

# An Empirical Study of PBL-CBL Combined Situational Simulation Teaching Method in Public Health Training in Primary Public Hospitals

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**Abstract:** *Objective:* to explore the effect of PBL-CBL combined with situational simulation teaching method in public health training in primary public hospitals. *Methods:* 20 assistant trainees who received public health training in our hospital from January 2022 to December 2022 were selected as the traditional group to receive the traditional teaching method; another 20 assistant trainees who were interned from January 2023 to December 2023 were selected as the observation group, and the PBL-CBL combined situational simulation teaching method was used. Compare the teaching effect of the two groups. *Results:* The level of practical skill mastery as well as teaching satisfaction of the observation group was higher than that of the traditional group ( $P < 0.05$ ). *Conclusion:* The application of PBL-CBL combined with situational simulation teaching method in public health training in primary public hospitals has significant effect, which can effectively improve the level of mastery of practical skills and teaching satisfaction of assistant trainees, and it is recommended to widely popularize and apply this teaching method in public health training.

**Keywords:** PBL; CBL; Scenario simulation; Public health training; Practical skills; Teaching satisfaction; Primary public hospitals

As an important part of the health care delivery system, primary public hospitals bear the important responsibility of maintaining the health of community residents. Public health training is a key link to enhance the ability of primary hospitals to respond to public health emergencies, in which the popularization of epidemiological knowledge and the enhancement of practical skills are particularly important. Epidemiology is the science of studying the patterns of disease distribution and influencing factors to formulate countermeasures to prevent and control diseases, and it is an indispensable part of the public health training<sup>[1]</sup>. In recent years, with the continuous innovation of medical education model, traditional teaching methods have been difficult to meet the current needs of public health training. PBL (Problem-Based Learning) and CBL (Case-Based Learning) teaching methods have gradually occupied a place in medical education with their unique advantages. PBL teaching method is student-centered, learning by solving real problems, while CBL teaching method enables students to combine theory and practice through the analysis of real cases. Scenario simulation teaching method allows students to practice in a safe environment by simulating real scenarios to improve their ability to cope with real problems. The PBL-CBL joint scenario simulation teaching method combines the advantages of the above two teaching methods and integrates the simulation of practical aspects, so that students can better combine theoretical knowledge with practical operation in the learning process and improve the learning effect<sup>[2-3]</sup>. This study aims to explore the application effect of this joint teaching method in public health training in primary public hospitals, with a view to providing a scientific basis for improving the quality of training and enhancing the ability of medical staff to respond to public health events.

## 1. Information and methodology

### 1.1 General information

Twenty assistant trainees who received public health training in our hospital from January 2022 to December 2022 were selected to be included in the traditional group, and 20 assistant trainees who received public health training in our hospital from January 2023 to December 2023 were selected to be included in the observation group. The traditional group was 7/13 male/female, aged 19-24 ( $22.75 \pm 1.39$ ) years; the observation group was 10/10 male/female, aged 20-25 ( $22.66 \pm 1.53$ ) years. There was no difference in the data of the two groups ( $P > 0.05$ ) and they were comparable. Inclusion criteria: training assistants who received public health training during the study period; training assistants who were willing to participate in this study and signed the informed consent form; training assistants who were able to complete all training courses according to the teaching plan. Exclusion criteria: trainee assistants who had already participated in other training programs with the

joint PBL-CBL scenario simulation teaching method; trainee assistants who were unable to participate in this study in its entirety for any reason; trainee assistants who withdrew voluntarily during the training period for personal reasons.

## 1.2 Methodology

The traditional group receives traditional teaching methods. Teachers prepare relevant teaching materials and handouts according to the syllabus and training plan, and impart public health knowledge to trainee assistants through classroom lectures. During the teaching process, teachers will emphasize the basic concepts of public health, principles of epidemiology, disease prevention and control strategies and other core contents, and analyze them with practical cases to help the assistant trainees understand and master the knowledge they have learned.

