

An Integrative Review of Core Competencies for Nursing Undergraduates

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**ABSTRACT**

Background: To systematically review research on the core competencies of nursing undergraduates, exploring their definitions, components, evaluation methods, enhancement strategies, and influencing factors, in order to provide references and evidence for the cultivation of nursing core competencies and related research, and to offer insights that may inform curriculum development and policy improvement in nursing education.

Methods: Databases including Wiley, Cochrane, SpringerLink, Scopus, PubMed, Embase, CNKI, Wanfang, and VIP, were searched for literature published between January 2015 and May 2025. The included studies were assessed for quality, and data were extracted and synthesized.

Results: A total of 39 articles were included. Nursing institutions and scholars from multiple countries or regions have defined the core competencies of undergraduates, with five sub-competencies appearing most frequently. Various teaching strategies have shown significant effects in enhancing nursing undergraduates' core competencies, with six key themes identified: "evidence-based nursing," "collaborative learning," "competency-based education," "constructivism," "simulation teaching," and "others."

Conclusion: There is no unified definition or framework for nursing core competencies, but they generally encompass knowledge, skills, and attitudes. "theoretical knowledge," "communication and collaboration," "professionalism," "safety," and "clinical nursing skills" are widely regarded as essential components of undergraduate core competencies. While multiple teaching strategies have proven effective in enhancing these competencies, the implementation of competency-based education in nursing remains relatively slow, requiring further research and practical exploration for its effective application in nursing education.

Keywords: Nursing education; Nursing student; Clinical competence; Core competence

INTRODUCTION

Nursing core competencies can comprehensively and objectively reflect nurses' professional capabilities (1) and play a crucial role in ensuring patient safety and improving the quality of nursing care (1-4). With the rapid development of the modern healthcare industry and profound transformations in medical models, nursing practice has evolved toward greater specialization and integration, leading to increasingly higher demands for nurses' core competencies (5-7).

Particularly after the COVID-19 pandemic, there has been heightened societal attention to the development of healthcare professionals (8,9). The nursing discipline urgently needs to cultivate innovative and versatile nursing talent. In response, countries such as the United States and Singapore have successively issued national standards for nurses' core competencies. Nursing undergraduates represent a critical group in nursing education and serve as the future frontline clinical workforce. Their core competencies directly impact the quality of clinical care provided by future practitioners (10,11).

However, China currently lacks a standardized framework for nursing core competencies to guide nursing education. Research indicates that nursing core competencies are complex, multidimensional, and dynamic, varying with time, experience, and regional differences (12), making it impractical to directly adopt standards from other countries.

Furthermore, current studies on core competencies in China mainly concentrate on clinical specialist nurses, with relatively limited attention given to nursing students at the higher education level (13). Therefore, this study aims to conduct a systematic review of clinical core competencies among nursing undergraduates, analyzing and integrating relevant research from both domestic and international sources.

The findings are expected to provide evidence-based guidance for competency development and curriculum enhancement. It is hoped that this review will help bridge the existing gap in the literature by synthesizing evidence published over the past decade and by incorporating perspectives from diverse cultural and educational contexts.

METHODS

Inclusion and Exclusion Criteria

The inclusion and exclusion criteria were developed based on the SPIDER framework, as detailed in **Table 1**.

Search Strategy

This study conducted literature searches in the following databases: Wiley, Cochrane, SpringerLink, Scopus, PubMed, Embase, CNKI, Wanfang, and VIP. The search strategy was:

"nursing undergraduates" OR "undergraduate nursing students" OR "nursing students" OR "baccalaureate" OR "bachelor" OR "pre-licensure" OR "pre-registration" OR "Bachelor of Nursing") AND ("core competencies" OR "nursing core competence").

Search Results

The initial search yielded 5,919 potentially relevant articles. After reviewing titles and abstracts, 105 articles were selected for further evaluation. Following full-text assessment, 39 studies met the inclusion criteria and were included in the final analysis. Detailed information on these studies is presented in the "Key Information Table of Included Literature". The literature screening process and results are presented in **Figure 1**.

Literature Screening, Data Extraction, and Analysis

The quality of included studies was assessed using the JBI (Joanna Briggs Institute) Critical Appraisal Tools (14). Two reviewers independently evaluated the methodological quality, with disagreements resolved through consensus discussion or consultation with a third reviewer when necessary.

Key data extracted from eligible studies included: title, publication language, year, country, methodology, phenomena of interest, setting and participants, and key findings (appendix for complete details). Data were synthesized using a narrative integration approach.

RESULTS

Characteristics of the Included Studies

This review included a total of 39 studies published between 2015 and 2025, encompassing research from seven countries and regions

(Table 2). These included 18 studies from Mainland China (46.2%), 7 from Taiwan (17.9%), 1 from Oman (2.6%), 4 from South Korea (10.2%), 7 from the United States (17.9%), 1 from Iran (2.6%), and 1 from Saudi Arabia (2.6%). Among the included studies, quantitative research accounted for 25 studies (64.1%), qualitative research for 4 studies (10.3%), mixed-methods research for 6 studies (15.3%), and theoretical research for 4 studies (10.3%).

Evaluation Indicators of Core Competencies for Nursing Undergraduates

The core competency components identified from the included literature are presented in Table 3. The frequency of each sub-competency is illustrated in Figure 2.

Strategies for Enhancing Core Competencies of Nursing Undergraduates

In recent years, numerous studies from both domestic and international research have demonstrated the positive effects of various teaching strategies in improving the core competencies of nursing undergraduates. This study identified six key themes, as detailed in Table 4.

