



Enhancing Gerontological Nurse Practitioner Trainees' Diagnostic and Health Screening Competencies Through Competency Case-Based Learning (CCBL)

Wilaipun Somboontanont^{1*}, Khajornsak Buaraphan², Kwanjai Amnatsatsue¹, Orawan Kaewboonchoo¹, Patcharaporn Kerdmongkol¹

¹ Faculty of Public Health, Mahidol University, Bangkok, Thailand

² Institute for Innovative Learning, Mahidol University, Nakhon Pathom, Thailand

* Correspondence: Wilaipun Somboontanont, 420/1 Ratchawithi Road, Ratchawithi District, Bangkok 10400. Thailand, E-mail: wilaipun.som@mahidol.ac.th

Received: 31 May 2026; Revised: 31 August 2026; Accepted: 31 August 2026

Abstract

Background: Population aging has increased the demand for nurses with advanced competency in geriatric nursing. Competency Case-Based Learning (CCBL) provides opportunities to connect theoretical knowledge with authentic clinical situations; however, its application to competency-based gerontological nursing education remains insufficiently developed. **Objectives:** To evaluate the effectiveness of CCBL on gerontological nursing competency and to explore how participants experienced the intervention and perceived its contribution to competency development. **Design:** A mixed-methods, single-group pretest-posttest study. **Methods:** The convenience sample within a single clinical training cohort consisted of 8 gerontological nurse practitioner trainees. The intervention consisted of a structured CCBL program (3 days per week for 4 weeks, 12 sessions total) developed using the Bloom's Taxonomy. Nursing competency was assessed before and after the intervention across cognitive, psychomotor, and affective/professional domains. Focus-group discussions and reflective accounts were analyzed thematically. Quantitative and qualitative findings were integrated using a Joint Display Matrix to identify convergence, expansion, and discordance. **Results:** Eight participants completed the study. Overall competency calculated as the composite mean across four measured domains increased from a baseline median of 2.65 (IQR: 2.34–2.89) to 4.81 (IQR: 4.56–4.86) ($Z = -2.521$, $p = .012$, $r = .89$). Qualitative analysis generated five themes: Baseline Understanding, Expected Competency Outcomes, Instructional Process Expectations, Satisfaction / Perceived Value, and; Barriers & Facilitators. Joint-display integration demonstrated convergence

between improved competency and satisfaction scores. **Conclusions:** CCBL may provide a feasible competency-oriented approach for integrating clinical reasoning, multidimensional health screening, clinical performance, and person-centered gerontological nursing practice. Controlled studies with longitudinal evaluation of CCBL in specialty nursing education are warranted.

Keywords: Competency Case Based Learning, Gerontological nurse practitioner, Clinical Reasoning, Mixed-Methods Evaluation

What was Known

- Traditional lecture-based teaching methods may not sufficiently develop critical thinking, clinical reasoning, and decision-making skills required for complex geriatric care.
- Gerontological nurse practitioners need to equip with competencies in health assessment and complex problem diagnosis of community dwelling older adults.

What's New and Next

- Competency Case Based Learning (CCBL) provides opportunities to connect theoretical knowledge with authentic clinical practice situations.
- CCBL in this study was designed to facilitate nurse practitioner trainees to understand realistic community dwelling elder complex situations that simulate actual nursing interventions.

Introduction

Thailand has entered an aged society and is expected to become a super-aged society in the near future^(1,2). The increasing number of older adults has created substantial challenges for healthcare systems, particularly in the management of chronic diseases, frailty, dependency, falls, dementia, and end-of-life care^(1,2). Consequently, healthcare professionals, especially gerontological nurses, require advanced competencies to provide comprehensive and person-centered care⁽³⁾.

Gerontological nurse practitioners play a critical role in health assessment, chronic disease management, rehabilitation, health promotion, and palliative care for older adults⁽³⁾. However, previous studies have suggested that traditional lecture-based teaching approaches may not adequately develop higher-order thinking skills, clinical judgment, and decision-making competencies necessary for geriatric nursing practice⁽⁴⁾.

Competency Case-Based Learning (CCBL) is an active learning approach that uses realistic clinical scenarios to facilitate analytical thinking, collaborative learning, and application of knowledge to practice⁽⁵⁾. It uses authentic clinical cases to promote inquiry, knowledge application, clinical

reasoning, and decision-making. Evidence suggests that CCBL can connect theory with clinical practice and produce promising outcomes in nursing education; however, its effectiveness varies according to case design, implementation, facilitation, feedback, and assessment^(4,6). Therefore, CCBL should be deliberately aligned with intended competency outcomes. This approach is particularly relevant to gerontological nursing, where older adults often present with multiple interacting health problems. Effective nursing care requires learners to identify clinical cues, select appropriate screening assessments, interpret multidimensional findings, prioritize health problems, and develop individualized care plans. These abilities require higher-order cognitive processes beyond simple knowledge recall. Bloom's Revised Taxonomy provides a framework for progressing from remembering and understanding to applying, analyzing, evaluating, and creating^(7,8). In addition, gerontological nursing competency involves psychomotor and professional behaviors, including communication, empathy, respect for autonomy and dignity, and person-centered care.

