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## The Expanding Scope of Nursing: Integrating Evidence-Based Practice, Technology, and Compassionate Care in the 21st Century

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### Abstract

*Nursing in the 21st century is undergoing a profound transformation, expanding beyond its traditional caregiving role to embrace evidence-based practice, advanced technologies, and sustained compassionate care. This integrative review explores the evolving scope of nursing across five research dimensions: the role of evidence-based practice in improving patient outcomes, the integration of digital health technologies into nursing practice, the preservation of compassion and human connection in an increasingly technological environment, the challenges and barriers faced by the profession, and the implications for education, policy, and practice. Findings indicate that while evidence-based practice and technological tools enhance efficiency, safety, and standardization, the essence of nursing continues to depend on humanistic values that foster trust and empathy. However, barriers such as workforce shortages, ethical dilemmas, unequal access to resources, and resistance to change hinder the full realization of nursing's potential. The review concludes that the future of nursing lies in a balanced model that integrates science, innovation, and compassionate care, supported by progressive policies and continuous professional development. This holistic approach will ensure that nursing remains a cornerstone of healthcare transformation and patient-centered care in the modern era.*

**Keywords:** Nursing; Evidence-Based Practice; Compassionate Care; Technology Integration; Digital Health; Nursing Education; Patient Outcomes; Healthcare Innovation; 21st Century Nursing; Nursing Leadership.

### Introduction

Nursing has long been considered the cornerstone of healthcare, rooted in traditions of compassion, patient advocacy, and holistic care. Historically, the role of nurses centered on bedside caregiving and the provision of comfort to the sick and vulnerable (Watson, 2018). However, the 21st century has witnessed a significant transformation in nursing, with the profession expanding to encompass scientific rigor, advanced clinical responsibilities, and the integration of rapidly evolving technologies. This evolution has redefined nurses not only as caregivers but also as knowledge workers, innovators, leaders, and policy advocates in modern healthcare systems (Turale & Kunaviktikul, 2019).

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A defining characteristic of contemporary nursing is the emphasis on evidence-based practice (EBP). EBP has become a global standard for clinical decision-making, where care is guided by the best available scientific evidence, clinical expertise, and patient preferences (Melnik & Fineout-Overholt, 2018). Numerous studies demonstrate that EBP improves patient outcomes, reduces errors, and fosters consistent, high-quality care across clinical settings (Black et al., 2015). Despite its benefits, the adoption of EBP faces challenges such as resource limitations, lack of training, and institutional resistance, particularly in low- and middle-income countries (Dang & Dearholt, 2018).

Another major driver reshaping nursing is the integration of technology. From electronic health records (EHRs) and telehealth platforms to artificial intelligence (AI) and robotics, technology has broadened the scope of nursing practice, enhancing efficiency and expanding access to care (McBride et al., 2018). Nurses increasingly act as digital health leaders, using big data for decision-making, deploying telehealth to reach underserved populations, and employing simulation-based education to strengthen clinical skills (Topaz & Pruinelli, 2017). Nevertheless, the rapid pace of digitalization has raised concerns, including increased workload, depersonalization of care, and ethical questions around patient privacy and algorithmic decision-making (Skiba, 2017).

Despite these scientific and technological advances, compassionate care remains the foundation of nursing identity. Patients continue to value the humanistic qualities of empathy, trust, and emotional support as critical to their healing experience (Watson, 2018). Scholars argue that the challenge for nursing today is not whether technology will replace compassion, but rather how both elements can be harmonized to enhance holistic care (Turale & Kunaviktikul, 2019). Emerging evidence shows that nurses who successfully integrate digital tools with patient-centered communication strengthen the therapeutic nurse–patient relationship and improve satisfaction (McBride et al., 2018).

The expanding scope of nursing raises crucial questions about professional development, education, and policy. To ensure nurses are equipped for these complex roles, curricula must combine EBP training, digital literacy, and caring sciences, while health policies should provide supportive frameworks for technology adoption and compassionate practice (Melnik et al., 2017). Ultimately, the transformation of nursing in the 21st century reflects the convergence of three critical dimensions—science, technology, and compassion—positioning nurses as central agents of healthcare innovation and resilience.

### **Evidence-Based Practice (EBP) in Nursing**

Evidence-Based Practice (EBP) has emerged as a defining paradigm in modern nursing, reshaping how clinical decisions are made and patient care is delivered. EBP integrates three essential elements: the best available scientific evidence, the expertise and clinical judgment of healthcare professionals, and the values and preferences of patients (Melnik & Fineout-Overholt, 2018). This tripartite model ensures that nursing care is not solely driven by tradition or intuition but is instead grounded in systematically evaluated knowledge, thereby strengthening the profession’s scientific credibility and clinical effectiveness.