Table 1: SPIDER Framework Table

Categories	Inclusion Criteria	Exclusion Criteria
Sample	Studies exclusively focus on baccalaureate nursing students or include this population as a distinct subgroup.	Practicing nurses pursuing continuing education, licensed nurses, nursing graduates
Phenomenon of Interest	Publications address the following aspects: conceptual definitions, components, assessment methods, influencing factors, or development strategies related to core competencies.	Clinical competence, professional competence, soft skill, core skills, clinical practice competence, nursing competency, specialized nursing fields (e.g., geriatric, perioperative, pediatric nursing)
Design	Eligible studies employ the following methodologies: qualitative interview studies, quasi-experimental designs, survey research, and theoretical research. The search was restricted to documents published between January 2015 and May 2025, with English and Chinese language publications being considered for inclusion. We included publications sourced from authoritative journals or indexed in reputable databases.	Studies with unavailable full texts were excluded.
Evaluation	Studies provide the following types of outcome data: Verbatim qualitative findings derived from interviews; Quantitative scores from validated assessment scales; Outcome measures from quasi-experimental intervention; Critical analyses or evidence-based recommendations presented in original articles.	
Research type	The review included: Quantitative research studies, Qualitative research articles, Mixed-methods investigation, Theoretical research.	Secondary literature including systematic reviews, meta-analyses, literature reviews, and other non-original research publications were excluded

Figure 1: PRISMA Flowchart Describing the Stages of Review

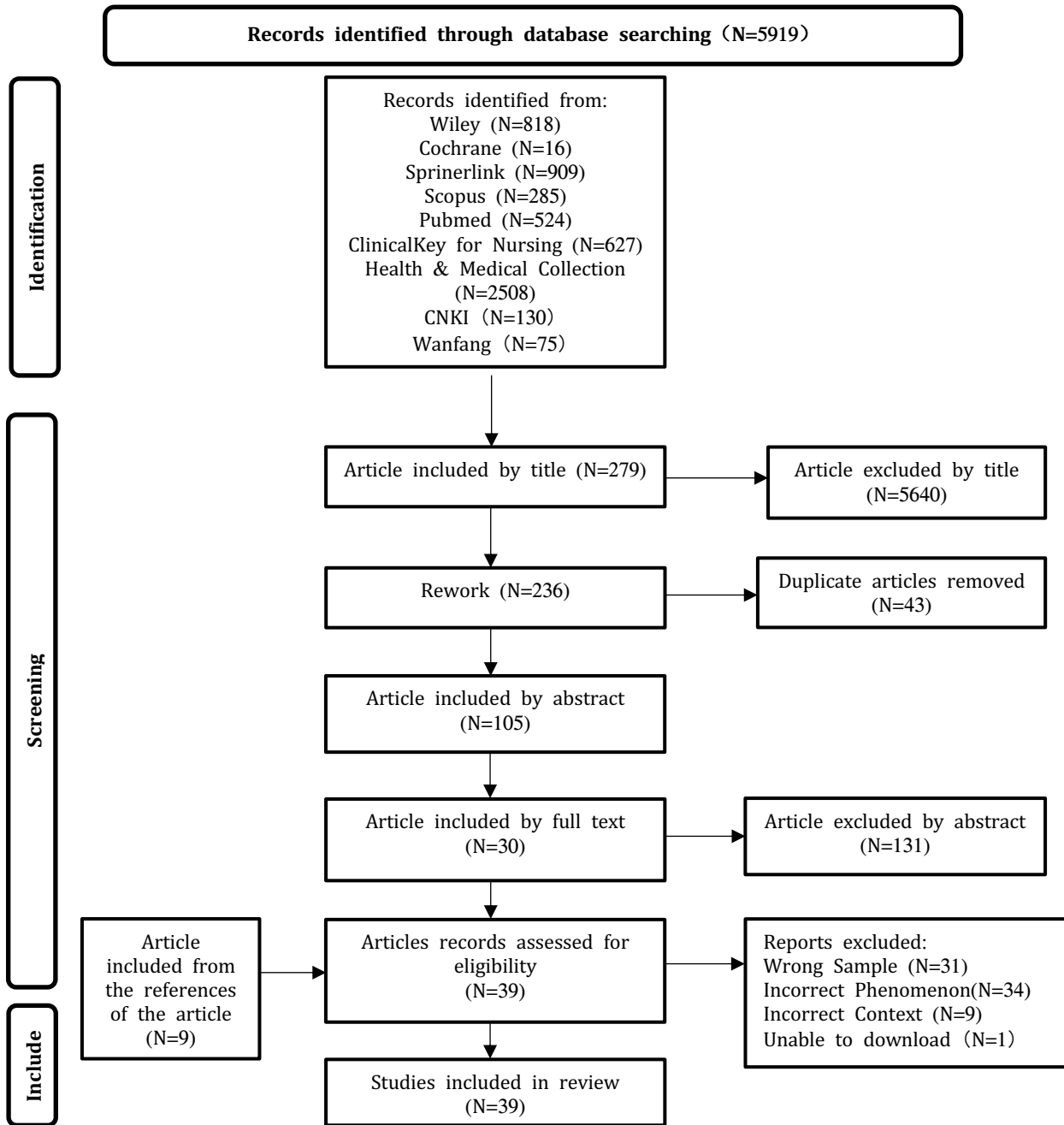


Table 2: Key Information Table of Included Literature

No.	Original studies/ country/ publication language/year	Methodology	Phenomena of interest	Setting and participants	Key Findings
1.	The effect of blended task-oriented flipped classroom on the core competencies of	Quasi-experimental	This study examines how a task-oriented blended flipped	University, 303 sophomore-year undergraduate nursing students	The task-oriented blended flipped classroom demonstrates positive effects on both core competencies and learning outcomes among nursing

