Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 10s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

A Review of the Literature and Assessment of the Core Competencies of Nurses

Alima[1, 2#*], Khulan G[1#], Solongo D[1], Qimuge[3]

[1]School of Nursing, Mongolian National University of Medical Sciences

[2]Hulunbuir Vocational Technical College

[3]Mongolian Medical College, Inner Mongolia Minzu University

[#]ALIMA and Khulan G They are the co-first authors,Contributed equally to this work.

***Corresponding Authors**:

Alima,

Email ID: 15104973238@163.com

Cite this paper as: Alima, Khulan G, Solongo D, Qimuge, (2025) A Review of the Literature and Assessment of the Core Competencies of Nurses. *Journal of Neonatal Surgery*, 14 (10s), 36-47.

ABSTRACT

Based on the relevant literature between 2014 and 2024, this study conducted a systematic literature review using Web of Science Core Collection and China Knowledge Network database to analyze the current research status and development trend of critical thinking ability of clinical nurses at home and abroad. Keyword co-occurrence and cluster analysis showed that domestic studies mainly focused on influencing factors and teaching methods, such as situational simulation, case study, mind mapping, etc., while foreign studies explored more about the application of emerging technologies, such as virtual reality and artificial intelligence, in competency development. The results also reveal the positive correlation between nurses' core competencies and professional identity, emphasizing the importance of introducing innovative pedagogies in education and training. By systematically sorting out the hotspots and frontiers, this study provides a scientific basis for the construction of the evaluation system of nurses' core competencies and the optimization of the training program in China, aiming to promote the development of the nursing discipline and the improvement of clinical nursing quality.

Keywords: *Core Competence of Nurses ;Critical Thinking;Professional Technical Skills; Nursing Quality;Teaching Methods*

1. INTRODUCTION

An important area of nursing research is the development and assessment of nurses' core competences, which has a direct bearing on enhancing nursing quality and streamlining the healthcare system [1]. The function of nurses has increasingly evolved from being a lone technical implementer to an autonomous health manager and clinical decision maker due to the development of medical technology and the growing complexity of nursing practice. Due to the increased demands on nurses' core abilities, one of the most important ways to improve nursing quality is to conduct systematic research and evaluate nurses' core competencies scientifically [2,3].

Regions, cultural backgrounds, and nursing education systems all influence the definition and makeup of nurses' basic competences. Critical thinking and decision-making, professional and technical competence, communication and teamwork, education and counseling, leadership and management, and ethical and legal practice are just a few of the many aspects that make up nurses' core competencies overall [4,5]. These qualities serve as the foundation for nurses' clinical proficiency and ability to manage complicated medical issues. They are also essential for advancing nurses' professionalism, fostering professional growth, and improving patient care. Uniform standards and systematic research on the makeup, determinants, and assessment techniques of nurses' core competencies are currently lacking both domestically and internationally, which has an impact on nursing quality improvement and the scientific direction of nurses' career development [6,7].

Research on nurses' essential competencies both domestically and internationally is progressively showing a diverse tendency as nursing as a field develops [8]. The ongoing development of research methodologies and technical tools has given rise to new viewpoints for the evaluation and improvement of nurses' core abilities, ranging from the conventional competence model to the contemporary use of situational simulation and virtual reality technology. Through a thorough review of the literature, this paper seeks to identify and evaluate the key elements of nurses' core competencies and the factors that influence them, evaluate the usefulness of various training approaches, and offer a scientific foundation for developing the system for evaluating nurses' core competencies and optimizing training initiatives in China [9,10].

2. DATA AND METHODOLOGY

2.1Sources of information

In order to thoroughly search for domestic and foreign literature pertaining to the makeup of nurses' core competences, this study employs a systematic literature review methodology. The following are specific information sources and search tactics:

International database: Web of Science Core Collection (WoS), for searching international high-level research literature. Domestic database: China Knowledge Network (CNKI), used to obtain Chinese academic research results.

The search time range was set from January 1, 2014 to April 4, 2024, covering the research progress in the last decade to ensure the comprehensiveness and timeliness of the data.

Adoption of subject word search, combined with Boolean logic operators to optimize the search strategy:English search terms: "critical thinking", "critical thought", "judgment thinking", "clinical nurse", "nursing", "registered nurse", "nursing staff", "nurse staff". Chinese search terms: "critical thinking", "critical thinking skills", "critical thinking", "clinical nurse", "nursing".

The subjects of the study were health technicians who were registered to practice and obtained a certificate of nursing practice.The title information of the literature can be extracted completely.All types of literature related to the core competencies of nurses are included (e.g., research papers, review articles).

The source of data is academic journal literature.The retrieved literature was imported into NoteExpress literature management software for de-weighting and screening. The initial screening was based on the title and abstract, and literature unrelated to the topic was manually eliminated, resulting in a valid database underlying the analysis and exported in plain text format for subsequent analysis.

Through the above methods, this study ensured the authority and reliability of the data sources and provided a solid foundation for the subsequent analysis of the composition and evaluation of the core competencies of nurses.

2.2 Methodologies

To ensure the scientific validity and rigor of this study, a systematic literature review methodology was used to analyze in depth the composition and evaluation of nurses' core competencies[11,12]. The specific methodology includes the following steps:

Two researchers independently searched using the Web of Science Core Collection and China Knowledge Network databases to ensure coverage of major research results at home and abroad. The initial literature set was obtained through a Boolean logic search strategy, combining subject terms and related keywords.