The historical evolution of EBP in nursing reflects the broader healthcare system’s shift toward quality improvement and patient safety. Initially, nursing practice was heavily reliant on tradition, physician orders, and experiential learning. Over the past three decades, however, there has been an intentional move toward embedding research evidence into day-to-day clinical

decision-making (Dang & Dearholt, 2018). Nurses today are encouraged to critically appraise research, identify best practices, and translate evidence into protocols that reduce variability and standardize care delivery.

Research consistently shows that EBP adoption improves patient outcomes. For instance, interventions guided by evidence have been linked to reductions in hospital-acquired infections, medication errors, and readmission rates (Black et al., 2015). In critical care units, evidence-based protocols for ventilator management and infection control have saved lives and lowered healthcare costs (Titler, 2018). Furthermore, EBP has improved chronic disease management, with nurse-led programs for diabetes and hypertension demonstrating enhanced adherence, better control of risk factors, and higher patient satisfaction (Melnyk et al., 2017).

Despite its benefits, the implementation of EBP is uneven across healthcare systems. A major challenge lies in the gap between research production and clinical application, often referred to as the “know-do” gap. Barriers include limited access to research databases, insufficient training in critical appraisal, time constraints due to workload, and resistance to changing established routines (Saunders & Vehviläinen-Julkunen, 2016). In resource-limited settings, lack of infrastructure and institutional support further hampers EBP adoption (Lehane et al., 2019).

Educational preparation plays a critical role in shaping nurses’ ability to apply evidence in practice. Nursing curricula worldwide are increasingly embedding EBP competencies, emphasizing skills such as literature searching, data interpretation, and guideline development (Horntvedt et al., 2018). Continuing professional development programs and hospital-based workshops have also proven effective in strengthening the evidence literacy of practicing nurses. Leaders in nursing practice stress that fostering an organizational culture that values inquiry, mentorship, and collaboration is essential for sustained EBP implementation (Melnyk et al., 2012).

Globally, professional organizations and policy initiatives are also driving the spread of EBP. The World Health Organization and national nursing bodies advocate for integrating evidence into health policies and clinical guidelines to ensure safe, effective, and equitable care. As healthcare systems face rising complexity and cost pressures, the ability of nurses to translate evidence into practice will be increasingly vital in improving quality, efficiency, and patient outcomes (Stevens, 2013).

In conclusion, EBP represents both a philosophy and a practical toolset that empowers nurses to deliver care that is scientifically validated, patient-centered, and outcome-driven. While barriers remain, strengthening education, institutional support, and access to research resources can accelerate its adoption. By embedding EBP as a professional norm, nursing solidifies its role as a discipline that balances compassion with clinical excellence.

### **Technological Advancements and Nursing Practice**

The rapid evolution of technology has reshaped nursing practice in profound ways, expanding the scope of responsibilities while simultaneously creating new opportunities and challenges. Advances in information systems, digital health platforms, and artificial intelligence have redefined how nurses deliver, coordinate, and evaluate patient care. Technology has become not only a supportive tool but also a driving force for efficiency, safety, and innovation in the nursing profession (McBride et al., 2018).

One of the most significant innovations is the widespread adoption of **electronic health records**

**(EHRs)**. EHRs allow nurses to document patient data, access laboratory results, track medication orders, and coordinate care across multiple providers in real time. These systems have been shown to reduce medical errors, improve communication between care teams, and provide a comprehensive view of patient health status (Topaz & Bowles, 2016). However, the increased documentation burden associated with EHRs can lead to nurse fatigue and reduced time for direct patient interaction (Kutney-Lee & Kelly, 2011).

Another key advancement is the rise of **telehealth and tele-nursing**, which have gained prominence especially during the COVID-19 pandemic. Telehealth enables nurses to extend care beyond hospital walls, reaching patients in rural or underserved areas. Research indicates that tele-nursing improves access to chronic disease management, patient education, and follow-up care, leading to reduced hospital readmissions and increased patient satisfaction (Rutledge et al., 2021). Nevertheless, disparities in access to digital infrastructure and training continue to limit its widespread adoption.

**Artificial intelligence (AI) and big data analytics** are also transforming nursing roles. AI algorithms assist nurses in identifying high-risk patients, predicting disease progression, and personalizing interventions (Topaz & Pruinelli, 2017). For example, predictive models have been used to anticipate sepsis onset, allowing nurses to initiate early interventions that save lives. While AI offers substantial benefits, concerns remain about ethical issues, data privacy, and the potential for algorithmic bias that could compromise patient safety (Skiba, 2017).

