



Reclaiming Nursing Science in Doctoral Education: A Narrative Review

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ABSTRACT

Background: This review highlights the critical need to balance the advancement of nursing-specific research with active participation in interdisciplinary collaboration. It advocates for a reflective and deliberate approach to nursing doctoral education; one that safeguards the discipline's core identity while embracing opportunities for integrative scholarship and innovation. **Purpose:** The review aims to explore how nursing distinguishes itself from other sciences and to analyze the unique contributions of nursing research, theories, philosophical, and doctoral education in advancing nursing knowledge as an autonomous profession. **Methods:** The PRESMA framework was used to organize and present the paper process, including data sources, study design, inclusion criteria, search methods, and thematic analysis. **Results:** The findings highlight nursing's classification as an applied science and demonstrate the interconnected influence of nursing philosophy, theory, research, and policy in shaping and advancing curriculum development. Together, these elements form a cohesive foundation that guides the evolution of nursing education to meet the complex demands of healthcare practice and scholarship. **Conclusion:** The review concludes that nursing is a distinct science, firmly grounded in unique philosophical and theoretical foundations that articulate its professional identity. **Implications for Nursing:** The paper underscores significant implications for advancing nursing science and strengthening professional identity across three key domains: education, policy, and clinical practice.

Keywords: Nursing science, Nursing doctoral education, Philosophy, Theory, Nursing policy.

What does this paper add?

1. This paper offers a nuanced analysis of how nursing science can be reclaimed and reaffirmed within the context of doctoral education. It underscores the persistent tension between interdisciplinary collaboration and the preservation of nursing's distinct disciplinary identity. By positioning nursing as a grounded science rooted in unique philosophical, theoretical, and epistemological foundations, the paper emphasizes the critical importance of maintaining a strong disciplinary core amidst growing integration with other fields.
2. Furthermore, the paper offers a critical reflection on the role of nursing theory, philosophy, and research in shaping doctoral curricula and advancing scholarly practice. It emphasizes the need for nurse scholars and educators to consciously engage with the foundational elements that differentiate nursing science, ensuring that these are neither diluted nor overshadowed in broader academic and healthcare environments.

Introduction

Nursing is a central discipline within the health sciences and a humanitarian profession dedicated to enhancing the health and well-being of individuals and communities (Rodríguez-Pérez et al., 2022). Nurses play a vital role across all levels of care from primary to tertiary, often serving as the primary point of contact for patients and their families (Oldland et al., 2019).

The nursing profession integrates theory, philosophy, research, and policy in a holistic approach to improving patient outcomes and advancing professional practice (Hansen & Dysvik, 2022). Theoretical frameworks guide clinical decision-making by helping nurses identify patient needs, predict outcomes, and implement effective interventions (Barnden et al., 2023). Philosophical assumptions shape the values, ethics, and humanistic foundations that define nursing as a caring and person-centered discipline (Meleis, 2018). Megersa et al. (2023) stated that research and evidence-based practice (EBP) serve as the backbone of standardized, high-quality care, while policy structures determine the scope of practice, access to care, and resource allocation (Downie et al., 2023).

To maintain its integrity and autonomy, nursing must continue to evolve its unique body of knowledge and reinforce its identity as a distinct scientific discipline (Parse, 2015). However, a gap exists in how nursing scholars engage with phenomena originating in other disciplines, raising questions about whether such phenomena can be considered truly “nursing” in nature (Saifan et al., 2021). This has sparked debate about whether interdisciplinary integration enriches nursing knowledge or risks diluting its identity.

Therefore, the aim of this paper is to explore how nursing distinguishes itself from other scientific fields and to analyze the unique contributions of nursing research methodologies, theoretical frameworks, philosophical foundations, and doctoral education in advancing nursing knowledge as an autonomous and evolving profession.

Methodology

This narrative review includes an introduction, a clear explanation of the literature searches and selection process (methods), discussion (thematic sections), implications, and conclusion (Paré & Kitsiou, 2017).

The PRESMA framework guides the paper (Page et al., 2020). The PRESMA framework is a structured

approach designed to guide comprehensive reporting of research methods in health sciences. It stands for Participants, Research design, Evaluation, Setting, Methods, and Analysis, providing a clear and systematic outline for describing each key component of the research process. Applying PRESMA framework enhances transparency, reproducibility, and rigor by ensuring that essential methodological details are clearly communicated.

In this narrative review, the PRESMA framework supports a coherent and transparent presentation of the methodological approach, facilitating understanding and critical appraisal of the study.