In nursing education, CCBL has been associated with improved critical thinking, clinical reasoning, communication, and learner engagement⁽⁹⁾. Nevertheless, evidence regarding the effectiveness of CCBL specifically in gerontological nursing education remains limited, especially within the Thai context. Moreover, Competency Case-Based Learning is a learner-centered instructional strategy that uses authentic clinical scenarios to facilitate active learning, critical thinking, and clinical reasoning⁽¹⁰⁾. Students engage in discussion, analysis, and collaborative problem-solving based on realistic patient situations. CCBL differs from traditional lecture-based instruction because learners actively construct knowledge rather than passively receive information⁽¹¹⁾. The approach aligns with constructivist learning theory, emphasizing contextualized learning and social interaction. Research in nursing education has demonstrated that CCBL improves: Clinical reasoning, Critical thinking, Communication skills, Decision-making, Learner engagement and, Knowledge retention⁽¹²⁾. In addition, many existing studies focus primarily on knowledge outcomes, while fewer studies comprehensively assess nursing competency across cognitive, psychomotor, and affective domains^(9,10). There is also limited integration of educational frameworks such as Bloom's Taxonomy in the development of CCBL programs for specialty gerontological nursing education^(13,14).

Despite growing evidence supporting CCBL, few studies have integrated gerontological nursing competency, multidimensional screening, problem identification, and higher-order clinical reasoning within a single structured intervention^(4,6). The translation of competency frameworks into authentic case-based activities and multidimensional assessment also remains insufficiently

established^(15,16). This study addresses this gap by integrating CCBL as the learning strategy, gerontological nursing competency as the target outcome, and Bloom's Revised Taxonomy as the alignment framework.

CCBL intervention was designed to promote multidimensional learning by integrating cognitive, psychomotor, and affective domains. The cognitive domain was guided by the revised Bloom's Taxonomy, progressing from understanding and application to analysis, evaluation, and creation. Learning activities included case analysis, evidence-based discussion, clinical reasoning, prioritization, and individualized care planning. The psychomotor domain was addressed through demonstration, simulation, role-play, skills practice, and return demonstration, allowing learners to translate clinical reasoning into nursing performance. The affective domain was incorporated through reflective discussion, ethical case analysis, role-play, and patient-centered communication activities to promote empathy, professional values, respect for autonomy, dignity, and person-centered care. Thus, each CCBL case was intentionally structured to integrate knowledge, clinical performance, and professional attitudes, consistent with the multidimensional nature of gerontological nursing competency.

Study Aims

This study aimed to 1) evaluate the effectiveness of a structured CCBL program on nursing competency in nursing diagnosis and health problem screening for community dwelling older adults among gerontological nurse practitioner trainees and 2) to explore participants' experiences of how CCBL contributed to their cognitive, psychomotor, and affective/professional development.

Research questions

1. Does CCBL improve gerontological nursing competency among nurses undertaking specialty education?
2. What aspects of the CCBL learning process do participants perceive as facilitating or challenging their development of gerontological nursing competency?
3. How do the qualitative findings converge with, expand upon, or diverge from the quantitative findings regarding changes in gerontological nursing competency following CCBL?

Materials and Methods

Study Design and Study population

This study evaluated the effectiveness of a structured CCBL on nursing competency in nursing diagnosis and health problem screening for community dwelling older adults among gerontological nurse practitioner trainees using a Convergent Parallel Mixed Methods design. It incorporated both quantitative (a one-group pretest-posttest) and qualitative. Participants were the gerontological nurse practitioner trainees at a nursing institution in Thailand. The purposive census sampling within a single clinical training cohort consisted of 8 trainees whom the researcher was randomly assigned to supervise during their clinical practice. Sample size calculation was omitted as this study evaluated a convenience census sample of all 8 eligible trainees within a single clinical rotation, following feasibility pilot study protocols.

Inclusion Criteria

Registered nurses enrolled in the gerontological nursing specialty program and willingness to participate.

Exclusion Criteria

Voluntary withdrawal from the research study and attending less than 80% of scheduled activities.

Instruments

All measurement instruments underwent standard evaluation to ensure content validity by a panel of three experts in nursing education and gerontological nursing. The finalized instruments were tried out with a comparable sample of 30 nursing trainees sharing characteristics similar to the study cohort. The instruments employed in this study to measure nursing competency (knowledge, awareness, and practice) towards nursing diagnosis and health problem screening for community dwelling older adults were as follows:

1. Competency Case Based Learning (CCBL) Lesson Plan. The lesson plan was reviewed for content validity by three experts in education and gerontological nursing. The program comprised three phases: (1) a 2-day preparation phase involving review of theoretical content and analysis of five case studies on common geriatric health problems (depression, dementia, falls, chronic diseases, and end-of-life care); (2) a practice phase involving supervised diagnostic assessment and health screening of community-dwelling older adults during clinical training, with 12 follow-up supervision

sessions; and (3) a 1-day group reflection session to summarize learning outcomes and program experiences. Items with IOC values were equaled to 1.00.

2. Nursing Competency Assessment for Diagnostic Evaluation and Common Health Problem Screening of Older Adults in the Community, comprising a knowledge assessment, skills assessment, awareness assessment, and a comprehensive geriatric assessment performance evaluation related to the diagnosis and screening of health problems among community-dwelling older adults, as follows:

2.1 The Knowledge Assessment on Diagnostic Evaluation and Health Screening of Older Adults in the Community consisted of 25 Short Answer Questions, with a total possible score of 25 points. The questions were developed based on five case studies representing common health problems encountered among community-dwelling older adults. Content Validity Index (S-CVI) of 1.00 and internal consistency (KR-20 = 0.702). Item analysis confirmed average difficulty index ($p = 0.52$ (0.21), range 0.20–0.83 and average discrimination index ($d = 0.41$, $SD=0.11$), range: 0.27–0.67.