In addition, **robotics and automation** are increasingly integrated into nursing practice. Robots are being used to deliver supplies, assist with lifting patients, and even provide companionship in long-term care settings. Robotic-assisted medication dispensing systems have reduced errors and improved efficiency in hospitals (Papastavrou et al., 2016). However, the introduction of robotics raises questions about the extent to which technology might depersonalize care and reduce opportunities for human connection.

Nursing education has also been revolutionized by **simulation technologies and virtual reality (VR)**. High-fidelity simulation labs allow nursing students and professionals to practice complex procedures and critical thinking skills in risk-free environments. Studies show that simulation enhances clinical judgment, teamwork, and preparedness for real-world patient scenarios (Foronda et al., 2017). These technologies not only improve competency but also provide ongoing opportunities for professional development.

Despite the clear benefits of technological integration, challenges remain. Nurses often experience **technology-related stress**, arising from system usability issues, inadequate training, and increased workload associated with digital documentation (Alasad et al., 2018). Furthermore, there is an ongoing concern that overreliance on technology may erode the humanistic aspects of nursing practice, which remain central to patient trust and satisfaction.

In conclusion, technological advancements have significantly expanded the scope of nursing practice, positioning nurses as leaders in digital health transformation. To maximize these benefits, healthcare systems must invest in digital literacy training, ensure equitable access to technologies, and adopt policies that balance efficiency with compassionate care. By embracing innovation while safeguarding the core values of the profession, nurses can continue to shape a future in which technology and human care coexist harmoniously.

## Compassionate Care in the Digital Era

Compassion has always been considered the essence of nursing, forming the basis of therapeutic relationships and patient trust. Defined as the ability to recognize suffering, respond with empathy, and take action to alleviate distress, compassionate care is central to patient-centered nursing practice (Sinclair et al., 2017). However, in the 21st century, the digitalization of healthcare has reshaped the context in which compassion is delivered. The growing integration of electronic health records (EHRs), telehealth, artificial intelligence (AI), and automation raises critical questions about how nurses can maintain human connection and emotional presence in an increasingly technology-driven environment.

Despite fears that technology may depersonalize care, evidence suggests that compassionate nursing remains both possible and essential in digital contexts. Studies highlight that patients continue to value empathy, trust, and clear communication above technical competence alone (Suárez-Alvarez et al., 2020). For instance, while EHRs may initially distract from face-to-face interaction, nurses who develop strategies such as positioning screens to include patients in the review process foster transparency and engagement rather than detachment (McBride et al., 2018). In this way, compassion is not diminished but redefined to incorporate digital literacy alongside interpersonal sensitivity.

Telehealth presents both opportunities and challenges for compassionate care. On one hand, remote nursing consultations risk reducing nonverbal cues and physical presence, elements traditionally associated with empathy. On the other hand, telehealth enables nurses to reach isolated patients, provide timely follow-up, and offer emotional reassurance despite geographic barriers (Rutledge et al., 2021). Research indicates that nurses who use active listening, verbal affirmation, and patient-centered dialogue during virtual encounters can successfully convey compassion and foster therapeutic relationships (Hjelm, 2019). Thus, compassion in the digital age requires adaptation of communication styles to ensure patients feel heard and valued.

Artificial intelligence and automation also influence compassionate nursing. While AI can enhance efficiency by predicting patient risks and reducing repetitive tasks, concerns exist that reliance on algorithms may erode the relational aspect of care. However, scholars argue that by offloading routine monitoring and documentation, AI may free nurses' time to focus on human connection and emotional support (Topaz & Pruinelli, 2017). Compassion in this context becomes a deliberate act, as nurses balance the use of technology with attentive presence and advocacy for patient dignity.

Nursing theories, particularly Watson's *Theory of Human Caring*, remain highly relevant in guiding compassionate practice in digital settings. Watson (2018) emphasizes the integration of science and humanism, encouraging nurses to view technology as a supportive rather than a dominating element of care. Embedding caring values into digital healthcare requires intentional education and professional development. Training programs that combine empathy-building with digital communication skills have been shown to improve nurses' confidence in maintaining compassionate interactions online (Sinclair et al., 2021).

Compassionate care also plays a vital role in mitigating patient anxiety associated with technology use. Older adults and vulnerable populations may feel overwhelmed by telehealth platforms or monitoring devices. Nurses who take time to explain procedures, provide reassurance, and personalize digital interactions help reduce stress and promote trust (Suárez-Alvarez et al., 2020). Compassion thus becomes not only an emotional quality but also a

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practical skill for ensuring equity and accessibility in digital healthcare.