PRESMA Framework

P - Participants (Data Sources)

This narrative review is based on a comprehensive examination of scholarly literature related to nursing science, philosophy, theory, policy, and doctoral education. Data was retrieved from established electronic databases, including Web of Science (Clarivate), EBSCOhost, Wiley Online Library, Scopus, and Science Direct. The search included peer-reviewed articles, conceptual papers, policy documents, and position statements relevant to the study aims. Both quantitative and qualitative studies, as well as theoretical and philosophical works, were included to provide a comprehensive thematic discussion.

R - Research Design

A narrative review methodology was employed to critically examine and synthesize theoretical and philosophical perspectives on nursing science within doctoral education.

E - Evaluation Criteria (Inclusion/Exclusion)

Inclusion criteria targeted English-language literature explicitly discussing the nature, evolution, and role of nursing science in doctoral education. Priority was given to works addressing epistemological foundations, theoretical frameworks, interdisciplinary integration, and the philosophical basis of nursing as a discipline.

Exclusion criteria included omitting studies focused on undergraduate or master's-level clinical education, general health science education without nursing focus, and articles lacking conceptual or theoretical

orientation. In addition, included articles were published between 2000 and 2025 to ensure contemporary relevance. Numbers of included papers throughout the stages of the study are shown in Figure 1.

S - Setting

The review was conducted in an academic context, drawing on global peer-reviewed publications across nursing and interdisciplinary health science domains.

M - Methods of Data Collection and Extraction

A structured search strategy was developed using the following keywords: *nursing science*, *nursing doctoral education*, *philosophy*, *theory*, and *nursing policy*. Boolean operators (AND, OR) and database-specific filters were applied to refine the search results and enhance precision. The literature search was conducted from May 1 to May 30, 2025.

An initial total of 360 articles were identified. Following title and abstract screening, 67 articles were selected for full-text review. Based on the inclusion criteria, a final sample of 35 relevant sources published between 2000 and 2025 was extracted for detailed discussion, as illustrated in Figure 1. To substantiate the ideas discussed in this paper, it was essential to include supporting literature, including sources published prior to 2020, hence their inclusion.

A - Analysis

A thematic synthesis approach was used to analyze the selected literature, focusing on core concepts and themes related to nursing science development, theoretical frameworks, and doctoral education. This discussion provided insights into nursing's unique disciplinary identity and the integration of knowledge in advanced education.

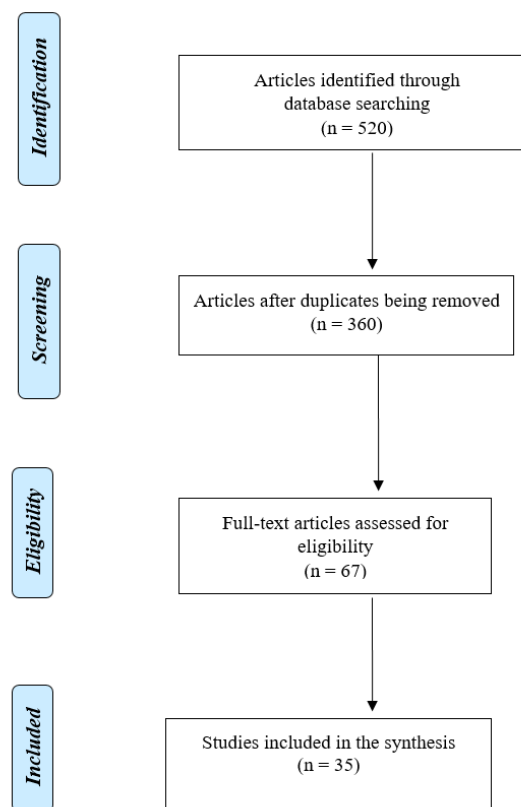


Figure 1. PRESMA flow diagram

Discussion

The discussion is organized around six debatable themes that emerged from the literature. These themes collectively reflect the ongoing debate surrounding

nursing's identity as an autonomous profession and the extent to which nursing research should focus solely on nursing science; each reflecting ongoing tensions and critical perspectives within the field: (1) the nature of

nursing science; (2) doctoral education programs; (3) philosophical and theoretical underpinnings; (4) the role of evidence-based practice; (5) the policy role in the nursing profession; and (6) the risks and benefits of interdisciplinary integration in nursing doctoral education.

The Nature of Nursing Science

Until now, debate has persisted regarding whether nursing science should be classified as a basic or an applied science (Turkowski & Turkowski, 2024). Defining nursing's scientific nature is essential to resolving this theoretical discourse. Nurse scholars have translated foundational sciences, such as pharmacology, pathology, biology, chemistry, and anatomy, into the nursing body of knowledge, where these concepts are integrated into practical care, including medication management, vital-sign monitoring, infection control, wound care, and the development of comprehensive care plans (He et al., 2024).

