Enhancing undergraduate nursing students' competency in nursing care plan through case-based learning

Melhorando a competência de estudantes de enfermagem na elaboração de planos de cuidados através da aprendizagem baseada em casos

10.29073/jim.v6i1.1006

Recebido: 26 de agosto de 2025.
Aprovado: 1 de novembro de 2026.
Publicado: XX de mês de 20XX.

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Abstract

Background: Case-based learning (CBL) is an active learning approach proposed to strengthen clinical reasoning and to bridge the gap between theory and practice in nursing education. Evidence from Cambodia is scarce, and limited resources may constrain its implementation.

Objective: This pilot study explored changes in self-rated nursing care plan (NCP) competency among third-year nursing students before and after a CBL-based Adult Nursing 2 course.

Method: A single-group pretest–posttest pilot study was conducted at the University of Puthisastra from November 2024 to February 2025. Of 50 students recruited, 48 completed the pretest and 44 completed both assessments (paired analysis). Competency was self-rated on a 20-item, 5-point Likert questionnaire in Khmer (score range 20–100; six subscales). Pre- and posttest scores were compared with the Wilcoxon signed-rank test, and effect size was estimated as $r = Z/\sqrt{n}$ pairs.

Results: Overall NCP scores increased from 58.22 ± 8.63 to 68.00 ± 11.64 ($Z = 3.51$, $p < .001$, $r = 0.53$). All six subscales were higher at posttest ($p < .001$ to .012; $r = 0.38$–0.56).

Conclusion: Self-rated NCP competency was higher after the CBL-based course. Because the design had no comparison group, the change cannot be attributed to CBL alone; controlled studies with observer-rated outcomes are needed.

Keywords: Cambodia; Case-Based Learning; Competency-Based Education; Nursing Students; Pilot Study.

Resumo

Enquadramento: A aprendizagem baseada em casos (ABC) tem sido proposta como abordagem de aprendizagem ativa para reforçar o raciocínio clínico e aproximar a teoria da prática no ensino de enfermagem. A evidência proveniente do Camboja é escassa e a limitação de recursos pode condicionar a sua implementação.

Objetivo: Este estudo piloto explorou as alterações na competência autoavaliada para elaborar planos de cuidados de enfermagem (PCE) em estudantes do terceiro ano, antes e depois de uma unidade curricular de Enfermagem do Adulto 2 baseada em casos.

Método: Estudo piloto com um único grupo e avaliação de pré-teste e pós-teste (relato segundo a TREND), realizado na Universidade de Puthisastra entre novembro de 2024 e fevereiro de 2025. Dos 50 estudantes recrutados, 48 concluíram o pré-teste e 44 concluíram ambas as avaliações (análise emparelhada). A competência foi autoavaliada com um questionário de 20 itens em khmer (escala de Likert de 5 pontos;

pontuação de 20 a 100; seis subescalas). As pontuações foram comparadas com o teste de Wilcoxon dos postos sinalizados e a dimensão do efeito foi estimada por r = Z/√n pares.

Resultados: A pontuação global de PCE aumentou de 58,22 ± 8,63 para 68,00 ± 11,64 (Z = 3,51; p < 0,001; r = 0,53). Todas as seis subescalas foram superiores no pós-teste (p de < 0,001 a 0,012; r = 0,38–0,56).

Conclusão: A competência autoavaliada na elaboração de PCE foi superior após a unidade curricular baseada em casos. Sem grupo de comparação, a alteração não pode ser atribuída apenas à ABC; são necessários estudos controlados com resultados avaliados por observadores.