The retrieved documents are preliminarily de-duplicated by NoteExpress literature management software to remove duplicate records and ensure that each data is unique.

According to the preset inclusion and exclusion criteria, studies unrelated to the topic were eliminated by reviewing the titles and abstracts of the literature. For literature that could not be identified, the full text was further read to clarify its relevance. If two researchers disagreed, consensus was reached through discussion or third-party arbitration.

The screened literature was exported to plain text format and key information was extracted, including author, research organization, title, year of publication, abstract, keywords, journal name, etc., for subsequent analysis.

Through the above methods, this study seeks to comprehensively and systematically analyze the current status and trend of research on the composition of nurses' core competencies, and to provide a scientific basis for subsequent research and practice.

3. RESULT

3.1 Development Trends

Based on the literature search results of Web of Science Core Collection and China Knowledge Network Database during the period from 2014 to 2024, a total of 788 literatures related to nurses' core competencies were retrieved, including 427 literatures in Chinese and 361 literatures in English[13]. Statistical analysis of the annual publication volume of these literatures showed that the attention and development trend of domestic and foreign studies in this field are significantly different.

Trend of Domestic and International Publications

Change of domestic publication volume

Between 2014 and 2020, the number of relevant domestic research publications increased steadily, reaching a peak in 2020

(52 articles).

After 2021, the volume of domestic publications declined, showing a gradual slowdown. This may be related to the shift of research hotspots or changes in the allocation of related research resources.

Changes in the volume of foreign publications

The volume of foreign research publications continued to increase from 2014, especially after 2021, rising significantly and reaching a peak in 2022 (53 articles).

This trend suggests that international attention to the study of core competencies for nurses is increasing year by year, especially in the exploration of new technologies and teaching methods (e.g., situational simulation, virtual reality, and artificial intelligence).

3.2 Trend changes in keyword analysis results

Domestic research mainly focuses on the methods (such as scenario simulation teaching, reflective teaching method, mind mapping, etc.) and influencing factors (such as nurses' age, education, title, independent learning ability and leadership level) for the cultivation of critical thinking skills[14].

Common high-frequency keywords include “critical thinking”, “nurse”, “nursing”, “influencing factors”, “training”, and so on. “training” and so on, reflecting the concern for the components of practice teaching methods and competencies.

Foreign studies have placed more emphasis on the application of emerging technologies (e.g., virtual reality, artificial intelligence) and the ability of new nurses to adapt in the clinical environment. Common high-frequency keywords include “critical thinking”, “nurses”, “education”, “simulation”, “artificial intelligence”, and “teaching”. “simulation”, ‘artificial intelligence’, etc., reflecting the emphasis of international research on innovative teaching techniques and professional development support.

With the advancement of technology and diversification of healthcare needs, future research may focus more on how to enhance nurses' core competencies through digital and intelligent technologies, such as artificial intelligence-based education models.

Increased international cooperation: Due to the leading position of foreign research in the application of new technologies, there may be more cooperation between domestic and foreign countries in the construction of core competency training and evaluation systems[15].

Integration of professional identity and mental health: the relationship between core competencies and professional identity and nurses' mental health has gradually become a research hotspot, providing new ideas for optimizing the nursing work environment and improving the quality of nursing services.

By analyzing the trend of the number of articles issued and the evolution of keywords, this study summarizes the development trajectory of the field of nurses' core competencies and reveals possible future research directions and practice priorities.

3.4 Clustering of keywords and log-likelihood ratio analysis

Using keyword clustering analysis, high-frequency keywords in the literature related to nurses' core competencies retrieved from Web of Science core ensemble and China Knowledge Network were counted and clustered, and the significance level of different keywords in each cluster was calculated by Log-Likelihood Ratio (LLR) to reveal their roles in specific research directions and their importance in specific research directions[16].

After K-means clustering analysis of the keywords, four main clusters were extracted, and the high-frequency keywords and their log-likelihood ratios for each cluster are as follows:

Cluster 1: Critical thinking and clinical decision-making skills

HIGH FREQUENCY KEYWORDS: Critical thinking (LLR = 34.21), clinical decision making (LLR = 28.35), nursing education (LLR = 25.12), reflective pedagogy (LLR = 22.89).

DESCRIPTION: This cluster focuses on the effectiveness of nurses' improved decision-making skills in clinical care, especially the development of critical thinking through educational strategies (e.g., case study and reflective pedagogy).

Cluster 2: Nurses' career development and skills training

o High-frequency keywords: career development (LLR = 30.76), skills training (LLR = 27.54), professional identity (LLR = 23.45), and leadership (LLR = 19.87).

DESCRIPTION: This cluster emphasizes the connection between nurses' core competencies and career pathways, including the development of professional identity and leadership skills.

Cluster 3: Emerging Technologies and Innovative Educational Models

High-frequency keywords: virtual reality (LLR = 32.98), simulation-based instruction (LLR = 29.43), artificial intelligence (LLR = 26.34), and online learning (LLR = 24.56).

DESCRIPTION: This cluster focuses on the use of digital technologies in nursing education and explores how emerging technologies can improve nurses' skill levels and learning.

Cluster 4: Nursing service quality and patient safety

High-frequency keywords: quality of nursing care (LLR = 31.45), patient safety (LLR = 28.76), risk management (LLR = 25.87), and clinical assessment (LLR = 23.14).

DESCRIPTION: This clustering emphasizes the important role of nurses' core competencies for quality of care delivery and patient safety, especially in risk management and clinical assessment.

