ARTÍCULO DE REVISIÓN

Gac Méd Caracas 2026;134(1):200-211
DOI: 10.47307/GMC.2026.134.1.17

# The effectiveness of implementing case-based learning in improving clinical skills, critical thinking, problem solving, motivation, and satisfaction of nursing students: Systematic Review

## La efectividad de implementar el aprendizaje basado en casos para mejorar las habilidades clínicas, el pensamiento crítico, la resolución de problemas, la motivación y la satisfacción de los estudiantes de enfermería: Revisión Sistemática

Muhammad Al-Amin R. Sapeni[*1a], Mariyati Mardjuky[2], Eza Kemal Firdaus[3], Haeril Amir[4], Candra Dewi Rahayu[5], Afni Yan Syah[6], Yunita[7], Evi Gustia Kesuma[8]

**SUMMARY**

**Objectives:** *This study aimed to identify and analyze the effectiveness of implementing case-based learning in improving nursing students' clinical skills, critical thinking, problem-solving, motivation, and satisfaction.*

**Methods:** *A systematic review was employed. This article has been compiled in accordance with the PRISMA method. Article searches were conducted using PubMed, EBSCOhost, ProQuest, ScienceDirect, the Cochrane Library, and Scopus. Structured research questions using the PICO method, and search keywords based on Boolean combinations. A total of 590 articles*

DOI: https://doi.org/10.47307/GMC.2026.134.1.17

ORCID: 0000-0002-6859-5675[1a]
ORCID: 0009-0009-9765-2921[2]
ORCID: 0000-0001-9111-211X[3]
ORCID: 0000-0002-2350-0150[4]
ORCID: 0000-0002-2633-3482[5]
ORCID: 0009-0003-8411-6667[6]
ORCID: 0009-0002-7214-2334[7]
ORCID: 0009-0005-4402-4447[8]

[1a]Nursing Department, Sekolah Tinggi Ilmu Kesehatan Mayapada, Jakarta, Indonesia

**Recibido: 11 de diciembre 2025**
**Aceptado: 16 de enero 2026**

[2]Department Maternity Nursing, Nursing Study Program, Sekolah Tinggi Ilmu Kesehatan Maluku Husada, Indonesia
[3]Department of Nursing, Universitas Tanjungpura, Indonesia
[4]Department of Nursing, Faculty of Public Health, Universitas Muslim Indonesia
[5]Department of Nursing, Universitas Sains Al-Qur'an, Indonesia
[6]Department of Nursing, Akademi Keperawatan Kesdam Iskandar Muda Banda Aceh, Indonesia
[7,8]Department of Nursing, Faculty of Nursing, Stikes Griya Husada, Sumbawa, Indonesia

[1a] Corresponding author: Muhammad Al-Amin R. Sapeni
E-mail: muh.alamin@stikesmayapada.ac.id
Address: Semut Swamp Seclusion Street, Margahayu, Bekasi City, West Java, Indonesia 17113
Phone:+6282291875670

*were identified, and 6 were included based on the research question. The included articles were assessed using the Critical Appraisal Skills Programme and the Mixed Methods Appraisal Tool. To determine the article's quality, the Effective Public Health Practice Project was used.* **Results:** *There were 6 articles included in this study. Regarding the results of the critical assessment, the implementation of case-based learning can significantly improve nursing students' clinical skills, critical thinking, problem-solving, motivation, and learning satisfaction.* **Conclusion:** *Implementing case-based learning for nursing students can improve clinical skills, critical thinking, problem-solving, motivation, and student satisfaction with learning. Therefore, the CBL method is recommended for nursing education.*

**Keywords:** *Case-based learning, clinical skills, critical thinking, problem solving, motivation, satisfaction, nursing students.*

## RESUMEN

**Objetivos:** *Identificar y analizar la efectividad de la implementación del aprendizaje basado en casos para mejorar las habilidades clínicas, el pensamiento crítico, la resolución de problemas, la motivación y la satisfacción de los estudiantes de enfermería.* **Métodos:** *El diseño de investigación utilizado fue una revisión sistemática. Este artículo ha sido elaborado de acuerdo con el método PRISMA. Las búsquedas de artículos utilizaron las bases de datos PubMed, EBSCOhost, Proquest, ScienceDirect, Cochrane Library y Scopus. Preguntas de investigación estructuradas utilizando el método PICO y palabras clave de búsqueda basadas en combinaciones booleanas. Se encontraron 590 artículos y se incluyeron 6, de acuerdo con la pregunta de investigación. Los artículos incluidos fueron analizados mediante el Programa de Habilidades de Evaluación Crítica y la Herramienta de Evaluación de Métodos Mixtos. Para evaluar la calidad del artículo se utilizó el Proyecto de Práctica de Salud Pública Efectiva.* **Resultados:** *Se incluyeron 6 artículos en este estudio. En cuanto a los resultados de la evaluación crítica, la implementación del aprendizaje basado en casos puede mejorar significativamente las habilidades clínicas, el pensamiento crítico, la resolución de problemas, la motivación y la satisfacción con el aprendizaje de los estudiantes de enfermería.* **Conclusión:** *La implementación del aprendizaje basado en casos en estudiantes de enfermería puede mejorar las habilidades clínicas, el pensamiento crítico, la resolución de problemas, la motivación y la satisfacción del estudiante con el aprendizaje. Por lo tanto, el método CBL puede recomendarse en la formación en enfermería.*