	undergraduate nursing students: a quasi-experimental study/China /In English/2023		classroom approach influences core competencies among undergraduate nursing students		undergraduates, suggesting its validity as an effective pedagogical approach in nursing education.
2.	The effects of simulation-based education on undergraduate nursing students' competences: a multicenter randomized controlled trial/China/In English/2024	Quasi-experimental	To explore the Impact of Simulation-Based Teaching on Competency Development in Nursing Under-graduates	239 nursing students from five universities in China	Simulation-Based Learning Enhances Nursing Students' Knowledge Acquisition, Interprofessional Collaboration Competence, Critical Thinking, Humanistic Care Competency, and Learning Engagement.
3.	Perceived efficacy of case analysis as an assessment method for clinical competencies in nursing education: a mixed methods study/Oman/In English/2024	Mixed methods	Examining the Effectiveness of Case-Based Assessment in Evaluating Nursing Students' Core Competencies and Knowledge Mastery	Universiy, The study included 91 undergraduate nursing students	Case analysis proves an effective method for assessing core competencies, while further optimization of specific teaching components is warranted.
4.	A blueprint for integrating nursing history: Performance indicators for competency-based education/America/In English/2025	Theoretical Research	To explore the Performance Evaluation System of Competency-Based Education	-	The integration of nursing history into curriculum systems is essential to strengthen competency-based education and ensure comprehensive professional training.
5.	A qualitative study on undergraduate nursing interns' perceptions of core nursing competencies/China/Chinese/2023	Qualitative research	To explore Nursing Undergraduate s' Perceptions of Core Competencies During Clinical Practicum	Hospital, The study recruited 15 undergraduate nursing students from a tertiary teaching hospital	Undergraduate nursing students during clinical practicum demonstrate inadequate integration of essential nursing competencies, highlighting the urgent need for better articulation between classroom education and clinical training.
6.	Implementing Entrustable Professional Activities in a pre-licensure nursing program to facilitate competency-based	Theoretical Research	To explore the Instructional Effectiveness of Introducing Entrustable Professional Activities (EPAs) in	-	Gradual development, implementation, and evaluation of diversified Entrustable Professional Activities (EPAs) throughout nursing curricula can significantly enhance graduates' practice readiness.

	education/America/In English/2024		Baccalaureate Nursing Programs		
7.	The AACN essentials: An intentional framework for successful implementation/America/In English/2024	Theoretical Research	To explore Reform Pathways for Competency-Based Education in Nursing	-	This study delineates the implementation pathway of nursing core curriculum standards and the transition to competency-based education at a university setting.
8.	Conceptualizing and determining core clinical competencies in nursing students: a qualitative study/Iran/In English/2019	Qualitative research	To explore the Constituent Elements of Clinical Core Competencies in Iran's Nursing Education System	University, 14 senior-year nursing students, 4 active hospital-based nurse educators, 6 clinical instructors with extensive field experience	This study constructs a comprehensive core competency framework for nursing students, emphasizing an integrated nursing education model that bridges theoretical knowledge with clinical application.
9.	Approach to Developing a Core Competency Framework for Student Nurses in Saudi Arabia: Results from Delphi Technique/Saudi Arabia/In English/2022	Qualitative research	Developing a Core Competency Framework for Undergraduate Nursing Students in Saudi Arabia	University, A 10-member expert panel was convened	This study identifies six essential core competency domains for nursing students in Saudi Arabia.
10.	Incorporating Future of Nursing Competencies Into a Clinical and Simulation Assessment Tool: Validating the Clinical Simulation Competency Assessment Tool/America/In English/2020	Qualitative research	Validating the Effectiveness of Clinical Core Competency Assessment Tools	University, The study engaged 42 nursing educators	The tool demonstrates robust psychometric properties.
11.	Design of a Competency Evaluation Model for Clinical Nursing Practicum, Based on Standardized Language Systems: Psychometric Validation	Mixed methods	Developing a Clinical Competency Assessment System for Nursing Students Based on the Nursing Interventions Classification (NIC)	University, The study involved: 290 second-year nursing students, 860 third-year nursing students, a 15-member expert consensus panel	Through the Delphi expert consensus method, 26 core competencies and 91 corresponding interventions were ultimately established, with the model demonstrating good reliability and validity upon testing.

12.	Study/America/In English/2015 Effects of Team-Based Learning on the Core Competencies of Nursing Students: A Quasi-Experimental Study/Korea/In English/2018	Quasi-experimental	Comparative Analysis of Team-Based Learning (TBL) vs. Traditional Lecture-Based Teaching in Cultivating Core Competencies Among Nursing Students	University, The study enrolled 183 undergraduate nursing students	Team-based learning (TBL) demonstrates significant superiority over traditional lecture-based teaching in enhancing nursing students' core competencies, particularly in clinical skills, communication competence, and self-leadership capabilities.
13.	Analysis of Core Competencies and Their Influencing Factors Among Undergraduate Nursing Students/China/Chinese/2018	Investigative Study	To investigating the Current Status and Influencing Factors of Core Competencies Among Undergraduate Nursing Students	Hospitals, The study recruited 183 undergraduate nursing students completing clinical rotations at tertiary hospitals	The core competencies of undergraduate nursing students reached an above-average level. The study found that place of origin, professional identity, general self-efficacy, and self-directed learning ability were significant predictors.
14.	Evaluating the effects of simulated interprofessional teaching on the development of clinical core competence in nursing students: A mixed methods study/China/English/2022	Mixed methods	To explore the Impact of Simulated Interprofessional Education on the Development of Clinical Core Competencies in Nursing Students	University, The study recruited 60 full-time nursing students	Simulated interprofessional education (Sim-IPE) effectively cultivates students' core competencies, including critical thinking, teamwork, and interprofessional collaboration.
15.	Psychometric evaluation of a nursing competence assessment tool among nursing students: a development and validation study/English/Taiwan, China/2022	Mixed methods	Developing and Validating a Competency Assessment Tool for Undergraduate Nursing Students	At one medical college in Taiwan, 241 nursing students	This study developed and validated a competency assessment tool for undergraduate nursing students demonstrating excellent psychometric properties.
16.	Performance evaluation of nursing students following competency-based education/	Quasi-experimental	To investigating the Impact of Competency-Based Education (CBE) on	A private university in northern Taiwan, 312 second-year baccalaureate	Competency-Based Education (CBE) Helps Bridge the Gap Between Nursing Education and Rapidly Evolving Clinical Practice.

