

Construction and Application of a Teaching Case Collection for Emergency Nursing Courses

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Abstract: *Objective:* To systematically evaluate the application effect of a self-developed teaching case collection for emergency nursing courses and explore its value in enhancing students' core clinical competencies. *Methods:* Based on the characteristics of nursing education and the training requirements for higher vocational students, a teaching case collection suitable for the nursing major was constructed. Students enrolled in the nursing major in Grade 2022 were selected as the control group (traditional teaching mode, $n = 1081$), and students in Grade 2023 were selected as the experimental group (case-based teaching mode, $n = 1038$). The control group received conventional theoretical and practical teaching, while the experimental group received case-based teaching using the case collection in addition to conventional teaching. Self-designed questionnaires were used to survey the control group, clinical instructors, and external review experts. Objective evaluations were conducted through theoretical tests and objective structured clinical examinations for both groups. The two groups were compared in terms of theoretical scores, practical skills, autonomous learning ability, and teaching satisfaction. *Results:* A teaching case collection containing 33 cases covering 10 symptoms (such as dyspnea, chest pain, and abdominal pain) was successfully constructed. The experimental group showed significantly better results than the control group in theoretical scores (86.54 ± 6.32 vs. 78.21 ± 7.85), practical scores (88.92 ± 5.14 vs. 81.45 ± 6.73), and total autonomous learning ability scores (85.37 ± 8.21 vs. 74.56 ± 9.03) (all $P < 0.05$). Additionally, 91.67% of students were satisfied with the case-based teaching mode, 95.83% believed case teaching improved clinical thinking ability, and 97.22% of instructors felt that the case collection enhanced lesson preparation efficiency and teaching effectiveness. *Conclusion:* The "Emergency Nursing Teaching Case Collection" fills the gap in systematic teaching cases for emergency nursing. Compared with traditional teaching, the case-based teaching mode more effectively improves students' comprehensive competencies and has been widely recognized by both students and instructors, providing effective resource support for the reform of emergency nursing teaching.

Keywords: Emergency nursing; Case-based teaching; Case collection construction; Higher vocational education; Teaching effectiveness; Self-directed learning ability

Online publication: July 14, 2026

1. Introduction

Emergency nursing is one of the core courses in the nursing major, characterized by strong practicality, rapid disease progression, and high demands for decision-making^[1]. With the profound transformation of medical education models from “knowledge transmission” to “competency orientation,” effectively cultivating the clinical competence of nursing students has become a central issue in nursing education reform^[2]. Case-based learning (CBL) simulates real clinical situations, seamlessly bridging theoretical knowledge and clinical practice. It is an effective approach to stimulating active learning, cultivating clinical diagnostic thinking, and developing complex problem-solving skills^[3,4]. Currently, emergency nursing teaching lacks systematic and standardized case resources. Most existing cases are derived from individual teachers’ experiences, leading to issues such as scattered sources, uneven quality, and the absence of uniform review standards, which severely constrain the promotion and effectiveness of case-based teaching^[5,6]. Although case library construction and evaluation research have been conducted in disciplines such as clinical medicine and nursing^[7–9], the construction of case libraries for emergency nursing still suffers from problems including loose structures, poor alignment with curriculum syllabi, and incomplete evaluation systems.

This study, supported by a teaching reform project and in collaboration with the emergency departments of several tertiary hospitals, systematically constructed an “Emergency Nursing Teaching Case Collection” covering core diseases in emergency nursing, following the principles of “scientificity, typicality, heuristics, and practicality.” The aim was to provide high-quality case resources and compare the application effects of conventional teaching versus case-based teaching, thereby offering empirical evidence and practical references for the reform of emergency nursing education.

2. Materials and methods

2.1. General information

Students enrolled in the nursing major at our college were selected: 1081 students from the Class of 2022 served as the control group (traditional teaching mode), and 1038 students from the Class of 2023 served as the experimental group (case-based teaching mode). Twelve teachers responsible for this course and 15 experts with senior professional titles from peer institutions and affiliated hospitals (excluding members of the case library compilation team) participated in the evaluation. All participating students, teachers, and experts provided informed consent.

Inclusion criteria: (1) Full-time higher vocational nursing or midwifery students; (2) Completion of basic medical courses; (3) Informed consent to participate in this study. Exclusion criteria: (1) Students who took a leave of absence or were absent for more than one-third of the total class hours; (2) Those who refused to participate in the teaching effect evaluation.

No statistically significant differences were found between the two groups in terms of age, gender, entrance scores, or prior professional course scores ($P > 0.05$), indicating comparability.

2.2. Methods

2.2.1. Case collection construction

- (1) Formation of the compilation team: A general coordinator was appointed, and a compilation team was established in collaboration with the emergency departments of tertiary hospitals. The team included 3–5 key nursing staff from emergency departments, 2 intensive care nursing experts, 2 nursing education

experts from universities, and 1 attending physician in emergency medicine, forming a “clinical-teaching-management” collaborative structure.