**Palabras clave:** *Aprendizaje basado en casos, habilidades clínicas, pensamiento crítico, resolución de problemas, motivación, satisfacción, estudiantes de enfermería.*

## INTRODUCTION

In recent years, nursing professionalism has become a salient topic in health professional education (1). Advances in technology, knowledge, and new concepts in the world of nursing demand nursing education to apply professional skills in the learning curriculum (2). Nursing graduates are expected to possess strong professional competence, enabling them to make sound decisions in providing nursing care to patients (3). Therefore, a pedagogical concept of nursing education is needed that focuses on students' ability to analyze cases, be active, reason, and apply theory in practice (4). By changing the traditional learning curriculum to a constructivist or experiential curriculum (5).

Currently, nursing education still relies primarily on traditional lecture-based instruction. Where the teacher teaches without assessing students' interest, motivation, and activity (6). According to Zhang et al. (7), this traditional learning method is unable to improve the relationship between nursing professionalism and decision-making ability. In addition, the application of lecture-based learning to nursing students is often ambiguous regarding its effectiveness in increasing student motivation, fostering active participation, and providing feedback on learning (8).

One learning method that can enhance nursing professionalism is the implementation of Case-Based Learning (CBL) (9). This method combines the concepts of constructivist and experiential learning (5). CBL is an active learning method that uses real cases and authentic patient data (10) and links theory and practice in learning (11). According to Gholami et al. (11), implementing CBL among nursing students can enhance students' critical thinking and stress management, strengthen peer collaboration, improve diagnostic skills, and enhance professional competence. Implementing CBL also improves students' decision-making skills and motivates them to learn independently (12). Furthermore, students

prefer case-based learning to problem-based learning (10).

Although the benefits of CBL have been widely studied, research evaluating its effectiveness in nursing education remains limited (13). Further research is needed to assess the application of CBL to nursing students keperawatan (14). Thus, we conducted a systematic review to summarize, evaluate, and describe the effectiveness of implementing Case-based Learning in improving Clinical Skills, Critical Thinking, problem-solving, Motivation, and Nursing Student Satisfaction, which may be helpful for readers, particularly educators of nursing students.

## METHODS

This study employed a systematic review design and was conducted in accordance with the PRISMA 2020 guidelines (15). The PRISMA guidelines consisted of 27 statement items and 4 stages of flowcharts. The literature search for this article used 6 electronic databases: PubMed, ProQuest, ScienceDirect, Scopus, EBSCOhost, and the Cochrane Library. Meanwhile, keywords are based on Boolean combinations (Table 1).

Table 1. PICO Keywords.

| | |
|---|---|
| P | "Nursing Students" OR "Nurse Students" OR "Baccalaureate Nursing Students" OR "Undergraduate Nursing Students" |
| I | "Case-Based Learning" OR "Case-Based Learning" |
| C | "No Intervention" OR "Standard Intervention" |
| O | "Clinical Competency" OR "Clinical Skills" AND "Critical Thinking" AND "Problem-Solving" OR "Problem Solving" AND "Satisfaction" OR "Motivation" |