Palavras-Chave: Aprendizagem Baseada em Casos; Camboja; Educação Baseada em Competências; Estudantes de Enfermagem; Estudo Piloto;

1. Introduction

Cambodia, a post-conflict country, has seen substantial improvements in political stability and economic growth during the 2010s, which has positively impacted public health. To meet the challenges of a developing health system, the Cambodian Ministry of Health (CMOH) has strengthened its healthcare system and is working to revise its nursing curriculum to a competency-based framework that aligns with the ASEAN Mutual Recognition Arrangement (ASEAN Joint Coordinating Committee on Nursing, 2016). Improving nurse education has been a priority, with efforts to upgrade nursing leaders' qualifications to support education and services (Koto-Shimada et al., 2022; Ministry of Health, 2016). In 2023, Cambodia launched the National Competency-Based Nursing Curriculum to enhance nursing education and healthcare quality by emphasizing practical skills and essential competencies for real-life healthcare situations, encouraging students to learn through hands-on experiences rather than solely through theoretical study. This competency-based education (CBE) approach aims to strengthen Cambodia's nursing workforce, ensuring that graduates can provide safe, high-quality care (Deutsche Gesellschaft für Internationale Zusammenarbeit [GIZ], 2023).

Adult Nursing is one of the compulsory courses in a baccalaureate nursing program, as outlined in Cambodia's National Curriculum for Bachelor's Degrees in Nursing (Department of Human Resources Development, Ministry of Health, 2023). In particular, this course aims to develop the competencies needed to provide safe care for adult patients with a variety of disorders by using the nursing process. Nursing students will concentrate on the nursing care of adults who are experiencing prevalent health disorders affecting the human body. Students were introduced to the knowledge and skills required for holistic assessment and patient care management of these disorders using the nursing process. Emphasis is placed on integrating therapeutic communication skills and critical thinking skills in student development of competencies as well as ensuring evidence-based nursing care plans (Department of Human Resources Development, Ministry of Health, 2023). A nursing care plan (NCP) requires strong analytical skills and the ability to link theoretical knowledge to practical nursing applications. Case-based learning (CBL) is widely recognized for helping learners analyze and integrate knowledge effectively. This learning method encourages students to evaluate, discriminate, and process information within realistic contexts, promoting deeper engagement and understanding (Burgess et al., 2021). Case-based teaching focuses on immersing students in real-life situations, allowing them to develop comprehensive problem-solving skills, manage cases systematically, and confidently create nursing care plans (Sompuet, 2016). Studies have reported that CBL enhances students' analytical abilities, essential nursing skills, and confidence in clinical settings, making it ideal for clinical nursing education (Apichutboonchock, 2015). In CBL, students are presented with authentic case studies relevant to critical nursing care. They analyze cases, share insights with peers under instructor guidance, and ultimately develop nursing care plans. This structured approach strengthens critical thinking, promotes effective integration of theory and practice, and improves presentation skills (Rugyingcharean et al., 2014). Case study learning has been shown to improve nursing students' critical thinking, presentation skills, and understanding of Bloom's taxonomy, which includes competencies in knowledge, application, and evaluation (Malesela, 2009; Bonney, 2015).

In Cambodia, using CBL to teach nursing has challenges that go beyond simply adopting a new teaching style; it requires sensitivity to the cultural context. CBL methods are typically developed in Western settings, which may not fully resonate with Cambodian students if not carefully adapted. Cultural relevance is essential in nursing education, as students need to understand patient care within the Cambodian context. Without this adaptation, students may struggle to connect with the material and apply it meaningfully to real-life situations (Koto-Shimada et al., 2023). Another challenge is the lack of resources. Many Cambodian nursing programs face limitations, such as outdated materials, minimal access to technology, and insufficient training for faculty. This makes it difficult for students to fully engage with case studies and practice critical thinking skills. Additionally, many educators may not receive enough support to develop the expertise needed to teach effectively with CBL, which limits the benefits students can gain from this teaching method (Truong, 2023). These resource gaps make it challenging to provide the hands-on, practical learning experiences that CBL is intended to offer. Lastly, a shift in mindset is often required, as some faculty members may be hesitant to move away from traditional, lecture-based teaching. CBL asks educators to engage students differently, which can feel unfamiliar and uncomfortable for those used to conventional methods. Faculty may be reluctant to adopt CBL without adequate support, training, and encouragement to make the transition easier (Kansal et al., 2024)