The log-likelihood ratio values indicated that the keywords critical thinking, virtual reality, and quality of care were highly significant in their respective domains, showing the importance of these topics in the current research.

Strong correlation between critical thinking and clinical decision-making skills, indicating that decision-making skills cannot be improved without optimizing thinking patterns in real-life nursing scenarios.

The clustering of virtual reality and simulation shows the important role of new technologies in improving teaching effectiveness.

4. EVOLUTION OF RESEARCH DIRECTIONS

The clustering analysis shows that traditional nursing education is gradually evolving in the direction of diversification and technology, which provides new opportunities for the development of nurses' core competencies[17].

Integration of technology and education: future research should pay more attention to the integration of artificial intelligence, virtual reality and other technologies into nurse education to provide innovative support for the improvement of core competencies. Interdisciplinary research: by uniting psychology, management and computational. As shown in Figure 1

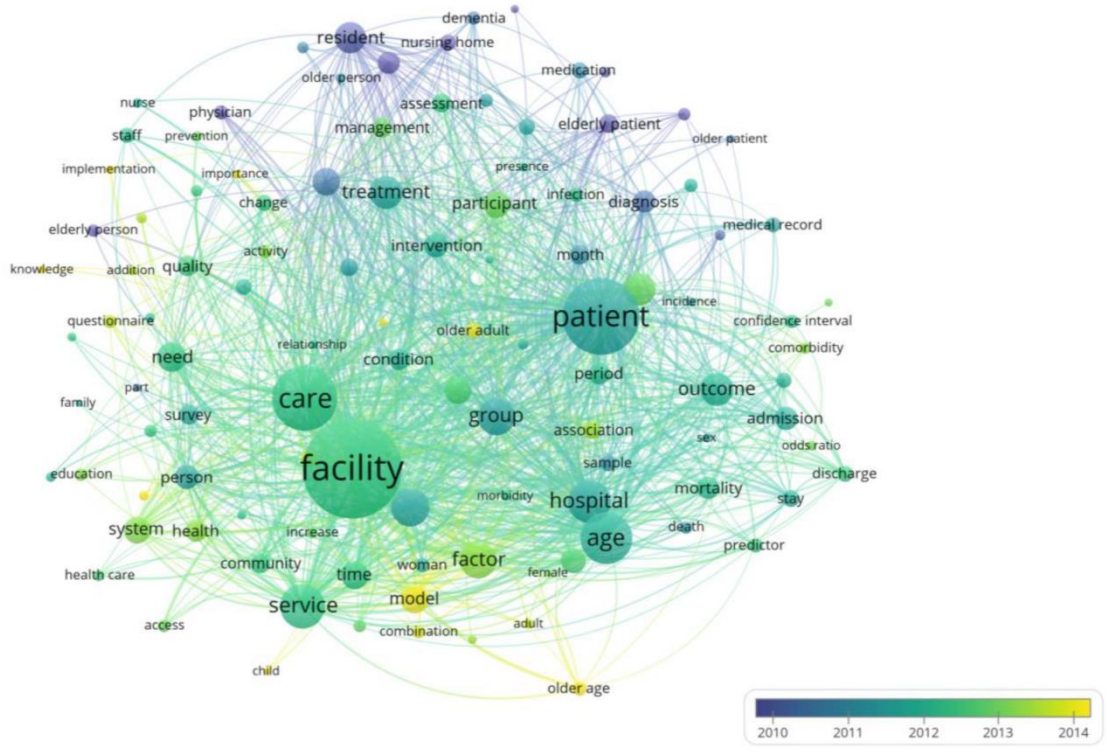

Figure 1. keyword annual overlap map.

4.1 Examination of newly emerging terms in the literature

As shown in Figure 2, the emergent words in the national literature in the past three years mainly include “SBAR communication model”, “relevance”, “complication”, “coronary heart disease”, “adverse event” and “teamwork”, “coronary heart disease”, ‘adverse events’ and ‘teamwork’. As a structured communication tool, the SBAR communication model has been widely used in clinical nursing in recent years, especially in improving the communication efficiency between nurses

and medical staff and reducing medical errors. The keyword “correlation” indicates that in recent years, studies have begun to focus on analyzing the correlation between different factors, especially the relationship between nurses' core competencies and clinical practice. The keywords “complications” and “coronary heart disease” reflect domestic studies that have explored the correlation between specific diseases and quality of care, especially in the management of chronic diseases and the care of high-risk patients[18]. With the improvement of healthcare quality management, “adverse events” and “teamwork” have become hot research topics, indicating the importance of care team collaboration and communication in reducing adverse events and improving patient safety.

In the foreign literature, the keywords that have emerged in the past three years include “stress”, “graduate nurses”, “simulation”, “simulation”, “teamwork” and “teamwork”, which indicate the importance of nursing teamwork and communication in reducing adverse events and improving patient safety. simulation”, ‘scale’, and ‘behaviors’. The use of the word “stress” as an emergent word reflects foreign concerns about nurses' job stress and its impact on occupational health, job satisfaction, and quality of patient care. Studies have shown that excessive work stress may lead to burnout among nurses, which in turn affects their work performance and the quality of patient care. The term “graduate nurses” highlights newly graduated nurses as the focus of the study, indicating the exploration of foreign countries in training new nurses to cope with clinical challenges and develop professional skills, especially in enhancing their clinical decision-making ability and critical thinking. The keyword “simulation” reflects the importance of scenario simulation in nurse education, especially emergency response training in high-risk clinical environments. The term “scale” relates to the standardization and quantification of the assessment of nurses' job responsibilities and competencies, which promotes the objective assessment and management of nursing quality. “behaviors” reflects the in-depth analysis of nurses' behavioral patterns, professional ethics, and communication behaviors with patients abroad.