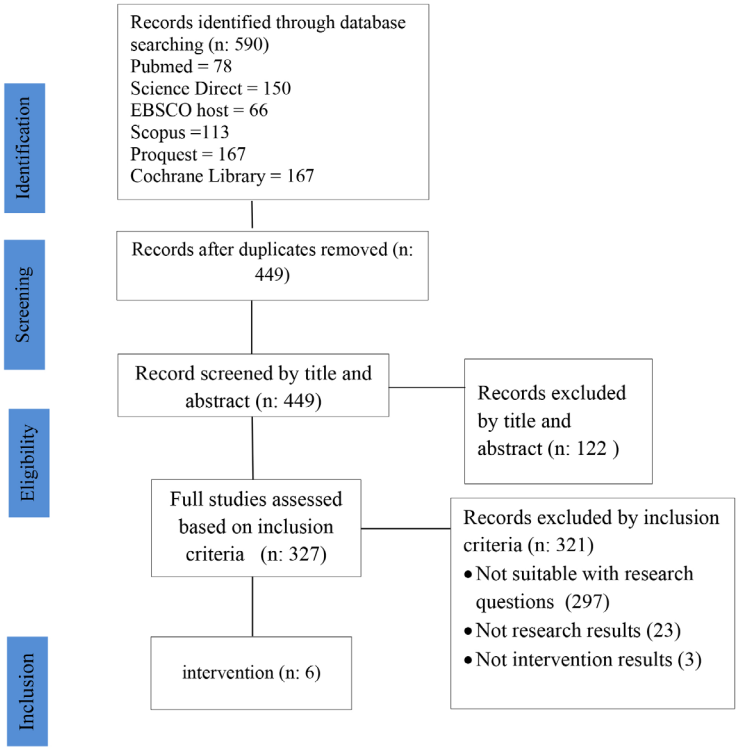


Figure 1. Flow Diagram for selecting an inclusive study

### Article Criteria

The article's question was structured using the PICO (Population, Intervention, Comparison, Outcome) method (16). The PICOs in this study are: P: Nursing Students; I: Case-based learning; C: standard intervention; O: Clinical Skills, Critical Thinking, Problem Solving, Motivation, Independent Learning, and Nursing Student Satisfaction. While the inclusion criteria in this review article are 1) to focus on the application of case-based learning, 2) to evaluate the ability of clinical skills, critical thinking, problem solving, motivation, and satisfaction of nursing students 3) types of intervention research, 4) published in English, and 5) published in the last 10 years. The research question in this article is the effectiveness of case-based learning in developing clinical skills, critical thinking, problem-solving, motivation, independent learning, and nursing students' satisfaction.

### The Selection of Article

590 articles were identified from 6 databases. Furthermore, the articles were screened by four researchers. Of the identified articles, 141 were excluded due to duplicate publication, and 122 were excluded because they did not match the title and abstract. Then, 297 articles were excluded for failing to align with the research question, 23 for not presenting research results, and 3 for not being intervention studies. A total of 6 articles were included in this study, namely those with intervention research (Figure 1).

### Data Extraction

All researchers contributed to data extraction and categorization. The data extracted for each article were the names of researchers and countries, research design, objectives, samples, and procedures (Table 2). In addition, variables, research results, and instruments were extracted (Table 3). The methods in each article were identified, categorized into themes, summarized, and systematically synthesized.

### Assessment of the article quality

To assess the feasibility of the included articles, they were filtered using the Critical Appraisal Skills Program (CASP) (17) and the Mixed Methods Appraisal Tool (MMAT) Version 2018 (18). Additionally, to assess the quality of quantitative studies, the Effective Public Health Practice Project (EPHPP) assessment tool was used (19).

The article quality assessment tool used EPHPP and consisted of 3 grades: strong, moderate, and weak, using 6 components, namely selection bias, research design, confounding, blinding, data collection, withdrawal, and dropout. For ranking assessments, studies that did not have weak evaluations and at least 4 strong assessments were classified as strong, and those with 1 weak assessment and 4 strong assessments were classified as moderate, while those with 2 or more weak assessments were classified as weak (19).

## RESULTS

### Characteristic study

This systematic review analyzed the implementation of case-based learning to improve clinical skills, critical thinking, problem-solving, motivation, and nursing student satisfaction, and included 6 related studies. The six studies were conducted in Spain, Iran, South Korea, China, and Hong Kong and were published between 2015 and 2021. Five studies employed quantitative methods, and one used mixed methods. Each intervention was conducted over one to two learning semesters. All respondents in this study were nursing students, with a sample size of 80-144 respondents.

### Intervention

6 articles apply CBL interventions to nursing students. Raurell-Torredà et al. (20) reported that the intervention group received case studies with regular treatment content, current medical diagnoses, medical history, information about

Table 2. Case-based Learning Intervention on Nursing Students.