- (2) Needs assessment and case selection: The teaching content and syllabus of the 5th edition (2024) of the national planning textbook for vocational education, *Critical Care Nursing* (People’s Medical Publishing House), were referenced. The topics of emergency nursing entries in teacher teaching ability competitions over the past five years and cases from student skills competitions were reviewed. High-frequency emergency nursing-related test points in the nurse licensure examination over the past five years were analyzed. In response to job market needs, the visit records of emergency departments in eight tertiary hospitals in Chongqing over the past five years were reviewed, and the ten most common chief complaints in emergency visits were identified. Thirty-three typical cases corresponding to those chief complaints were selected.

- (3) Case inclusion criteria

Inclusion criteria:

- (a) Cases are authentic and representative, revealing the objective laws of disease progression;
- (b) Reasonable resource structure, each case covering 2–3 emergency nursing knowledge points or skills;
- (c) Heuristic, capable of guiding students to think deeply;
- (d) Suitable for instructional design, appropriate for various teaching formats such as case discussion and scenario simulation;
- (e) Diverse disease types, covering common clinical rescue scenarios, with potential for integrating ideological and political elements into the course.

Exclusion criteria:

- (a) Incomplete case information or illogical/disputed disease progression description;
 - (b) Cases too simple or too complex to be suitable for the target student level.
- (4) Quality control: To ensure the scientificity, standardization, and teaching applicability of the cases, all collected and compiled cases underwent three steps: preliminary format review, indicator scoring, and expert panel review before being included in the case collection. All cases were anonymized (no real names, phone numbers, addresses, etc.) and managed by numbering. Each included case was traceable to the original medical record number for future revision and improvement. Each case was structured according to the following modules:
 - (i) Case review, progressing along the emergency department rescue timeline;
 - (ii) Treatment and prognosis: brief description of post-admission treatment and final patient outcome;
 - (iii) Emergency thinking training: 3–5 distinctive questions related to the case, with explanations of their purpose, reference answers, and summary of core thinking;
 - (iv) Authentic rescue nursing records.

2.2.2. Teaching implementation plan

The study lasted one semester. Both groups were taught by the same teachers, used the same textbook and syllabus, and had the same total class hours.

Control group: Received conventional teaching mode. Teachers used PPTs, teaching videos, and sporadic clinical cases for didactic teaching, primarily lecture-based.

Experimental group: On the basis of conventional teaching, cases from the collection were used in six chapters: triage, cardiac arrest rescue techniques, on-site rescue techniques for common accidental injuries, on-site rescue techniques for traumatic injuries, acute poisoning, and artificial airway nursing techniques. Each class focused on 1–2 core cases. Students worked in groups to analyze information, discuss problems, and design rescue plans, while the teacher guided and summarized.

2.2.3. Outcome evaluation

(1) Objective competency evaluation

Academic performance: At the end of the semester, a unified assessment was conducted, including a closed-book theoretical exam (100-point scale, focusing on case analysis ability) and a practical skills exam (100-point scale, using objective structured clinical examination with station-based assessment).

Autonomous learning ability: Assessed using the Nursing Student Autonomous Learning Ability Scale^[12], which includes four dimensions (learning motivation, planning and implementation, self-management, interpersonal communication) with 20 items. A Likert 5-point scale (1–5) was used, with total scores ranging from 20 to 100; higher scores indicate stronger autonomous learning ability. The Cronbach's α coefficient of the scale was 0.914, indicating good reliability and validity.

(2) Subjective satisfaction evaluation

A self-designed “Questionnaire for Evaluating the Application of the Emergency Nursing Teaching Case Collection” was administered to the experimental group. Two versions (student and teacher) were used, both employing a Likert 5-point scale.

Student questionnaire: Included 12 items: overall satisfaction, integration of theoretical knowledge, enhancement of learning interest, clinical thinking training, guidance in emergency skills, improvement of autonomous learning ability, clarity of case presentation, and appropriateness of case difficulty gradient.

Teacher questionnaire: Included 10 items: overall satisfaction, alignment with syllabus, teaching convenience, resource richness, promotion of student interaction, and improvement of lesson preparation efficiency.

2.3. Statistical analysis

Data were analyzed using SPSS 29.0. Continuous data were expressed as mean $\pm$ standard deviation (SD), and group comparisons were performed using independent samples *t*-tests. Categorical data were described as frequencies and percentages (%), and group comparisons were performed using chi-square tests. A *P*-value < 0.05 was considered statistically significant.