2.2 The Procedural Skills Assessment Form was used to evaluate students' procedural competencies in the course. The instrument consisted of eight items with a total score of 50 points. Each item was rated on a five-point scale, where 5 = $\geq 90\%$ performance, 4 = 80.00–89.99%, 3 = 70.00–79.99%, 2 = 60.00–69.99%, and 1 = 50.00–59.99%. Higher scores indicated better procedural skills performance. The instrument demonstrated content Validity Index (S-CVI = 1.00), internal consistency (Cronbach's alpha = 0.894), and Inter-rater reliability (IRR= 0.88).

2.3 The Awareness of Diagnostic Assessment and Health Screening for Older Adults in the Community Scale was developed by the researcher based on a literature review and validated by three experts. The instrument consisted of 20 items rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree), with total scores ranging from 20 to 100. Scores of 81–100 indicated high awareness, 61–80 indicated moderate awareness, and 60 or below indicated low awareness. Higher scores reflected greater awareness of diagnosing and screening health problems among community-dwelling older adults. The instrument demonstrated content Validity Index (S-CVI = 1.00), internal consistency (Cronbach's alpha = 0.875).

2.4 Holistic Geriatric Assessment and Screening tool was used to assess performance skills in clinical diagnosis and health screening. This instrument was a behavioral assessment form used to evaluate students' performance in conducting comprehensive geriatric assessment and screening within the course curriculum. The assessment consisted of eight behavioral domains: history taking, physical examination, approach to older adults, explanation of findings obtained from the history and physical examination, identification of older adults' health problems, development of a nursing care plan, provision of health education and recommendations, report writing, and demonstration of interest and responsibility in learning. The total possible score was 48 points. Performance was rated using a four-point scale according to the level of practical competence, with scores ranging from 1 to 4. A score of 4 indicated excellent, 3 indicated good, 2 indicated fair, and 1 indicated needs improvement. The instrument demonstrated content Validity Index (S-CVI = 1.00), internal consistency (Cronbach's alpha = 0.871).

3. Satisfaction in CCBL Questionnaire was used to assess participants' satisfaction toward CCBL activities. It composed of 10 items with a total score of 50, where a score of 41-50 indicated a high level of satisfaction, 31-40 indicated moderate level of satisfaction, and 30 or less indicated lower level of satisfaction. The instrument demonstrated content Validity Index (S-CVI = 1.00), internal consistency (Cronbach's alpha = 0.908).

4. CCBL Learning expectations focus group questions. The semi-structured interview guide comprised eight key questions addressing participants' expectations of Competency Case-Based Learning (CCBL), perceptions of how CCBL differs from conventional teaching methods, levels of satisfaction with the learning experience, and other relevant perspectives related to the implementation of CCBL.

Procedures

I. The CCBL intervention of this research was divided into 3 phases as follows:

Phase 1: Trainees Preparation and Knowledge Integration (Introduction and Preparation) This phase focuses on demonstration and modeling of health assessment and screening for elderly individuals in the community, aligning with Bloom's Taxonomy within the Cognitive Domain. Conducted over a 2-day period during the first week of practicum, it encompasses a review of theoretical knowledge to prepare trainees prior to practice, a review of geriatric health screening forms, and practical demonstrations. Furthermore, it includes situational analyses of community-based elderly care utilizing 5 case studies of commonly encountered health issues in older adults,

namely: 1) geriatric depression, 2) dementia, 3) falls in the elderly, 4) common chronic diseases in community-dwelling elderly (e.g., diabetes, hypertension, and stroke), and 5) end-of-life care for older adults.

Phase 2: Evaluation of the Competency Development Program for Gerontological Nurse Practitioners in Community-Based Geriatric Assessment and Screening This phase involves the supervision and monitoring of trainees performing health assessment and screening for the elderly in the community, aligning with Bloom's Taxonomy within the Psychomotor and Affective Domains. It incorporates clinical instruction, case study analysis, group discussions, consultations, care planning guidance, and constructive feedback. Additionally, it provides opportunities for reflective thinking after students complete their assessments and screenings. This phase takes place during actual community practicum where students provide real care to older adults. Supervision is provided to all 8 participating trainees 3 days per week for 4 weeks (12 sessions total).

Phase 3: Group Meeting and Project Evaluation. This final phase consists of a 1-day focus group meeting to conclude and summarize the competency development program for gerontological nurse practitioners in community-based geriatric assessment and screening, aligning with Bloom's Taxonomy within the Cognitive and Affective Domains.

II. Quantitative Phase: Administered a validated Nursing Competency Assessment for Diagnostic Evaluation and Common Health Problem Screening of Older Adults in the Community before (Pre) and after (Post) the CCBL implementation.

III. Qualitative Phase: Conduct 45-minute semi-structured focus group discussions with participants' after completing the CCBL modules to capture their expectation and satisfaction of CCBL for Diagnostic Evaluation and Common Health Problem Screening of Older Adults in the Community.

