

Digital Empathy in Nursing: A Systematic Review

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Received April 8, 2025; Accepted August 5, 2025; Online Published December 30, 2025

Abstract

Introduction: Digital empathy has become an essential component in modern nursing care, particularly as healthcare systems increasingly rely on digital communication tools. This systematic review explores the concept, practical applications, and outcomes of digital empathy in nursing practice. The goal is to understand how digital empathy contributes to patient-centered care and emotional support in virtual healthcare settings.

Methods: A comprehensive literature search was conducted using databases such as PubMed, Scopus, Web of Science, SID, and Magiran. Keywords included "digital empathy," "nursing care," "virtual communication," and "patient-centered care." Studies published between 2015 and 2025 were reviewed based on predefined inclusion criteria. The selected articles were analyzed to identify key themes and insights related to the implementation of digital empathy in nursing.

Results: The findings highlight that digital empathy plays a crucial role in enhancing nurse-patient interactions across virtual care platforms. Interventions such as online training, digital empathy tools, and AI-supported communication systems have been shown to improve emotional engagement, patient satisfaction, and trust. However, challenges like reduced non-verbal cues and digital fatigue were also noted, emphasizing the need for better training in digital communication skills and more empathy-focused system designs.

Conclusion: Digital empathy has the potential to significantly improve the quality of nursing care in digital environments. While technology can facilitate empathetic communication, maintaining a human-centered approach remains essential. Ongoing education and thoughtful design of digital tools that prioritize empathy are vital for delivering meaningful and compassionate care in virtual healthcare settings.

Keywords: Digital Empathy, Nursing Care, Virtual Communication, Patient-Centered Care, Emotional Support, Telehealth, Digital Tools in Nursing, Ai in Healthcare Communication

Introduction

Empathy is a core attribute in nursing, deeply influencing both the quality of care and the overall patient experience. The ability to understand and share patients' emotions not only strengthens nurse-patient relationships but also plays a vital role in building trust and improving treatment outcomes.¹ Numerous studies have shown that empathy can help reduce patients' anxiety and stress, thereby contributing to better therapeutic effects.²

However, in today's rapidly evolving healthcare landscape, the concept of empathy is being reshaped by the increasing integration of digital technologies. A major transformation in this regard is the emergence and adoption of digital tools such as telehealth systems, virtual reality (VR), artificial intelligence (AI)-powered platforms, mobile applications, chatbots, and

remote monitoring technologies, which enable the communication and delivery of empathy even in non-face-to-face contexts.^{3,4} This transformation became particularly evident during the COVID-19 pandemic, when these technologies played a critical role in ensuring continued access to care despite restrictions on in-person interactions.¹

Among these innovations, VR and telehealth systems have emerged as prominent tools for enhancing empathy in both clinical practice and nursing education. Research has shown that VR enables nursing students and professionals to virtually experience the perspective of patients, thereby deepening their understanding of patient conditions and enhancing empathetic attitudes.⁵ Similarly, studies have reported that digital platforms and AI-based communication tools can positively

shape the emotional engagement and patient-centered perspectives of nursing students.²

Despite these advantages, several challenges remain. Technical limitations, digital literacy gaps, lack of human touch, and difficulties in conveying emotional subtleties through digital interfaces raise concerns about the authenticity and adequacy of digitally mediated empathy.^{6,7} These issues are particularly critical in complex care settings, where deep human interaction may be essential for empathetic communication and therapeutic rapport.⁸

Given the widespread and accelerating use of technology in healthcare delivery and education, the concept of digital empathy has become increasingly important. Although existing research highlights the potential of digital tools to enhance communication and patient-centeredness, there are significant gaps in the literature. Most previous reviews have focused on isolated technologies (e.g., VR or AI) or limited contexts, lacking a comprehensive synthesis that spans both clinical and educational environments and the full spectrum of digital communication tools in nursing.

Moreover, the current body of literature does not adequately address the barriers, facilitators, and outcomes associated with digital empathy across different settings. There is also limited discussion on implementation challenges, such as tool adoption, integration into curricula or clinical routines, and standardized methods for measuring empathy in virtual environments.

Accordingly, this systematic review aims to comprehensively examine the impact of diverse digital technologies—including VR, AI-driven platforms, telehealth systems, chatbots, and mobile applications—on the development and delivery of empathy in nursing practice and education. It will further identify the key challenges and enablers of implementation and offer strategic recommendations to enhance the effectiveness of digital tools in fostering empathy in modern nursing contexts.