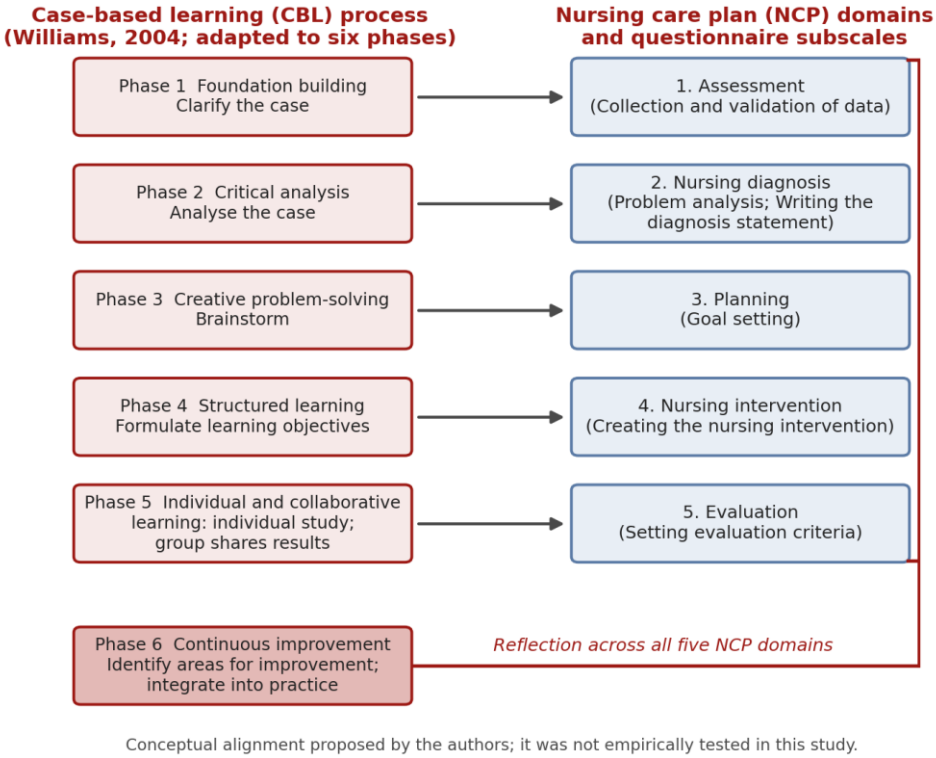
Evidence from health professions education suggests that students value CBL, but its effect on learning relative to other methods remains uncertain. According to a BEME systematic review of 104 studies concluded that the empirical data were inconclusive regarding learning effects, and only 22% of the included studies evaluated outcomes both before and after the intervention (Thistlethwaite et al., 2012). Moreover, a meta-analysis of 13 studies out of 1,396 studies from Chinese nursing students reported higher critical thinking disposition scores after CBL application than compared to traditional teaching (Xiang et al., 2025). In Cambodia, a cross-sectional mixed-methods study of 719 third-year nursing students found higher competency levels among students who had experienced CBL in both the classroom and the clinical practicum than among students without CBL experience (Koto-Shimada et al., 2023). However, we are not aware of studies from Cambodia that have examined changes in students' NCP competency, a core application of the nursing process, over the course of a CBL-based course.

The aim of this pilot study was to explore changes in self-rated NCP competency among third-year Bachelor of Science in Nursing students before and after a CBL-based Adult Nursing 2 course. The specific objectives were (1) to describe the participants' characteristics, (2) to compare overall NCP competency scores before and after the course, and (3) to compare scores on each NCP subscale and estimate the magnitude of change. We hypothesised that posttest scores would be higher than pretest scores. As a pilot study with a single-group design, it was intended to provide preliminary estimates and to test the feasibility of procedures for a future controlled evaluation (Lancaster et al., 2004), not to establish the effectiveness of CBL.

