Jurnal Media Penelitian dan Pengembangan Kesehatan

Vol 36 No 1, Maret 2026
e-ISSN: 0853-9987
p-ISSN:2338-3445

Clinical competence in nursing education: a concept analysis

Kompetensi Klinik Pada Pendidikan Keperawatan: Analisis Konsep

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ABSTRACT

Introduction: *Clinical competence is a fundamental component of nursing education; however, the concept remains inconsistently defined across contexts. This lack of clarity hampers effective teaching, assessment, and the development of shared competency standards.*

Objective: *This study aimed to clarify the construct of clinical competence for prelicensure nursing students during clinical education and to identify its implications for the learning process and evaluation.*

Methods: *This study employed Walker and Avant's concept analysis systematically following the sequential steps of concept selection, multidisciplinary literature exploration, and identification of defining attributes, antecedents, and consequences. A literature review was conducted using Scopus, Proquest, Springer, and SAGE Journal. Searches conducted from January 2018-December 2023 identified 70 records, of which 18 studies met the inclusion criteria. The analysed literature encompassed multiple health-related disciplines, including nursing, digital health, medicine, midwifery, dentistry, allied health, physical therapy, and obstetrics.*

Results: *Clinical competence is conceptualised as an integrative capability encompassing cognitive, affective, and psychomotor domains, strengthened by advanced nursing skills, soft skills, leadership, and professionalism. These capabilities develop through formal education and supervised clinical experiences and are influenced by both educational contexts and individual factors. Clinically competent students can deliver safe, effective, high-quality care, maintain nursing standards, and perform efficiently in professional settings.*

Conclusion: *This study provides a refined operational definition and key attributes of clinical competence, offering guidance for curriculum development, instructional strategies, and assessment practices in competency-based nursing education. The findings highlight the importance of standardised definitions to improve teaching quality and consistency in evaluating clinical competence.*

Keywords: *clinical competence, competency-based education, nursing education, nursing student, teaching and evaluation*

ABSTRAK

Pendahuluan: Kompetensi klinis merupakan komponen fundamental dalam pendidikan keperawatan; namun, definisi konsep ini belum konsisten sdalam berbagai konteks. Ketidakjelasan tersebut menghambat efektivitas proses pembelajaran, penilaian, serta pengembangan standar kompetensi.

https://doi.org/10.34011/jmp2k.v36i1.3465

Vol 36 No 1, Maret 2026
e-ISSN: 0853-9987
p-ISSN:2338-3445

Tujuan: Penelitian ini bertujuan untuk memperjelas konstruksi kompetensi klinis pada mahasiswa keperawatan tahap pra-profesi selama pendidikan klinik serta mengidentifikasi implikasinya terhadap proses pembelajaran dan evaluasi.
Metode: Studi ini menggunakan analisis konsep Walker dan Avant yang diterapkan secara sistematis dengan mengikuti tahapan berurutan, meliputi pemilihan konsep, penelusuran literatur multidisipliner, serta identifikasi atribut, anteseden dan konsekuensi. Tinjauan literatur dilakukan melalui database Scopus, ProQuest, Springer, dan SAGE Journal. Pencarian literatur pada periode Januari 2018-Desember 2023 mengidentifikasi 70 artikel, dengan 18 studi yang memenuhi kriteria inklusi. Literatur yang dianalisis mencakup berbagai disiplin ilmu kesehatan, termasuk keperawatan, digital health, kedokteran, kebidanan, kedokteran gigi, profesi kesehatan lain, fisioterapi, dan kedokteran obstetric.
Hasil: Kompetensi klinis dikonseptualisasikan sebagai kemampuan integratif yang mencakup domain kognitif, afektif, dan psikomotor, serta diperkuat oleh keterampilan keperawatan lanjutan, soft skills, kepemimpinan dan profesionalisme. Kemampuan ini berkembang melalui pendidikan formal dan pengalaman klinik yang disupervisi, serta dipengaruhi oleh faktor pendidikan dan individu. Mahasiswa yang kompeten secara klinis akan memberikan asuhan keperawatan yang aman, efektif, dan berkualitas tinggi, mempertahankan standar keperawatan, serta bekerja secara efisien dalam lingkungan profesional.
Kesimpulan: Studi ini menghasilkan definisi operasional dan atribut utama kompetensi klinis yang lebih terperinci, serta memberikan arahan bagi pengembangan kurikulum, strategi pembelajaran, dan praktik penilaian dalam pendidikan keperawatan berbasis kompetensi. Temuan ini menegaskan pentingnya definisi yang terstandar untuk meningkatkan kualitas pembelajaran dan konsistensi dalam evaluasi kompetensi klinis.