	Taiwan, China/English/2015		Learning Outcomes in Undergraduate Nursing Students	nursing students	
17.	Effects of video-recorded role-play and guided reflection on nursing student empathy, caring behavior and competence: A two-group pretest-posttest study/Taiwan, China/English/2023	Quasi-experimental	To explore the Instructional Effectiveness of Video-Based Role-Playing with Guided Reflection	A medical college in northern Taiwan, 75 first-year nursing students at college	The video-based role-playing with guided reflection teaching model significantly enhanced first-year nursing students' empathy, caring behaviors, and core competencies.
18.	Effects of a Clinical Practicum Using Flipped Learning Among Undergraduate Nursing Students/Korea/English/2019	Observational Study	To explore the Effectiveness of Flipped Learning in Psychiatric Nursing Practicum	A university in South Korea, 70 third year undergraduate students	Flipped Learning Significantly Enhances Core Competencies and Academic Development in Undergraduate Nursing Students During Practicum Courses.
19.	Effects of Problem-Based Learning Strategies on Undergraduate Nursing Students' Self-Evaluation of Their Core Competencies: A Longitudinal Cohort Study/Taiwan, China/English/2022	Quasi-experimental	To investigate the Impact of Problem-Based Learning (PBL) Strategies on Nursing Students' Core Competencies	Chung Shan Medical University, 322 nursing students	The Promoting Effect of Problem-Based Learning (PBL) Strategies on Core Competency Development in Undergraduate Nursing Education.
20.	Psychometric Evaluation of the Capstone Core Competency Scale on Nursing Students in Taiwan/Taiwan, China/English/2022	Mixed Methods	Development and Validation of a Concise Core Competency Assessment Scale (CCCAS) for Undergraduate Nursing Students	University, In the first phase of the study, a total of 596 participants were enrolled, including 446 senior-year students from three private universities and 150 junior-year students from one private university. The second phase involved 520	The scale developed in this study demonstrated good reliability and validity among nursing students, making it suitable for assessing their comprehensive performance during the learning process.

21.	Enhancing nursing education through mobile health clinics: Aligning AACN core competencies with pediatric clinical experiences in rural and indigenous communities/ America/English/ 2024	Mixed Methods	To evaluate the Effectiveness of a Mobile Health (mHealth) Training Program Integrated with AACN Core Competencies	senior-year students 160 undergraduate nursing students participating in the MHTP at a land-grant university in the western U.S	This study provides a practical model for aligning educational programs with AACN core competencies and enhancing student learning outcomes.
22.	Innovating to meet AACN essentials in a bachelor of science in nursing program /America/English/ 2024	Theoretical Research	The nursing baccalaureate curriculum has been revised in response to the AACN competency requirements.	-	This paper systematically elaborates on the curriculum reform initiatives implemented to address contemporary nursing education needs, specifically including: expanding elective courses, establishing a Health and Professional Resilience specialization, introducing new palliative care and symptom management courses, increasing clinical practice hours, and collaboratively developing innovative student practicum programs with clinical partners.
23.	Factors influencing on future core nursing competency: focusing on King's Dynamic Interaction System Model in South Korea: a cross-sectional study/Korea/ English/2025	Investigative Study	To explore Key Factors Influencing Core Nursing Competencies Among Senior Nursing Students	University, 150 third- and fourth-year nursing students from various regions of South Korea participated	Interpersonal Skills, Innovation-Encouraging Culture, and Teamwork Significantly Impact Core Nursing Competencies.
24.	2022 Shandong Province university medical technical skills competition nursing track: An effective project to improve core competencies of	Investigative Study	Organizing Process and Implementation Guidelines for Nursing Skills Competitions, Analysis of Competition Results, and	The participants were fourth-year undergraduate nursing students, universities in Shandong Province	Nursing Skills Competitions Effectively Enhance Core Competencies of Nursing Students.

	nursing students/China/Chinese/2024		Exploration of Their Impact on Core Competencies of Nursing Students		
25.	Effects of high-fidelity patient simulation led clinical reasoning course: Focused on nursing core competencies, problem solving, and academic self-efficacy/Korea/English/2016	Quasi-experimental	To explore the Teaching Effectiveness of a Clinical Reasoning Course Using High-Fidelity Patient Simulation for Undergraduate Nursing Students	49 senior students in a nursing college in Seoul	Clinical Reasoning" Courses Using High-Fidelity Patient Simulation Effectively Enhance Core Competencies in Nursing Students.
26.	Construction and Application of Intelligent Nursing Learning System Taiwan/China 2024	Quasi-experimental Study	To explore the Application of an Intelligent Nursing Learning System to Enhance Core Competencies of Nursing Students	In the Department of Nursing of a University in Central Taiwan, 11009 undergraduate students and 1279 master students	The intelligent nursing learning system effectively facilitates the development of nursing students' core competencies.
27.	AACN competency-based essentials revisit: Evidence-based validation of entrustable professional activities in Asia/Taiwan, China/English/2024	Quasi-experimental Study	Validating Competency-Based Teaching Methods Through Entrustable Professional Activities (EPAs) in Undergraduate Nursing Education in China's Taiwan Region	72 undergraduate nursing students from a college of nursing in southern China's Taiwan region	Entrustable Professional Activities (EPAs) enhance nursing students' core competencies and improve Objective Structured Clinical Examination (OSCE) scores.
28.	Study on influence of undergraduate nursing students' professional identification and learning engagement on core competency of nursing students/China/Chinese/2017	Investigative Study	To explore the Impact of Professional Identity and Learning Engagement on Nursing Students' Core Competencies	University, 541 undergraduate nursing students	Undergraduate nursing education should emphasize professional identity development to enhance students' core competencies and improve their future employability.
29.	Application of Work-Based Learning in Cultivating Core	Quasi-experimental Study	To explore the Application of Work-Based	Hospital, 64 undergraduate nursing interns	Implementing work-based learning (WBL) in clinical nursing education effectively enhances core