The applied nature of nursing is evident in its dynamic and iterative processes of clinical decision-making and problem-solving (Connor et al., 2023). Nurses assess patients, identify health problems, implement appropriate interventions, and evaluate outcomes in a continuous cycle that evolves with the patient's condition (Potter et al., 2023).

Nursing also stands as an independent and distinct science, contributing significantly to global health and enhancing patient well-being. Its foundation is built on nursing theories, philosophical perspectives, and methodologies designed to address human needs, values, and beliefs (Parse, 2025). In contrast, medical science is primarily rooted in the biomedical model, with a focus on disease diagnosis and treatment based on physiological, pathological, and pharmacological principles (Loewa et al., 2023). While essential to healthcare, these domains derive from medical not-nursing philosophy and theory, further distinguishing the two sciences.

The Nursing Doctoral Education Program

Since the 1960s, nursing scholars have raised concerns about the discipline's lack of a clearly defined and unique knowledge base (Smith, 2019). These concerns remain relevant today, as many nursing doctoral programs continue to emphasize research methodologies and technical skills at the expense of

cultivating a robust nursing-specific intellectual foundation (Ladden et al., 2024). This shift risks producing competent researchers who are insufficiently grounded in the profession's theoretical and philosophical roots, potentially weakening nursing's distinct contribution to healthcare systems and patient outcomes.

To address this issue, nursing must be recognized not merely as a technical field, but as an intellectually autonomous discipline. Doctoral education should go beyond knowledge generation to prepare nurses as scholars capable of advancing evidence-based practice (EBP), influencing policy, and leading clinical innovation (Ketefian & Redman, 2020). However, the increasing adoption of research competencies from other disciplines has contributed to a drift away from nursing's core values and conceptual frameworks.

Reclaiming the identity of nursing science requires doctoral curricula to emphasize the profession's philosophical, theoretical, and empirical foundations. Doing so empowers nurse scholars to build a meaningful body of knowledge rooted in nursing's worldview enhancing scholarly productivity, interdisciplinary engagement, and relevance to clinical practice (Rosario et al., 2024). A curriculum grounded in these pillars also strengthens the capacity of nurse scientists to frame research questions that reflect nursing-informed inquiry and to generate contextually appropriate evidence for improved patient and population health.

To achieve this goal, doctoral programs must ensure alignment among coursework, mentorship, and research experiences with nursing's unique contributions. Such alignment equips graduates to lead in diverse settings, shape policy, and address global health challenges, including Universal Health Coverage (UHC) and the Sustainable Development Goals (SDGs) (Rehg & SmithBattle, 2015; Smaldone & Larson, 2021). Cultivating a generation of scholars deeply rooted in the discipline's epistemological core ensures that nursing continues to evolve without losing its foundational identity.

In an era of rapid healthcare transformation and interdisciplinary collaboration, nursing science must reaffirm its unique disciplinary stance, particularly within doctoral education. This involves a deliberate re-engagement with the profession's philosophical and epistemological underpinnings, while adapting to the demands of a global educational landscape (Warren &

Warren, 2023). Doctoral education should preserve and expand nursing's distinct worldview, which integrates humanistic, ethical, and empirical ways of knowing.

Central to this endeavor is the design of curricula that prioritize nursing theory, values, and practice-based evidence elements essential for preparing future nurse scholars and leaders (Tweedie et al., 2025). This mission is strengthened by alignment with global frameworks, such as the International Council of Nurses (ICN) and the American Association of Colleges of Nursing (AACN) essentials. These frameworks emphasize core competencies including system thinking, population health, scholarly inquiry, and ethical leadership. For instance, the AACN essentials call for the integration of nursing knowledge and person-centered care, while the ICN promotes a global vision that positions nurses as key agents in health system transformation (Glarcher & Vaismorad, 2024).

By incorporating these frameworks, nursing doctoral programs should ensure that their goals are internationally relevant and responsive to current health priorities. This approach enables doctoral education to serve both as a platform for disciplinary consolidation and as a space for global innovation. Rather than being diluted by interdisciplinary collaboration, nursing science is elevated through it. Ultimately, reclaiming nursing science in doctoral education requires a reflective and forward-looking approach that safeguards the discipline's intellectual legacy while expanding its influence in shaping the future of healthcare.

Philosophical and Theoretical Underpinnings of Nursing Science

There is ongoing debate regarding the use of philosophy and theory to shape nursing science. Supporters argue that these elements offer a foundational understanding of nursing's unique values, guiding ethical practice, research, and education through abstract conceptual frameworks that have practical relevance in clinical settings (Grace et al., 2022). Critics, however, contend that some theories and philosophies are overly idealistic or outdated, lacking applicability in today's complex healthcare environment and distancing nursing science from other health disciplines (Jensen & Jerpseth, 2023).