| No. | Researcher, Country | Research Design | Purpose | Procedure | | |
|---|---|---|---|---|---|---|
| | | | | Sample | Intervention | Control |
| 1. | Raurell-Torredà et al. (20), Spain | Non-randomized clinical trial | To compare the skills of nursing bachelor students who took the surgery medical course.<br>To compare the skills of students without clinical practice previously (bachelor's) and nurses with the clinical skills listed in Continuing Professional Education (CPE). | •Intervention group 35 respondents<br>•Control group 66 respondents<br>• CPE group 59 respondents | •Intervention group of the case-based learning method<br>•Intervention applied for 32 class sessions | The control group applied the traditional learning method |
| 2. | Yoo & Park (2), South Korea | Quasi-experimental study | To explore the influence of case-based learning on communication skills, problem-solving skills, and learning motivation of nursing students | •Intervention group: 73 respondents<br>•Control group 71 respondents | •The intervention group applied case-based learning with 4 learning stages.<br>•Intervention was carried out for a total of 28 hours | The control group used a lecture-based approach to learning. |
| 3. | Hong & Yu (14), China | Randomized controlled trial study | To explore and compare the effectiveness of two learning styles methods based on cases, unfolding nursing cases, and common nursing cases in the same work environment. | •Intervention group 58 respondents<br>•Control group 64 respondents | •Intervention group taught by a course presenting multiple episode cases<br>•Intervention was conducted for 2 semesters/8 months of lectures. | The control group was taught common cases from the textbook |
| 4. | Li, Ye, & Chen (21), China | Quasi-experimental study | To explore the effect of nursing case-based learning on the critical thinking of nursing students | •Intervention group 40 respondents<br>•Control group 40 respondents | •Intervention group applied nursing case-based learning<br>•Intervention was conducted for 1 semester | The control group applied the conventional learning method |
| 5. | Chan et al. (22), Hongkong | Mix-method approach | To test the effect of case-based learning implementation on nursing students, using traditional class approach and web-based approach in improving independent learning ability, clinical reasoning ability, and learning satisfaction in nursing students. | Intervention group: 141 respondents | Implementation of web-based CBL during semester 2 | The implementation of face-to-face CBL during semester 1 |
| 6 | Gholami et al. (23), Iran | Quasi-experimental study | To compare the effect of case-based learning and multi-episode case study, and lecture-based learning on problem-solving skills and learning motivation of nursing bachelor students | •Intervention group 45 respondents<br>•Control group 45 respondents | •Intervention group given the CBL learning method<br>•The learning was carried out for 12 hours or 6 weeks | The control group was given the LBL learning method |

Table 3. The result of Case-Based Learning Implementation on Nursing Students.

| No. | Researcher, Country | Variable | Result | | | | | | Theme | P Value | Instrument |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Intervention | | | Control | | | | | |
| | | | Pre Test | Mid Test | Post Test | Pre Test | Mid Test | Post Test | | | |
| 1 | Raurell-Torredà et al. (20), Spain 2 | Clinical Competence: | - | - | | | | | | | OSCE |
| | | Patient safety and communication | - | - | 5.3±2.7 | - | - | 4.4±1.9 | - | p= 0.2 | |
| | | Assessment | - | - | 7.5±1.4 | - | - | 6.3±2.3 | - | p= 0.04 | |
| | | Diagnosis | - | - | 7.8 ± 2.6 | - | - | 6.6 ± 3.2 | - | p= 0.2 | |
| | | Intervention | - | - | 6.7±1.6 | - | - | 6.4±1.9 | - | p= 0.5 | |
| | | Critical Thinking | - | - | 6.5±2.2 | - | - | 5.7±2.1 | - | p= 0.2 | |
| 2 | Yoo & Park (2), South Korea 2 | Communication skills | 40.69 ± 6.56 | - | 58.42 ± 6.75 | 42.70 ±6.16 | - | 46.64 ± 9.79 | - | p=0.061 | CAT |
| | | Problem-solving ability | 112.32 ± 5.27 | - | 97.73 ± 16.08 | 111.75 ± 4.87 | - | 123.49 ± 14.16 | - | p=0.501 | PSI |
| | | Learning motivation | 102.63 ± 8.75 | - | 110.05 ± 11.87 | 99.53 ± 0.85 | - | 98.29 ± 2.97 | - | p=0.061 | IMMS |
| 3 | Hong & Yu (14), China 2 | Critical Thinking | 278.71 ± 21.80 | - | 303.77 ± 15.24 | 278.98 ± 20.27 | - | 288.34±13.94 | - | p= 0.000 | CTDI-CV |
| 4 | Li, Ye, & Chen (21), China 3 | Critical Thinking | 250.81 ± 45.07 | 303.60 ± 35.22 | 322.82 ± 29.07 | 251.15 ± 50.82 | 265.95 ± 36.08 | 269.58 ± 31.44 | - | p= 0.01 | CTDI-CV |
| 5 | Chan et al. (22), Hongkong 3 | Satisfaction | - | - | 16.41± 3.2 | - | - | 15.55 ± 4.1 | •The structure of CBL<br>•The learning environment of Web-based CBL<br>•Critical thinking and problem solving<br>•The cultural influence on the learning experience in CBL<br>•The dilemma of student-centered learning versus teacher-centered learning | P= 0.83 | Instrument Developed |
| 6 | Gholami et al. (23), Iran 2 | Problem-solving ability | 58.45 ± 15.19 | - | 31.64 ± 11.18 | 59.56 ± 15.32 | - | 58.45 ± 15.19 | - | P=0.001 | PSI |
| | | Learning motivation | | - | 75.38 ± 11.77 | - | - | 48.62 ± 13.88 | - | P=0.000 . | IMMS |