Kata kunci: kompetensi klinis, pendidikan keperawatan, mahasiswa keperawatan, pendidikan berbasis kompetensi, pengajaran dan evaluasi

INTRODUCTION

Clinical competence (CC) is a cornerstone of nursing education because it underpins graduates' ability to provide safe, effective, and ethical patient care within their scope of practice [1] [2]. However, CC remains conceptually unclear in the nursing education literature and is frequently conflated with adjacent constructs such as professional competence, confidence, capability, or academic success [3]. This lack of clarity has been accompanied by an increasing emphasis on 'capability/capable graduates' and 'academic success' as more readily measurable outcomes. Importantly, this conceptual uncertainty has practical consequences: it contributes to heterogeneous assessment approaches across institutions, constrains the development of standardised curricula, and risks misalignment between educational outcomes and workplace expectations—particularly during students' transition to professional practice[4], [5]. In parallel, post-pandemic disruptions to clinical learning and the accelerating digital transformation of healthcare have increased expectations for graduate readiness (e.g., communication, clinical reasoning, digital capability, telehealth and leadership) [6]–[8], further amplifying the need for a clear, usable delineation of CC for pre-licensure education [9], [10].

Existing studies have advanced the discussion of CC through concept analyses and instrument development; nonetheless, important gaps remain. Prior concept analyses often focus on practising nurses or mixed populations, offer variable operational definitions, and provide limited guidance on translating conceptual attributes into curricula and assessments

https://doi.org/10.34011/jmp2k.v36i1.3465

Vol 36 No 1, Maret 2026
e-ISSN: 0853-9987
p-ISSN:2338-3445

at the point of graduation [4], [11], [12]. Reviews of CC measurement tools also report inconsistent coverage of competence domains and continuing concerns regarding validity, reliability, and overreliance on self-report, suggesting that conceptual uncertainty persists in educational practice [7], [13]. Consequently, it remains unclear which core attributes should define CC among pre-licensure nursing students, what antecedents support its development, and what outcomes and educational implications should be expected at program completion.

To address these gaps, this article conducts a concept analysis of CC in pre-licensure nursing education using the Walker and Avant framework [14], strengthened by a synthesis of contemporary evidence from nursing education and health workforce literature. The analysis aimed to (1) refine an operational definition of CC for nursing students, (2) identify defining attributes, antecedents, and consequences relevant to curriculum and assessment, and (3) provide an educationally actionable model to support competency-based education, assessment design, and policy discussions on graduate readiness and workforce alignment.

METHODS

Study design

This study used Walker and Avant's concept analysis [14] to clarify and operationalize CC in nursing students, a concept that remains inconsistently defined. The analysis followed eight steps: concept selection, purpose determination, identification of uses, defining attributes, model case, borderline and contrary cases, antecedents and consequences, and empirical referents. Concept selection began with preliminary clarification of CC, while the purpose (Aligned with Step 2: purpose determination) was to define and apply the concept in nursing education based on literature synthesis. To ensure transparency, the literature search and selection process followed PRISMA-ScR guidelines.

Data sources

The "sample" for this concept analysis comprised peer-reviewed and scholarly literature relevant to CC across health and non-health disciplines (nursing, digital health, medicine, midwifery, dentistry, allied health, physical therapy, and obstetrics), as the term is frequently used in multiple domains. A full inventory of included sources and extracted definitions is provided in Supplementary **Table S1.**

Search Strategy (Aligned with Step 3: Identification of all uses of the concept)

A comprehensive literature search was conducted between March and November 2023 using the following databases: Scopus, ProQuest, Springer, and SAGE Journals. In addition, the reference lists of included articles were hand-searched (citation chasing) to identify further eligible records. Search terms were developed iteratively from scoping reads and key papers, combining synonyms for the concept (clinical competence/clinical competency/competence) with population/context terms (*nursing student/undergraduate/preclinical/clinical learning/nursing education*). The search syntax was tailored to each database. All retrieved records were exported to the reference manager, and duplicates were removed prior to screening.

