International Education Forum, 2024, Volume 2, Issue 9
http://ojs.bbwpublisher.com/index.php/IEF
Online ISSN: 2981-8605

# Application of Case-based Learning in Respiratory Medicine Nursing Education

**Junying Nie, Ying Li*, Xiangli Zhang, Ying Gao**

Shaanxi Provincial People's Hospital, Xi'an 710068, Shaanxi Province, China

***Corresponding author:** Ying Li, 13474368590@163.com



**Abstract:** *Objective:* To explore the application effects of case-based learning in respiratory medicine nursing education. *Methods:* 60 nursing interns in the respiratory medicine department of our hospital from January 2023 to December 2023 were selected and randomly divided into a control group and an observation group, with 30 students in each group. The control group adopted traditional teaching methods, while the observation group adopted case-based learning based on traditional teaching methods. The differences in theoretical knowledge, operational skills, clinical thinking ability, and learning interest between the two groups were compared. *Results:* The scores of theoretical knowledge, operational skills, clinical thinking ability, and learning interest of the observation group were significantly higher than those of the control group, and the differences were statistically significant ($P < 0.05$). The satisfaction score of the observation group was significantly higher than that of the control group, with a significant difference ($P < 0.05$). *Conclusion:* Case-based learning can effectively improve the teaching effect of respiratory medicine nursing, cultivate students' comprehensive abilities, and is worthy of promotion and application.

**Keywords:** Case-based learning; Respiratory medicine; Nursing education

**Online publication:** November 4, 2024

## 1. Introduction

The Respiratory Medicine department deals with a wide range of diseases, including infectious diseases, chronic diseases, acute exacerbations, and more. The clinical manifestations of each disease vary greatly, from common symptoms like cough, expectoration, and dyspnea to critical conditions such as respiratory failure and consciousness disorders, requiring nursing staff to have keen observation and judgment skills [1]. Additionally, there are numerous diagnostic and therapeutic techniques in Respiratory Medicine, including non-invasive ventilators, invasive ventilators, respiratory function monitoring, endotracheal intubation, tracheotomy care, closed thoracic drainage, and others. These technical operations are complex and demand a high level of professional skill and emergency response capabilities from operators [2].

Most nursing interns, even if they have mastered theoretical knowledge, may still make mistakes when

providing patient care due to a lack of practical experience. For example, they may not observe changes in the patient's condition promptly, adjust ventilator parameters inaccurately, or handle operational complications improperly. These oversights can easily lead to conflicts between nurses and patients and even affect the patient's treatment effectiveness. Case-based learning, as a student-centered teaching method, emphasizes introducing actual cases into the classroom. By analyzing and discussing real cases, it helps students integrate theoretical knowledge with clinical practice and improves their ability to analyze and handle complex clinical situations [3]. Case-based learning can effectively enhance students' interest in learning, clinical thinking skills, and problem-solving abilities, making it widely used in medical education.

# 2. Materials and methods

## 2.1. General information

60 nursing interns from the Respiratory Medicine department of our hospital were selected from January 2023 to December 2023. They were randomly divided into a control group and an observation group using a random number table, with 30 students in each group. There were no statistically significant differences in gender, age, or education level between the two groups ($P > 0.05$), ensuring comparability.

## 2.2. Methods

### 2.2.1. Control group

The control group received traditional teaching methods, including classroom lectures, demonstrations, and operational training. In traditional teaching, classroom lectures build a theoretical framework of respiratory medicine nursing for students. Teachers systematically impart professional knowledge to students through detailed explanations, enabling them to develop a preliminary understanding of the basic concepts, principles, and methods of respiratory medicine nursing. The demonstration session provides a more intuitive showcase of the specific procedures and norms of nursing operations, allowing students to witness correct operating methods and laying a foundation for their future practice. Operational training gives students hands-on opportunities to improve their nursing skills through repeated practice.