Despite these differing views, integrating philosophy and theory with evidence-based practice is essential to ensure that nursing science remains

meaningful, relevant, and distinct. This integration supports the evolution of nursing beyond task-oriented care and reinforces its identity as a knowledge-based profession (Smith & Parker, 2020). Unlike medicine, which often draws from basic sciences, nursing science must focus on the human experience of health, illness, and care domains uniquely aligned with nursing's holistic perspective (Grace & Zumstein-Shaha, 2020).

In this context, epistemology and ontology are central to nursing philosophy. Epistemology addresses the nature, sources, and validation of nursing knowledge asking questions, such as how nurses know, what they know, and what counts as evidence (Sherwood, 2024). It encompasses diverse ways of knowing, including empirical, ethical, aesthetic, and personal knowledge, all of which contribute to a holistic understanding of patient care (Reed, 2022). Ontology, on the other hand, concerns the nature of being and defines core elements of nursing, such as person, health, environment, and the nursing role shaping how theorists conceptualize reality and practice in healthcare settings (Holmes et al., 2023).

Together, ontology and epistemology provide the philosophical foundation for building meaningful and coherent nursing theories. These theories, in turn, guide education, research, and clinical practice by articulating nursing-specific phenomena and maintaining the profession's intellectual autonomy (Pagnucci et al., 2024). They help distinguish nursing as an independent discipline by offering structured approaches to understanding complex human experiences and health-related situations (Löfgren et al., 2023).

The neglect of theory in nursing risks diminishing the focus on person-centered care and the social determinants of health critical aspects of the profession's identity. Therefore, it is essential that nursing scholars and doctoral candidates develop not only technical competence, but also philosophical insight and theoretical fluency to advance practice and research meaningfully.

The Role of Research in Nursing Science

In this sub-section, it is argued that some nursing research incorporates non-nursing phenomena, such as medical and biomedical topics. Although these domains are relevant to nursing practice, they do not stem from nursing-specific theories or philosophies and, therefore, should not serve as the foundational basis for nursing research frameworks if the unique identity of nursing

science is to be preserved.

Nursing academics play a pivotal role in shaping the research interests of doctoral candidates, primarily through mentorship and subject-matter expertise (Eugelyn & Guzman, 2025). Supervisors often guide students toward dissertation topics aligned with nursing-relevant phenomena and faculty research interests, thereby reinforcing the autonomy and scholarly development of the nursing profession (Karlsholm et al., 2024).

The pedagogical influence of nursing academics also extends to methodological preferences and theoretical orientations, shaping how doctoral candidates conceptualize their research from the outset (Douglas, 2021). Evidence-based Practice (EBP) serves as a cornerstone of nursing by integrating the best available evidence, clinical expertise, and patient values into clinical decision-making (Larsen et al., 2019). Nursing research underpins EBP by generating the scientific knowledge necessary to inform clinical guidelines, improve patient outcomes, and address gaps in care (Dagne & Tebeje, 2021).

EBP bridges the gap between theory and practice, enhancing the scientific and philosophical underpinnings of nursing by demonstrating how conceptual frameworks translate into tangible improvements in care (Pitsillidou et al., 2021). It also reinforces the professional identity of nursing as a rigorous, evidence-driven discipline.

Furthermore, EBP fosters a culture of lifelong learning and critical thinking, ensuring that nurses remain current with evolving standards and best practices (Mohamed et al., 2024). Nurses who implement EBP often experience greater job satisfaction, driven by improved competence and confidence. Evidence-based protocols also enhance care efficiency; reduce complications and hospital stays, and lower healthcare costs (Mohamed et al., 2024).

Policy Pathways to Enhance Nursing Profession

Nursing policy shapes the identity of the profession by establishing a robust framework that defines its scope, values, standards, and priorities (Cornett et al., 2023). It also encourages alignment of nursing curricula with the unique epistemological and ontological foundations of the discipline, enriching both theory and practice while navigating its distinction from other health professions (Rice, 2023).

Nursing leaders and policymakers must recognize the significance of "habits of mind" and "ways of knowing," grounded in the theoretical and philosophical foundations of nursing science (Carper, 1978; Chinn & Kramer, 2018; White, 2009). There is a renewed call to emphasize these underpinnings in research and education. This involves fostering curricula that balance methodological rigor with intellectual curiosity, philosophical inquiry, and theory-driven research (Grace & Zumstein-Shaha, 2020). A solid grounding in nursing science ultimately equips nurses for greater leadership and decision-making roles, reinforcing their autonomy within interdisciplinary teams (Glarcher & Vaismoradi, 2024).