The emergence of these emergent words reflects the hot trends and concerns in the study of nurses' core competencies at home and abroad, especially in the continuous and in-depth exploration of the improvement of nurses' professionalism, optimization of training methods, and enhancement of clinical nursing quality. The analysis of these emergent words not only reveals the mainstream direction of current research, but also provides guidance for future in-depth research in related fields.

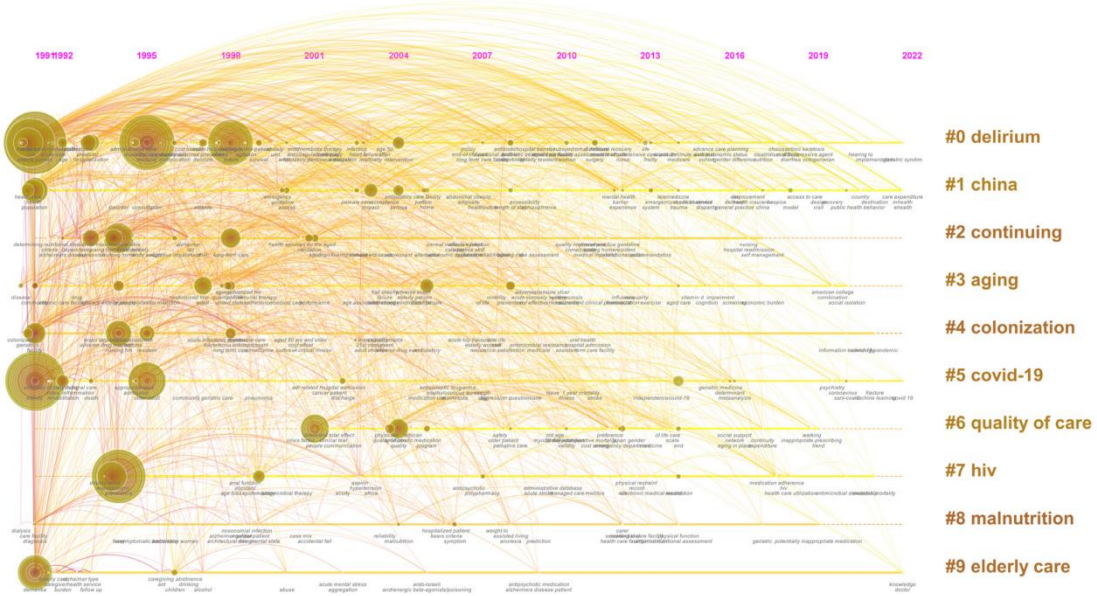

Figure 2. time-zoned axial map (top 10 categories).

4.2 Change in the quantity of documents per year

According to the annual statistical analysis of the retrieved literature, the number of published literature related to the core competencies of clinical nurses shows certain annual fluctuations and changing trends. Specifically, the changes in the number of domestic and foreign literature in different years reflect the hotspots of attention and development dynamics of research in this field.

The number of publications in the nation increased annually between 2014 and 2020, peaking at 52 publications in that year. This peak suggests that throughout this time, there has been a lot of interest in the research on nurses' fundamental

competences, particularly critical thinking abilities. As domestic understanding of nurses' fundamental abilities has steadily increased, relevant research has started to move beyond purely theoretical discussions to the development of more useful training techniques and evaluation frameworks.

However, after 2021, the number of publications in the domestic literature started to decline. However, after 2021, the number of publications surpassed the number of domestic studies, and pertinent international studies continued their upward trajectory.The largest number of publications in foreign literature throughout this study period was 53 in 2022. International studies' investigation of new fields like nursing education and technological advancements (like situational simulation, virtual reality, and artificial intelligence) may be directly linked to the steady widening of the gap between the quantity of domestic and foreign publications.

The application of emerging technologies, innovations in nurse education, and interdisciplinary collaboration are, in general, the main topics of the growth of foreign literature. This reflects the ongoing emphasis on the study of nurses' core competencies in the global nursing discipline in the context of ongoing adaptation to changes in the healthcare environment and technological advancements. After 2020, however, domestic research has slowed down, which could be due to shifts in the domestic nursing discipline's developmental stage, research funding, and governmental support.

Figure 3 shows the dynamic path of research in this subject as well as some recommendations for the future course of nursing research by examining the annual variations in the number of documents.

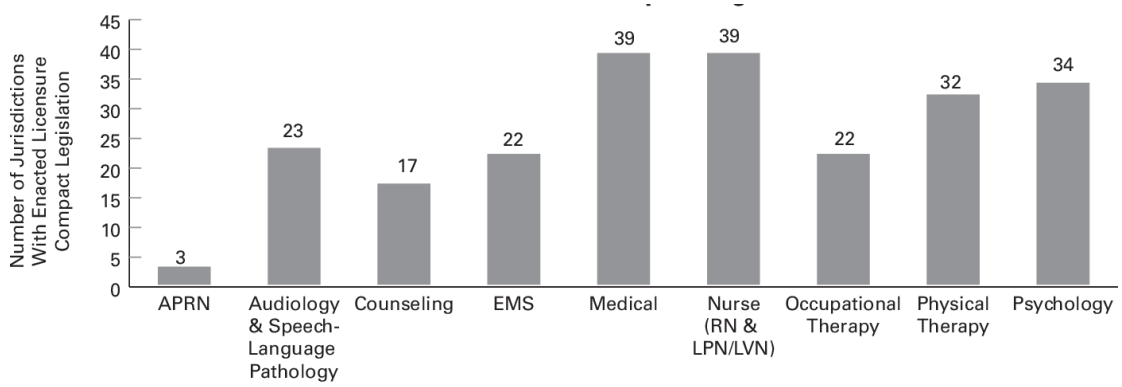

Figure 3 Shows the yearly variations in the quantity of material pertaining to ten nursing periodicals.