IV. Data were collected concurrently during the same implementation phase, analyzed independently, and subsequently integrated during the interpretation phase using a side-by-side Joint Display. In order to mitigate bias, blinded, independent clinical preceptors (not the primary researcher/instructor) conducted the pre- and post- intervention clinical performance evaluations of participants. Participation was voluntary, did not affect official academic grades. Participant confidentiality was protected using anonymized numerical codes, with all data analyzed and reported strictly in aggregate.

Statistical Analysis

I. Quantitative data were analyzed using IBM SPSS Statistic version 30, with the level of statistical significance set at $p \leq .05$. Descriptive statistic was analyzed for the demographic variables. Due to the small sample size ($n = 8$) and non-normal distribution of the data, non-parametric statistics were applied. Differences in pretest and posttest performance scores before and after the intervention were evaluated using the Wilcoxon signed-rank test. In addition, effect sizes (r) were calculated to determine the magnitude of intervention outcomes.

II. The qualitative reflection data was analyzed using a six-step thematic analysis to explore qualitative data on expectation and satisfaction of CCBL. Audio recordings were transcribed verbatim and analyzed using Braun and Clarke's 6 phase thematic analysis framework¹⁷. Inductive coding was used to extract core themes regarding satisfaction/ expectation and nursing competency.

III. Data integration via Joint Display: A side-by-side integration table was created linking statistical findings directly with corresponding qualitative quotes and theme categories.

Trustworthiness of Qualitative Data

Qualitative data and first transcription were conducted by researcher and team while educational researcher provided critical analytical results. Trustworthiness was addressed through credibility, dependability, confirmability, and transferability¹⁸. Credibility was enhanced through purposive sampling, triangulation of focus-group data, reflective accounts, and quantitative findings, together with member checking and peer debriefing. Dependability was supported by a consistent semi-structured interview protocol, systematic thematic analysis, and an audit trail documenting analytic decisions. Confirmability was strengthened through peer review of coding and themes, and the use of verbatim quotations to anchor interpretations in participants' accounts. Transferability was supported by a detailed description of participants, educational context, CCBL intervention, and learning processes.

Results

1. Participant Characteristics

A total of 8 nurse trainees (table 1) were included in this study. The youngest and oldest participants being 31 years and 61 years respectively with the mean age of 44.88 (S.D. = 9.89). All of nurse trainees were female. Highest and lowest years of professional nursing experience were 8 years and 37 years respectively with the mean nursing experience of 23.5 years (S.D. = 10.36). None of nurse trainees had experience in CCBL before.

Table 1 Characteristics of participants (N = 8)

Characteristics	Frequency N (%)
Age	
31 – 40 Years	3 (37.50)
41 – 50 Years	4 (50.00)
> 60 Years	1 (12.50)
Nursing Experiences	
≤ 10 Years	1 (12.50)
11 - 20 Years	2 (25.00)
21 - 30 Years	3 (37.50)
31 – 40 Years	2 (25.00)
Highest Education	
Bachelor Degree	6 (75.00)
Master Degree	2 (25.00)
Experience in Caring for Community -Dwelling older adults	
None	7 (87.50)
Less than 5 years	1(12.50)
Frequency of elder care prior to training	
None	5 (62.50)
Sometimes (Once a month or more)	2 (25.00)
Regularly (more than 1 time/week)	1(12.50)
Application of training knowledge to current work	
Direct application to current work	5(62.50)
Somewhat applicable to current work	3(37.50)

2. Geriatric Nurse competency: Knowledge, Practical skills, and Awareness of common health problem screening and clinical diagnosis among community-dwelling older adults

Geriatric nurse competency across four domains such as Knowledge, Awareness of Diagnostic Assessment and Health Screening, Procedural Skills, and Holistic Geriatric Assessment and Screening and Overall competency were analyzed using the Wilcoxon Signed-Ranks Test (Table 2). Overall, participants demonstrated significant improvement in competency following the intervention, including cognitive, psychomotor, and affective/professional domains. The post-intervention median scores were higher than pre-intervention scores for Knowledge ($p = 0.012$, $r = 0.89$), Awareness ($p = 0.017$, $r = 0.84$), Procedural Skills ($p = 0.012$, $r = 0.89$), and Holistic Geriatric Assessment and Screening ($p = 0.011$, $r = 0.90$). The overall competency score, calculated as the mean composite score across all four domains standardized to a 1–5 scale, was higher than pretest median scores from 2.65 (Q1–Q3 = 2.34–2.89) to 4.81 (Q1–Q3 = 4.56–4.86) at post-test ($Z = -2.521$, $p = 0.012$). The calculated effect size (r) = 0.89.

Table 2 Changes in overall and domain-specific gerontological nursing competency before and after CCBL (N = 8)

Domain	Mean Rank	Median (Q1-Q3)	Z	p ^a	Effect size (r)
Knowledge (0-25 scores)					
Pretest	-	13.00 (9.00–14.00)	-2.527	0.012	0.89
Posttest	4.50	18.00 (14.75–19.00)			
Awareness (20 – 100 scores)					
Pretest	1.00	86.50 (79.25–91.25)	-2.383	0.017	0.84
Posttest	5.00	94.00 (91.50–98.75)			
Procedural Skills (8-50 scores)					
Pretest	-	18.00 (14.25-22.75)	-2.524	0.012	0.89
Posttest	4.50	50.00 (50.00–50.00)			
Screening (8-48 scores)					
Pretest	-	17.50 (15.50–23.75)	-2.536	0.011	0.90
Posttest	4.50	48.00(48.00–48.00)			
Competency ^b (1-5 scale)					
Pretest	-	2.65 (2.34-2.89)	-2.521	0.012	0.89
Posttest	4.50	4.81 (4.56-4.86)			
^a	Wilcoxon	Signed	Ranks	Test	