1.1. Conceptual Framework

This study draws on the CBL process described by Williams (2004), who outlined seven steps: the case is established, the case is analysed by groups, brainstorming, formulation of learning objectives, dissemination of new findings, group sharing of results, and identification of areas for improvement integrated into clinical practice. For this study, the authors adapted the sequence into six phases by merging the dissemination of findings and group sharing (Phase 5) and aligned the phases with the five core domains of nursing care planning (Figure 1). Phase 1 (Foundation building: clarifying the case) corresponds to assessment, as students gather and organise patient data. Phase 2 (Critical analysis) corresponds to nursing diagnosis, as students examine the data to identify patterns and recognise health problems. Phase 3 (Creative problem-solving: brainstorming) corresponds to planning, as students generate options and prioritise care strategies. Phase 4 (Structured learning: formulating learning objectives) corresponds to nursing intervention, as students set specific, measurable goals that inform the choice of interventions. Phase 5 (Individual and collaborative learning) corresponds to evaluation, as students assess the effectiveness of interventions individually and in groups. Phase 6 (Continuous improvement) integrates reflection across all domains. This alignment is a conceptual proposition developed by the authors; it was not empirically tested in the present study.

Figure 1: Conceptual model of case-based learning (CBL) aligned with the nursing care plan (NCP) domains.



Conceptual alignment proposed by the authors; it was not empirically tested in this study.

2. Methodology

2.1. Design and Reporting Guideline

This study used a single-group pretest–posttest design (a quasi-experimental design without a comparison group) to compare nursing students' self-rated ability to develop a nursing care plan before and after the Adult Nursing 2 course, which covers the nursing care management of respiratory and cardiovascular disorders using a case-based teaching method in the 2024–2025 academic year. Because there was neither a control group nor randomisation, the design cannot rule out history, maturation, testing, instrumentation, regression to the mean or attrition as explanations for changes in scores. Findings are therefore interpreted as associations between course participation and score change, not as evidence of effectiveness. The study is reported following the TREND statement (Des Jarlais et al., 2004).

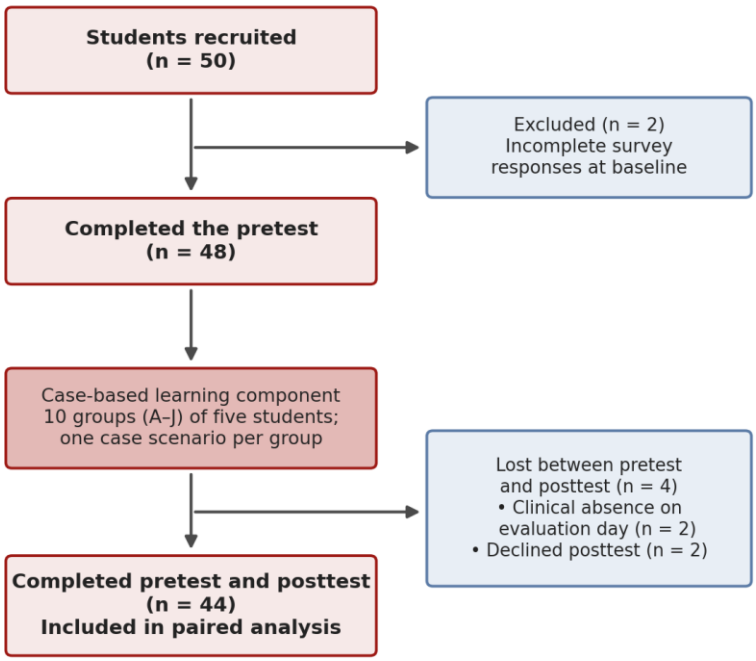
2.2. Setting and Participants

A purposive sampling method was used to recruit a total of 50 third-year nursing students who were enrolled in the first semester in the Department of Nursing, Faculty of Nursing and Midwifery, University of Puthisastra. Students were eligible if they had fully attended the Adult Nursing 2 course. Data were collected from November 2024 to February 2025.

Participant flow is shown in Figure 2. Of the 50 students recruited, 2 were excluded before the pretest because of incomplete survey responses, leaving 48 who completed the pretest. Between the pretest and the posttest, 4 participants (8.3% of 48) were lost to follow-up: 2 were absent for clinical placement on the evaluation day and 2 chose not to complete the posttest, consistent with the right to withdraw voluntarily without penalty. Consequently, 44 participants completed both assessments and were included in the paired analysis.