Materials and Methods

This study is a systematic qualitative review conducted in accordance with the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to investigate the role of digital technologies in enhancing empathy in nursing care. The review process was carried out in six structured

stages, incorporating rigorous methods for article identification, screening, selection, data extraction, quality appraisal, and synthesis.

In Stage 1, the research questions were developed based on the PICO framework. The population (P) included nurses, nursing students, and patients interacting within digital care settings. The intervention (I) involved digital empathy-related technologies such as virtual reality, tele-nursing, digital storytelling, and simulation platforms. The comparison (C) comprised traditional in-person care or groups not exposed to digital tools. The outcomes (O) were defined as improvements in empathy levels, communication abilities, and quality of nursing care.

In Stage 2, a comprehensive search strategy was developed using predefined keywords such as “digital empathy,” “nursing,” “virtual reality,” “tele-nursing,” “digital storytelling,” and “digital learning.” Searches were conducted across five major databases: PubMed/Medline, Scopus, Web of Science, Cochrane Library, and Google Scholar. Boolean operators (AND, OR) and controlled vocabulary (e.g., MeSH terms) were applied to optimize search sensitivity.

In Stage 3, inclusion and exclusion criteria were established. Studies published between 2015 and 2025 in English or Persian were included, provided they focused on digital empathy interventions within nursing practice or education. Only peer-reviewed empirical studies (qualitative, quantitative, or mixed methods) were considered. Exclusion criteria included theoretical papers, reviews, editorials, commentaries, letters to the editor, non-peer-reviewed articles, and conference abstracts.

In Stage 4, a dual-review process was used for screening and selecting studies. Two independent reviewers screened the titles and abstracts of the 1,655 initially retrieved articles. After removing 769 duplicates, 906 records were assessed, of which 764 were excluded based on title/abstract relevance. 142 full-text articles were retrieved for further review. Any discrepancies between reviewers were resolved through discussion and consensus, and when necessary, a third reviewer was consulted.

In Stage 5, full-text evaluation led to the exclusion of 128 articles for reasons such as lack of relevance to the research objectives, poor methodological quality, incomplete data, or being poster presentations. Ultimately, 14 eligible studies were included in the

final review and underwent detailed data extraction.

In Stage 6, data extraction was conducted using a structured form that captured key information from each study, including: title, author(s), publication year, location, study design, sample size, data collection tools, and primary results. The extraction process was completed by two reviewers independently, and discrepancies were again resolved via consensus.

To ensure methodological rigor, the quality of included studies was assessed using validated tools appropriate for each study type: the Critical Appraisal Skills Programme (CASP) for qualitative studies, the Joanna Briggs Institute (JBI) checklist for quantitative studies, and the Cochrane Risk of Bias tool for randomized controlled trials.¹⁵⁻¹⁷

Finally, a thematic synthesis approach was applied to categorize and interpret the findings. Studies were grouped into conceptual themes, such as virtual reality, tele-nursing, and digital storytelling, to analyze the impact of each intervention on empathy outcomes in nursing. The flow of study selection was documented using a PRISMA flow diagram, indicating the number

of studies included and excluded at each stage of the review.

Limitations and Potential Biases

This systematic review has several limitations. First, only articles published in English or Persian between 2015 and 2025 were included; this linguistic restriction may lead to language bias and restrict the generalizability of the findings to broader global contexts. Second, unpublished studies and gray literature were not systematically searched, which may result in publication bias—studies with non-significant or negative outcomes are less likely to be published and, therefore, may have been missed. Third, many of the included studies suffered from methodological limitations, such as small sample sizes and substantial heterogeneity in study designs, interventions, and outcome measures. These issues may influence the consistency, interpretation, and applicability of the synthesized results. Accordingly, the findings should be interpreted with caution, and future research should aim to address these limitations.

