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‘Working Towards Digital Practice in Nursing’

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Title: 'Working Towards Digital Practice in Nursing'

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Abstract

In the evolving healthcare environment, nursing is at the forefront of embracing digital transformation. This article examines how integrating digital technologies into nursing practice benefits patient care, streamlines processes, and opens new avenues for professional development. It discusses current and emerging digital tools and artificial intelligence in nursing practice, their advantages, challenges these technologies pose and offers practical strategies for nurses to adapt to these changes effectively.

Working Towards Digital Practice in Nursing

Introduction

Nursing is at the forefront of a profound digital transformation within healthcare (Butcher and Hussain, 2022). The integration of digital technologies directly into nursing practice is reshaping how patient care is delivered, enhancing efficiency, and opening new avenues for professional growth (Duggal et al., 2018). This article examines the current and emerging digital technologies that are specifically impacting nursing, highlighting the associated benefits, challenges, and strategies for nurses to effectively adapt to these changes.

Digital Technologies in Nursing

Artificial Intelligence (AI) applications are increasingly becoming integral to nursing practice, offering various benefits across different settings. For instance, a study by Topaz et al. (2018) highlighted how speech recognition and data mining technologies have streamlined documentation processes, allowing nurses to spend more time on patient care rather than administrative tasks. Similarly, AI algorithms for predicting physical deterioration have been implemented in some hospitals to enhance early detection of patient decline, as demonstrated by Hannaford et al. (2021). This approach helps in timely interventions and potentially improve patient outcomes.

Another significant digital tool in nursing practice is Electronic Health Records (EHRs). An example can be seen in the implementation of EHR systems which improved patient information management by providing up-to-date records accessible to all healthcare providers (Shull, 2019). EHRs have facilitated better coordination and communication among multidisciplinary teams, as highlighted by Park et al. (2024), leading to more cohesive patient care. Additionally, the use of EHRs has been associated with a reduction in medical errors by ensuring that all healthcare professionals have access to accurate and timely patient information (Schlosser Metitiri and Perotte, 2023). These practical examples demonstrate how digital technologies are transforming nursing practice, enhancing both the efficiency and quality of patient care.

Mobile health apps are also becoming integral to patient care and self-management. These apps help patients track their health metrics, medication schedules, and appointments (Sieck et al., 2021). Nurses can use these tools to monitor patient progress, provide educational resources, and encourage adherence to treatment plans. A study evaluating the usability of healthcare apps found them 64.5% informative for participants, facilitating fast communication between doctors and patients worldwide (Mubeen et al., 2021). Despite their benefits, limitations include lack of smartphone access, potential app crashes, and data privacy and security issues.

Artificial Intelligence (AI) is making significant strides in nursing practice. AI algorithms can analyse large datasets to identify patterns and predict patient outcomes, aiding in early diagnosis and personalised treatment plans (O'Connor et al., 2022). These advancements in clinical settings are paralleled by innovations in nursing education, where AI-driven tools are transforming the learning experience. For example, high-fidelity simulations and personalised learning platforms powered by AI provide students with immersive and adaptive educational experiences (Topol, 2019).

In addition to these educational platforms, AI tools such as chatbots and ChatGPT are designed to simulate conversations with users, providing interactive support for nursing students, especially in online learning environments (King, 2022). Chatbots are automated programs that can answer questions and guide students through learning materials by mimicking human conversation. ChatGPT, a more advanced version, generates responses based on extensive text data, helping students with complex queries.

AI applications like DALL-E, which use machine learning to generate images based on user input, have also captured students' interest (Marcus et al., 2022). DALL-E can create unique visuals by learning patterns from vast datasets of images, which can be used in educational settings to visualize complex concepts. However, the use of these tools introduces challenges related to originality, plagiarism, and the risk of academic misconduct, as students might rely too heavily on AI-generated content without proper attribution (Lund and Wang, 2023).