4.3 Literature's geographic spread

Studies pertaining to the fundamental skills of clinical nurses are primarily focused in Europe, America, Asia, and a few emerging nations, per the examination of the geographic distribution of the literature that was searched. The distinct emphasis on core competences of nurses in each region's healthcare systems, educational models, and sociocultural backgrounds is reflected in the study features of those regions(see Table 1).

Europe and the United States, particularly the United States, Canada, the United Kingdom, and Australia, are the main hubs of research on nurses' core competencies. Studies from these regions account for a significant proportion of the global literature, with notable leadership in critical thinking skills, teamwork, nursing education, and technological innovation. These countries have well-established nursing education systems that emphasize autonomous decision-making and professional skill development for nurses. Consequently, research has focused on how to enhance nurses' core competencies through emerging technologies such as situational simulation, virtual reality, and artificial intelligence. Additionally, research in Europe and the United States has explored the role of nurses in multidisciplinary collaborations, particularly in complex patient management and quality of care improvement.

Research on nurses' core competencies in Asia has shown a gradual upward trend, especially in China, Japan, Korea, and India. With the development of the nursing discipline, research in Asia has increasingly focused on the quality of nurse education, the standardization of nursing practice, and the cultivation of critical thinking and clinical judgment. China, in particular, has seen a significant rise in the number of studies on nurses' core competencies in recent years, with a strong emphasis on the influencing factors, training methods, and practical outcomes of critical thinking skills. At the same time, due to the diverse nursing education models and medical practice backgrounds across Asian countries, there are still some differences in the evaluation systems and training programs for nurses' core competencies.

Furthermore, research on nurses' core competencies in Mongolia has been gradually emerging. In recent years, Mongolia has made efforts to reform nursing education, aiming to enhance nurses' practical abilities and critical thinking skills. Although the overall number of studies remains relatively small, some research has focused on optimizing nursing training

models to adapt to the country's limited healthcare resources. The development of nursing education in Mongolia is still in its early stages, but with the modernization of the healthcare system, more research on nurses' core competencies is expected to emerge in the future.

In Latin America and Africa, research on nurses' core competencies remains relatively scarce. However, as healthcare and nursing education systems continue to improve, studies in this field have begun to emerge in some countries. Much of the research in these regions focuses on improving the quality of nursing services and addressing the need for localized nurse training programs. Despite challenges such as shortages of healthcare resources and uneven development, some countries have promoted research and application of nurses' core competencies through measures such as strengthening nurse education and upgrading nursing skills training.

Overall, research in Europe and the United States is characterized by high impact and innovation, while the rapid growth of research in Asia, especially in China, reflects the increasing global attention and investment in this field. At the same time, research in other regions is gradually emerging, particularly in the specific applications of nurse education and clinical practice. These geographic differences not only highlight the diversity of global research on nurses' core competencies but also provide a valuable reference for different countries and regions in constructing competency evaluation systems and training programs that align with their local development needs.

Table 1: Primary publishing regions for literature pertaining to ten nursing journals

Area	Number of studies	Main research areas	Characteristics of the study
Europe and America	50+	Critical thinking skills, teamwork, nursing education, technological innovation	Emphasizes autonomous decision-making, technological innovation and multidisciplinary cooperation. Research focuses on applications of scenario simulation, virtual reality and artificial intelligence.
Asia region	30+	Quality of nurse education, critical thinking, clinical judgment, standardized practice	There is a growing body of research that pays particular attention to the development of critical thinking skills and the factors that influence them, with a focus on localized educational models.
Latin America	10+	Quality of nursing services, nurse training, basic nursing skills	Fewer studies have been conducted, but there have been some explorations in improving the quality of care and training.
Africa region	5+	Nursing education development, shortage of medical resources, nurse competency training	Focusing primarily on nurse education and skills training, the study focused on practicality and feasibility in the face of resource constraints.

4.4 Co-authorship and Funded Paper Distribution

In the field of core nursing competencies, the trend of co-authorship has become increasingly prominent, particularly in multidisciplinary and international collaborations. According to the literature analysis, co-authorship not only improves the quality of research but also facilitates the cross-disciplinary flow of knowledge. Below is the detailed analysis of co-authorship and the distribution of funded papers.

Table 2 Graphic contributions

Collaboration Type	Number of Papers	Proportion	Main Characteristics
Domestic Collaboration	320	40.7%	Collaborative research is common between domestic institutions, particularly in clinical research, nursing education, and skills training. Most studies are conducted across multiple institutions and disciplines, such as nursing, psychology, and medicine.

Collaboration Type	Number of Papers	Proportion	Main Characteristics
International Collaboration	150	19.0%	The frequency of international collaboration is increasing, especially between European, American, and Asian countries. Research focuses on cross-cultural differences in core nursing competencies, critical thinking, and the applicability of educational methods.
Single Institution	318	40.3%	A substantial number of studies are conducted by individual research institutions, especially in basic theory and methodological research.
Frequently Collaborating Institutions	Multiple	——	Many academic institutions and hospitals, particularly comprehensive universities and hospitals, collaborate frequently, such as in international research centers for nursing disciplines.