	Competencies Among Undergraduate Nursing Interns During Clinical Practice/China/Chinese/2021		Learning in Cultivating Core Competencies of Undergraduate Nursing Students During Clinical Internships		competencies among undergraduate nursing interns, representing a validated pedagogical approach for competency development.
30.	Application of evidence-based nursing concept guiding by core competence in clinical teaching of traditional Chinese medicine colleges and universities/China/Chinese/2015	Quasi-experimental Study	Evaluating the Effectiveness of Evidence-Based Nursing Education in Clinical Practice for Core Competency Development Among TCM University Nursing Undergraduates	University, 90 undergraduate nursing students	The application of evidence-based nursing (EBN) principles in clinical education enhances core competencies among undergraduate nursing students.
31.	Correlation Study between Clinical Practice Environment and Core Competency of Nursing Students/China/Chinese/2015	Investigative Study	To investigate the Relationship Between Nursing Students' Core Competencies and Clinical Learning Environments	University, 169 nursing students	Clinical learning environments positively predict nursing students' core competencies, and improving these environments serves as an effective strategy for competency enhancement.
32.	Application of analytic hierarchy process to construction core competence evaluation system for undergraduate nursing students in clinical practice/China/Chinese/2015	Qualitative research	Developing a Scientifically Validated Evaluation Index System for Core Competencies of Undergraduate Nursing Interns	University, 18 nursing experts	This evaluation index system demonstrates rational indicators and comprehensive content, effectively reflecting professional characteristics, making it suitable for assessing core competencies in undergraduate nursing interns.
33.	Analysis of Core Competency Levels and Influencing Factors Among Undergraduate Nursing Students/China/Chinese/2018	Investigative Study	To investigate the Current Status and Influencing Factors of Core Competencies Among Undergraduate Nursing Students	University, 600 undergraduate nursing students	The core competency levels of undergraduate nursing students require further enhancement. Academic institutions should implement measures to strengthen students' professional identity and commitment, thereby improving their core competencies.

34.	Effect of Mobile Teaching Mode Based on Doctor-Nurse Cooperation on Nursing Students' Clinical Practice Ability/China/Chinese/2018	Quasi-experimental Study	To explore the Impact of an Interprofessional Mobile Learning Model on Nursing Students' Clinical Practice Competencies	Hospital, 100 undergraduate nursing interns	The interprofessional mobile learning model significantly enhances nursing students' clinical core competencies, with high satisfaction rates reported among participants.
35.	The effects of peer assisted learning based on learning style on the core competence of freshman nursing undergraduates/China/Chinese/2019	Quasi-experimental Study	To explore the Impact of Learning-Style-Based Peer-Assisted Learning on Core Competencies Among First-Year Nursing Undergraduates	University, Four first-year undergraduate nursing classes	Learning-style-based peer-assisted learning (PAL) effectively enhances core competencies and professional knowledge mastery among first-year nursing undergraduates, representing an evidence-informed pedagogical approach adapted to modern education.
36.	Effects of simulation teaching on core nursing competence for nursing undergraduates in the clinical internship/China/Chinese/2017	Quasi-experimental Study	Implementing simulation-based education for undergraduate nursing students during clinical practicum: Exploring its impact on core nursing competencies.	Hospital, 100 undergraduate nursing interns	Integrating simulation-based education with traditional clinical teaching during practicum enhances the development of core nursing competencies among undergraduate students.
37.	The effect of evidence-based practice teaching on professional competency of undergraduate nursing students/China/Chinese/2015	Quasi-experimental Study	Evaluating the Effectiveness of Evidence-Based Practice Education in Cultivating Core Nursing Competencies Among Undergraduate Nursing Interns	Hospital, 261 undergraduate nursing interns	Evidence-based practice (EBP) education effectively cultivates core nursing competencies among undergraduate nursing interns, facilitates clinical instructors' professional development, and enhances clinical training outcomes, warranting widespread adoption in nursing clinical education.
38.	Implementing Formative Assessment Models in Teaching Rounds to Enhance Students' Core Competencies/China/Chinese/2017	Quasi-experimental Study	To explore the Value and Impact of Formative Assessment Models in Teaching Rounds on Undergraduate Nursing	Hospital, 108 undergraduate nursing interns	Implementing formative assessment models in teaching rounds optimizes nursing education processes, enhances clinical teaching quality, and significantly improves students' core competencies including clinical judgment, decision-

39.	Application of core competence-based teaching mode in clinical practice teaching for nursing undergraduates/ China/Chinese/ 2018	Quasi-experimental Study	Students' Core Competencies To explore the Effectiveness of a Competency-Based Clinical Training Model for Undergraduate Nursing Interns in Practical Education	Hospital, 80 undergraduate nursing interns	making, communication, and self-directed learning. The competency-based teaching model effectively enhances nursing students' core competency levels.
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Table 3: Core Competency Components

No.	Time	Country	Publication language	Institution	Program/Title	Components
1.	2015	China	Chinese	Yumei Yang	Application of analytic hierarchy process to construction of a core competence evaluation system for undergraduate nursing students in clinical practice	Professionalism; personal qualities; theoretical knowledge; clinical nursing skills; critical thinking abilities; communication and collaboration skills; and professional development capabilities (15)
2.	2019	Iran	English	Y. Moradi	Conceptualizing and determining core clinical competencies in nursing students: a qualitative study	Adoption and adaptation with the nursing practice; nursing Knowledge; self-direction in clinical learning; patient care skills; professional ethics; the development of professional behaviours (16)
3.	2020	America	English	Audrey Marie Beauvais	Incorporating Future of Nursing Competencies Into a Clinical and Simulation Assessment Tool: Validating the Clinical Simulation Competency Assessment Tool	Patient-centered care; teamwork and collaboration; evidence-based practice; quality improvement; safety; informatics; professionalism; and systems-based practice (5)
4.	2021	America	English	American Association of Colleges of Nursing	The Essentials: Core Competencies for Professional	Knowledge for nursing practice; person-centered care ; population health;

					Nursing Education	scholarship for the nursing discipline; quality and safety; interprofessional partnerships; systems-based practice; informatics and healthcare technologies; professionalism; personal, professional, and leadership development (17)
5.	2022	Saudi Arabia	English	Dena Attallah	Approach to Developing a Core Competency Framework for Student Nurses in Saudi Arabia: Results from Delphi Technique	System-based practice; Quality care & patient safety; evidence-based practice; professionalism and leadership; communication and teamwork; informatics and technology; person-centered Care (18)
6.	2022	Taiwan, China	English	Sheng-Miauh Huang	Psychometric evaluation of a nursing competence assessment tool among nursing students: a development and validation study	Medical related knowledge; basic nursing skills; communication and cooperation; life-long learning; global vision; critical thinking (19)
7.	2023	China	Chinese	Chun Han	A qualitative study on undergraduate nursing interns' perceptions of core nursing competencies	Clinical practice; professional development; nursing management skills; research and innovation; clinical teaching ability; communication and collaboration skills; humanistic care; professional knowledge and related expertise; professional ethics; ethical-legal compliance (2)