Round	Search Terms
1	("Digital Empathy"[Title/Abstract] OR "Virtual Reality"[Title/Abstract]) AND ("Nursing"[Title/Abstract] OR "Nurse"[Title/Abstract])
2	("Tele-nursing"[Title/Abstract] OR "Telehealth"[Title/Abstract]) AND ("Empathy"[Title/Abstract] OR "Communication"[Title/Abstract])
3	1 + 2
4	("Digital Storytelling"[Title/Abstract] OR "Simulation"[Title/Abstract]) AND ("Empathy Training"[Title/Abstract] OR "Compassion"[Title/Abstract])
5	3 + 4
6	("Virtual Care"[Title/Abstract] OR "Technology in Nursing"[Title/Abstract]) AND ("Patient Care"[Title/Abstract] OR "Emotional Support"[Title/Abstract])
7	5 + 6
8	("Digital Health"[Title/Abstract] OR "Technology in Healthcare"[Title/Abstract]) AND ("Nurse Training"[Title/Abstract] OR "Nursing Education"[Title/Abstract])
9	7 + 8
10	("Barriers"[Title/Abstract] OR "Facilitators"[Title/Abstract]) AND ("Digital Empathy"[Title/Abstract] OR "Digital Technologies"[Title/Abstract])
11	9 + 10
12	("Patient Outcomes"[Title/Abstract] OR "Quality of Life"[Title/Abstract]) AND ("Digital Empathy"[Title/Abstract] OR "Virtual Care"[Title/Abstract])
13	11 + 12
14	("Qualitative Research"[Title/Abstract] OR "Intervention Studies"[Title/Abstract]) AND ("Digital Empathy"[Title/Abstract] OR "Virtual Reality"[Title/Abstract])
15	13 + 14

Cochrane Library	PubMed/Medline	Embase	Web of Science	Scopus	ProQuest	Ovid	SID	Google Scholar	Total
95	245	210	195	230	160	110	90	320	1655