Eligibility criteria

Articles published between 2013–2023, written in English, and classified as scholarly works (empirical, theoretical, or methodological) were included if they defined, described, or measured CC in nursing students (preclinical/clinical). Only open-access, full-text articles were selected to ensure transparency. Studies were excluded if they focused on licensed

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Vol 36 No 1, Maret 2026
e-ISSN: 0853-9987
p-ISSN:2338-3445

nurses, did not address CC conceptually, were non-scholarly, or not open access. This may introduce availability bias, mitigated by searching multiple databases and citation tracking

Study Selection and Screening

Titles and abstracts were independently screened by two reviewers based on the eligibility criteria. Full texts of potentially eligible records were then independently assessed by the same two reviewers. Disagreements at any stage were resolved through discussion. Due to the interpretive nature of concept analysis, inter-rater reliability statistics (e.g., kappa) were not calculated; instead, structured consensus was achieved through iterative discussion of discrepancies to standardise decisions. The literature search yielded 70 records, of which 18 studies met the inclusion criteria and were included in the final analysis. The study selection process is presented in a PRISMA-ScR flow diagram (Figure 1).

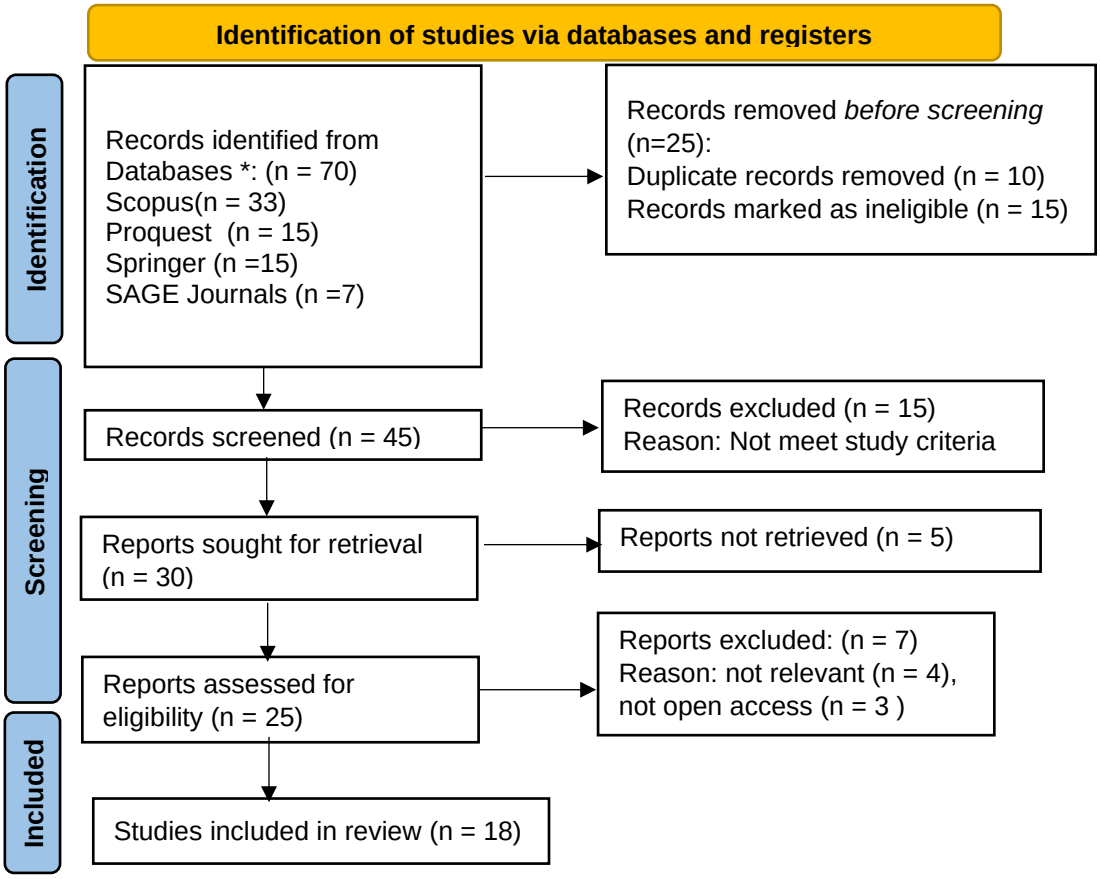

Figure 1. PRISMA Flow Diagram

Trustworthiness and Methodological Rigour

Methodological rigour was enhanced through dual independent review (screening and synthesis), iterative consensus discussions, and consultation with experienced nurse educators and a healthcare researcher to refine defining attributes and operational definitions. No formal quality appraisal of the included studies was conducted, as the primary aim of concept analysis is conceptual clarification rather than evaluating methodological quality

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e-ISSN: 0853-9987
p-ISSN:2338-3445

Variables (Aligned with Step 1: Concept Selection = Identifying and Naming the Concept)

The focal concept (variable) was CC as applied to nursing students. In line with Step 1 (concept selection) of Walker and Avant's procedure, CC was selected as the target concept for analysis based on preliminary meaning clarification, indicating definitional variability and inconsistent use across disciplines. The unit of analysis was any textual content that defined, described, operationalised, or measured CC (conceptual definitions, attributes/dimensions, antecedents, consequences, empirical indicators/instruments, and contextual uses across disciplines).

Instruments

A structured eligibility checklist was used during screening, and a standardised data extraction matrix was used to capture key information from each included study (definitions/uses, defining attributes, antecedents, consequences, and empirical referents/measurement indicators). The extraction matrix was refined iteratively during the review to ensure consistent capture of relevant data across studies. Records were managed using a reference manager system to support de-duplication and screening tracking.

Data Analysis