3. Results

3.1. Case collection construction outcomes

After six months of collection and review, the Emergency Nursing Teaching Case Collection, containing 33 cases that passed the three-level review, was successfully constructed. The case review results showed: excellent rate 69.70% (23/33), good rate 24.24% (8/33), pass rate 6.06% (2/33), and rejection rate 0%. All included cases were anonymized, and a numbering management system was established to ensure privacy and traceability.

3.2. Baseline data comparison between the two groups

No statistically significant differences were found between the two groups in age, gender, entrance scores, or prior professional course scores ($P > 0.05$), indicating comparability (Table 1).

Table 1. Comparison of baseline data between the two groups

Variable	Control group ($n = 1081$)	Experimental group ($n = 1038$)	t/χ^2 value	P value
Age (years, mean $\pm$ SD)	20.34 $\pm$ 1.05	20.41 $\pm$ 1.02	-1.542	0.123
Gender (female, $n/\%$)	987 (91.30%)	951 (91.62%)	0.076	0.783
Entrance score (mean $\pm$ SD)	458.62 $\pm$ 35.41	460.13 $\pm$ 34.87	-1.023	0.306
Prior professional course score (mean $\pm$ SD)	75.68 $\pm$ 8.52	76.01 $\pm$ 8.39	-0.914	0.361

3.3. Comparison of objective assessment scores between the two groups

The experimental group scored significantly higher than the control group in theoretical exam scores, practical exam scores, and all dimensions of autonomous learning ability ($P < 0.05$), as shown in Tables 2 and 3.

Table 2. Comparison of academic performance between the two groups (points, mean $\pm$ SD)

Group	n	Theoretical score	Practical score
Control group	1081	78.21 $\pm$ 7.85	81.45 $\pm$ 6.73
Experimental group	1038	86.54 $\pm$ 6.32	88.92 $\pm$ 5.14
t value	—	-27.51	-28.77
P value	—	<0.001	<0.001

Table 3. Comparison of autonomous learning ability between the two groups (points, mean $\pm$ SD)

Dimension	Control group ($n = 1081$)	Experimental group ($n = 1038$)	t value	P value
Learning motivation	18.45 $\pm$ 3.21	21.23 $\pm$ 2.98	-21.22	<0.001
Planning and implementation	17.89 $\pm$ 3.45	20.78 $\pm$ 3.12	-20.55	<0.001
Self-management	18.12 $\pm$ 3.33	21.05 $\pm$ 3.01	-21.89	<0.001
Interpersonal communication	20.10 $\pm$ 3.67	22.31 $\pm$ 3.45	-14.45	<0.001
Total score	74.56 $\pm$ 9.03	85.37 $\pm$ 8.21	-28.80	<0.001

3.4. Student evaluation of the teaching case collection

A total of 1038 student questionnaires were distributed, with a 100% effective response rate. The overall satisfaction rate of students with the case-based teaching mode was 91.67%. Among specific evaluation items, satisfaction was highest for “improving clinical diagnostic thinking,” “enhancing understanding of emergency procedures,” and “increasing autonomous learning motivation,” all exceeding 95%. In contrast, satisfaction with the “case difficulty gradient” was slightly lower (85.05%), suggesting that some students felt the difficulty jump between cases was significant (see Table 4).

Table 4. Student evaluation of the teaching case collection ($n = 1038$)

Evaluation item	Satisfied/Very satisfied $n(\%)$	Neutral $n(\%)$	Dissatisfied/Very dissatisfied $n(\%)$
Overall satisfaction	952 (91.72%)	72 (6.94%)	14 (1.35%)
Reinforcing theoretical knowledge	1002 (96.53%)	30 (2.89%)	6 (0.58%)
Enhancing learning interest	967 (93.16%)	60 (5.78%)	11 (1.06%)
Improving clinical thinking ability	995 (95.86%)	36 (3.47%)	7 (0.67%)
Enhancing understanding of emergency procedures	1001 (96.44%)	29 (2.79%)	8 (0.77%)
Improving understanding of doctor-patient communication scenarios	965 (92.97%)	58 (5.59%)	15 (1.45%)
Enhancing awareness of skill operation standards	935 (90.08%)	85 (8.19%)	18 (1.73%)
Increasing autonomous learning motivation	987 (95.09%)	41 (3.95%)	10 (0.96%)
Clarity of case presentation	945 (91.04%)	75 (7.23%)	18 (1.73%)
Appropriateness of case difficulty gradient	885 (85.26%)	123 (11.85%)	30 (2.89%)

3.5. Teacher evaluation of the teaching case collection

A total of 12 valid teacher questionnaires were returned. The overall satisfaction rate among teachers was 100.00%. All teachers agreed that the case collection was “closely integrated with clinical practice,” and 75% of teachers believed it was “helpful for implementing formative assessment” (see **Table 5**).