### 2.2.2. Observation group

The case-based teaching method was introduced on the foundation of traditional teaching methods. The specific implementation steps are as follows:

(1) Case selection: Carefully selecting typical cases closely related to respiratory medicine nursing is a crucial starting point for the case-based teaching method. These cases must possess authenticity, as only cases derived from real clinical situations or reliable sources can enable students to experience the challenges and complexities of practical work. Integrity is also a key element, where a complete case should include the patient's basic information, disease progression, nursing measures, and their effects, allowing students to comprehensively understand each aspect of the nursing process. Representativeness ensures that the cases cover common issues and critical points in respiratory medicine nursing, enabling students to grasp solutions to a category of problems by analyzing one case. Simultaneously, it is essential to consider the difficulty level of the cases concerning the student's learning abilities. If the cases are too simple, they may not stimulate students' thinking and exploration desires, while overly complex cases may leave students feeling overwhelmed and discourage their

learning enthusiasm. Cases can be sourced from textbooks, professional journals, online resources, or actual clinical cases, providing students with a wealth of learning materials.

(2) Case analysis: Students are grouped, kicking off the exciting process of case analysis. Group discussions allow students to fully exchange ideas and perspectives, sparking intellectual collisions. In this process, they conduct in-depth analysis and discussions on the cases, ranging from patients' symptoms to diagnostic basis and the formulation of corresponding nursing measures. Each step requires students to apply their knowledge to think and make judgments. Teachers play a vital guiding role in case analysis, promptly answering students' questions and helping them clarify their thoughts when they encounter confusion. Additionally, teachers provide objective evaluations of students' performances, highlighting their strengths and weaknesses to guide their further learning.

(3) Case summary: After the case analysis, the teacher provides a comprehensive summary of the case. This step not only reviews the case itself but also systematically summarizes and expands on relevant knowledge points. The teacher organizes the key issues and knowledge points in the case, helping students deepen their understanding and mastery of the knowledge. Through the summary, students can more clearly recognize their shortcomings in the case analysis process and integrate the knowledge they have learned to form a more complete knowledge system.

(4) Case application: Encouraging students to apply case analysis methods to solve practical problems during clinical internships is a crucial step in integrating theoretical knowledge with practice. When facing real patients and complex clinical situations, students can utilize the learned case analysis methods to quickly make judgments and develop reasonable nursing plans. Guiding students in reflection and summary helps them continuously improve their practical abilities and overall qualities. Through reflection, students can identify their problems and deficiencies in practice, learn from their experiences, and prepare for future work.

## 2.3. Observation indicators

### 2.3.1. Theoretical knowledge

Assessment is conducted using a self-designed theoretical knowledge test paper, which is comprehensive and professional. With a full score of 100, the content covers the etiology, pathology, clinical manifestations, nursing assessment, treatment principles, and nursing measures of respiratory diseases. The examination of etiology encourages students to deeply understand the root causes of diseases. The pathology aspect helps students comprehend the underlying mechanisms of disease development. The assessment of clinical manifestations enables students to accurately identify external symptoms of different diseases. The nursing assessment section cultivates students' ability to accurately judge patients' conditions. Mastering treatment principles guides subsequent nursing measures, while the assessment of nursing measures ensures students' ability to respond in practical operations.

### 2.3.2. Operational skills

Operational skills are evaluated using standardized patients or simulators, also with a full score of 100. The assessment includes respiratory nursing, oxygen therapy, nebulization inhalation, mechanical ventilation, and other operational skills. Respiratory nursing operations ensure the patency and cleanliness of patients' respiratory tracts. The oxygen therapy assessment evaluates students' ability to reasonably adjust oxygen supply for patients

with different conditions. Nebulization inhalation requires students to accurately master drug usage methods and dosages. Mechanical ventilation tests students' proficiency in operating complex equipment during emergencies.

### 2.3.3. Clinical thinking ability

Assessment is conducted using case analysis with a full score of 100. Evaluation indicators include problem identification ability, information collection ability, analytical judgment ability, and plan formulation ability. Problem identification requires students to quickly identify key issues from complex cases. Information collection examines students' ability to comprehensively obtain patient condition information. Analytical judgment prompts students to accurately analyze and judge the collected information. Plan formulation tests whether students can develop reasonable and effective nursing plans based on analysis results.

### 2.3.4. Learning interest

A self-designed questionnaire is used for investigation, with a full score of 100. It covers aspects such as learning motivation, learning attitude, and learning participation. Learning motivation explores students' intrinsic drive for learning. Learning attitude reflects students' level of seriousness towards learning. Learning participation demonstrates students' active initiative in the learning process.