^b Overall competency score was calculated as the mean composite score across all four domains standardized to a 1–5 scale

3. Satisfaction Scores on CCBL

As presented in Table 3, the trainees expressed an exceptionally high level of satisfaction with the CCBL model, yielding a total mean satisfaction score of 4.73 (SD = 0.24) out of 5.00. The highest-rated items (Mean = 4.88, SD = 0.35) indicated that the case study content was highly appropriate for the role of a gerontological nurse practitioner, stimulated a strong motivation to learn, and achieved maximum overall satisfaction. Additionally, students strongly agreed that the program effectively stimulated analytical thinking, featured highly realistic community-dwelling elderly

scenarios, and provided practical knowledge that could be directly applied to actual clinical practice (Mean scores ranging from 4.50 to 4.88).

Table 3 Participant satisfaction with CCBL (N = 8)

Dimensions	Mean Score	SD	Interpretation
Content of the case studies	4.88	0.35	High Satisfaction
Learning activities	4.75	0.46	High Satisfaction
Simulating realistic community health scenarios	4.75	0.46	High Satisfaction
Facilitator support	4.75	0.46	High Satisfaction
Relevance of cases	4.75	0.46	High Satisfaction
Knowledge application	4.50	0.53	High Satisfaction
Group discussion	4.38	0.52	High Satisfaction
Instructional strategy	4.75	0.46	High Satisfaction
Motivation	4.88	0.35	High Satisfaction
Overall satisfaction	4.88	0.35	High Satisfaction
Overall Mean Scores	4.73	0.24	High Satisfaction

4. Qualitative findings: The expectation and satisfaction on CCBL.

Expectations of and Satisfaction with Competency Case-Based Learning for Competency Development in common health problem screening and clinical diagnosis among community-dwelling older adults from qualitative data were analyzed using thematic analysis¹³. The analysis generated five major themes as follows: Theme 1: Baseline Understanding of CCBL : Pre-existing Perceptions and Understanding of CCBL (Unfamiliarity – Interpreted through prior experiences); Theme 2: Expected Competency Outcomes: Expectations Regarding Competency Outcomes (Knowledge, skills, leadership, teaching, and referral/continuity of care); Theme 3: Instructional Process Expectations: Expectations Toward CCBL Teaching Methods, Media, and Processes (Real-world examples, demonstrations, videos, protocols, coaching, and documentation); Theme 4: Satisfaction

/ Perceived Value: Satisfaction and Perceived Value of CCBL (Clearer visualization, narrowing theory-practice gaps, practical applicability, and increased confidence) ,and; Theme 5: Barriers & Facilitators: Barriers and Facilitating Factors (Time constraints, elderly cooperation, redundancy of assessment forms, stress/lack of confidence, and incomplete data)

Theme 1: Baseline Understanding of CCBL: The majority of participants reflected that they were either 'unfamiliar with' or 'had just heard' the term Competency Case-Based Learning (CCBL) for the first time. Consequently, during the initial phase of the discussion, they interpreted the concept through the framework of their prior experiences, describing CCBL as 'utilizing real-world or paper-based cases' from hospital wards or communities as problem scenarios for learner analysis, with the aim of bridging theoretical knowledge and clinical decision-making. "I think CCBL can come from research and use in classroom activity through problems" (Participant 003). "For me, I start from zero for CCBL, I have no idea what that is. I didn't concentrate on each case, just look at the whole picture and go from there" (Participant 008).

Theme 2: Expected Competency Outcomes: The primary expectations of the learners were not limited to merely 'acquiring more knowledge,' but extended to practical competencies within the community context. These included: (1) enhancing comprehensive knowledge and systematic conceptual frameworks; (2) improving assessment and screening skills (such as holistic examinations and the application of screening tools) ; (3) increasing the ability to correlate symptoms, diseases, and health conditions, as well as prioritizing primary and secondary problems; (4) enhancing communication skills to foster cooperation from older adults; and (5) developing leadership and interprofessional collaboration competencies for holistic care. "Each example from CCBL learning gave me the variety of health problems of community dwelling elders. It provides me better understanding of nursing diagnosis in each scenario" (Participant 002). "I can apply knowledge to improve quality of care for older adults in my surgical care unit such as geriatric assessment or design activity for my clients" (Participant 007). "I expected to gain knowledge in teaching strategies in order to apply to my nursing students in working with elders in the community." (Participant 006).

Theme 3: Instructional Process Expectations: Participants explicitly indicated that their expectations for CCBL centered as much on the 'instructional methods' as on the 'content.' They desired to see real-world operational processes, spanning from the initial approach to older adults

and subsequent assessments, to data extraction and the prioritization of primary and secondary problems. The learners proposed that the core elements consist of: (1) modeling and demonstrations; (2) clear, step-by-step protocols; (3) active coaching during practice; and (4) video or documentary materials that succinctly summarize 'what to do, how to do it, and what outcomes to expect.' These components are essential for aligning everyone's understanding and narrowing the gaps in their baseline skills. "I expected to see you (the instructor) as a role model, how to approach elders, how to assess and screen for their health, how to set priority for their complex health problems, how to solve that problems and what techniques in community collaboration." (Participant 006). "I think CCBL provide me a vivid picture of the process of care. VDO clips provided good example of case study and caring process" (Participant 007).