No a priori sample size calculation was performed. A sensitivity calculation (paired comparison, two-sided α = .05, 80% power, n = 44, allowing for the approximately 95% asymptotic relative efficiency of the Wilcoxon signed-rank test) indicated that the study could detect a standardised mean difference (d_z) of about 0.45 or larger.

Figure 2: Participant flow diagram.



2.3. Case-Based Learning Intervention

The Adult Nursing 2 course lasted 15 weeks and combined theoretical sessions, group discussions and hands-on practicals on designed case studies, with a focus on cardiovascular and respiratory disorders. The 50 recruited students were divided into 10 groups of five, arranged alphabetically from A to J. Each group was assigned a unique case scenario covering a different health issue, while all groups addressed the same core course content, similar to the approach of Boonkong et al. (2022). Each group worked on its case using mind mapping to visualise the pathology of the disease, the SBAR (Situation, Background, Assessment, Recommendation) framework to structure the case presentation to classmates, and nursing care planning tools (assessment, nursing diagnosis, planning, nursing intervention, and evaluation). Case studies were uploaded to the UPOP e-learning platform, and a teacher provided mentorship and guidance throughout. After the technical practical class, each group presented its case report to the lecturers.

2.4. Research Instrument

The course outcome was measured with a pretest–posttest questionnaire on the ability to create nursing care plans. The instrument consists of 20 items in six subscales: (1) Collection and validation of data, (2) Problem analysis, (3) Writing a nursing diagnosis statement, (4) Goal setting, (5) Setting evaluation criteria, and (6) Creating the nursing intervention. Items are self-rated on a 5-point Likert scale from strongly disagree (1) to strongly agree (5), giving a total score of 20–100; higher scores indicate higher self-perceived competency. The score is categorized into four levels as follows: Excellent: 88–100; Good: 74–87; Satisfactory: 60–73; and need to improve: below 60. Each level reflects the participant's understanding and competency in developing nursing care plans. For analysis, the subscales were mapped onto the five NCP domains: assessment (collection and validation of data), nursing diagnosis (problem analysis plus writing the diagnosis statement), planning (goal setting), nursing intervention, and evaluation (setting evaluation criteria).

2.5. Validity and Reliability

To ensure clarity and relevance, the questionnaire underwent content validation by six experts, including three nurse educators and three clinical registered nurses, yielding a content validity index (CVI) of 0.99 and a content validity ratio (CVR) ranging from 0.88 to 1.00. The reliability of the questionnaire was examined with Cronbach's

alpha, which was 0.92 among 20 nursing students with demographic characteristics similar to the participants. The questionnaire was translated into Khmer using a forward and backward translation process involving two nursing faculty members and three nursing students to ensure that it was accessible and comprehensible for all participants.

2.6. Data Collection and Procedure

Faculty members and lecturers were authorized to recruit third-year nursing students as participants. Students were informed about the study's objectives and their rights, and consent was obtained for data collection as follows:

Pretest procedure: All third-year nursing students who have fully attended the Adult Nursing 2 course were recruited. A pre-test questionnaire was administered to students upon completion of the theory class. The students were then divided into ten subgroups, each consisting of five members. Each subgroup was assigned a unique case study to analyze, ensuring diverse topics are covered across all groups. Case studies were uploaded to a UPOP e-learning platform.

Intervention procedure: Engagement in Learning: Throughout the program, students engaged in group discussions, knowledge sharing, and information searching related to their cases. A teacher provided mentorship and guidance. Assessment of Nursing Care Plan Ability: A pretest evaluated students' knowledge of nursing care plans before the program. A post-test was then conducted to assess knowledge gains and the ability to create nursing care plans for each case.

Post-test procedure: After completing the technical practical class, each group presented their case report to the lecturers. A post-test questionnaire was administered to the students after the presentations.