The observation group adopted the PBL-CBL joint scenario simulation teaching method. (1) Preparation stage: The teacher team first clarifies the core knowledge points of public health training, such as the basis of epidemiology, disease prevention and control strategies, and public health emergency management. Select public health events that have been influential at home and abroad in recent years as cases, such as the New Crown Epidemic, SARS, etc., and organize relevant case descriptions, epidemic data, prevention and control measures, and other information. At the same time, prepare guiding questions and background information for the PBL session. (2) PBL session: design a series of guiding questions for the selected public health event, such as "Why did the epidemic spread rapidly?" "What measures were effective and what may have been problematic in the prevention and control of the outbreak?" etc. Students are grouped together and each group focuses on one question in depth. For example, to answer the question of "the reason for the spread of the epidemic", students need to collect information on the characteristics of the virus, population movement, community transmission, etc. and analyze it. (3) CBL session: Provide a complete case study of a public health event, including the outbreak of the epidemic, the response measures, social reactions, etc. Students will analyze the problem in the context of the PBL session. Students analyze the case in depth in conjunction with the problem analysis in the PBL session. For example, compare the response strategies of different countries or regions under the same outbreak and analyze their effectiveness and limitations. Students play the roles of government decision-makers, medical experts, community workers, etc. in groups to simulate an emergency meeting after an epidemic outbreak to discuss and formulate response measures. (4) Scenario Simulation: Create a highly simulated public health emergency scenario, such as simulating the outbreak of a new crown epidemic in a city. In this simulation environment, students make quick decisions according to their roles (e.g., public health officials, medical personnel, etc.), such as whether to implement a city closure, how to deploy medical resources, and so on. The simulation system gives real-time feedback based on students' decisions, helping them understand the consequences of their decisions and adjust their strategies. (5) Feedback and summarization: Students share their experiences, gains and confusions in each section. Teachers give professional comments on students' performance, pointing out strengths and weaknesses, especially in decision-making and problem-solving skills. Summarize the key knowledge points involved in this teaching and encourage students to apply this knowledge to their future practical work in public health.

## 1.3 Observation indicators

### (1) Practice skill mastery level

Apply our self-developed practical skills mastery level scoring scale, including operation standardization, problem analysis and solution ability, clinical comprehensive skills, teamwork ability, situational simulation coping ability of five dimensions, each dimension 0-20 points, the higher the score the higher the practical ability.

### (2) Teaching satisfaction

Very satisfied: rich teaching content, innovative methods, active participation of trainees, significant skills improvement, teaching effect beyond expectation; Satisfied: appropriate teaching content, effective methods, trainees are able to master the required skills, and the teaching effect is good; Average: the teaching content basically meets the needs, but the teaching methods or trainee participation needs to be improved, and the teaching effect is average; Unsatisfied: the teaching content is thin or does not match the actual needs, the unsatisfactory: the teaching content is thin or not in line with the actual needs, the teaching methods are outdated, the students' participation is low, and the teaching effect is not good. Teaching satisfaction = percentage of very satisfied + percentage of satisfied.

## 1.4 Statistical methods

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

## 2. Results

### 2.1 Practical skills

The level of practical skill mastery in the observation group was higher than that in the traditional group ( $P<0.05$ ). See Table 1.

**Table 1 Practical skills ( $\bar{x}\pm s$ , scores)**

groups	quorum	Operational stand-ardization	Problem analysis and resolution skills	Integrated Clinical Skills	Teamwork skills	Scenario simulation response capability
Observation Group	20	18.42±0.31	18.55±0.23	18.63±0.17	18.57±0.34	18.71±0.24
Traditional Group	20	17.56±1.17	17.68±1.27	17.47±1.39	17.52±1.22	17.41±1.30
t		3.178	3.015	3.705	3.708	4.398
P		0.003	0.005	0.001	0.001	0.000

## 2.2 Teaching satisfaction

The teaching satisfaction of the observation 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	17	3	0	0	100.00
Traditional Group	20	7	7	6	0	70.00
X <sup>2</sup> value		-	-	-	-	4.902
P-value		-	-	-	-	0.027

## 3. Discussion

With the continuous development of primary public hospitals in China, the importance of public health training has become increasingly prominent. In recent years, grassroots public hospitals have made remarkable progress in public health training, with richer training content and more diverse training methods. However, how to improve the public health knowledge and skills of medical staff more effectively is still a current challenge. As an innovative teaching mode, the joint PBL and CBL scenario simulation teaching method has demonstrated its unique advantages in public health training in primary public hospitals. The pedagogy enables trainees to gain a deeper understanding and mastery of public health knowledge through problem-guidance and case study analysis, and at the same time, trainees can practice and hone their clinical skills in simulated public health scenarios, thus improving their problem-solving and clinical practice abilities.

In this study, it was found that the observation group using the PBL-CBL combined situational simulation teaching method was significantly higher than the traditional group in terms of the level of practical skill mastery and teaching satisfaction ( $P<0.05$ ), a finding that proves the effectiveness of this teaching method in public health training in primary public hospitals. The mechanism of action of the PBL-CBL combined situational simulation teaching method is mainly embodied in the following aspects: firstly, the Problem-based learning stimulates trainees' curiosity and desire to explore, so that they can participate in learning more actively; secondly, case-based learning can help trainees combine theoretical knowledge with practical application and improve their clinical practice ability; finally, scenario-based simulation provides a safe practice environment for trainees to practice their decision-making and resource coordination skills in simulated public health events. decision-making and resource coordination skills<sup>[3-4]</sup>.

In summary, the PBL-CBL joint scenario simulation teaching method has significant advantages and effects in public health training in primary public hospitals. In the future, we can further explore and improve the pedagogy to improve the quality of public health training in primary public hospitals and make greater contributions to the protection of people's health.

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**Projects:**

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