Data synthesis followed Walker and Avant's framework using manual extraction and coding (n=18). Step 3 involved compiling definitions and uses of CC. Coding applied deductive categories (definitions, attributes, antecedents, consequences, empirical referents) and was refined iteratively. Step 4 identified defining attributes through frequency and thematic clustering. Steps 5–6 developed model, borderline, and contrary cases. Step 7 identified antecedents and consequences, and Step 8 summarised empirical referents (e.g., OSCE, observation, self-report). Credibility was ensured through dual-reviewer coding, consensus discussions, and an audit trail. Results of Steps 3–8 are presented in the Results section. Outputs are summarized in Table 1, Table 2, and Figure 2, with full inventories in Supplementary Tables (Table S1, Table S2, Table S3).

RESULTS

Results are presented as the key outputs of Walker and Avant's concept analysis [14]. While the procedures for the initial steps (Steps 1–3) are described in the Methods, this section reports the extracted definitions and the subsequent synthesis into defining attributes, the conceptual model, cases, antecedents–consequences, and empirical referents. Extracted definitions and the synthesis of defining domains are summarized in Supplementary Table (Table S1 and Table S2).

Step 4: Identifying Defining Attributes

The defining attributes of CC were grouped into seven domains. Further details are available in Supplementary **Table S2**. Cognitive capability includes knowledge, critical thinking, and decision-making; affective capability involves values and ethics; and psychomotor capability focuses on technical skills. Advanced nursing skills cover higher-level care such as counseling and clinical services, while soft skills emphasize empathy and communication. Leadership and professionalism involve teamwork, collaboration, time management, and autonomy. To support the interpretation of the dominant clusters, we calculated cluster-level frequencies as the number of included studies that m Domain frequencies across sources are summarized in Table 1.

https://doi.org/10.34011/jmp2k.v36i1.3465

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e-ISSN: 0853-9987
p-ISSN:2338-3445

Table 1. Cluster-Level Frequency of CC Defining-Attribute Clusters

Cluster	Unique studies mentioning cluster (n/18)	%
Cognitive capability	15/18	83.3
Psychomotor capability	15/18	83.3
Affective capability	9/18	50.0
Professionalism	6/18	33.3
Soft skills	2/18	11.1
Leadership	2/18	11.1
Advanced nursing skill	2/18	11.1

Note: Each study was counted once per cluster (unique), even if multiple terms within the same cluster were reported

As shown in Table 1, cognitive and psychomotor capabilities were the most frequently identified clusters (15/18; 83.3%), indicating that CC is mainly viewed as the integration of knowledge and practical skills. Affective capability (9/18; 50.0%) and professionalism (6/18; 33.3%) highlight the role of values, judgment, and autonomy in applying these competencies in clinical settings. Soft skills, leadership, and advanced nursing skills were less frequently reported (2/18; 11.1% each). However, advanced nursing skills were retained to reflect higher-level nursing functions such as counseling and clinical service provision. Clinical experience and education/training were considered cross-cutting enablers that support multiple capability domains rather than core defining attributes.