Theme 4: Satisfaction / Perceived Value: When compared to traditional learning methods, learners perceived that CCBL effectively 'unveiled the reality' of applying theoretical principles to complex and diverse cases. This was particularly evident in interpreting screening results and navigating real-world situations that strayed from textbooks, ultimately fostering higher self-confidence and reducing time-consuming trial and error in the field. Furthermore, learners reflected that observing older adults who actually struggled with certain test items allowed them to comprehend the underlying meaning of scores and the nature of the problems more vividly than before. "CCBL provided me with clarity and concreteness in screening for the complex cases. It reduced the gap between theory and practice in the real world". (Participant 006) "It was so practical and applicable to the real-life situations" (participant 008, participant 003).

Theme 5: Barriers & Facilitators: However, learners identified significant barriers to screening in real-world settings, including time constraints, fluctuating cooperation or attention spans of the elderly (e.g., hurrying to return home or waiting for their queue), and boredom resulting from redundant questions across multiple assessment tools. "CCBL was excellent for learning process but it was time consuming and difficult to comprehend at the beginning. I cannot concentrate for the whole session." (participant 004). These issues underscore the need for 'non-redundant protocols' and 'communication techniques' to sustain the process without making the elderly feel like they are failing, especially when encountering test items, they cannot answer. "I was so nervous and anxiety for incomplete data. (participant 003). Additionally, emotional dimensions among learners were observed, such as stress and lack of confidence when faced with incomplete data or uncertainty

regarding how to synthesize the findings into a comprehensive case study. This highlights the crucial necessity of pre-visit data preparation and active coaching during practice. “I was so glad when my client welcomed me for the home visit. I can apply CCBL concept that learn in class and do fall risk assessment in real case in the community. (participant 001). “CCBL was excellent for learning process but it was time consuming and difficult to comprehend at the beginning. I cannot concentrate for the whole session.” (participant 004).

5. Joint Display: Integration of Quantitative and Qualitative Findings

Quantitative and qualitative findings were integrated using a Joint Display Matrix to examine convergence, expansion, and discordance (Table 4). Findings demonstrated predominantly convergent evidence, with improvements in overall gerontological nursing competency and cognitive, psychomotor, and affective/professional domains supported by participants’ reports of enhanced clinical reasoning, multidimensional assessment, skills performance, and person-centered care. Qualitative findings expanded the quantitative results by identifying learning mechanisms, including collaborative case analysis, facilitator feedback, and reflection, that were not fully captured by competency scores. There was no discordance between competency and satisfaction. Overall, integration indicated that CCBL facilitated competency development through authentic cases, active inquiry, practice, feedback, and reflection.

Table 4 Joint Display Matrix: Integration of Quantitative and Qualitative Findings

Competency domain / outcome	Quantitative findings	Qualitative themes	Illustrative qualitative evidence	Integration	Meta-inference
Knowledge	Post-test median score increased significantly (p = .012, r = .89).	Baseline Understanding of CCBL	Participants described greater ability to connect theoretical knowledge with assessment and care planning.	Convergence	CCBL supported integration of knowledge and clinical performance.
Awareness	Post-test median score increased significantly (p = .017, r = .84).	Expected Competency Outcomes	Greater attention to dignity, autonomy, preferences, communication, and individual needs.	Expansion	CCBL facilitated professional and person-centered learning not fully captured by scores.
Practical Skills	Post-test median score increased significantly (p = .012, r = .89).	Instructional Process Expectations	Improved confidence and performance following repeated skills practice and facilitator feedback.	Convergence	Practice and feedback helped translate knowledge into observable performance.
Health Screening Skills	Post-test median score increased significantly (p = .011, r = .90).	Instructional Process Expectations	Participants integrated physical, functional, psychological, social, and environmental information.	Convergence + Expansion	CCBL promoted multidimensional assessment beyond individual health problems.

Table 4 Joint Display Matrix: Integration of Quantitative and Qualitative Findings (Cont.)

Overall Competency	Composite score increased from 2.65 to 4.81 ($p = .012$, $r = .89$).	Satisfaction / Perceived Value	Participants described greater ability to connect theoretical knowledge with assessment and care planning.	Convergence	CCBL supported integration of knowledge and clinical performance.
Satisfaction and Expectation	Total mean satisfaction score was exceptionally high at 4.73 out of 5.00.	- Satisfaction / Perceived Value - Barriers & Facilitators	Multiple interacting problems were difficult but perceived as valuable for learning.	Expansion	Case complexity may stimulate learning when supported by facilitation.
Overall integration	Overall competency increased following CCBL.	- Satisfaction / Perceived Value - Barriers & Facilitators	Progression from case analysis to assessment, reasoning, practice, feedback, and reflection.	Predominantly convergence with expansion	CCBL may develop competency through authentic cases, inquiry, assessment, reasoning, practice, feedback, and reflection.