Article quality: 1 = strong rating, 2 = moderate rating, 3 = weak rating

current illnesses, nursing diagnoses, nursing interventions, and doctors' orders, objective outcomes of nursing diagnoses, laboratory data, and additional tests. The intervention was conducted during each of the 32 class sessions. The content (lectures and discussions) lasted no more than 50 minutes, and the small groups engaged in case-based learning for the remaining 30 minutes. The control group used traditional learning methods, with 80 minutes per session for teaching and discussion. Furthermore, Yoo & Park (2) reported that the intervention group was given case studies with 4 stages: first, the presentation of cases of miscommunication between nurses and patients; second, individual case analysis; third, group discussion; and fourth, the group suggested the appropriate solution. In the control group, lecture-based learning was applied. The intervention lasted a total of 28 hours. Furthermore, Hong & Yu (14) reported that the intervention group was provided with a study of 23 hospitalized patients, based on the patients' disease histories and clinical features, treatment and care plans, and related social, mental, and psychological factors. The control group was taught the textbook's standard cases. The intervention was implemented over 2 semesters (8 months of lectures). Each group is taught randomly by assigning one of two lecturers with the same qualifications to teach Medical Nursing.

Li et al. (7) reported on the intervention group, who were taught cases drawn from patient nursing records in public hospitals, covering various aspects of the longitudinal development of the patient's condition from admission to discharge, including medical history and clinical appearance, treatment and care plans, and social, mental, and psychological status. The implementation of 8 nursing cases in medical nursing care, surgical nursing, gynecological nursing, and pediatric nursing. Meanwhile, the control group applied conventional learning methods. Students are randomly assigned to 4 groups and taught by a different teacher in each group. The intervention was carried out during semester 2 for level 3 nursing students. Meanwhile, Chan et al. (22) reported that, using 2 CBL approaches in class and online, 12 clinical case scenarios were developed. This scenario pertains to the teaching of the course, namely pediatric nursing in Semester 1 and medical and surgical nursing in Semester 2. Students are divided into 20 groups consisting of 7-8 students, with each tutor guiding 2 groups. Students in the same group then work together to assess case problems, conduct case analyses, gather evidence, and formulate solutions or treatments. Students participate in 6 face-to-face CBL sessions, each lasting 2 hours. Furthermore, Gholami et al. (23) reported that students in the intervention group received a CBL intervention with 5 stages: presenting cases on PowerPoint slides or on paper; student analysis of cases; group discussions to solve problems, identify appropriate solutions, evaluate, and reflect. Students are taught emergency material on 6 topics, done randomly. Students are trained in CBL before the session and by facilitators experienced in CBL. The control group received the LBL intervention. Learning is conducted over 12 hours or 6 weeks; each session is 2 hours.

**Student clinical skills**

Two articles were analyzed regarding nursing students' clinical skills. Raurell-Torredà et al. (20) found that implementing the CBL method for nursing students enrolled in adult patient 1 courses can significantly improve students' assessment skills compared with traditional learning methods. Although it did not yield significant results, the intervention group outperformed the control group in diagnosing and intervening in patients. The intervention group did better on patient safety and communication scores than the control group. Then, Yoo and Park (2) reported that implementing CBL for nursing students can significantly improve nurses' and patients' communication skills compared with lecture-based learning.

**Critical Thinking of Student**

4 studies measure the critical thinking skills of nursing students. Hong and Yu (14) reported that using CBL, with unfolding nursing cases and ordinary cases, can improve nursing students' critical thinking skills. The increase in critical thinking ability was significantly greater in

unfolding nursing cases than in ordinary cases. In addition, in a study by Li et al. (7), after 9 weeks of implementing CBL, critical thinking skills among nursing students who received CBL increased compared with conventional learning. Other research, based on interviews with nursing students, also indicates that CBL, delivered face-to-face and online, can improve nursing students' critical thinking skills (24). However, Raurell-Torredà et al. (20) reported that the application of CBL to nursing students' critical thinking skills was not significant, whereas the critical thinking skills of the control group were worse than those of the intervention group.

**Problem Solving of Student**

There are 3 articles summarized in analyzing the problem-solving abilities of nursing students. Yoo & Park (2) found that implementing the CBL method with authentic nurse-patient communication cases significantly improves nursing students' problem-solving abilities compared with the lecture-based learning method. Furthermore, Gholami et al. (23) reported that the application of CBL to nursing students improved problem-solving abilities compared with LBL. Moreover, Chan et al. (22) reported qualitative results on the implementation of CBL in the classroom, and the web can improve nursing students' problem-solving abilities.