The Risks and Benefits of Interdisciplinary Integration in Nursing Doctoral Education

Interdisciplinary integration in nursing doctoral education involves blending knowledge, theories, and methods from fields, such as public health, sociology, informatics, policy, and engineering (Naga et al., 2025). This approach enhances nursing science by enabling nurse scholars to address complex issues, like social determinants of health, aging, and technological change, through comprehensive, cross-disciplinary solutions (Kim et al., 2022; Meleis, 2018).

Key benefits include increased research innovation and alignment with global health priorities, such as equity, climate change, and digital transformation (AACN, 2021; ICN, 2023). Interdisciplinary training also strengthens leadership and collaboration skills, preparing nurses for roles in clinical, academic, and policy settings (Ketefian & Redman, 2020). Graduates gain access to diverse career opportunities in areas, such as global health, data science, policy, and biomedical research (Pulcini et al., 2019), while collaborations with fields like law and economics amplify nursing's influence on health system reform (WHO, 2020).

However, this integration poses challenges, including the potential dilution of nursing identity, curriculum overload, and weakened disciplinary focus (Rishel & Ridenour, 2019). Interdisciplinary mentorship may result in inconsistent guidance if advisors lack grounding in nursing theory (Tuma et al., 2021). Institutional barriers, such as resistance to change and limited funding, also hinder implementation (Pulcini et al., 2019).

To ensure success, programs must preserve

nursing's core identity through intentional curriculum design, cohesive mentorship, and institutional support (AACN, 2021). When strategically applied, interdisciplinary education can enrich nursing science without compromising its foundational values.

Implications for Nursing

The paper underscores significant implications for advancing nursing science and strengthening professional identity across three key domains: education, policy, and clinical practice.

At the educational level, it emphasizes the need for doctoral programs to reinforce nursing's unique philosophical and theoretical foundations. By focusing on the discipline's distinct epistemological and ontological underpinnings, these programs can cultivate critical thinking, robust theory development, and methodological diversity. This approach prepares doctoral candidates, not just as researchers, but also as knowledge producers and leaders who actively shape the future of nursing science.

At the policy level, the paper stresses the importance of developing frameworks that explicitly recognize and support the unique contributions of nursing science to health systems and research. Targeted funding and inclusion of nurse scientists in policy-making processes are essential to sustain nursing's influence and ensure that its perspectives are integrated into healthcare innovation and decision-making. Such policies also raise the visibility of nursing science and foster interdisciplinary respect on both national and global stages.

Finally, in the realm of clinical practice, the integration of nursing-led research into everyday care is vital for delivering evidence-based, holistic, and patient-centered healthcare. Encouraging collaboration between practicing nurses and doctoral-prepared nurse scientists facilitates the translation of complex research into practical interventions. To support this synergy, healthcare systems must create formal mechanisms that bridge academic and clinical nursing, promoting

ongoing knowledge exchange and ultimately enhancing both nursing science and patient outcomes. Through coordinated efforts at these three levels, nursing science can strengthen its identity, expand its influence, and continue to contribute meaningfully to healthcare advancements.

Conclusion

Nursing is an applied science that focuses on human caring, requiring appropriate research methods grounded on a unique nursing theoretical and philosophical system. Additional consideration of nursing theories, philosophical assumptions, and research methodologies that shape nursing profession should remain a high precedence for the preparation of the next generation of nursing faculty as scholars and leaders.

The integrating of nursing perspectives into national and international research agendas and health innovation strategies will promote the development of nursing research methodologies, for instance EBP, practice advancement, and patient-centered care, reflected collectively on improving healthcare system outcomes.

Ethical Approval

Ethical approval was not required for this paper.

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Conflict of Interests

The authors have no conflict of interests to declare.

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REFERENCES

- American Association of Colleges of Nursing (AACN). (2021). *The essentials: Core competencies for professional nursing education*. <https://www.aacnnursing.org/Essentials>
- Barnden, R., Snowdon, D.A., Lannin, N.A., Lynch, E., Srikanth, V., & Andrew, N.E. (2023). Prospective application of theoretical implementation frameworks to improve health care in hospitals: A systematic review. *BMC Health Services Research*, 23(1), 607. <https://doi.org/10.1186/s12913-023-09609-y>