2.7. Statistical Analysis

Data was collected with Google Forms, exported to Excel (version 16.92), and analyzed with IBM SPSS Statistics version 25.0. Demographic data were summarised with frequencies, percentages, means and standard deviations. Pretest and posttest scores were compared for the overall NCP score and for each of the six subscales; nursing diagnosis is additionally reported as the sum of the problem analysis and diagnosis statement subscales. The Kolmogorov–Smirnov test was used to assess the normality of the score distributions. Given the small sample and ordinal-type Likert scores, differences were tested with the Wilcoxon signed-rank test on matched pairs (n = 44) using complete-case analysis; no missing posttest data were imputed. Two-tailed p-values based on the normal approximation (Z) are reported, with statistical significance set at $p < .05$, The effect size was estimated as $r = Z/\sqrt{n}$, where n is the number of matched pairs (n=44), and interpreted as small (about 0.10), medium (about 0.30) or large (0.50 or above) (Tomczak & Tomczak, 2014).

2.8. Ethical Considerations

The approval granted by the Department of Nursing, Faculty of Nursing and Midwifery, and the University of Puthisastra Research Committee (UPRC) ensures that the ethical standards and procedures are met. The researchers asked volunteer third-year nursing students who had completed informed consent after learning and understanding the purpose of this research and the right to withdraw from the study. Students participating in the pilot project were provided with surveys as part of a continuous improvement process. These surveys were designed to gather feedback on their experience with the Google Form.

Before answering the questions in the Google form, participants were required to read the consent form. By clicking "Yes," they indicated their voluntary agreement to take part in the study. Once "Yes" was selected, they could proceed with the questions. Students' tests/surveys were anonymous, and no information was collected that could identify them individually. Participation in the final survey was optional, voluntary, and anonymous, ensuring that students felt comfortable providing honest feedback. No academic grade or credit was awarded to students who chose to participate in this study, and they have the right to withdraw from the study any time.

The pre-test, post-test, and anonymous evaluation survey data were securely stored on the researchers' Google Drive account. All research data is retained for at least five years following the date of publication.

3. Results

3.1. Descriptive Characteristics of Participants

Of the 50 students recruited, 48 completed the pretest and 44 completed both the pretest and the posttest (Figure 2). Baseline characteristics are reported for the 44 posttest respondents (Table 1). The age range of the participants was 18 to 24 years, with a mean age of 20.17 ± 1.24 years. The majority of the participants were female (84.09%), 9.09% were male, and 6.82% chose not to disclose their sex. Most participants (88.63%) reported previous experience in NCP, and 11.37% reported no prior experience.

Table 1: Participants' demographic information. (posttest respondents, n = 44)

Characteristic	n (%)	Min	Max	Mean ± SD
Age (years)	44 (100)	18	24	20.17 ± 1.24
Sex				
Male	4 (9.09)			
Female	37 (84.09)			
Prefer not to say	3 (6.82)			
Previous experience in NCP				
Yes	39 (88.63)			
No	5 (11.37)			

Note: Percentages are based on the 48 pretest respondents.

3.2. Nursing Care Plan Ability Before and After the Course

Overall NCP competency scores were higher after the course than before it (pretest 58.22 ± 8.63, in the "need to improve"; posttest 68.00 ± 11.64, in the "satisfactory"; $Z = 3.51$, $p < .001$, $r = 0.53$, a large effect;

Table 2). Scores were also higher on all six subscales. The largest effects were seen for goal setting (8.31 ± 1.70 to 10.04 ± 2.12; $Z = 3.69$, $p < .001$, $r = 0.56$), problem analysis (8.08 ± 2.04 to 10.20 ± 2.40; $Z = 3.54$, $p < .001$, $r = 0.53$) and collection and validation of data (8.87 ± 1.74 to 10.43 ± 1.80; $Z = 3.44$, $p < .001$, $r = 0.52$). Medium-to-large effects were found for creating the nursing intervention (15.39 ± 2.58 to 17.15 ± 3.13; $Z = 2.81$, $p = .005$, $r = 0.42$), writing the nursing diagnosis statement (8.58 ± 1.79 to 9.97 ± 2.23; $Z = 2.66$, $p = .008$, $r = 0.40$) and setting evaluation criteria (8.97 ± 1.52 to 10.18 ± 1.89; $Z = 2.51$, $p = .012$, $r = 0.38$). The composite nursing diagnosis score also increased (16.66 ± 3.47 to 20.18 ± 4.37; $Z = 3.30$, $p < .001$, $r = 0.50$, about 0.50).