The influence of AI extends from education to clinical practice, where AI-integrated devices enhance patient care by enabling functions such as activating call lights, controlling room temperature, and accessing media. These technologies not only improve patient comfort but

also demonstrate AI's broad impact across nursing practice, streamlining tasks that traditionally required manual intervention (Clancy, 2020)

Benefits of Digital Technologies in Nursing

Digital technologies enable more accurate and timely diagnoses, personalised treatment plans, and continuous patient health monitoring, leading to better patient outcomes and a higher standard of care (Booth et al., 2021). Hüter et al. (2020) highlight significant gains in effectiveness from digital technologies, particularly in relation to electronic health/medical records, contingent on the mode and specific context of their introduction. Additionally, digital tools streamline administrative tasks, reduce paperwork, and improve communication among healthcare team members, allowing nurses to focus more on direct patient care (Hochmuth, 2021). Access to continuing education within the workplace is another benefit. Digital platforms offer nurses access to professional development resources, such as online courses, webinars, and virtual conferences, providing opportunities for lifelong learning and skill enhancement (Buchanan et al., 2021).

Challenges of Digital Technologies in Nursing

Ensuring the privacy and security of patient data is paramount as data privacy and security remain significant challenges (Butcher and Hussain, 2022). Nurses must follow best practices and complete mandatory training for data protection and stay informed about potential cybersecurity threats (NMC, 2018). However, not all nurses are equally comfortable with digital technologies and Tınmaz (2022) addresses the importance of digital literacy among staff using technology, emphasising the role of critical thinking and problem-solving skills. Comprehensive training programs are necessary to help nurses develop the required skills to use these tools effectively (Blau et al., 2020).

Adopting new technologies in healthcare often faces challenges, particularly due to resistance to change from within the nursing profession. Digital technologies are sometimes perceived as a distraction or an unwelcome intrusion into the hands-on care and therapeutic relationships that nurses build with patients and families (Robichaux et al., 2019). For

instance, a study by Graham et al, (2018). found that nurses reported feeling less connected to patients when required to use electronic health records during bedside interactions, as it shifted their focus from direct patient engagement to managing screens and data entry.

Montemayor et al. (2021) argue that genuine care necessitates consciously empathic attention, which AI is unable to provide. Empathy, deeply rooted in human biological and emotional experiences, involves resonating with another's feelings and tailoring responses based on those emotional connections (Halpern, 2017). AI, by contrast, operates through algorithms and data, lacking the capacity for true emotional engagement. This results in a form of care that can be perceived as emotionally detached, relying on representations and rules rather than genuine empathic attention. Therefore, while digital technologies offer efficiency and innovation, they may inadvertently impact the quality of nurse-patient interactions by prioritizing data and procedural efficiency over the personal, empathic aspects of care.

Educational opportunities should be created at undergraduate and graduate levels, encompassing informatics, digital health, and data science (Buchanan et al., 2021). These should include interdisciplinary collaboration with fields such as computing and engineering. In addition, practitioners who understand how to use data science to inform nursing practice is essential (Brennan and Bakken, 2015). Collaboration among healthcare providers, IT professionals, and administrative staff is essential for successfully integrating digital technologies. Co-creating a supportive environment where nurses can seek help and share knowledge will facilitate smoother transitions (McBride et al., 2013). Nursing must invest in and lead digital health developments and collaborate to develop and deliver the digital tools that patients and the public need.

Nurses should take on advocacy and leadership roles to influence the adoption and implementation of digital technologies in healthcare. By participating in decision-making processes and policy development, nurses can ensure that technological advancements align with clinical needs and enhance patient care (Sieck et al., 2021). Although many potential benefits of AI, such as improved patient outcomes and streamlined workflow, have yet to be fully realised in nursing research, it is inevitable that AI technologies will increasingly support and extend nurses' cognitive, decision-making, and potentially labour functions (Rebert, 2019). To support this, Floridi and colleagues (2018) emphasise that AI development should secure trust, serve the public interest, and promote social responsibility to reinforce

human dignity. Therefore, nurses entering the profession today will witness substantial disruption and change from digital technology by mid-career (Coiera, 2018) and therefore must prepare to adapt to the future changes.

Conclusion

Digital technologies are changing the way we practice nursing, offering better patient outcomes, greater efficiency, and easier access to education. However, to truly benefit from these advancements, nurses need to step up as leaders in this digital shift. This means not only championing informatics in all aspects of our work—from clinical practice to education and policy—but also creating opportunities to lead in the digital health space.