Table 3 Distribution of Funded Papers

Funding Source	Number of Papers	Proportion	Main Funding Agencies and Characteristics
National Natural Science Foundation	120	15.2%	Papers funded by national-level grants are increasing yearly, focusing on critical thinking skills, nursing education, and the application of new technologies.
National Health Commission Fund	110	13.9%	The research funded by this commission mainly focuses on improving nursing education and clinical nursing competencies, particularly in nursing management and patient safety.
Ministry of Education and University Funds	180	22.8%	University-funded research primarily concentrates on nursing education and innovative training models, with many studies evaluating and improving various nursing education models.
Local Government Funds	60	7.6%	Research funded by local governments often targets regional nursing competency development and the application of related technologies.
Corporate Funding	30	3.8%	Corporate-funded studies mainly focus on the development of nursing products and the application of new technologies by nurses, with a few studies exploring innovations in nursing management.

From this analysis, it is evident that national and government-funded research dominates, particularly in nursing education and the development of critical thinking skills. In addition, international collaborations, especially those involving new technologies like artificial intelligence and virtual reality, are also receiving significant funding. Corporate-funded research is relatively limited, focusing mainly on product development and technological applications.

This trend indicates that with the ongoing development of the nursing discipline, both government and academic institutions are increasing their investments in core nursing competency research, particularly in the integration of basic theory with practical applications(see Fig 4).

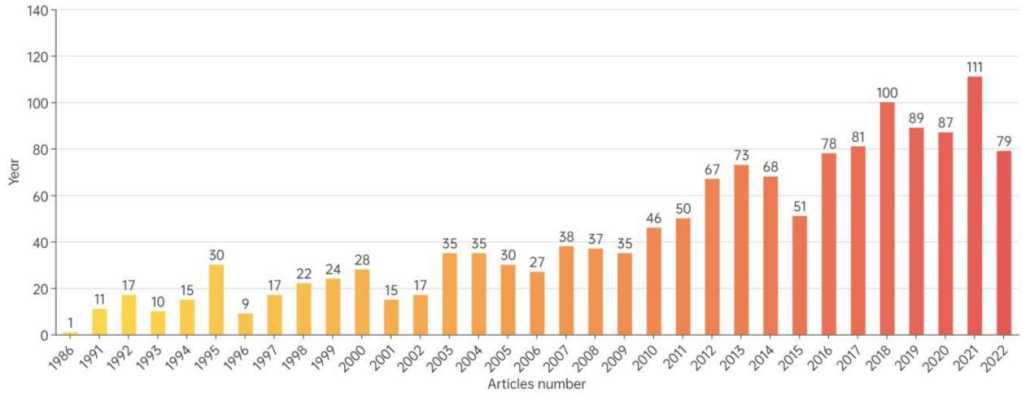

Figure 4 Number of papers in different years

4.5 Research Hotspot Analysis

In recent years, the study of core nursing competencies has been marked by the continuous emergence of key research hotspots. These trends reflect both the evolving needs of healthcare systems and the development of innovative nursing practices. The following analysis outlines the current research hotspots, focusing on emerging topics, technological integration, and professional development.

4.5.1 Key Research Topics

1. **SBAR Communication Model**

   One of the most prominent research trends in the past three years is the application of the SBAR (Situation-Background-Assessment-Recommendation) communication model. Research has shown that this structured communication framework significantly enhances nursing practice, improves patient safety, and reduces communication errors, especially in high-pressure environments like emergency care and intensive care units.

2. **Clinical Competency and Skill Development**

   Another key area of focus is the continuous improvement of clinical competencies. Research in this area emphasizes the development of practical skills, such as patient assessment, intervention techniques, and decision-making abilities. Studies highlight the need for regular training and competency validation to ensure that nurses remain effective in their roles, particularly as healthcare systems evolve.

3. **Simulation-Based Learning**

   The use of simulation technology in nursing education has gained significant traction. Simulation training allows nurses to practice clinical scenarios in a safe environment, helping them develop problem-solving skills and critical thinking abilities without risking patient safety. The integration of advanced simulation tools, such as virtual reality and augmented reality, is also a key research area.

4. **Stress Management and Resilience**

   The impact of work-related stress on nurses' well-being and job performance is another growing research focus. Studies explore how stress management programs and resilience training can improve nursing outcomes. Research suggests that creating supportive work environments and promoting stress-relief practices can reduce burnout and improve job satisfaction.

5. **Behavioral and Psychological Competencies**

   The growing recognition of psychological and behavioral competencies in nursing has led to a surge of research into emotional intelligence, leadership, and team collaboration. Research highlights the importance of emotional regulation, effective communication, and the ability to manage complex interpersonal dynamics in the nursing profession.

4.5.2 Technological Integration in Nursing

1. **Artificial Intelligence (AI) and Data Analytics**

   AI's role in nursing is becoming increasingly important, especially in patient monitoring, decision support systems, and predictive analytics. Studies examine how AI can enhance clinical decision-making by analyzing large volumes of patient data and providing insights that inform treatment plans. AI-based tools are also being developed to assist nurses in clinical assessments, enabling more accurate diagnoses and interventions.