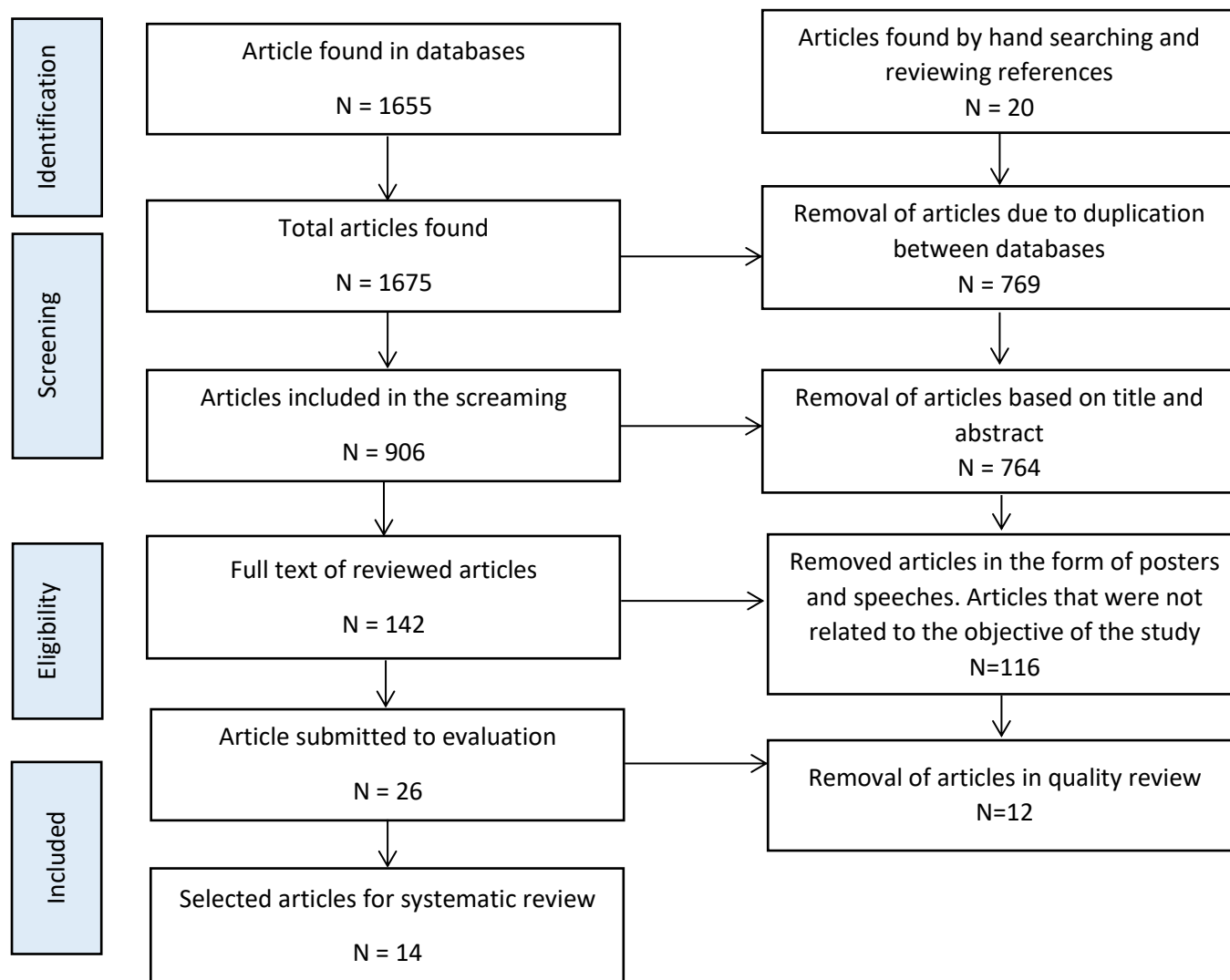


Figure 1. Prisma Flow Diagram.

Article Title	Authors	Year	Location	Sample Size	Data Collection Tool and Study Type	Results
Application of Virtual Reality in Empathy Training for Elderly Care Personnel ³	Zhang J.	2024	Switzerland	Unknown	Virtual Reality-based intervention, experimental study	Demonstrated the effectiveness of virtual reality in improving empathy among elderly care personnel.
Providing compassionate care via eHealth ¹	Su JJ, Bayuo J, Lin RS, Batalik L, Chen X, Abu-Odah H, Chan EA	2024	USA	Unknown	Tool: Semi-structured interviews Study Type: Qualitative	1. eHealth facilitated the provision of compassionate care during the COVID-19 pandemic. 2. Limitations of eHealth in managing complex conditions and low health literacy in patients were raised.
Communication and empathy of nursing students in patient care through telenursing ⁶	Gutiérrez-Puertas L, Gutiérrez-Puertas V, Ortiz-Rodríguez B, Aguilera-	2024	Spain	150 nursing students	Tool: Questionnaire Study Type: Cross-sectional comparative	1. Telenursing created empathy similar to in-person care. 2. Challenges in effective communication and understanding patient emotions in telenursing were identified.

	Manrique G, Márquez-Hernández VV					
Providing compassionate care in a virtual context ⁷	Rouleau G, Wu K, Parry M, Richard L, Desveaux L	2024	Canada	25 primary care nurses	Tool: In-depth interviews Study Type: Qualitative	1. Virtual care may limit empathy, but the use of specific techniques such as body language and tone of voice can be helpful. 2. Technology issues and time limitations were identified.
Design Concept of Interaction Simulation Video for Enhancing Digital Intelligent Quotient in Digital Empathy Skills ⁹	Chuensombat S, Maneenil S, Jamsai P, Locharoenrat W.	2023	Kasetsart Journal of Social Sciences	Not specified	Simulation video-based approach, conceptual study	Proposed a design concept for interactive simulation videos to enhance digital empathy skills and digital intelligence quotient.
Nursing Students' Experiences of Empathy in a Virtual Reality Simulation Game ⁵	Mattsson K, Haavisto E, Jumisko-Pyykkü S, Koivisto JM	2024	Finland	30 nursing students	Tool: Semi-structured interviews Study Type: Descriptive qualitative	1. Virtual reality helped students feel more empathy for patients. 2. Technology limitations and lack of real interaction were raised in the reports.
"Walking in Their Shoes": The effects of an immersive digital story intervention on empathy in nursing students ²	Yu J, Parsons GS, Lancaster D, Tonkin ET, Ganesh S	2021	Australia	120 nursing students	Tool: Empathy questionnaire Study Type: Experimental	1. The use of digital storytelling significantly increased students' cognitive and emotional empathy. 2. The experience of this method changed students' perspectives on patients.
Teaching compassionate care to nursing students in a digital learning and teaching environment ¹⁰	Hofmeyer A, Toffoli L, Vernon R, Taylor R, Klopper HC, Coetzee SK, Fontaine D	2018	Australia	45 nursing students	Tool: Focus group interviews Study Type: Qualitative	1. Digital learning can teach compassionate care, but requires appropriate instructional design. 2. Human connection may decrease in digital environments.
Designing a virtual reality game for promoting empathy toward patients with chronic pain ¹¹	Tong X, Gromala D, Ziabari SP, Shaw CD	2020	Canada	35 adults	Tool: User experience assessment questionnaire Study Type: Usability study	1. The virtual reality game helped improve empathy for patients with chronic pain. 2. The game was positively accepted by users, but technical issues were reported.
Virtual reality-based training for mental health staff: a novel approach to increase empathy, compassion, and subjective understanding of service user experience ⁴	Riches S, Iannelli H, Reynolds L, Fisher HL, Cross S, Attoe C	2022	UK	50 mental health staff	Tool: Empathy questionnaire Study Type: Quasi-experimental	1. Virtual reality-based training significantly increased staff empathy and compassion. 2. Staff gained a better understanding of patients' experiences.
Exploring the impact of digital stories on empathic learning in neonatal nurse education ¹²	Petty J, Jarvis J, Thomas R	2020	UK	40 neonatal nursing students	Tool: Semi-structured interviews Study Type: Qualitative	1. The use of digital stories strengthened empathy in neonatal nursing education. 2. Nurses were able to better understand families' experiences.
The Lived Experience of Patients in	Cutting DL	2022	USA	20 patients	Tool: In-depth interviews Study Type:	1. Patients felt empathy via telehealth was less tangible. 2. Some reported that using kind