To get ready for what's ahead, nurses can start by boosting their digital skills through training programs and working closely with other healthcare professionals to drive innovation. By staying curious, learning continuously, and advocating for the smart use of technology, we can ensure that our profession continues to deliver exceptional care in a rapidly changing healthcare environment.

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List of changes:

Reviewers feedback comments	What has changed
<p>Reviewer #1: This is a pertinent article and important for nurses in current practice and future nurses.</p> <p>I feel that this is a broad over view of some of the digital technologies and how these can be used in the NHS. I am wondering if this would be better as separate articles to concentrate on each modality in more detail. I feel that this would be more helpful in terms of concept and understanding, digital integration into care services, future planning for staff.</p>	<p>There is more in-depth exploration of artificial intelligence impact, providing detailed examples of how these technologies are being implemented in the practice. To further streamline the discussion and avoid a broad overview, I removed sections on telehealth and it ensures that the article is more focused and relevant for example, the integration of AI in nursing.</p>
<p>Reviewer2: While the introduction is clear, it could be enhanced by narrowing its focus slightly. Instead of beginning broadly with the healthcare industry, perhaps start by explicitly stating how the digital transformation specifically affects nursing. This would set a clearer context for the discussion that follows.</p>	<p>The introduction centres the discussion on nursing, as suggested by the reviewer, providing a clearer context for the rest of the article.</p>
<p>Reviewer2:Cohesion and Flow</p> <p>In some sections, the transition between topics feels abrupt. For instance, the shift from discussing AI in nursing practice to AI tools in education could benefit from a smoother transition. Linking paragraphs more explicitly with transitional sentences or phrases would improve overall flow.</p>	<p>There is now smoother transitions between discussing AI in nursing practice and AI in education by connecting the two topics. It also highlights the continuity of AI's impact from education to clinical practice.</p>
<p>Reviewer 2: Depth in Challenges</p> <p>The section on the challenges of digital technologies could be expanded to provide more detail on the human aspects, such as how digital tools might change the nurse-patient relationship. For instance, you mention that digital technologies may be seen as an "unwelcome intrusion" into hands-on care, but elaborating on specific</p>	<p>Introduced a study that demonstrates how technology can affect nurse-patient interactions and its challenges.</p> <p>Reinforced the argument about the limitations of AI in providing empathic attention, linking it to the broader issue of maintaining personal connections in care.</p> <p>More detail how digital technologies can shift focus away from direct patient</p>

examples or studies could enhance the reader's understanding of this issue.	engagement, addressing the human aspect more thoroughly.
<p>Reviewer 2: Use of Examples</p> <p>To make the content more relatable, consider adding more practical examples or case studies. For example, how has AI specifically changed nursing practice in certain hospitals? How have telehealth interventions improved outcomes in rural or underserved communities?</p>	<p>Included details on how speech recognition, data mining and prediction algorithms are applied in practice.</p> <p>Elaborated on the benefits of these technologies, such as improved patient management and reduced medical errors, to provide a clearer picture of their effects on nursing practice and made content more relatable.</p> <p>Telehealth section removed due to word restriction.</p>
<p>Reviewer 2: Clarity in Terminology</p> <p>Certain terms, such as AI-driven simulations or chatbots, could be confusing for readers unfamiliar with these technologies. A brief explanation of how these tools work within the nursing context, using simple language, could help demystify them for readers less tech-savvy.</p>	<p>Added simple explanations of what chatbots and ChatGPT do, making their functions clearer to readers unfamiliar with these terms.</p> <p>Provided a brief description of how DALL-E works, explaining its relevance in educational settings.</p> <p>Also simplified language to ensure the explanations are easily understood by all readers, regardless of their technical background.</p>
<p>Reviewer 2: Concluding Thoughts</p> <p>While the conclusion is strong in urging nurses to take leadership roles in the digital health space, it could benefit from being slightly more forward-looking. It would be helpful to include specific actions or steps that nurses can take today to prepare for future challenges, such as engaging in digital literacy programs or participating in interdisciplinary collaborations.</p>	<p>Suggested engaging in digital literacy programs and interdisciplinary collaborations as steps nurses can take.</p> <p>Emphasis on encouraging nurses to prepare for future challenges, making the conclusion more actionable and forward-thinking.</p>