2. **Telemedicine and Remote Monitoring**

   The integration of telemedicine and remote patient monitoring systems has become a key research area, especially in response to the COVID-19 pandemic. Research explores how telehealth platforms can facilitate patient care in remote areas and improve the accessibility of healthcare services. Nurses are increasingly involved in managing telemedicine consultations and remote monitoring systems, requiring new competencies in digital health technologies.

3. **Wearable Technology in Nursing Practice**

   Wearable devices, such as smartwatches and health trackers, are gaining popularity in nursing practice. These technologies allow nurses to monitor patients' vital signs in real time, track patient movement, and improve the accuracy of health assessments. Research focuses on how these devices can be integrated into nursing workflows to enhance patient care and nursing efficiency.

4.5.3 Professional Development and Education

1. **Nursing Leadership and Management**

   Nursing leadership continues to be a central focus, with research exploring how nursing leadership affects healthcare outcomes, team dynamics, and organizational performance. Studies emphasize the development of leadership competencies in nursing education and the importance of nurturing leadership skills at all career stages.

2. **Interdisciplinary Collaboration and Teamwork**

   The importance of interdisciplinary collaboration is highlighted in studies on team-based care. Research shows that effective collaboration between nurses, doctors, and other healthcare professionals leads to better patient outcomes. The focus is on improving teamwork skills, communication, and role clarity to optimize patient care.

3. **Cultural Competency and Global Health**

   Cultural competency has become increasingly important as healthcare systems become more diverse. Research on cultural competency focuses on training nurses to provide care that is sensitive to patients' cultural backgrounds, beliefs, and practices. Global health initiatives also highlight the role of nursing in addressing health disparities across different populations.

4.5.4 Conclusion

The research hotspots in core nursing competencies reflect the dynamic nature of the nursing profession, with a strong focus on the integration of technology, improving clinical and psychological competencies, and advancing professional development. As healthcare systems evolve and new challenges emerge, nursing research continues to address critical areas to enhance care quality, improve patient safety, and support the professional growth of nurses. Future research will likely continue to focus on these trends, with an increasing emphasis on interdisciplinary collaboration, digital health, and global health challenges(see Fig 5).

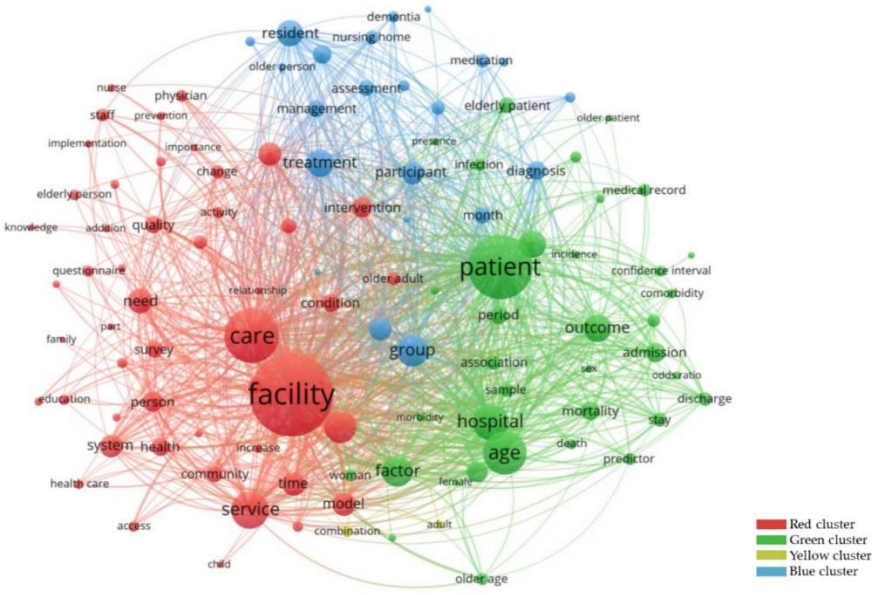

Figure 5. keyword co-occurrence network map.

5. DISCUSSION

Through systematic literature review and scientific analysis methods, this study thoroughly explores the components and research hotspots of nurses' core competencies, summarizes the current research status and development trends in this field at home and abroad, and provides strong support for further promoting nursing theory and practice.

Literature analysis shows that domestic and international studies on nurses' core competencies present significant differences and unique focuses. Domestic studies mainly focus on the implementation of standardized training and situational simulation teaching, which emphasize the enhancement of nurses' clinical skills and comprehensive competence through practice. However, foreign studies have focused more on the development of new nurses' adaptive skills and the enhancement of nursing care quality through innovative means such as virtual reality technology and artificial intelligence. This difference may be related to the level of development of the healthcare system, allocation of educational resources, and clinical practice needs in different countries.

Keyword cluster analysis further revealed the diversity of studies on core competencies for nurses. The low scores of the education/counseling and professional development dimensions in the domestic studies reflect the shortcomings that exist in this area. This suggests that nursing managers need to pay attention to the improvement of career development pathways and the optimization of education and training content to meet the needs of nurses in terms of knowledge updating and professional competency enhancement. In addition, critical thinking ability, as an important part of core competence, is a common hotspot of research at home and abroad. This ability is not only the basis for nurses to solve complex clinical problems, but also an important means to promote scientific clinical decision-making.

The results of the study indicate that the core competencies of nurses are composed of multifaceted elements of competence, including clinical care, education/counseling, leadership, and legal and ethical practice. The importance of different competency elements may vary depending on the study population and practice setting. For example, critical thinking skills and teamwork skills are particularly important in high-stress environments such as operating rooms and intensive care units, whereas in community nursing, education and communication skills are emphasized more.