Figure 2: Frequency of Core Sub Competencies

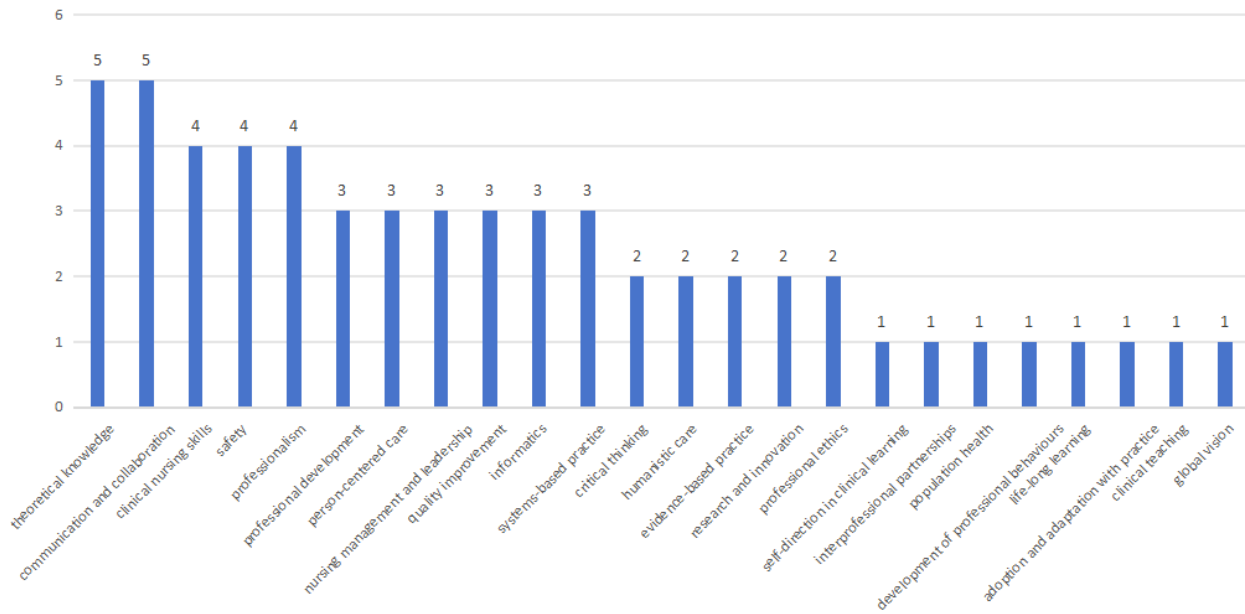


Table 4: Strategies for Enhancing Core Competencies

No.	Theme	Author	Time	Country	Title	Study design	Key conclusions
1.	Evidence-based nursing teaching strategies	Wenxiao Zhao et al. (20)	2015	China	Application of evidence-based nursing concept guiding by core competence in clinical teaching of traditional Chinese medicine colleges and universities	Quasi-experimental study	Integrating evidence-based nursing principles into clinical teaching enhances core competencies among undergraduate nursing students.
		Fenlian Zeng et al. (21)	2015	China	The Impact of Evidence-Based Practice Education on Core Nursing Competencies among Undergraduate Nursing Interns	Quasi-experimental study	The evidence-based practice teaching methodology is more conducive to fostering the development of core nursing competencies.
2.	Collaborative learning teaching strategies	Chunmia o Tan et al. (22)	2018	China	Effect of Mobile Teaching Mode Based on Doctor-Nurse Cooperation on Nursing Students' Clinical Practice Ability	Quasi-experimental study	The mobile interprofessional education (IPE) model significantly enhances nursing students' clinical core competencies

3. Competency-based teaching strategies	Kyung Eun Lee et al. (23)	2018	Korea	Effects of Team-Based Learning on the Core Competencies of Nursing Students: A Quasi-Experimental Study	Quasi-experimental study	Team-Based Learning (TBL) serves as an effective pedagogical approach for cultivating core competencies in nursing education.
	Yuanyuan Liang et al. (24)	2019	China	The effects of peer assisted learning based on learning style on the core competence of freshman nursing undergraduates	Quasi-experimental study	peer assisted learning based on learning style facilitates the enhancement of students' core competencies.
	Jun-Yu Fan et al. (25)	2015	Taiwan, China	Performance evaluation of nursing students following competency-based education	Quasi-experimental study	Students receiving Competency-Based Education (CBE) demonstrate significantly superior academic performance in medical-surgical nursing courses and clinical practicums compared to those in traditional programs, with marked improvements in both comprehensive competencies and metacognitive skills.
	Xiaohong Wang et al. (26)	2018	China	Application of Core Competency-Based Teaching Model in Clinical Practice Education for Undergraduate Nursing Students	Quasi-experimental study	The competency-based instructional model demonstrates statistically significant improvements in nursing students' core competency attainment.

	Sookbin Im et al. (27)	2019	Korea	Effects of a Clinical Practicum Using Flipped Learning Among Undergraduate Nursing Students	Investigative study	Flipped learning demonstrates significant benefits in psychiatric nursing rotations, enhancing both academic performance and five core competency domains: (1) interpersonal skills, (2) accountable practice, (3) problem-solving, (4) information management, and (5) professional identity formation.	
4.	Constructivist teaching strategies	Yen-Chiao Angel Lu et al. (28)	2022	Taiwan, China	Effects of Problem-Based Learning Strategies on Undergraduate Nursing Students' Self-Evaluation of Their Core Competencies: A Longitudinal Cohort Study	Quasi-experimental study	Problem-Based Learning (PBL) facilitates the achievement of learning objectives and enhances self-awareness/evaluation of core competencies through structured simulation scenarios and authentic clinical environments.
		Li Ke et al. (29)	2023	China	The effect of blended task-oriented flipped classroom on the core competencies of undergraduate nursing students: a quasi-experimental study	Quasi-experimental study	The Blended Task-Oriented Flipped Classroom (BTOFC) approach not only enhances students' learning initiative and efficiency, but also demonstrates positive impacts on core