### 2.3.5. Satisfaction score

A self-made satisfaction scoring survey questionnaire from our hospital is adopted, with a total score of 10. It is used to understand students' overall satisfaction with the teaching process and teaching effectiveness.

## 2.4. Statistical methods

Statistical Package for Social Sciences (SPSS) 27.0 statistical software is used for data analysis. Measurement data are expressed as mean ± standard deviation ($\bar{x} \pm s$). The *t*-test is used for comparison between groups, and $P < 0.05$ is considered statistically significant.

# 3. Results

## 3.1. Comparison of theoretical knowledge, operational skills, clinical thinking ability, and learning interest scores between the two groups

The observation group significantly outperforms the control group in theoretical knowledge, operational skills, clinical thinking ability, and learning interest, with *P*-values all less than 0.001, indicating significant differences, as shown in **Table 1**.

**Table 1.** Comparison of theoretical knowledge, operational skills, clinical thinking ability, and learning interest scores between the two groups ($\bar{x} \pm s$, points)

| Groups | Theoretical knowledge | Operational skills | Clinical thinking ability | Interest in learning |
|---|---|---|---|---|
| Control group (n = 30) | 78.53 ± 6.12 | 82.17 ± 5.95 | 75.43 ± 6.89 | 72.83 ± 7.14 |
| Observation group (n = 30) | 85.45 ± 5.67 | 88.51 ± 5.58 | 83.31 ± 6.45 | 80.87 ± 6.44 |
| *t*-value | 4.543 | 4.257 | 4.573 | 4.580 |
| *P*-value | < 0.001 | < 0.001 | < 0.001 | < 0.001 |

### 3.2. Comparison of teaching satisfaction scores between the two groups of students

The satisfaction score of the observation group was significantly higher than that of the control group, with a significant difference ($t = 3.213$, $P = 0.002 < 0.05$), as shown in **Table 2**.

**Table 2.** Comparison of teaching satisfaction scores between the two groups of students ($\bar{x} \pm s$, points)

| Groups | *n* | Satisfaction score |
|---|---|---|
| Control group | 30 | 7.62 ± 0.74 |
| Observation group | 30 | 8.29 ± 0.87 |
| *t*-value | | 3.213 |
| *P*-value | | 0.002 |

## 4. Discussion

The case-based teaching method abandons the boring theoretical indoctrination model of traditional classrooms. Introducing real clinical cases combines abstract and obscure theoretical knowledge with specific clinical situations, bringing knowledge to life. This approach enables students to intuitively understand and grasp knowledge, effectively enhancing their interest and initiative in learning [4,5]. In case-based teaching classrooms, students are no longer passive recipients of knowledge but active participants in the learning process. Teachers and students interact through cases. Students analyze cases, solve problems, and draw conclusions independently, gaining deeper understanding and stronger memories. Additionally, the case-based teaching method emphasizes students' analysis and discussion of cases rather than rote memorization, fostering critical thinking and problem-solving abilities [6].

During case analysis, students need to flexibly apply theoretical knowledge learned, and consider specific information provided by the case, such as patient symptoms, signs, and examination results, to identify patients' nursing problems, formulate reasonable nursing plans, and evaluate nursing effectiveness. This series of thinking, analysis, and decision-making processes can effectively improve students' clinical thinking and decision-making abilities, helping them better cope with various challenges in future clinical work. The case-based teaching method not only focuses on the combination of theory and practice but also often incorporates teaching methods such as simulation operations and role-playing, providing students with a learning experience closer to the real clinical environment. Through practical operations in simulated hospital rooms, such as respiratory care, oxygen therapy operations, ventilator application and care, students can apply theoretical knowledge to practice, improving their practical skills and emergency response capabilities, laying a solid foundation for future clinical work [7].

The results of this study showed that the observation group's scores for theoretical knowledge, operational skills, clinical thinking ability, and learning interest were significantly higher than those of the control group, with statistically significant differences ($P < 0.05$). Furthermore, the satisfaction score of the observation group was also significantly higher than that of the control group ($P < 0.05$). The reasons for this are likely as follows:

(1) The case-based teaching method emphasizes students' subject status and focuses on connecting theory with practice. Unlike the traditional teacher-centered teaching model, the case-based teaching method places students at the center of learning, encouraging them to actively participate in case analysis and discussion. This teaching model can effectively stimulate students' interest in learning and enhance

their enthusiasm and initiative. In contrast, the control group adopted a traditional teaching model where students passively received knowledge, resulting in relatively lower learning interest and initiative [8].