- Carper, B.A. (1978). Fundamental patterns of knowing in nursing. *Advances in Nursing Science*, 1(1), 13-23. <https://doi.org/10.1097/00012272-197810000-00004>
- Chinn, P.L., & Kramer, M.K. (2018). *Knowledge development in nursing: Theory and process* (10th edn.). Elsevier.
- Connor, J., Flenady, T., Massey, D., & Dwyer, T. (2023). Clinical judgement in nursing: An evolutionary concept analysis. *Journal of Clinical Nursing*, 32(13-14), 3328-3340. <https://doi.org/10.1111/jocn.16469>
- Cornett, M., Palermo, C., & Ash, S. (2023). Professional identity research in the healthprofessions: A scoping review. *Advances in Health Sciences Education: Theory and Practice*, 28(2), 589-642. <https://doi.org/10.1007/s10459-022-10171-1>
- Dagne, A.H., & Tebeje, H.D. (2021). Research utilisation in clinical practice: The experience of nurses and midwives working in public hospitals. *Reproductive Health*, 18(1), 62. <https://doi.org/10.1186/s12978-021-01095-x>
- Douglas, A.S. (2021). Dimensions of fit for doctoral candidates: Supporting an academic identity. *Research Papers in Education*, 37(6), 954-974. <https://doi.org/10.1080/02671522.2021.1905704>
- Downie, S., Walsh, J., Kirk-Brown, A., & Haines, T.P. (2023). How can scope of practice be described and conceptualised in medical and health professions? A systematic review for scoping and content analysis. *The International Journal of Health Planning and Management*, 38(5), 1184-1211. <https://doi.org/10.1002/hpm.3678>
- Eugelyn, M.G., & Guzman, M.M. (2025). Mentorship in doctoral nursing education: Cultivating discipline-focused scholarship. *Nursing Education Perspectives*. <https://doi.org/10.1111/jan.70004>
- Glarcher, M., & Vaismoradi, M. (2024). A systematic integrative review of specialized nurses' role to establish a culture of patient safety: A modeling perspective. *Journal of Advanced Nursing*. <https://doi.org/10.1111/jan.16105>
- Grace, P.J., & Zumstein-Shaha, M. (2020). Nursing theory in the discipline of nursing. *Nursing Philosophy*, 21(1), e12329. <https://doi.org/10.1111/nup.12329>
- Grace, P.J., & Zumstein-Shaha, M. (2020). Using Ockham's razor to redefine "nursing science." *Nursing Philosophy*, 21(3), e12288. <https://doi.org/10.1111/nup.12288>
- Grace, P.J. et al. (2022). The place of philosophy in nursing education. *Journal of Nursing Scholarship*, 54(2), 123-130.
- Grace, P.J., Willis, D.G., Roy, C., & Jones, D.A. (2022). Nursing knowledge and theory innovation: advancing the science of practice. *Nursing Outlook*, 70(1), 5-13. <https://doi.org/10.1016/j.outlook.2021.08.001>
- Hansen, B.S., & Dysvik, E. (2022). Expanding the theoretical understanding in advanced practice nursing: Framing the future. *Nursing Forum*, 57(6), 1593-1598. <https://doi.org/10.1111/nuf.12827>
- He, X., Mao, Y., Cao, H., Li, L., Wu, Y., & Yang, H. (2024). Factors influencing the development of nursing professionalism: A descriptive qualitative study. *BMC Nursing*, 23(1), 283. <https://doi.org/10.1186/s12912-024-01945-6>
- Holmes, D., Turcotte, P., Adam, S., Johansson, J., & Orser, L. (2023). Toward an ontology of the mutant in health sciences: Re/defining the person from Cronenberg's perspective. *Nursing Inquiry*, 31(1). <https://doi.org/10.1111/nin.12599>
- International Council of Nurses (ICN). (2023). *Global strategic directions for nursing and midwifery 2021-2025*. <https://www.icn.ch>
- International Council of Nurses (ICN). (2023). *Strategic directions 2023-2027*. <https://www.icn.ch>
- Jensen, K.T., & Jerpseth, H. (2023). Nursing students' perception of nursing knowledge: A qualitative study. *Nursing Open*, 10(10), 7058-7065. <https://doi.org/10.1002/nop2.1964>
- Karlsholm, G., André, B., & Grønning, K. (2024). Supervising undergraduate nursing students on their bachelor's thesis: A qualitative study. *SAGE Open Nursing*, 10, 23779608231226074. <https://doi.org/10.1177/23779608231226074>
- Ketefian, S., & Redman, R.W. (2020). Nursing science and the research doctorate. In C.L. Meleis (Ed.), *Theoretical nursing: Development and progress* (6th edn., pp. 333-348). Wolters Kluwer.
- Kim, H., Choi, M., & Song, R. (2022). Exploring interdisciplinary research collaboration in nursing: A scoping review. *Journal of Advanced Nursing*, 78(4), 879-892. <https://doi.org/10.1111/jan.15084>
- Ladden, M.D., Kelley, H.J., McBride, A.B., Fairman, J., & Hassmiller, S. (2024). Preparing the next generation of nurse leaders in education, science, and practice: Lessons from four Robert Wood Johnson foundation programs. *Nursing Outlook*, 73(1), 102314. <https://doi.org/10.1016/j.outlook.2024.102314>