Table 2: Comparison of the pretest and posttest on NCP ability among participants.

Domain	Pretest (n = 48) Mean ± SD	Posttest (n = 44) Mean ± SD	Z	p	r
Overall NCP competency (total score, 20–100)	58.22 ± 8.63	68.00 ± 11.64	3.51	<.001	0.53
Collection and validation of data	8.87 ± 1.74	10.43 ± 1.80	3.44	<.001	0.52
Nursing diagnosis (composite)	16.66 ± 3.47	20.18 ± 4.37	3.30	<.001	0.50
Problem analysis	8.08 ± 2.04	10.20 ± 2.40	3.54	<.001	0.53
Writing the nursing diagnosis statement	8.58 ± 1.79	9.97 ± 2.23	2.66	.008	0.40
Goal setting	8.31 ± 1.70	10.04 ± 2.12	3.69	<.001	0.56
Creating the nursing intervention	15.39 ± 2.58	17.15 ± 3.13	2.81	.005	0.42
Setting evaluation criteria	8.97 ± 1.52	10.18 ± 1.89	2.51	.012	0.38

Note: Z = Wilcoxon signed-rank test statistic; p = two-tailed p-value from the normal approximation; r = Z/√44, where 44 is the number of matched pairs (Cohen thresholds: 0.10 small, 0.30 medium, 0.50 large).

4. Discussion

4.1. Principal Findings

In this single-group pilot study, self-rated NCP competency was higher after the CBL-based course than before it, overall and on each of the six subscales, with medium-to-large effect sizes (r = 0.38 - 0.56). The overall mean rose by about 10 points, moving the group average from the “need to improve” level to the “satisfactory” level. Because there was no comparison group, these results are preliminary estimates of change in a single cohort and do not show that CBL caused the improvement.

4.2. Comparison with Previous Studies

The direction of change is consistent with Cambodian evidence that nursing students who had experienced CBL showed higher competency levels (Koto-Shimada et al., 2023), with meta-analytic evidence of improved critical thinking dispositions among nursing students (Xiang et al., 2025), and with a literature review linking CBL to critical thinking in nursing students (Sapeni & Said, 2020). Studies from Thailand have examined case-based approaches in relation to competency, academic achievement and NCP ability (Apichutboonchock, 2015; Rugyingcharean et al., 2014; Boonkong et al., 2022). These studies differ in design, outcomes and populations, however, and the BEME review concluded that evidence for greater learning effects than with other teaching methods is inconclusive (Thistlethwaite et al., 2012). Our uncontrolled results therefore cannot show that CBL is superior to lecture-based teaching.

The largest effects were seen for goal setting, problem analysis and collection and validation of data. A possible explanation is that the early CBL phases (clarifying and analysing the case) give students repeated practice in organising patient data and identifying problems, but this was not tested. The effect sizes should also be read in light of the different item counts and score ranges of the subscales.

4.3. Interpretation and Alternative Explanations

Several alternative explanations must be considered. First, students may have improved because of other course components, concurrent courses, practice with the questionnaire, or normal progress over the semester. Second, the outcome was self-rated; self-assessment has been shown to relate only weakly to observed competence in practising health professionals (Davis et al., 2006), so higher scores may partly reflect greater confidence rather than better care plans. Third, 89.58% of participants reported previous NCP experience, which may have influenced baseline ratings. Fourth, the pretest was given after the theory class, so the change reflects the case-based and practical phase of the course rather than the whole course.