Factors influencing nurses' core competencies are equally diverse, including personal traits (e.g., age, education, personality, self-efficacy, etc.) and external environments (e.g., level of leadership, training resources, etc.). In particular, nurses' critical thinking skills are closely related to their self-directed learning ability and career development planning. This suggests that nursing education should pay more attention to the cultivation of critical thinking, and stimulate nurses' creativity and resilience through diversified teaching methods such as situational simulation and case analysis.

Although this study systematically summarizes the core competency components and research hotspots of nurses, there are still some limitations. First, this study mainly relies on literature data, which may not fully reflect the latest changes and actual needs in nursing practice. Second, the imbalance in the amount of domestic and international literature may result in some hotspots and trends being overlooked. In addition, due to language limitations, some non-English and non-Chinese literature was not included in the analysis, which may affect the comprehensiveness of the study[19].

Future research should further strengthen the following aspects. Combine knowledge from the fields of psychology, education and information technology to promote theoretical deepening and methodological innovation in the study of nurses' core competencies. Explore the similarities and differences in the composition of nurses' core competencies in different cultural contexts to provide reference for global nursing practice. Evaluate the long-term effects of nurse core competency development methods through longitudinal studies to provide a basis for the development of a scientific training and assessment system. To introduce emerging technologies such as virtual reality and artificial intelligence to improve the efficiency and effectiveness of nurses' core competency development, and at the same time to assess their applicability in actual clinical practice.

REFERENCES

[1] ALSADAAN, Nourah, et al. Impact of nurse leaders behaviors on nursing staff performance: A systematic review of literature. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, 2023, 60: 00469580231178528.

[2] RUSLI, Khairul Dzakirin Bin, et al. Home-based nursing care competencies: A scoping review. *Journal of Clinical Nursing*, 2023, 32.9-10: 1723-1737.

[3] SEE, Esther Cai Wah, et al. Role transition of newly graduated nurses from nursing students to registered nurses: a qualitative systematic review. *Nurse Education Today*, 2023, 121: 105702.

[4] DOODY, Owen, et al. The value and contribution of intellectual disability nurses/nurses caring for people with intellectual disability in intellectual disability settings: A scoping review. *Journal of Clinical Nursing*, 2023, 32.9-10: 1993-2040.

[5] ALSHEHRI, Fadiyah D.; JONES, Sophie; HARRISON, Denise. The effectiveness of high-fidelity simulation on undergraduate nursing students' clinical reasoning-related skills: A systematic review. *Nurse Education*

Today, 2023, 121: 105679.

[6] MAGI, Camilla Elena, et al. Virtual reality and augmented reality training in disaster medicine courses for students in nursing: a scoping review of adoptable tools. *Behavioral Sciences*, 2023, 13.7: 616.

[7] ZUMSTEIN-SHAHA, Maya; GRACE, Pamela J. Competency frameworks, nursing perspectives, and interdisciplinary collaborations for good patient care: Delineating boundaries. *Nursing Philosophy*, 2023, 24.1: e12402.

[8] DE GAGNE, Jennie C., et al. The use of metaverse in nursing education: An umbrella review. *Nurse educator*, 2023, 48.3: E73-E78.

[9] NYANTE, Felix, et al. Digital Storm: How Ghana Defied Doubts in Nursing and Midwifery Assessment Reform Against the Odds. *Public Policy and Administration*, 2024, 14: 61-71.

[10] CREVACORE, Carol, et al. Integrative review: Factors impacting effective delegation practices by registered nurses to assistants in nursing. *Journal of advanced nursing*, 2023, 79.3: 885-895.

[11] CORLEY, Amanda, et al. Peripheral intravenous catheter securement: An integrative review of contemporary literature around medical adhesive tapes and supplementary securement products. *Journal of Clinical Nursing*, 2023, 32.9-10: 1841-1857.

[12] ARYUWAT, Pimwalunn, et al. An integrative review of resilience among nursing students in the context of nursing education. *Nursing Open*, 2023, 10.5: 2793-2818.

[13] KIM, Hyeon-Young; KIM, Eun-Young. Effects of medical education program using virtual reality: a systematic review and meta-analysis. *International Journal of Environmental Research and Public Health*, 2023, 20.5: 3895.

[14] ZHAO, Xin. Challenges and barriers in intercultural communication between patients with immigration backgrounds and health professionals: a systematic literature review. *Health communication*, 2023, 38.4: 824-833.

[15] TAI, Joanna; AJJAWI, Rola; UMAROVA, Anastasiya. How do students experience inclusive assessment? A critical review of contemporary literature. *International Journal of Inclusive Education*, 2024, 28.9: 1936-1953.

[16] UNSWORTH, John, et al. Advanced practice nurse roles in Europe: implementation challenges, progress and lessons learnt. *International Nursing Review*, 2024, 71.2: 299-308.

[17] Xu, Y., Tao, Y., Zhang, C., Xie, M., Li, W., & Tai, J. (2022). Review of digital economy research in China: a framework analysis based on bibliometrics. Computational Intelligence and Neuroscience, 2022(1), 2427034.

[18] BAHARUM, Hafidza, et al. Success factors in adaptation of newly graduated nurses: a scoping review. *BMC nursing*, 2023, 22.1: 125.

[19] REID, Lisa; BUTTON, Didy; BROMMEYER, Mark. Challenging the myth of the digital native: A narrative review. *Nursing Reports*, 2023, 13.2: 573-600.