- Larsen, C.M., Terkelsen, A.S., Carlsen, A.M.F., & Kristensen, H.K. (2019). Methods for teaching evidence-based practice: A scoping review. *BMC Medical Education*, 19(1), 33. <https://doi.org/10.1186/s12909-019-1681-0>
- Larsen, R. et al. (2019). The role of evidence-based practice in nursing doctoral education. *Journal of Professional Nursing*, 35(1), 16-22.
- Loewa, A., Feng, J. J., & Hedtrich, S. (2023). Human disease models in drug development. *Nature Reviews Bioengineering*, 1-15. Advance online publication. <https://doi.org/10.1038/s44222-023-00063-3>
- Löfgren, U., Wälivaara, B. M., Strömbäck, U., & Lindberg, B. (2023). The nursing process: A supportive model for nursing students' learning during clinical education: A qualitative study. *Nurse Education in Practice*, 72, 103747. <https://doi.org/10.1016/j.nepr.2023.103747>
- Megersa, Y., Dechasa, A., Shibru, A., Mideksa, L., & Tura, M.R. (2023). Evidence-based practice utilisation and its associated factors among nurses working at public hospitals in West Shoa zone, central Ethiopia: A cross-sectional study. *BMJ Open*, 13(1), e063651. <https://doi.org/10.1136/bmjopen-2022-063651>
- Meleis, A.I. (2018). *Theoretical nursing: Development and progress* (6th edn.). Wolters Kluwer.
- Mohamed, R.A., Alhujaily, M., Ahmed, F.A., Nouh, W.G., & Almowafy, A.A. (2024). Nurses' experiences and perspectives regarding evidence-based practice implementation in healthcare context: A qualitative study. *Nursing Open*, 11(1), e2080.
- Naga, B.S.H.B., Hayajneh, F., & Othman, E.H. (2025). Enhancing clinical training in nursing education: overcoming barriers and exploring innovative solutions. *International Journal of Nursing Education*, 17(3), 2-9. <https://doi.org/10.37506/my5pfk28>
- Oldland, E., Botti, M., Hutchinson, A.M., & Redley, B. (2019). A framework of nurses' responsibilities for quality healthcare: exploration of content validity. *Collegian Journal of the Royal College of Nursing Australia*, 27(2), 150-163. <https://doi.org/10.1016/j.colegn.2019.07.007>
- Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., ..., & Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Systematic Reviews*, 10(1), 89. <https://doi.org/10.1186/s13643-021-01626-4>
- Pagnucci, N., Tolotti, A., Valcarengi, D., Carnevale, F., Sasso, L., & Bagnasco, A. (2024). Conceptualising nursing theory and practice within a local cultural and professional context: A methodological example to inform theory development. *Journal of Research in Nursing: JRN*, 17449871241268493. Advance online publication. <https://doi.org/10.1177/17449871241268493>
- Paré, G., & Kitsiou, S. (2017). Methods for literature reviews. In F. Lau & C. Kuziemsky (Eds.), *Handbook of eHealth evaluation: An evidence-based approach* [Internet]. University of Victoria. <https://www.ncbi.nlm.nih.gov/books/NBK481583/>
- Parse R.R. (2015). Nursing: A basic or applied science? *Nursing Science Quarterly*, 28(3), 181-182. <https://doi.org/10.1177/0894318415585636>
- Parse, R.R. (2025). Human becoming and the future of nursing science. *Nursing Science Quarterly*, 38(1), 5-9. DOI: [10.1177/08943180222108732](https://doi.org/10.1177/08943180222108732)
- Parse, R.R. (2025). Nursing science: What's included and what's not? *Nursing Science Quarterly*, 38(1), 5. <https://doi.org/10.1177/089431842412915577>
- Pitsillidou, M. et al. (2021). Conceptual models and evidence-based practice in nursing: Bridging the gap. *International Journal of Nursing Studies Advances*, 3, 100018. <https://doi.org/10.1016/j.ijnsa.2021.100018>
- Pitsillidou, M., Roupá, Z., Farmakas, A., & Noura, M. (2021). Factors affecting the application and implementation of evidence-based practice in nursing. *Journal of the Society for Medical Informatics of Bosnia & Herzegovina*, 29(4), 281-287. <https://doi.org/10.5455/aim.2021.29.281-287>
- Potter, P.A., Perry, A.G., Stockert, P.A., & Hall, A.M. (2023). *Fundamentals of nursing* (11th edn.). Elsevier.
- Pulcini, J., Jelic, M., Gul, R., & Loke, A.Y. (2019). An overview of nursing doctoral education programs in five countries: A descriptive comparison. *Nurse Education in Practice*, 37, 24-30. <https://doi.org/10.1016/j.nepr.2019.04.004>
- Reed, P.G. (2022). Epistemological evolution in nursing: The imperative of philosophical inquiry. *Nursing Science Quarterly*, 35(1), 14-20.
- Reed, P.G. (2022). Standpoint epistemology and nursing science. *Nursing Science Quarterly*, 35(1), 41-45. <https://doi.org/10.1177/08943184211051361>
- Rehg, E., & SmithBattle, L. (2015). On to the 'rough ground': Introducing doctoral students to philosophical perspectives on knowledge. *Nursing Philosophy: An International Journal for Healthcare Professionals*,

