **Project type:** Self-financed project of Xingtai Key R&D Programme

Project title: Research on the application effect of PBL-CBL joint scenario simulation in teaching in primary public hospitals

Project number: 2023ZC347

2. **Project type:** Self-financed project of Xingtai Key R&D Programme

Project name: Evaluation of the Effectiveness of Construction of Chronic Disease Health Management Demonstration Villages in Rural Areas of Xingtai City

Project number: 2023ZC220

First Author: Xiaoming Niu, 1995, Female, Han, Jiazhuang Village, Dicun Township, Julu County, Xingtai City, Hebei Province, Junior, Master of Medical Science, Major research direction: Epidemiology of infectious diseases.

Corresponding author: Luyu Jin, 1989, Male, Han, Miaowangzhuang Village, Julu County, Xingtai City, Hebei Province, Supervisory Nurse, Main research direction: Hospital Management.

Second author: Hong Li, 1991, Female, Han, Healthy Realm Garden Community, Julu County, Xingtai City, Hebei Province, Intermediate, Master, Major research direction: Health Statistics and Epidemiology.

Third author: Weijia Wang, 1991, Female, Han, Junior, Chikuei Manor Community, Julu County, Xingtai City, Hebei Province, China.

Fourth author: Hui Li, 1993, Female, Han, Junior, Dongmaxian District, Julu County, Xingtai City, Hebei Province, China.