Feeling Empathy from Nurses when Receiving Care via Telehealth ⁸					Qualitative	language and tone of voice enhanced empathy.
The language of empathy in virtual clinical training ¹³	Strekalova YA, Krieger JL, Neil J, Caughlin JP, Kleinheksel AJ, Kotranza A	2017	USA	50 nursing students	Tool: Discourse analysis Study Type: Experimental	1. The use of empathetic language increased emotional connection with patients. 2. Positive and supportive vocabulary strengthened empathy in virtual interactions.
Students' perceptions of digital narratives of compassionate care ¹⁴	Waugh A, Donaldson J	2016	Australia	60 nursing students	Tool: Questionnaire and semi-structured interviews Study Type: Qualitative	1. Digital narratives can strengthen empathy and compassion in nursing students. 2. Students were able to better understand patients' experiences.

Results

This systematic review included 14 studies that explored the role of digital technologies in fostering empathy in nursing. The findings were categorized into three main domains: virtual reality (VR), tele-nursing /remote care, and digital storytelling/digital education.

1. **Virtual Reality (VR)** Four studies^{3,4,5,11} examined the impact of VR-based interventions on empathy in nursing contexts. A study in Switzerland demonstrated that VR simulations significantly improved empathy levels among elderly care personnel by enabling them to experience age-related health conditions from a first-person perspective.³ Similarly, a Finnish qualitative study involving 30 nursing students showed that VR environments deepened students' emotional understanding of patient experiences, although limitations such as reduced human interaction and technical issues were noted.⁵ In Canada, the design of a VR game for chronic pain education was well-received and enhanced users' empathy, despite technical barriers.¹¹ Furthermore, a quasi-experimental study in the UK found that VR training for mental health professionals increased empathy and compassion and enhanced their understanding of patients' psychological challenges.⁴ These results suggest that immersive digital environments can be a powerful tool for enhancing affective and cognitive empathy, particularly when the design supports emotional engagement.
2. **Tele-nursing and Remote Care** Four studies^{1,6-8} focused on tele-nursing and remote care. A cross-sectional study in Spain with 150 nursing students reported that digital communication during tele-nursing generated empathy comparable to in-person care, but participants noted challenges in emotional interpretation, connectivity issues, and the need for

stronger digital literacy.⁶ Similarly, Canadian nurses interviewed in a qualitative study shared that virtual care environments might reduce empathy, but effective communication strategies—such as using a warm tone and reading subtle cues—could partially compensate for this.⁷ In a U.S.-based patient interview study, participants acknowledged that empathy felt less tangible through telehealth, although thoughtful verbal communication improved their emotional experience.⁸ A multinational qualitative study also highlighted that eHealth tools were crucial in maintaining compassionate care during the COVID-19 pandemic but faced limitations in managing patients with low health literacy and complex needs.¹ These findings emphasize that verbal empathy cues, digital fluency, and the structure of communication significantly affect the success of remote care.