Discussion

This mixed-methods study evaluated whether a competency-oriented CCBL intervention could improve gerontological nursing competency among nurses undertaking specialty education. The study was based on the proposition that CCBL would be most educationally meaningful when authentic cases were deliberately aligned with explicit gerontological competencies and progressively higher-order cognitive processes. Overall, the findings support this proposition. Quantitatively, overall competency calculated as the composite mean across four measured domains increased from a baseline median of 2.65 (IQR: 2.34–2.89) to 4.81 (IQR: 4.56–4.86) ($Z = -2.521$, $p = .012$, $r = .89$). Qualitatively, participants described Baseline Understanding, Expected Competency Outcomes,

Instructional Process Expectations, Satisfaction / Perceived Value, and; Barriers & Facilitators. Integration through the Joint Display Matrix demonstrated predominantly convergent findings, while qualitative evidence expanded the quantitative results by identifying collaborative discussion, feedback, and reflection as important learning mechanisms.

The improvement in competency is consistent with evidence supporting case-based learning (CCBL) in health-professional education. The enhancement of psychomotor competency may be associated with collaborative problem-solving and simulation of clinical situations. Participants practiced care planning, communication, and geriatric assessment skills within realistic contexts⁽¹⁵⁾. Furthermore, the improvement in affective competency suggests that CCBL may promote empathy, ethical awareness, and professional attitudes toward older adults. Reflection activities encouraged deeper understanding of patient-centered care and end-of-life issues^(16,17). A BEME systematic review reported that CCBL can support knowledge application, clinical reasoning, and learner engagement, although considerable heterogeneity exists in its implementation and evaluation⁽⁴⁾. The present study extends this evidence by explicitly aligning case-based activities with gerontological nursing competencies. Rather than using cases primarily to reinforce theoretical content, participants were required to interpret assessment findings, identify and prioritize health problems, justify clinical decisions, and develop individualized care plans. This competency-oriented structure may have facilitated the integration of knowledge with clinical reasoning.

The findings also support the use of Bloom's revised Taxonomy to guide learning activities. The integration of the Bloom instructional design model contributed to systematic development and implementation of the learning activities^(11,12). Structured learning objectives, carefully designed case scenarios, and comprehensive evaluation strategies likely enhanced the effectiveness of the intervention. Participants progressed from understanding and applying knowledge to analyzing clinical information, evaluating priorities, and creating individualized care plans. Such higher-order cognitive processes are important in gerontological nursing because older adults commonly present with multiple interacting physical, functional, psychological, social, and environmental needs⁽⁸⁾. The qualitative findings indicated that participants increasingly considered these interconnected factors rather than focusing on isolated diseases. This aligns with contemporary conceptualizations of gerontological nursing competency, which emphasize person-centered care, professional values, relational competence, and holistic assessment⁽¹⁵⁾.

Improvement in multidimensional assessment and health-problem screening is particularly

relevant. Comprehensive geriatric assessment requires integration of medical, functional, psychological, and social information to inform individualized care planning⁽²²⁾. The authentic complexity of the CCBL cases may have enabled participants to move beyond learning individual screening procedures toward interpreting findings within the broader context of the older person. Similarly, improvement in psychomotor competency may reflect the integration of case discussion with structured practice and facilitator feedback, allowing participants to translate clinical decisions into observable performance.

The Joint Display provided additional explanatory value. Quantitative improvements in competency converged with participants' accounts of enhanced reasoning, assessment, and performance, while qualitative findings expanded the results by identifying changes in confidence, holistic thinking, and professional awareness that may not be fully captured by competency scores. This integration is consistent with the value of joint displays in mixed-methods research for connecting numerical outcomes with explanatory qualitative evidence⁽²³⁾. These findings have implications for nursing education. CCBL may be most effective when cases are explicitly linked to competency outcomes, incorporate realistic clinical complexity, and require higher-order reasoning. Structured skills practice, feedback, and reflection should also be incorporated to support the development of cognitive, psychomotor, and professional competencies. Overall, CCBL appears to be a promising competency-oriented approach to gerontological nursing education. Its potential lies in integrating authentic cases, higher-order reasoning, multidimensional assessment, clinical practice, feedback, and reflection to support holistic competency development.

Limitations and Strengths

Several limitations should be considered. A small sample size from a single cohort with the single-group pretest-posttest design limits causal inference, and the specific educational context may restrict transferability to other nursing populations and educational contexts. Immediate post-intervention assessment also provides limited evidence of long-term retention to clinical practice. Finally, this was a preliminary effect of CCBL on this population. Future studies should use controlled or randomized designs, larger samples, longitudinal follow-up, and objective measures of clinical performance.

Despite these limitations, the study has several strengths. First, for the contextual value, it has high regional relevance, addressing a critical training gap for gerontological nurse practitioners in Thailand's rapidly super aged society. Second, the intervention was theoretically aligned with both

gerontological nursing competency and Bloom's Taxonomy. Third, the cases were designed around authentic multidimensional older-adult problems. Fourth, competency was assessed across cognitive, psychomotor, and affective/professional domains. In addition, qualitative findings were not treated as an adjunct but were explicitly integrated with quantitative outcomes using a Joint Display.

Conclusion

This study developed and evaluated a Competency Case-Based Learning approach for specialty gerontological nursing education. CCBL integrates authentic older-adult cases, explicit gerontological nursing competencies, and Bloom's Taxonomy to structure progressive learning from knowledge acquisition to clinical reasoning, multidimensional assessment, decision-making, and individualized care planning. The mixed-methods approach provides an opportunity to determine both whether competency changes and how learners experience the processes underlying that change. The use of a Joint Display further strengthens interpretation by identifying convergence, expansion, and discordance between quantitative and qualitative findings. Supported by the final quantitative and qualitative results, CCBL provide an additional educational approach for preparing nurses to manage the complexity of older-adult care. Further research using controlled designs, larger samples, longitudinal follow-up, and objective clinical outcomes is warranted.