Step 5: Development of a Model Case

To illustrate how the seven defining-attribute clusters co-occur in practice, we developed a model case that reflects the full set of attributes identified in Step 4. This case provides a concrete example of clinical competence in nursing education and supports operationalisation of the concept for teaching and assessment [14]. The case demonstrates cognitive reasoning, affective orientation, psychomotor performance, advanced nursing skills, soft skills, leadership, and professionalism through observable behaviors.

Model case

"A 22-year-old final-year nursing student is completing her final clinical rotation and preparing to enter professional practice. Through diverse clinical experiences, she has developed critical thinking, expanded her knowledge, and improved case management skills. She demonstrates empathy, effective communication, and teamwork while becoming proficient in both invasive and noninvasive procedures. Her growing confidence is reflected in her ability to perform nursing interventions with minimal supervision, earning trust from her clinical preceptor. As she approaches graduation, she is actively exploring career opportunities in hospitals, both locally and internationally."

Step 6: Development of Borderline and Contrary Cases

Borderline Case

Only some clinical competence (CC) attributes are evident in this scenario:

A 23-year-old final-year nursing student has completed her rotations and is preparing to graduate, but feels anxious about entering the workforce. Her experience has improved through rotations, yet her confidence in handling complex cases remains

https://doi.org/10.34011/jmp2k.v36i1.3465

Vol 36 No 1, Maret 2026
e-ISSN: 0853-9987
p-ISSN:2338-3445

limited. Despite some non-fatal procedural errors, she continues to learn through reflection and team support. Her strengths lie in communication and patient education, while her psychomotor skills are still inconsistent. She has started exploring job opportunities, preferring smaller clinics before applying to major hospitals.

Contrary Case

This scenario illustrates the absence or the opposite of core clinical competence (CC) attributes:

"A 22-year-old final-year nursing student nearing graduation feels anxious about competency exams. Low self-confidence and repeated procedural errors lead to reprimands due to patient safety concerns. Comparisons with more capable peers increase discouragement, while a lack of focus hinders skill development. She delays career planning and begins to doubt her professional path."

Step 7: Identifying Antecedents and Consequences

Antecedents

The factors that influence clinical competence in nursing education comprise educational factors and individual capability factors [15]. Academic factors include the learning environment [15], curriculum, learning methods [16], facilities, faculty, clinical experience, and evaluation techniques [17]. Individual capabilities encompass professional interest and self-efficacy [15], as well as self-directed learning ability, professional self-concept, and critical-thinking skills [16]. Antecedents are summarized in Table 2, and their linkage to attributes and outcomes is illustrated in Figure 2.

a. Educational Factors

Educational factors strongly influence students' clinical competence. Conducive learning environments in academic and clinical settings enhance motivation and learning outcomes [15], [18], [19]. A curriculum that balances theory and practice, together with innovative methods—case-based learning [20], simulation and interactive discussion [8], [21]— strengthens critical thinking, problem-solving, and decision-making. Tamene's findings show that practice satisfaction and positive attitudes are strongly associated with competency: satisfied students are 20.7×, and those with positive attitudes nearly 2.5×, more likely to be competent [3].