**Student Motivation**

2 articles were analyzed to assess motivation among nursing students. Yoo & Park (2) found that implementing CBL can significantly increase students' motivation to learn compared with the lecture method. The real-world cases used in this study are relevant to the clinical environment, thereby increasing participants' motivation to learn. Furthermore, it is consistent with the study by Gholami et al. (23), who reported that nursing students' motivation increased after learning CBL compared with learning CBL.

**Student Satisfaction**

There is 1 article that analyzes nursing students' satisfaction. According to Chan et al. (22), there was no significant difference in student satisfaction between in-class and online delivery in the CBL group. However, the use of CBL can increase nursing students' satisfaction in both groups.

**Assessment of the quality of the article**

To assess the feasibility of the included articles, we used the Critical Appraisal Skills Program (CASP) (17) and the Mixed Methods Appraisal Tool (MMAT) Version 2018 (18). Of the 6 articles analyzed, 5 were intervention studies, and 1 was a mixed-methods study. Regarding these studies, most report the research focus, sample homogeneity, results, and applicability to the local population. However, several studies did not report blinding, the intervention in the control group, the effect size, or the precision of the study results (Table 4).

In addition to assessing the feasibility of the article, its quality was also evaluated using the Effective Public Health Practice Project (EPHPP) (19). 6 quantitative research studies were analyzed in this assessment. Research ranked as moderate (2,14,20,23). This study is ranked as weak (21,24).

**Instrument**

In these 6 articles, several instruments are used to evaluate CBL implementation, including clinical competence assessment with the Objective Structured Clinical Examination (OSCE) checklist and the Communication Assessment Tool (CAT) (2,20). Furthermore, to assess Critical thinking abilities, the Critical Thinking Disposition Inventory -Chinese Version (CTDI-CV) (14,21) was used. Additionally, the Problem-Solving Inventory (PSI) was used to assess problem-solving ability (2,23). To

Table 4. Critical Appraisal: Intervention and Mixed Methods.

| No. | Critical Appraisal of Intervention | Raurell-Torredà et al. (20) | Yoo & Park (2) | Hong & Yu (14) | Li, Ye, & Chen (21) | Gholami et al. (23) | Critical Appraisal of Mixed Methods | Chan et al. (22) |
|---|---|---|---|---|---|---|---|---|
| 1 | Is there any clarity in the research focus? | Yes | Yes | Yes | Yes | Yes | Was there a straightforward research question? | Yes |
| 2 | Was patient determination conducted randomly? | No | No | Yes | No | No | Were the collected data possible to answer the research question? | Yes |
| 3 | Were all patients entered in the research counted until the conclusion stage? | Yes | No | No | Can't tell | No | Was there an adequate reason to use the mixed method design to answer the research question? | Yes |
| 4 | Were the patients, medical staff, and researchers blinded in the research? | Yes | No | No | No | No | Were different research components effectively integrated to answer the research question? | Yes |
| 5 | Was the group the same in the initial research? | Yes | Yes | Yes | Can't tell | Yes | Were the outputs of qualitative and quantitative component integration interpreted adequately? | Yes |
| 6 | Aside from the intervention group, was the control group treated identically? | Can't tell | Can't tell | Can't tell | Can't tell | Can't tell | Were the differences and inconsistencies between quantitative and qualitative results managed adequately? | Can't tell |
| 7 | How significant was the research effect? | Yes | Yes | Yes | Yes | Yes | Did the various research components meet the quality criteria for each employed method? | Yes |
| 8 | How appropriate was the precision of the research effect? | Yes | Yes | Yes | Yes | Yes | | |
| 9 | Could the result be applied to the local population or to your environment? | Yes | Yes | Yes | Yes | Yes | | |
| 10 | Was the result clinically important to be considered? | Yes | Yes | Yes | Yes | Yes | | |
| 11 | Was the benefit equal to the danger and its cost? | Yes | Yes | Yes | Yes | Yes | | |

measure motivation, the Instructional Materials Motivation Scale (IMMS) was used (2,23). On the other hand, instruments developed by Chan et al. were used (24). Qualitative studies also support the results of this study. Therefore, based on previous studies, the instruments used demonstrate high validity and reliability.