3. **Digital Storytelling and Virtual Education** Six studies^{2,9,10,12-14} investigated the effects of digital storytelling and online educational design on empathy. An experimental study in Australia involving 120 nursing students found that exposure to immersive digital narratives increased both cognitive and emotional empathy and reshaped students' perspectives toward patient care.² Likewise, qualitative studies in Australia and the UK reported that digital storytelling helped students understand the experiences of neonatal patients' families and reinforced compassionate attitudes in virtual environments.^{10,12} Another study proposed the use of interactive simulation videos as a way to enhance digital empathy skills and social awareness among healthcare learners.⁹ Furthermore, discourse analysis in a U.S. study showed that integrating empathetic language into virtual clinical training strengthened students' emotional connection

with patients.¹³ In another Australian study, nursing students noted that digital narratives improved their ability to relate to patient emotions and experiences.¹⁴ These findings collectively suggest that emotionally engaging educational content and thoughtfully designed virtual platforms are essential for nurturing empathy.

Challenges and Gaps While most studies reported positive outcomes, several common challenges were identified. These include limited face-to-face interaction,^{5,10} technical barriers such as poor internet connectivity,^{6,7} insufficient digital literacy among users,¹ and the need for specialized training in using these technologies.^{4,11} Moreover, many studies lacked long-term follow-up data or used qualitative or small-sample designs, limiting the generalizability of the findings.^{10,12,14} Importantly, the effectiveness of these tools appears closely linked to their design—technologies that are intentionally crafted to promote emotional communication and social connection tend to yield better empathy outcomes.¹⁴ The review also highlighted gaps in research involving low-resource settings and populations with limited digital health literacy.

In summary, the results indicate that digital technologies—especially virtual reality, tele-nursing, and digital storytelling—hold strong potential to enhance empathy among nurses and nursing students. However, their effectiveness depends on multiple contextual factors, including technological design, communication strategies, and user competence. Addressing technical limitations, improving digital education frameworks, and conducting longitudinal, large-sample studies are necessary to fully harness the power of digital empathy in clinical education and practice.

Discussion

Empathy remains a foundational component of nursing, critically shaping patient care quality and nurse-patient relationships. In recent years, digital technologies have emerged as innovative tools to enhance empathy, especially when direct patient contact is limited, such as during pandemics or in remote settings.

Virtual reality (VR) stands out as an effective approach by immersing nurses and students in realistic clinical scenarios. For example, Zhang (2024) demonstrated that VR simulations significantly improved empathy

among elderly care nurses by allowing them to experience patients' emotional and physical challenges firsthand.³ Similarly, digital storytelling and tele-nursing have shown promise in fostering empathetic communication. Gutiérrez-Puertas et al. (2024) reported that remote consultations enabled nurses to maintain empathetic interactions despite physical distance,⁶ while Mattsson et al. (2023) found VR-based education deepened nursing students' emotional understanding.⁵

Nevertheless, challenges such as privacy concerns, data security, limited technology access, and digital literacy gaps must be addressed to maximize the benefits of digital empathy tools. Healthcare institutions should prioritize robust infrastructure, user-friendly platforms, and targeted training programs to develop nurses' competencies in digital communication and ethical technology use. Incorporating these competencies into nursing curricula can help ensure compassionate care remains central, even within technology-mediated environments.

Importantly, digital empathy also offers benefits for nurses' well-being by providing reflective and simulated environments that may reduce emotional burnout. However, the psychological impacts of prolonged virtual exposure necessitate support mechanisms such as debriefings and psychosocial resources.

Future research should focus on longitudinal assessments of digital empathy's impact, innovation in adaptive AI-based empathy tools, and the development of comprehensive ethical guidelines to address evolving challenges in digital healthcare.

Conclusion

Digital empathy technologies—including VR and telehealth platforms—offer substantial opportunities to enhance nursing care by enabling compassionate, patient-centered interactions even in the absence of physical presence. To fully realize their potential, challenges related to privacy, equitable access, and workforce training must be strategically addressed. Integrating these tools with ethical awareness and evidence-based practice can help embed digital empathy into nursing education and clinical care, preserving the human essence of nursing in an increasingly digital healthcare landscape.

Conflict of Interest

The authors declare no conflicts of interest.

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