Institutional components include adequate facilities—laboratories [17] and learning technologies [35]—a safe and comfortable clinical ecosystem [3], [22], and access to clinical resources, all of which enhance learning effectiveness. These are supported by hospital policies that foster a professional environment. Positive interactions with educational staff strengthen confidence, adaptation, and collaboration [3], [22]. Clinical mentorship and high-quality supervision with structured and varied clinical exposure and prior clinical experience [17] [22], mature students' skills, while evaluation techniques (e.g., direct observation, checklists) and objective assessments such as the OSCE (Objective Structured Clinical Examination) ensure competence before workforce entry [23]. Educational preparation and clinical exposure function as cross-cutting enablers that strengthen multiple defining-attribute clusters simultaneously. See Table 2 for the full antecedent inventory and source mapping.

https://doi.org/10.34011/jmp2k.v36i1.3465

Vol 36 No 1, Maret 2026
e-ISSN: 0853-9987
p-ISSN:2338-3445

Table 2. Antecedents of Clinical Competence In Nursing

Antecedents	Description
Educational factors	Learning environment[15]
	Curriculum [16]
	Learning methods[16]
	Facilities [17]
	Faculty [17]
	Prior clinical experience [17]
	Evaluation techniques [17]
Individual capabilities	Professional interest [15]
	Self-efficacy[15]
	Self-directed learning ability [16]
	Professional self-concept [16]
	Critical-thinking ability [16]

b. Individual Capabilities

Individual capabilities are key determinants of clinical competence. Professional interest increases engagement in clinical learning [24][15], whereas self-efficacy enhances learning effectiveness and performance [25]. Self-directed learning and a strong professional self-concept support autonomous skill development, adaptability, and ethical professional practice [16]. Meanwhile, critical thinking underpins clinical reasoning, case analysis, and effective interventions [16].

Consequences

As a consequence, when nursing students and new graduates demonstrate clinical competence, they deliver high-quality, safe patient care [1], [11], uphold elevated nursing service standards, and operate more efficiently and effectively within professional practice settings. This supports the need for comprehensive assessments of technical performance, judgment, professionalism, and advanced nursing functions before workforce entry (see Figure 2).

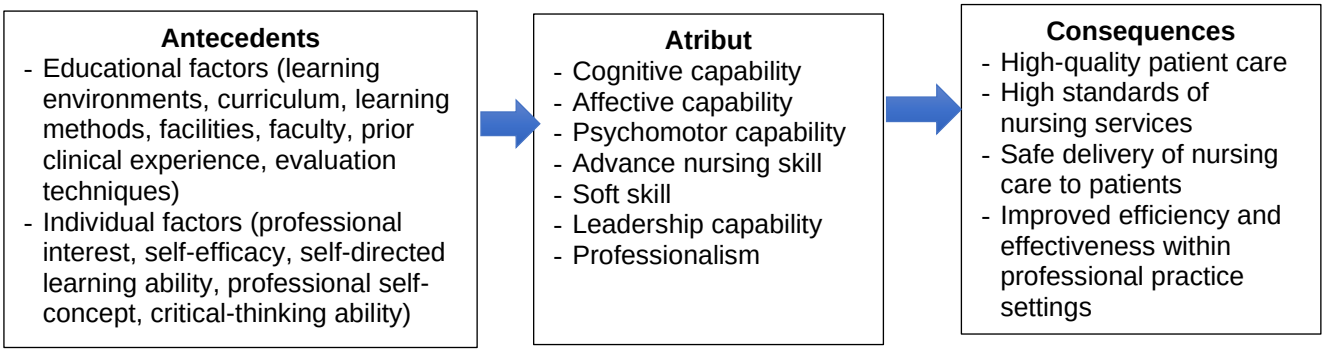

Figure 2. Model for Clinical Competence in Nursing Education

Step 8: Identifying Empirical Reference

Empirical referents are measurable indicators that demonstrate the presence of the concept in practice [14]. In nursing education, CC referents should reflect the seven identified domains and be assessed using performance-based methods and validated instruments. Measurement approaches and representative tools are summarized in Supplementary Table S3.

https://doi.org/10.34011/jmp2k.v36i1.3465

Vol 36 No 1, Maret 2026
e-ISSN: 0853-9987
p-ISSN:2338-3445

DISCUSSION

CC is fundamental to nursing education and encompasses cognitive, psychomotor, and affective domains, enriched by advanced nursing skills, soft skills, leadership, and professionalism [3], [17]. Key defining domains are summarized in Table 1 and Supplementary Table (Table S2), and the concept model is shown in Figure 2. Students develop these competencies through formal education and supervised clinical experiences, which are influenced by institutional factors, faculty quality, and individual student characteristics [5], [15], [16]. Literature across health disciplines shows that terminology for clinical competence is inconsistent and often overlaps with professional competence, with varying expectations across contexts [4], [13], [26]–[28]. In professional practice, clinical competence is expressed through integrated performance encompassing professionalism, caring, ethical conduct, reflection, and clinical skills [29], whereas in educational settings, CC emphasises supervised performance, scaffolded decision-making, patient safety behaviours, and formative reflection [17], [30], [31]. These conceptual variations may lead to inconsistencies in teaching, learning, and assessment, underscoring the need for a shared and clearly articulated understanding of clinical competence at the student level.