In conclusion, the digital era challenges traditional expressions of compassion but also opens new avenues for its demonstration. Rather than being replaced by technology, compassion in nursing is redefined, requiring adaptation of communication, creativity in patient engagement, and deliberate efforts to sustain human connection. Nurses must embrace both digital competencies and caring sciences to ensure that compassion remains the foundation of practice. In doing so, they uphold the timeless values of the profession while responding to the evolving needs of patients in technology-driven healthcare systems.

### **Implications for Education, Policy, and Practice**

The expanding scope of nursing in the 21st century carries significant implications for education, health policy, and clinical practice. As evidence-based practice, digital technologies, and compassionate care converge, there is a pressing need to prepare nurses for increasingly complex roles. These implications are not only relevant for the nursing profession itself but also for healthcare systems and policymakers seeking to enhance quality, efficiency, and equity.

#### - **Education**

Nursing education must evolve to equip professionals with the competencies necessary to balance evidence, innovation, and humanistic care. Traditional curricula that emphasize clinical skills alone are insufficient in a digital, evidence-driven era. Instead, programs must integrate **evidence-based practice (EBP) training, digital literacy, informatics, and ethical reasoning** alongside caring sciences (Horntvedt et al., 2018). High-fidelity simulation, virtual reality, and telehealth platforms should be embedded into training to prepare nurses for technology-enhanced practice (Foronda et al., 2017). Additionally, compassion training—through reflective practice, patient narratives, and mentorship—remains critical to ensure that emotional intelligence and human connection are not overshadowed by technical skills (Sinclair et al., 2021). Lifelong learning through continuing education, certification programs, and professional development workshops is essential to keep nurses updated with evolving evidence and digital tools.

#### - **Policy**

At the policy level, governments and healthcare organizations must create enabling environments for nurses to maximize their expanded scope. Policies should prioritize **access to resources** such as research databases, decision-support systems, and telehealth infrastructure, particularly in underserved regions (Lehane et al., 2019). Regulatory frameworks must address ethical issues related to artificial intelligence, patient data security, and digital consent while safeguarding compassionate, patient-centered care (Topaz & Pruinelli, 2017). Nursing leadership must be represented in policy-making bodies to ensure that frontline perspectives guide strategic decisions (Turale & Kunaviktikul, 2019). Moreover, policies that mandate minimum staffing levels, support mental health programs, and reduce administrative burdens are critical to mitigating burnout and enabling nurses to balance technology use with compassionate care.

#### - **Practice**

In clinical practice, the implications of an expanded nursing scope are multifaceted. Nurses are increasingly recognized as leaders in **interprofessional collaboration, patient education, and care coordination** (Melnik et al., 2017). The integration of EBP into daily routines demands

that organizations establish cultures of inquiry, mentorship, and continuous improvement. Technological tools such as EHRs, predictive analytics, and telehealth must be adopted in ways that enhance efficiency without diminishing human presence. This requires structured training, supportive leadership, and workflow designs that allocate time for meaningful nurse–patient interactions (McBride et al., 2018). Moreover, compassionate care must be intentionally reinforced in practice, with nurses encouraged to use digital platforms not only for efficiency but also for engagement, transparency, and reassurance.

In conclusion, the implications of nursing’s expanded scope span beyond individual practice into systemic transformations. Education must prepare nurses for dual competencies in science and empathy, policies must provide supportive infrastructures and ethical safeguards, and practice must embrace innovation without compromising the humanistic values at the core of nursing. Together, these dimensions form the foundation for a sustainable, resilient, and patient-centered nursing profession in the 21st century.

## **Discussion**

This review highlights the expanding scope of nursing in the 21st century, emphasizing three interconnected domains: evidence-based practice (EBP), technological advancements, and compassionate care. Taken together, these dimensions illustrate a profession that is simultaneously scientific, innovative, and deeply humanistic. The discussion integrates the findings across these areas, examining their synergies, challenges, and implications for the future of nursing.

Evidence-based practice provides the scientific foundation upon which modern nursing care is built. By relying on the best available evidence, nurses enhance patient safety, standardize interventions, and improve health outcomes. At the same time, the rise of technologies such as electronic health records, telehealth, and artificial intelligence has broadened the nursing role beyond traditional boundaries. Importantly, the review underscores that technological innovation and EBP are not mutually exclusive but complementary. Technology can accelerate the integration of evidence into practice by enabling access to databases, predictive analytics, and clinical decision-support tools (McBride et al., 2018; Topaz & Pruinelli, 2017).