		Yan Tu et al. ⁽³⁰⁾	2017	China	The Impact of Simulation-Based Teaching on the Core Nursing Competencies of Undergraduate Nursing Students During Clinical Practice	Quasi-experimental study	competency development. Introducing simulation-based teaching during clinical practice, compared to traditional teaching alone, facilitates the development of core clinical nursing competencies among undergraduate nursing students.
5.	Simulation-based teaching strategies	Lai Kun Tong et al. (31)	2024	China	The effects of simulation-based education on undergraduate nursing students' competences: a multicenter randomized controlled trial	Quasi-experimental study	High-fidelity simulation (HFS) refers to an extremely realistic simulated experience that provides learners with an immersive and highly interactive clinical learning environment. HFS not only serves as a partial substitute for clinical practicum but also indirectly enhances clinical competence by improving clinical reasoning skills.
6.	Others	Liyan Chen et al. (32)	2017	China	The formative evaluation model is used in teaching rounds to enhance students' core competencies	Quasi-experimental study	The introduction of a formative evaluation model in teaching rounds effectively optimizes nursing education processes and enhances

Dandan Liu et al. (6)	2021	China	The application of work-based learning principles in cultivating core competencies of undergraduate nursing students during clinical practice	Quasi-experimental study	students' core competencies. The study found that work-based learning (WBL) is effective in enhancing the core competencies of undergraduate nursing students during clinical practice.
Sheng-Miauh Huang et al. (33)	2023	Taiwan, China	Effects of video-recorded role-play and guided reflection on nursing student empathy, caring behavior and competence: A two-group pretest-posttest study	Quasi-experimental study	The teaching method based on video-recorded role-play and guided reflection effectively enhances empathy, caring behaviors, and nursing competencies among first-year nursing students
Shih-Tzu Huang (34)	2024	Taiwan, China	Construction and Application of Intelligent Nursing Learning System	Quasi-experimental study	The application of this system has significantly improved both the teaching quality and core competency levels of nursing students.
Yahui Liang et al. (35)	2024	China	2022 Shandong Province university medical technical skills competition nursing track: An effective project to improve core competencies of nursing students	Investigative study	Skills competitions play a vital role in promoting nursing students' core competencies.
Hsueh-Fen S. Kao et al. (36)	2024	Taiwan, China	AACN competency-based essentials revisit: Evidence-based validation of	Quasi-experimental study	Entrustable Professional Activities (EPAs) can effectively

entrustable
professional
activities in Asia

enhance
students' core
competencies
and improve
their Objective
Structured
Clinical
Examination
(OSCE) scores

DISCUSSION

Definition and Components of Nursing Core Competencies

The International Council of Nurses defined competence as "the effective application of a combination of knowledge, skill, and judgement demonstrated by an individual in daily practice or job performance," providing a foundational reference for various countries in defining and developing competency frameworks (37). The American Association of Colleges of Nursing (17) further described competency in *The Essentials: Core Competencies for Professional Nursing Education* as "an observable ability of a health professional, integrating multiple components such as knowledge, skills, values, and attitudes." In contrast, the term "capability" is less commonly used compared to "competency" or "competence." Australia's National Nursing and Midwifery Digital Health Capability Framework (38) highlights that capability extends beyond technical skills, emphasizing adaptability to change, lifelong learning, and self-efficacy.

Nursing core competencies have garnered global attention, but due to their complexity, multidimensionality, dynamic nature, and variation across time, experience, and regions, they require adaptation to local cultural and contextual needs (12). As a result, no universally agreed-upon international definition exists (18). The Nursing Council of Hong Kong defines core competencies for Registered Nurses (General) in 2012 as "the fundamental competencies that a Registered Nurse (General) must possess upon entering practice, achieved through nursing education, to deliver safe, effective, and ethical care to the public (39)." While the Singapore Nursing Board in 2023 describes them as "a standardized framework of performance domains and their corresponding behavioral standards that a nurse must demonstrate (40)." Academic discourse reveals substantial scholarly contributions to this conceptual framework. Although there are differences in expression and emphasis, there is a certain consensus regarding

core nursing competencies: core nursing competencies are generally considered to encompass three aspects: knowledge, skills, and attitude, consistent with the findings of scholars such as Lundell Rudberg et al. (41). However, the field suffers from significant conceptual ambiguity, with terms like "core competencies," "professional competencies," "clinical proficiency," and "job performance standards" being used interchangeably without clear differentiation (42). This lexical inconsistency has created substantial methodological challenges, compromising research validity, cross-study comparability, and ultimately, the translational potential of findings into clinical practice (43,44). While this review assumes cross-cultural transferability of core competency concepts, differences in educational systems, healthcare contexts, and cultural values may affect their applicability.

Tingting Li identifies compassionate care as the fundamental essence of nursing core competencies, demonstrating that undergraduate nursing students' active cultivation of caring abilities directly enhances overall nursing standards and future clinical care quality (45). Su et al. emphasize patient safety as the primary focus of nursing core competencies, while recognizing individualized care capabilities as a critical component (46). El-Sayed advocates for incorporating AI literacy as an essential nursing education competency, with particular emphasis on developing practical application skills in healthcare settings (47). The American Association for the History of Nursing underscores the importance of integrating nursing history into curricula to foster nursing students' deeper understanding of the profession's essence, mission, and social responsibilities (48). Our systematic analysis of competency frameworks reveals five predominant elements: "theoretical knowledge," "communication and collaboration," "professionalism," "safety" and "general clinical skills", demonstrating their universal recognition as indispensable core elements in contemporary clinical nursing practice.

Evaluation of Nursing Core Competencies

Tarabeih et al. highlight a strong correlation between nurses maintaining high-level core competencies and their ability to deliver high-quality healthcare (49). Won-Hee Lee emphasizes that core competency standards should be reviewed and updated every five years to adapt to evolving job demands and ensure nurses possess the professional capabilities required for their roles (50). Beauvais et al. further propose that the evaluation of nursing students' core competencies should not only cover foundational skills from nursing education but also reflect future practice needs to address challenges posed by societal and healthcare changes (5). Additionally, Fan Junyu notes that assessment methods for core competencies should be collaboratively developed by academic institutions and industry stakeholders, including enterprises and hospitals, and should align with clear educational objectives and curricula to ensure consistency between evaluation content and training goals (25).