## DISCUSSION

This systematic review aims to identify the effectiveness of implementing case-based learning in improving clinical skills, critical thinking, problem-solving, motivation, and satisfaction of nursing students. Of the 6 articles reviewed, 5 were intervention studies (RCT, non-randomized clinical trial, and quasi-experimental), and 1 was a mixed-method study. Based on the analysis, the application of CBL can improve clinical skills, critical thinking, problem-solving, learning motivation, and learning satisfaction among nursing students. Previous evidence has shown that applying case-based learning to students can improve their knowledge of learning concepts and skills for assessing patients in practice (25). Furthermore, implementing CBL in the assessment of critical thinking skills can significantly improve nursing students' critical thinking skills (26). Implementing CBL also enhances students' clinical problem-solving skills (27). Furthermore, student motivation to learn also increases with the implementation of CBL (28). Students are also more satisfied and prefer CBL learning (29).

The implementation of CBL for nursing students is undertaken over one to two semesters of lectures. To achieve effective results when applying a learning method to students, it is necessary to consider the frequency, duration, and target audience of the learning (30). A group discussion learning approach also supports the implementation of CBL. Although the results are not yet known regarding whether case or discussion factors are more effective, the CBL method, which is applied through group discussions among students, can increase students' interest in learning (31).

In assessing articles using CASP, several drawbacks are evident in the research: researchers do not apply blinding (2,14,21,23). In research, blinding is essential to prevent bias in the results. Double-blind or single-blind designs can affect respondents' or researchers' attitudes toward treating respondents more objectively (32).

## IMPLICATION FOR EDUCATION OF NURSING

Case-based learning is a learning concept that integrates theory into practice. By adapting the work environment, the CBL method is efficacious in improving nursing students' professional skills. This study found that CBL application can affect clinical skills, critical thinking, problem-solving, motivation, and learning satisfaction among nursing students (2,14,20–23). There is an inevitable need to explore the role of instruction in developing professional skills in nursing students. Because professional skills are developmental, educational programs can play an active role in enhancing them. In implementing the learning curriculum, nursing education must prioritize outcomes required by employers and workplaces (9). The implementation of CBL uses real-life cases to assess bio-psychosocial and clinical situations, thereby maintaining narrative pedagogical features (33). Thus, it is necessary to shift the curriculum from traditional to constructivist and experiential approaches through the CBL method (5).

## LIMITATION

There are several limitations in this study: although the search was extensive and inclusive, some relevant studies may have been overlooked. In addition, few studies met the inclusion criteria; RCTs were lacking, and several quantitative quality-assessment articles were of poor quality.

## CONCLUSION

This systematic review is limited to 6 research articles involving 737 respondents. The application of case-based learning can improve nursing students' clinical skills, critical thinking, problem-solving, motivation, and learning satisfaction. Therefore, the CBL method is recommended for nursing education.