Using Walker and Avant's concept analysis framework, the identified attributes provide a foundation for clarifying student-level clinical competence and aligning curricula, learning, and assessment strategies [14]. The findings delineate the boundaries and developmental trajectory of clinical competence in nursing education by clearly distinguishing student-level educational competence from professional practice competence, thereby establishing appropriate expectations for student performance prior to and during clinical learning [31], [32]. Emphasising scaffolded competency development supports progressive learning and avoids the premature application of licensed professional standards to students [9], [33]. These findings are consistent with prior concept analyses that conceptualise clinical competence as a multidimensional construct encompassing cognitive, psychomotor, and affective domains across nursing and other health professions [4], [17].

The findings have important pedagogical implications for curriculum design and assessment in nursing education. Assessment options mapped to domains are provided in Supplementary Table (Table S3). Curricula should explicitly define student-level attributes of clinical competence and ensure alignment between learning activities and assessment strategies [13], [33]. Cognitive competence may be assessed using multiple-choice or short-answer examinations that emphasise clinical reasoning, while psychomotor competence can be evaluated through structured OSCEs, skills laboratories, and simulation-based assessments [23], [30], [34]. Affective competence may be assessed through reflective writing, multisource feedback from peers and preceptors, and professionalism rubrics addressing ethical decision-making and teamwork [35], [36]. Educational strategies such as clinical simulation, case-based learning, and scaffolded clinical rotations have been shown to support competency development across domains [20], [21], [23]. To further operationalise the pedagogical implications, the identified attributes of clinical Competence can be translated into an assessment blueprint aligning cognitive attributes with MCQ/SAQ items, psychomotor attributes with OSCE stations, and affective attributes with multisource feedback and professionalism rubrics. [23], [30] However, implementation challenges may include limited simulation resources, variability in preceptor quality, and differences in student readiness, all of which should be anticipated in curriculum and assessment planning [19], [22].

https://doi.org/10.34011/jmp2k.v36i1.3465

Vol 36 No 1, Maret 2026
e-ISSN: 0853-9987
p-ISSN:2338-3445

This study has several methodological limitations, including reliance on English-language sources and selected open-access databases, which may have introduced selection bias and limited the generalisability of the findings. The multidisciplinary literature may influence how clinical competence is interpreted across contexts. Nevertheless, the proposed model offers practical guidance to improve clarity and consistency in competency development. Aligning assessment with identified attributes can support more standardized evaluation of students' readiness before clinical placement[12], [30]. Institutional investment in faculty development and the integration of educational technologies may further facilitate implementation across diverse educational settings [7], [37]. Future research should prioritise the development and psychometric validation of standardised assessment instruments, longitudinal studies tracking competency development over time, and cross-contextual validation of the proposed model within diverse nursing education contexts [12], [32], [38].

The results offer clear guidance for improving curricula and evaluation in competency-based nursing education. A more precise definition of CC allows institutions to implement focused, evidence-based learning strategies that better prepare graduates for clinical practice. These findings also support policy development aligned with global standards, ultimately enhancing the quality of nursing education and patient care.

CONCLUSION

This concept analysis defines clinical competence in nursing education as an integrative construct combining cognitive, affective, and psychomotor abilities with advanced nursing skills, soft skills, leadership, and professionalism. The synthesized model is shown in Figure 2. The model can guide educators and policymakers in aligning curricula, learning, and assessment with competency-based standards and evaluating students' readiness for clinical practice. Future research should focus on developing and validating standardized instruments, including cross-cultural and longitudinal studies. A key limitation is the restriction to mainly English-language sources and selected databases, which may limit broader perspectives.

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