Scales are the most common tools for assessing core competencies (18), with many scholars developing localized versions. In China, the most widely used is the "Chinese Registered Nurse Core Competency Scale" by Liu Ming et al. (51). Beauvais et al. created a nursing student competency scale encompassing key abilities outlined by multiple U.S. authoritative bodies (5). Sheng-Miauh Huang et al. developed the NSCS scale, featuring 30 items across six dimensions (19), while Hui-Chen TSENG et al. designed a shorter 24-item scale with three dimensions to evaluate undergraduate nursing students' academic and practical performance (52).

Alternative assessment methods include the Objective Structured Clinical Examination (OSCE), which Al Yazeedi et al. identify as effective for evaluating practical skills in nursing core competencies (53). Miller's Pyramid evaluates student competencies through four levels: theoretical knowledge, understanding and application, operational performance, and performance in real-world settings. This framework helps educators and evaluators systematically assess learners' competency development (54,55). Lenburg's 1979 Competency Outcomes and Performance Assessment (COPA) model focuses on cultivating and evaluating practical abilities to ensure workplace readiness, though its

reliability and validity require further empirical validation (52). Iglesias-Parra et al. established a clinical competency evaluation system for nursing interns based on the Nursing Interventions Classification (NIC) (56). Case studies, as noted by Yazeedi et al., enhance critical thinking and problem-solving, proving particularly effective in pediatric nursing courses for clinical competency assessment (53). Andrea N. Neher et al. explore Virtual Reality (VR) as an innovative tool for evaluating core competencies in nursing and medical students, especially for high-risk or hard-to-replicate clinical scenarios (57).

Competency-Based Education

The history of medical education has undergone three major reforms. The first focused on science-based curricula, the second shifted to problem-oriented learning models, and the current third reform emphasizes competency-driven teaching methods (58). Consensus on competency-based education (CBE) is growing, recognized as the future trend across all higher education domains (59).

CBE, an outcome-oriented educational approach, effectively resolves the contradiction between limited teaching time and unlimited content in traditional nursing education by moving beyond mere knowledge and skill transmission (60). It emphasizes the acquisition of knowledge, skills, and attitudes, enhances students' practical readiness, and ultimately improves patient outcomes. The International Council of Nurses (ICN) consistently advocates transforming health professional education by integrating competency-based curricula.

In the U.S., CBE has been widely promoted in nursing education. In April 2021, the American Association of Colleges of Nursing (AACN) released *The Essentials: Core Competencies for Professional Nursing Education*, transitioning education from knowledge-based to competency-based models (61). Following this, many U.S. institutions actively explored implementation pathways. For example, Mueller et al. detailed how one Maryland school adopted a core curriculum transitioning to CBE. Maeve Howett et al. outlined revisions at the University of Maryland School of Nursing to align with AACN competencies, including expanded electives (e.g., palliative

care/symptom management courses) and increased clinical hours (62). Shelly Hogan et al. integrated AACN competencies into the Mobile Health Training Program (MHTP) to address pediatric nursing needs in rural Montana communities (63).

While scholars continue researching strategies to enhance undergraduate nursing competencies, CBE adoption in nursing remains slow. Many programs fail to fully integrate core competencies into teaching, necessitating further research and practical exploration for effective CBE application in nursing education (64).

Factors Influencing Nursing Undergraduates' Core Competencies

Research on factors affecting nursing undergraduates' core competencies remains relatively limited. Du Li et al. identified key influences including geographical background, career motivation, general self-efficacy, and self-directed learning ability (64). Gao Xinyi et al., in a study of 541 nursing undergraduates, demonstrated that professional identity and learning engagement significantly enhance core competencies (65). Chen Ying et al.'s survey of 600 students revealed professional identity as the most impactful factor (66). Cheol Eon Park et al.'s cross-sectional study of 150 senior Korean nursing students highlighted interpersonal skills and an innovation-encouraging organizational culture as critical determinants (67). Li Yan et al. established a modest positive correlation between clinical practicum environments and competency development, suggesting environmental improvements could augment core competencies (68). Future research should further investigate specific influencing factors, clarify their mechanisms, and provide theoretical foundations for targeted educational interventions.

LIMITATIONS

This research did not include detailed discussion of clinical sub-competencies, which may affect granular understanding of core competencies, suggesting an area for future scholarly expansion. In addition, only studies published in English and Chinese were included, which may introduce language bias. Potential publication bias should also be acknowledged.

CONCLUSION

Nursing core competencies have garnered global attention, with this study focusing on undergraduate nursing students to examine their definition, components, evaluation methods, enhancement strategies, and influencing factors. While international consensus on the precise definition and components of nursing core competencies remains elusive, they are generally acknowledged to encompass knowledge, skills, and attitudes, with broad agreement on key sub-competencies including "theoretical knowledge," "communication and collaboration," "professionalism," "safety," and "clinical nursing skills" as indispensable elements. Regarding evaluation and enhancement approaches, competency scales represent the most common assessment tool, supplemented by methods such as Objective Structured Clinical Examinations (OSCE), case studies, and Miller's Pyramid model. Competency-based education has become a crucial direction in modern nursing education reform. Various teaching strategies have demonstrated significant effectiveness in enhancing undergraduate nursing students' core competencies, covering six key themes: "evidence-based nursing," "collaborative learning," "competency-based approach," "constructivism," "simulation-based teaching," and "other methodologies. However, CBE implementation in nursing education progresses relatively slowly, with many programs failing to fully integrate core competencies into curricula, necessitating further research and practical exploration for effective application. Additionally, research on influencing factors remains limited, warranting future investigations to identify specific determinants and elucidate their mechanisms.

CONFLICT OF INTEREST

The author(s) declared no conflict of interest.

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AUTHOR CONTRIBUTIONS

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TH: Review and editing.

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