(2) The case-based teaching method helps students apply theoretical knowledge to clinical practice. By selecting real clinical cases, the method combines abstract theoretical knowledge with specific clinical situations, assisting students in better understanding and mastering knowledge and applying it to clinical practice. Through case analysis, students learn how to identify patients' nursing problems, develop reasonable nursing plans, and evaluate nursing effectiveness [9]. Students in the control group lacked opportunities to combine theoretical knowledge with practice, leading to relatively weak clinical thinking ability and operational skills.

(3) The case-based teaching method contributes to improving students' clinical thinking ability and problem-solving skills. It emphasizes students' analysis and discussion of cases, cultivating critical thinking and problem-solving abilities. In the process of analyzing cases, students need to apply their knowledge, identify patients' nursing problems, and formulate corresponding nursing measures. This process of analysis and problem-solving can effectively enhance students' clinical thinking ability and decision-making skills. Students in the control group lacked such training, resulting in relatively weaker clinical thinking abilities and problem-solving skills.

(4) The case-based teaching method aids in increasing students' learning satisfaction. It transforms boring theoretical knowledge into lively and interesting cases, utilizing interactive teaching methods to enhance student's interest and participation [10]. This teaching model is closer to students' actual needs, effectively boosting their learning satisfaction. In contrast, students in the control group lacked a sense of participation and accomplishment during the learning process, leading to relatively lower learning satisfaction.

## 5. Conclusion

In summary, the case-based learning method is an effective nursing teaching approach that can enhance students' interest in learning, clinical thinking skills, and practical abilities. To fully leverage the advantages of this method and improve the quality of nursing education, it is essential to carefully design cases and focus on case analysis and discussion when applying it in respiratory medicine nursing instruction.

## Disclosure statement

The authors declare no conflict of interest.

## References

[1] Wang W, Zhou X, Wei Y, 2020, Application of PBL Combined with EBM Teaching Method in Respiratory Medicine Nursing Teaching. Health Vocational Education, 38(22): 91–92.

[2] Zhao N, 2020, The Role and Effectiveness of Strengthening Safety Education in Respiratory Medicine Nursing Teaching. International Journal of Nursing, 39(17): 3109–3111.

[3] Wang L, Chu Z, Zhao J, et al., 2020, Application of Student Standardized Patients Combined with Case Teaching

Method in Clinical Teaching of Internal Medicine of Traditional Chinese Medicine. Modern Chinese Clinical Medicine, 27(2): 57–60.

[4] Sun Z, Zhang X, Wang F, 2021, Analysis of the Application Effect of CBL Combined with PBL Teaching Method in Respiratory Medicine Nursing Teaching. Chinese Cases, 22(10): 74–77.

[5] Chen Y, 2020, Observing the Application of "Case-based Learning Method" in Clinical Nursing Teaching of Respiratory Medicine. China Health Industry, 17(12): 114–116.

[6] Zeng Y, 2021, Application of Case-based Learning Method in Nursing Teaching for Internship Nurses in Internal Medicine. Chinese Community Doctors, 37(1): 113–114.

[7] Wang Z, Huang Y, Huang Y, 2020, Application of Case-Based Learning Combined with Scenario Simulation in Emergency Response Training for Outpatient Triage Nurses. Nursing Practice and Research, 17(2): 136–139.

[8] Tian A, 2020, Evaluation of the Effect of Applying PBL Teaching Method in Clinical Nursing Teaching of Respiratory Medicine. China Health Industry, 17(13): 132–134.

[9] Qiu Y, Chen M, Wang W, et al., 2021, Application of Scenario Simulation Teaching Method in Clinical Nursing Teaching of Respiratory Medicine. Chinese Continuing Medical Education, 13(12): 33–36.

[10] Tian M, Zhang Y, 2019, Application of Case-Based Learning Method in Internal Medicine Nursing Teaching. Clinical Medicine Practice, 28(7): 528–530.