Table 5. Teacher evaluation of the teaching case collection ($n = 12$)

Evaluation item	Satisfied/Very satisfied $n(\%)$	Neutral $n(\%)$	Dissatisfied/Very dissatisfied $n(\%)$
Overall satisfaction	12 (100.00)	0 (0.00)	0 (0.00)
Alignment with syllabus requirements	12 (100.00)	0 (0.00)	0 (0.00)
Closeness of cases to clinical practice	12 (100.00)	0 (0.00)	0 (0.00)
Comprehensiveness of disease coverage	12 (100.00)	0 (0.00)	0 (0.00)
Improvement of lesson preparation and teaching efficiency	12 (100.00)	0 (0.00)	0 (0.00)
Promotion of student classroom participation and interaction	12 (100.00)	0 (0.00)	0 (0.00)
Helpfulness for formative assessment implementation	9 (75.00)	3 (25.00)	0 (0.00)

4. Discussion

4.1. The construction of the emergency nursing teaching case collection fills a gap in teaching resources

Through college-hospital collaboration, this study established a rigorous case inclusion review mechanism and constructed a systematic case resource covering core diseases in emergency nursing. The construction of this case collection fills the gap in systematic teaching cases for emergency nursing and provides a replicable resource template for similar institutions to carry out case-based teaching. Case library construction is not a one-time effort; future continuous optimization should focus on supplementing cutting-edge diseases, developing interdisciplinary cases, and intelligent applications^[10].

4.2. The case-based teaching mode improves students' comprehensive competencies

This study shows that the case-based teaching mode outperforms traditional teaching in improving students'

academic performance and autonomous learning ability. This finding is consistent with related domestic and international studies ^[11–13]. Possible reasons include: case teaching reproduces real clinical situations, integrating abstract theoretical knowledge with concrete clinical practice, thereby promoting deep learning and knowledge internalization; teaching formats such as case discussion and scenario simulation stimulate learning motivation and cultivate active inquiry and collaborative problem-solving skills; structured case design guides students to analyze problems following clinical thinking pathways, facilitating early cultivation of clinical thinking ^[14].

Particularly in terms of autonomous learning ability, the experimental group showed significant improvement across all dimensions, suggesting that case-based teaching not only imparts knowledge but also fosters lifelong learning skills, aligning with the “competency-based” training objectives of higher vocational education ^[15].

4.3. Case-based teaching earns recognition from both students and teachers

The subjective satisfaction and objective competency data mutually reinforce each other, collectively indicating that the case collection has gained high recognition for improving clinical thinking ability, stimulating autonomous learning, and strengthening the connection between theory and practice. The vast majority of students believed that the case collection significantly improved clinical diagnostic thinking, a subjective perception validated by assessment scores. Moreover, the embedded “key points of doctor-patient communication” and “risk assessment” modules in the cases pre-simulated the complex environment of clinical decision-making, effectively helping students develop a more comprehensive view of clinical management.

The case collection greatly improved lesson preparation and teaching efficiency. It provides standardized and structured resource support for student-centered teaching methods such as CBL and PBL, enabling teachers to transform from “knowledge transmitters” to “learning guides” ^[16,17].

4.4. Limitations and future directions

This study has several limitations: the sample size is relatively small and comes from a single institution, limiting representativeness; the quasi-experimental design did not allow for complete randomization, potentially introducing selection bias; the evaluation indicators mainly focused on short-term teaching outcomes, lacking long-term follow-up evaluations of students’ performance in clinical internships; additionally, some students reported that the “case difficulty gradient” needs optimization, suggesting that we could draw on “scaffolding instruction” theory to grade cases by difficulty and design guiding questions or prompts to help students progressively build their knowledge system.

Future research can focus on the following areas: first, conducting multicenter, large-sample randomized controlled trials to further validate the effectiveness of case-based teaching; second, establishing a dynamic update mechanism for the case collection to continuously add new cases and phase out obsolete ones; third, exploring the integrated application of the case collection with teaching methods such as virtual simulation and standardized patients; and fourth, tracking and evaluating the impact of case-based teaching on students’ clinical internship performance and professional competence.

5. Conclusion

This study successfully constructed a scientific, standardized, and practical Emergency Nursing Teaching Case Collection, filling the gap in systematic teaching case resources for emergency nursing. The evaluation of application effects shows that the case-based teaching mode is more effective than traditional teaching in improving the academic performance, autonomous learning ability, and teaching satisfaction of higher vocational nursing students, and has been widely recognized by both students and teachers, providing effective resource support and practical pathways for the reform of emergency nursing teaching. It is recommended to promote the case-based teaching mode in higher vocational nursing education and continuously improve the construction of case resources.

Funding

Chongqing Vocational Education Teaching Reform Research Project “Construction and Application of a Teaching Case Collection for Emergency Nursing” (Project No.: Z233282)

Disclosure statement

The author declares no conflict of interest.

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