## REFERENCES


1. Akhtar-Danesh N, Baumann A, Kolotylo C, Lawlor Y, Tompkins C, Lee R. Perceptions of Professionalism Among Nursing Faculty and Nursing Students. West J Nurs Res. 2013;35(2):248-271.
2. Yoo MS, Park HR. Effects of case-based learning on communication skills, problem-solving ability, and learning motivation in nursing students. Nurs Heal Sci. 2015;17(2):166-172.
3. Raymond C, Profetto-McGrath J, Myrick F, Strean WB. Balancing the seen and unseen: Nurse educator as role model for critical thinking. Nurse Educ Pract. 2018;31:41-47.
4. Martyn J, Terwijn R, Kek MYCA, Huijser H. Exploring the relationships between teaching, approaches to learning, and critical thinking in a problem-based learning foundation nursing course. Nurse Educ Today. 2014;34(5):829-835.
5. Benner P, Sutphen M, Leonard V, Day L. Educating nurses: A call for radical transformation. San Francisco: Jossey-Bass, CJNR 2010;42(2):141-143.
6. Tu Y-C, Lin Y-J, Lee JW, Fan L-W. Effects of Didactic Instruction and Test-Enhanced Learning in a Nursing Review Course. J Nurs Educ. 2017;56(11):683-687.
7. Zhang F, Zhao L, Zeng Y, Xu K, Wen X. A comparison of inquiry-oriented teaching and lecture-based approach in nursing ethics education. Nurse Educ Today. 2019;79:86–91.
8. Afrasiabifar A, Asadolah M. Effectiveness of shifting traditional lecture to interactive lecture to teach nursing students. Investig y Educ en Enferm. 2019;37(1).
9. Kantar LD, Massouh A. Case-based learning: What traditional curricula fail to teach. Nurse Educ Today. 2015;35(8):e8-14.
10. McLean SF. Case-Based Learning and its Application in Medical and Health-Care Fields: A Review of Worldwide Literature. J Med Educ Curric Dev. 2016;3:JMECD.S20377.
11. Gholami M, Saki M, Toulabi T, Kordestani Moghadam P, Hossein Pour AH, Dostizadeh R. Iranian Nursing Students' Experiences of Case-Based Learning: A Qualitative Study. J Prof Nurs. 2017;33(3):241-249.
12. Yoo MS, Park JH, Lee SR. The effects of case-based learning using video on clinical decision making and learning motivation in undergraduate nursing students. J Korean Acad Nurs. 2010;40(6):863871.
13. Kaddoura MA. Critical Thinking Skills of Nursing Students in Lecture-Based Teaching and Case-Based Learning. Int J Scholarsh Teach Learn. 2011;5(2).
14. Hong S, Yu P. Comparison of the effectiveness of two styles of case-based learning implemented in lectures for developing nursing students' critical thinking ability: A randomized controlled trial. Int J Nurs Stud. 2017;68:16-24.
15. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. BMJ. 2021;372.
16. Eriksen MB, Frandsen TF. The impact of patient, intervention, comparison, outcome (PICO) as a search strategy tool on literature search quality: A systematic review. J Med Libr Assoc. 2018;106(4):10-11.
17. Singh J. Critical appraisal skills programme. J Pharmacol Pharmacother. 2013;4(1):76-77.
18. Hong QN, Fàbregues S, Bartlett G, Boardman F, Cargo M, Dagenais P, et al. The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. Educ Inf. 2018;34(4):285-291.
19. Thomas BH, Ciliska D, Dobbins M, Micucci S. A process for systematically reviewing the literature: Providing the research evidence for public health nursing interventions. Worldviews Evidence-Based Nurs. 2004;1(3):176-184.
20. Raurell-Torredà M, Olivet-Pujol J, Romero-Collado À, Malagon-Aguilera MC, Patiño-Masó J, Baltasar-Bagué A. Case-Based Learning and Simulation: Useful Tools to Enhance Nurses' Education? Nonrandomized Controlled Trial. J Nurs Scholarsh. 2015;47(1):34–42.
21. Li S, Ye X, Chen W. Practice and effectiveness of "nursing case-based learning" course on nursing student's critical thinking ability: A comparative study. Nurse Educ Pract. 2019;36(759):91-96.
22. Chan AWK, Chair SY, Sit JWH, Wong EML, Lee DTF, Fung OWM. Case-based web learning versus face-to-face learning: A mixed-method study on university nursing students. J Nurs Res. 2016;24(1):31-40.
23. Gholami M, Changaee F, Karami K, Shahsavaripour Z, Veiskaramian A, Birjandi M. Effects of multiepisode case-based learning (CBL) on problem-solving ability and learning motivation of nursing students in an emergency care course. J Prof Nurs. 2021;37(3):612-619.
24. Chan AW-K, Chair S-Y, Sit JW-H, Wong EM-L, Lee DT-F, Fung OW-M. Case-Based Web Learning Versus Face-to-Face Learning. J Nurs Res. 2016;24(1):31-40.
25. Ha H, Lopez T. Developing health literacy knowledge and skills through case-based learning. Am J Pharm Educ. 2014;78(1):1-7.
26. Sapeni MAAR, Said S. The effectiveness of case-based learning in increasing critical thinking of nursing students: A literature review. Enferm Clin. 2020;30:182-185.

27. Bi M, Zhao Z, Yang J, Wang Y. Comparison of case-based learning and traditional method in teaching postgraduate students of medical oncology. Med Teach. 2019;41(10):1124-1128.

28. Simonsohn AB, Fischer MR. Evaluation eines fallbasierten computergestützten lernsystems (CASUS) im klinischen studienabschnitt. Dtsch Medizinische Wochenschrift. 2004;129(11):552-556.

29. Haley CM, Brown B, Koerber A, Nicholas CL, Belcher A. Comparing Case-Based with Team-Based Learning: Dental Students' Satisfaction, Level of Learning, and Resources Needed. J Dent Educ. 2020;84(4):486-494.

30. Chae D, Kim H, Yoo JY, Lee J. Agreement on Core Components of an E-Learning Cultural Competence Program for Public Health Workers in South Korea: A Delphi Study. Asian Nurs Res (Korean Soc Nurs Sci). 2019;13(3):184-191.

31. Thistlethwaite JE, Davies D, Ekeocha S, Kidd JM, MacDougall C, Matthews P, et al. The effectiveness of case-based learning in health professional education. A BEME systematic review: BEME Guide No. 23. Med Teach. 2012;34(6):42-4–44.

32. Kabisch M, Ruckes C, Seibert-Grafe M, Blettner M. Randomized Controlled Trials. Dtsch Arztebl Int. 2011;108(39):663-668.

33. Grendell RN. Narrative pedagogy, technology, and curriculum transformation in nursing education. J Leadersh Stud. 2011;4(4):65-67.