Ethical Approval Statement

Ethical approval was obtained from the Ethical Review Committee for Human Research, Faculty of Public Health, Mahidol University, Thailand, on September 18, 2025 (MU-MOU CoA No. 2025-005).

Author Contributions

WS designed the study, conceptualization, developed the content of the intervention program, tools, study material, resources, Data collection, Formal analysis, Investigation, Methodology, Supervision, Validation, Writing – original draft, statistical analysis and manuscript preparation, Writing – review and editing. KP provided supervision, conceptualization, methodological oversight, qualitative analysis and writing – review and editing. KA and PK were responsible for resources, participant recruitment and data collection. OK were responsible for resources, participant recruitment, data collection, and writing – review and editing.

All authors read and approved the manuscript prior to submission for publication.

Acknowledgements

We would like to thank all gerontological nurse practitioner trainees in this study for their perseverance, diligence and dedication to CCBL learning. We also extend our sincere gratitude to the community- dwelling older adults who served as vital educators in the trainees' learning process.

Source of Funding

The work presented in this article was self-funded.

Conflicts of Interest

The authors declare that there is no conflict of interest.

References

1. Office of the National Economic and Social Development Council (NESDC). Population projections for Thailand 2010–2040 (revised edition). Bangkok: NESDC; 2019.
2. Department of Older Persons (DOP). Situation of the Thai older persons 2022. Bangkok: Amarin Corporation Public Company Limited; 2023.
3. Thailand Nursing and Midwifery Council (TNMC). Specialty nurse competencies in gerontological nursing. Bangkok: TNMC; 2017.
4. 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):421-44.
5. Yang W, Zhang X, Chen C, Lu J, Tian F. Web-based case-based learning and flipped classroom as a means to improve international students' active learning and critical thinking ability. *BMC Med Educ*. 2024;24(1):Article 759. DOI:10.1186/s12909-024-05758-8
6. Yao J, Fu R, Zhu M, Jia L, Dong X, Shi Y, et al. Case-based learning interventions for undergraduate nursing students in a theoretical course: a review of design, implementation, and outcomes. *J Prof Nurs*. 2023;46:119-133.
7. Anderson LW, Krathwohl DR, editors. A taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives. New York: Longman; 2001.
8. Su WM, Osisek PJ. The revised Bloom's taxonomy: implications for educating nurses. *J Contin Educ Nurs*. 2011;42(7):321-327. doi:10.3928/00220124-20110621-05.

9. Lin GS, Tan W, Ng YS, Afrashtehfar KI. Enhancing students' academic performance through hybrid team-based case-based learning. *Asia Pac Scholar*. 2024;9(3):67-69. DOI:10.29060/TAPS.2024-9-3/CS3189
10. Surinarporn M, Deeprasit M. Effects of case-based learning on nursing problem-solving ability among nursing students. *J Nurs Health Res*. 2024;25(2):1-16.
11. Dewey J. *Experience and education*. New York: Macmillan; 1938.
12. Knowles MS. *The modern practice of adult education: from pedagogy to andragogy*. New York: Cambridge Books; 1980.
13. Bloom BS, Engelhart MD, Furst EJ, Hill WH, Krathwohl DR. *Taxonomy of educational objectives: Handbook I: Cognitive domain*. New York: David McKay; 1956.
14. Krathwohl DR. A revision of Bloom's taxonomy: an overview. *Theory Pract*. 2002;41(4):212-218.
15. Tate K, Guney S, Lai C, Van Son C, Kennedy M, Dahlke S. Gerontological nursing competencies: a scoping review. *Nurse Educ Today*. 2024;133:106034. DOI:10.1016/j.nedt.2023.106034
16. Chan ZC. A systematic review of creative thinking/creativity in nursing education. *Nurse Educ Today*. 2013;33(11):1382-7.
17. Braun V, Clarke V. *Thematic analysis: a practical guide*. Newbury Park, CA: Sage Publications; 2022.
18. Lincoln YS, Guba EG. *Naturalistic inquiry*. Newbury Park, CA: Sage Publications; 1985.
19. Wang Y, Wang L, Chen L, Zhu Y. Application of case-based learning in clinical nursing teaching: a meta-analysis. *Nurse Educ Today*. 2020;94:104577.
20. Kim H, Park JH, Shin S. Effectiveness of flipped learning in nursing education: a systematic review and meta-analysis. *BMC Med Educ*. 2016;16:243.
21. Ghosh S. Combination of didactic lectures and case-oriented problem-solving tutorials toward better learning. *Adv Physiol Educ*. 2007;31(2):193-197.
22. Ellis G, Gardner M, Tsiachristas A, Langhorne P, Burke O, Harwood RH, et al. Comprehensive geriatric assessment for older adults admitted to hospital. *Cochrane Database Syst Rev*. 2017;9(9):CD006211.

23. Guetterman TC, Feters MD, Creswell JW. Integrating quantitative and qualitative results in health science mixed methods research through joint displays. *Ann Fam Med*. 2015;13(6):554-561.