4.4. Implications for Nursing Education

The course used simple, low-cost components: group-based case scenarios, mind mapping, SBAR presentations, an e-learning platform and facilitator guidance. This suggests that CBL can be delivered in resource-limited settings, although faculty support and training remain necessary (Truong, 2023; Williams, 2004). Cases should also be adapted to the Cambodian context (Koto-Shimada et al., 2023). Programme leaders considering wider use of CBL for NCP teaching should evaluate it with observer-rated assessment rather than relying on student self-rating alone.

4.5. Strengths and Limitations

Strengths of this study include its focus on a core nursing process skill in a setting with little published evidence, alignment with the national competency-based curriculum, an instrument with content validation, and transparent reporting of participant flow and effect sizes. Limitations include (1) the lack of a control group, which prevents causal inference; (2) attrition of 4 of 48 pretest respondents (8.3%) and 6 of 50 recruited students (12%), and unmatched denominators between pretest (n = 48) and posttest (n = 44) descriptive statistics; (3) a small, purposive, single-site sample that limits generalisability (the sensitivity calculation indicates adequate power only for d*z* of about 0.45 or larger); (4) a self-rated outcome that may be affected by social desirability and recall bias, including self-reported prior NCP experience; (5) reliability evidence limited to a 20-student pilot, with no factor analysis; (6) multiple subscale comparisons, for which Holm and Bonferroni results differed for one subscale; (7) no confidence intervals, because the raw data were not available for this revision; and (8) the lack of direct clinical exposure during the study period, which means that skills shown with case scenarios may not transfer to real patient care. Infrastructure constraints, including limited access to clinical placements, inadequate technological resources and varying faculty expertise in CBL, may also affect implementation in other Cambodian institutions (Cho & Yang, 2016; Ly, 2018).

4.6. Recommendations for Future Research

Future studies should (1) use a comparison group, preferably a cluster-randomised or controlled design reported according to CONSORT, including its extension for pilot and feasibility trials where appropriate (Eldridge et al., 2016); (2) add observer-rated, rubric-based NCP assessment by raters blind to timing, with inter-rater reliability; (3) calculate sample size in advance, use multi-site samples, and report confidence intervals with effect sizes; (4) follow students beyond the course to see whether CBL-acquired skills transfer to real patient care during clinical clerkships under supervision; and (5) evaluate faculty training needs and costs.

5. Conclusion

In this single-group pilot study, third-year nursing students in Cambodia rated their NCP competency higher after a CBL-based course, with medium-to-large effects across all subscales. Because the design lacked a comparison group and relied on self-ratings, the findings are preliminary and do not establish that CBL is effective. They do support a controlled evaluation of CBL for NCP teaching with observer-rated outcomes, together with continued investment in faculty development and educational resources.

Acknowledgments

The authors gratefully acknowledge Ms. PHAY Soklim– Director of the Cambodian Association of Nurses (CAN), Mr. NHEM Vannarith– Vice-dean of Woo Joeng Cambodia Nursing College, Mr. SARY Chhairath–Head of Nursing Department, Chenla University (CLU), Mr. Y Sokchay– Vice-dean of the Faculty of Nursing, International University (IU), Mr. UM Channseyha– Nursing Lecturer, Kampot Regional Training Center (RCT), and Ms. HONG Youlay–Registered nurse (RN) at Jeremiah's Hope Medical Center for providing the content validity index (CVI) to the research tools. No external funding was received for this research. This research received no specific grant from any funding agency in public, commercial, non-governmental, governmental, or not-for-profit sectors. The authors also recognize the contributions of the Cambodian nursing students who participated in this research. Fieldwork permission and institutional review board approval were obtained from the University of Puthisastra Research Committee (IRB # 002UPRC).

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Declaração Ética

Revisão por Pares: Simples-cega.

Contributos:

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- Redação (versão original): Mao EAM; Monirath SUON
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- Supervisão: Mao EAM; Monirath SUON; Sreypeov TUN
- Administração do projeto: Mao EAM
- Tradução: Mao EAM; Monirath SUON

Financiamento: Nada a declarar.

Conflito de Interesse: Nada a declarar.

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