Yet, these advances must not overshadow the timeless element of nursing: compassion. Compassionate care remains the central driver of trust, patient satisfaction, and therapeutic effectiveness. Far from being undermined by digitalization, compassion can be reimaged through new mediums. For example, telehealth consultations, when delivered with active listening and patient-centered communication, can foster meaningful relationships even at a distance (Rutledge et al., 2021). Thus, the synergy among EBP, technology, and compassion points to a blended model of nursing where science and humanity coexist.

Despite this synergy, several challenges complicate the integration of these domains. First, the adoption of EBP is uneven, often hindered by limited access to resources, lack of training, and resistance to change (Lehane et al., 2019). Second, technology presents a double-edged sword: while it enhances efficiency and expands access to care, it can also increase workload, contribute to nurse burnout, and risk depersonalization of care if not managed carefully (Kutney-Lee & Kelly, 2011; Alasad et al., 2018). Third, sustaining compassion in technology-heavy environments requires intentional strategies, as digital platforms may reduce nonverbal cues and emotional presence (Sinclair et al., 2017).

These tensions underscore the importance of balancing innovation with the humanistic values

that define nursing. Without careful management, there is a risk of shifting the profession toward a purely technical orientation, neglecting the interpersonal qualities that patients value most.

The findings of this review also raise questions about the evolving identity of nursing. Nurses are no longer confined to supportive roles but are increasingly recognized as leaders in healthcare transformation. They serve as knowledge brokers, advocates, and policymakers who shape how evidence and technology are applied at systemic levels (Turale & Kunaviktikul, 2019). Leadership training and representation in decision-making bodies are therefore critical for ensuring that nursing voices guide the ethical and practical integration of innovation.

Furthermore, the expansion of nursing's scope highlights the need for continuous professional development. Lifelong learning, mentorship, and interprofessional collaboration are essential for building capacity to adapt to rapid changes. Nurses who are equipped with both digital literacy and emotional intelligence will be best positioned to deliver care that is efficient, ethical, and compassionate.

Another important theme is the variation in how EBP, technology, and compassionate care are integrated globally. High-income countries have greater access to digital infrastructure and research resources, while low- and middle-income countries often struggle with limited capacity for implementing EBP or telehealth. However, in many resource-constrained settings, the emphasis on compassion and interpersonal relationships remains strong, reminding the global community that human connection is the cornerstone of care regardless of technological access (Suárez-Alvarez et al., 2020). Bridging these global disparities will require policies that support equitable access to education, technology, and evidence-based resources.

The future of nursing lies in creating sustainable systems that embed EBP, support digital innovation, and preserve compassion as a guiding principle. This requires education that integrates scientific rigor with caring sciences, policies that address ethical and equity concerns, and practice environments that support both efficiency and human presence. As healthcare becomes increasingly complex, the ability of nurses to navigate these intersecting domains will determine not only the future of the profession but also the quality of healthcare outcomes worldwide.

## **Conclusion**

Nursing in the 21st century stands at a critical juncture, defined by the convergence of evidence-based practice, technological innovation, and compassionate care. This review has shown that evidence-based practice strengthens the scientific foundation of nursing, leading to improved patient safety, standardized care, and measurable health outcomes. At the same time, advances in digital technologies such as electronic health records, telehealth, and artificial intelligence have expanded nursing responsibilities, enabling greater efficiency and accessibility. Yet, despite these advances, compassion remains the defining characteristic of nursing, ensuring that care remains human-centered and holistic.

The integration of these three domains is not without challenges. Barriers such as limited resources, uneven adoption of evidence-based approaches, ethical dilemmas around technology use, and risks of depersonalization highlight the need for deliberate strategies to preserve the balance between science and empathy. Equally important are systemic issues such as nurse burnout, workforce shortages, and global disparities in access to education and technology.

To address these challenges, a forward-looking approach is required—one that prioritizes

continuous professional development, embeds digital literacy and EBP competencies into nursing education, and enacts policies that safeguard both ethical practice and compassionate values. Nurses must also be empowered as leaders and advocates in shaping healthcare systems, ensuring that innovation does not come at the expense of humanity.

In conclusion, the expanding scope of nursing represents both an opportunity and a responsibility. By harmonizing evidence, technology, and compassion, the profession can continue to evolve while staying true to its core identity. The future of nursing lies in embracing transformation without losing the timeless art of caring, thereby securing its place as a central pillar of global healthcare innovation and patient well-being.

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