- 16(2), 98-109. <https://doi.org/10.1111/nup.12077>
- Rice B. M. (2023). Using nursing science to advance policy and practice in the context of social and structural determinants of health. *Nursing Outlook*, 71(6), 102060. <https://doi.org/10.1016/j.outlook.2023.102060>
- Rishel, C.J., & Ridenour, N. (2019). Advancing nursing science through innovative curriculum design in PhD education. *Nursing Outlook*, 67(5), 499-506. <https://doi.org/10.1016/j.outlook.2019.03.005>
- Rodríguez-Pérez, M., Mena-Navarro, F., Domínguez-Pichardo, A., & Teresa-Morales, C. (2022). Current social perception of and value attached to nursing professionals' competences: An integrative review. *International Journal of Environmental Research and Public Health*, 19(3), 1817. <https://doi.org/10.3390/ijerph19031817>
- Rosario, A.A., Gau, A., Munsterman, E., & Ancheta, A.J. (2024). Decolonizing nursing for health equity: A scoping review. *Nursing outlook*, 72(5), 102230. <https://doi.org/10.1016/j.outlook.2024.102230>
- Saifan, A., Devadas, B., Daradkeh, F., Abdel-Fattah, H., Aljabery, M., & Michael, L.M. (2021). Solutions to bridge the theory-practice gap in nursing education in the UAE: A qualitative study. *BMC Medical Education*, 21(1), 490. <https://doi.org/10.1186/s12909-021-02919-x>
- Sherwood G. (2024). Reflective practice and knowledge development: Transforming research for a practice-based discipline. *International Journal of Nursing Sciences*, 11(4), 390-404. <https://doi.org/10.1016/j.ijnss.2024.08.002>
- Smaldone, A., & Larson, E.L. (2021). What PhD competencies should guide the preparation of nurse scientists? *Journal of Professional Nursing*, 37(1), 201-203. <https://doi.org/10.1016/j.profnurs.2020.06.010>
- Smith, M.C. (2019). Regenerating nursing's disciplinary perspective. *Advances in Nursing Science*, 42(1), 3-16. <https://doi.org/10.1097/ANS.0000000000000241>
- Smith, M.C., & Parker, M.E. (2020). *Nursing theories and nursing practice* (5th edn.). F.A. Davis.
- Tuma, T.T., Adams, J.D., Hultquist, B.C., & Dolan, E.L. (2021). The dark side of development: A system characterization of the negative mentoring experiences of doctoral students. *CBE—Life Sciences Education*, 20(2), ar16. <https://doi.org/10.1187/cbe.20-10-0231>
- Turkowski, Y., & Turkowski, V. (2024). Florence Nightingale (1820-1910): The founder of modern nursing. *Cureus*, 16(8), e66192. <https://doi.org/10.7759/cureus.66192>
- Tweedie, J., Pelly, F., Wright, H., & Palermo, C. (2025). Exploring the adoption of concept based curricula: Insights from educators and implications for change. *Advances in Health Sciences Education: Theory and Practice*, 30(1), 223-237. <https://doi.org/10.1007/s10459>
- Warren, J.L., & Warren, J.S. (2023). The case for understanding interdisciplinary relationships in health care. *Ochsner Journal*, 23(2), 94-97. <https://doi.org/10.31486/toj.22.0111>
- White, J. (2009). Patterns of knowing: Review, critique, and update. *Advances in Nursing Science*, 32(1), E1-E13. <https://doi.org/10.1097/01.ANS.0000341415.50766.0b>
- World Health Organization (WHO). (2020). *State of the world's nursing 2020: Investing in education, jobs and leadership*. <https://www.who.int/publications/i/item/9789240003279>