Community nursing and the digital technology revolution: the past, present and future

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While considered still very much in its infancy in terms of becoming an established tool, the push in favour of the use of digital technology in the UK's healthcare system is steadily advancing. This is despite the persistent barriers to, and challenges encountered in its uptake and implementation. The mobile nature of a community nurse's daily practice should theoretically facilitate the rapid and seamless uptake of technology to enable high-quality patient care in a profession that is short on time and staff, and managing an ever-increasing caseload. However, there are indications that technology may not be the panacea it was originally proclaimed to be, but can instead present its own series of obstacles.

The first steps

The technology revolution is not necessarily new. Initiatives like the shift from a paper-based model to a digital e-community service model were implemented in 2019 in the Whittington Health NHS Trust District Nurse (DN) Service (Basi, 2019). The service received around 200 new referrals per day; an investigation identified unwarranted variation in the standardised delivery of high-quality care, including a disparity in waiting times and continuity of care, missed DN appointments and complaints from patients (Basi, 2019). To address this, a bespoke e-community technology solution incorporating the following elements was created and implemented:

- A standardised review of patients on the DN caseloads to enable timely discharge
- The alignment of individual DNs and patient allocation through review of training and competency records
- The inclusion of rostering information, encompassing shift patterns and annual leave, triage allocation, geographical mapping, competency mapping/skill levels and electronic caseload
- A user-friendly system that linked to other services and could be used remotely from a tablet or mobile device (Basi, 2019).

Following implementation, the average waiting time for a DN was 4.98 days, which was significantly lower than the national average of 7.1 days, despite increased caseloads. Moreover, improved caseload management and continuity of care, achieved through use of the new system, had reduced missed appointments from 6–10 per month to 0–1 per month (Basi, 2019). The benefits were not only limited to better

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Digital technology is steadily growing and is becoming an important part of district and community nursing

Abstract

While very much in its infancy in terms of becoming an established tool, the use of digital technology in community nursing is steadily growing, despite the persistent barriers to, and challenges encountered in its uptake and implementation. The mobile nature and high workload of a community nurse's daily practice should facilitate the rapid uptake of time-saving technology. However, there are indications that technology may not be the panacea it was originally proclaimed to be. Francesca Ramadan elaborates on the past and present applications of digital technology in community nursing and delves into the principles that should shape the future potential of tools such as artificial intelligence, automation technologies and clinical decision support systems.

Keywords: artificial intelligence • digital technology • clinical support

patient outcomes and experience but also the provision of a technology solution that was mobile and user-friendly, which had a positive impact on the DNs themselves. It increased patient facing time while reducing travel time in an inner London area, thereby supporting staff recruitment and retention, with an 8% decrease in staff turnover observed in the first year (Basi, 2019). When using the e-community to book temporary staff and to process expenses, such as mileage claims, into the roster, the new system also provided improved financial efficiency, with an estmated cost-saving of £300 000 following the implementation of the programme (Basi, 2019).

Present realities and future potential

Initiatives such as the example outlined above heralded a promising—if tentative—beginning to the implementation of technology into community nursing practice. However, the COVID-19 pandemic significantly accelerated the adoption of technology-driven strategies. For instance, virtual assessment platforms and their use within care home settings allowed face-to-face visits to be completed in a safe way and in accordance with national social distancing guidance (Grindle, 2021). Digital technology is now being used creatively for a wide range of applications, and its use is firmly embedded across community nursing practice. *Table 1* summarises the potential benefits, challenges and implications of emerging technological and digital innovations to practice.

However, *Nursing in the Digital Age* (Leary and Bushe, 2023), a report published by the Queen's Nursing Institute, which was based on an online survey on digital technology in community nursing, revealed significant problems. Many nurses reported that the application of digital technology in practice was poor. The more recent survey responses were compared to the previous survey of digital technology carried out by the QNI in 2018, which enabled some trends to be identified:

Table 1. Benefits, challenges and implications of selected digital technologies in nursing

Digital technologies	Examples of potential benefits	Examples of current challenges	Future implications
Artificial intelligence/ big data	Use in decision support systems can improve the identification of infection Pandemic/outbreak response using big data analytics to help in contact tracing and population health response	Biases in current datasets can become ingrained in artificial intelligence (AI) algorithms Techniques are complex and may unintentionally reduce nursing involvement in the development of these systems Ethics and accountability of decisions generated by these systems, including transparency and privacy concerns	AI-based nursing in acute and primary care needs research Policies needed on professional accountability Educational and leadership competencies and opportunities related to AI and data analytics
Automation technologies (eg, robotics, drones)	Robots can support people with cognitive, sensory, and motor impairments; help those who are ill or injured; support caregivers; and aid the clinical workforce	Technologists, researchers, providers, and users must collaborate to ensure success	Emerging innovations coupling AI and robotics will have intended and unintended changes to nursing practice and its professional culture Nursing must assist in co-designing and developing these solutions to be complementary to practice Cost–benefit analysis of developing complex health technologies that use planetary resources is needed
Automation technologies (eg, robotics, drones)	Robots can support people with cognitive, sensory, and motor impairments; help those who are ill or injured; support caregivers; and aid the clinical workforce	Technologists, researchers, providers, and users must collaborate to ensure success	Emerging innovations coupling AI and robotics will have intended and unintended changes to nursing practice and its professional culture Nursing must assist in co-designing and developing these solutions to be complementary to practice Cost–benefit analysis of developing complex
Clinical decision support systems	Systems can detect infectious disease and trigger appropriate actions	Over alerting clinicians results in alert fatigue and workarounds Owing to lack of research rigour, the impact and effectiveness in some clinical environments (eg, emergency departments) is unclear	Nurses should be involved in design, development, and implementation Consider usability when designing systems that improve rather than disrupt decision making and workflow

Note: Adapted from Booth et al (2021)

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Electronic health records (EHRs)	Nursing documentation is superior to paper-based records in aspects of data completeness and structure, including legibility	Weaknesses in documentation quality and quantity due to factors such as the time required or poor system or interface design	Nurses need dedicated time and equipment and a supportive digital work culture AI-driven clinical decision support integrated into the EHRs to facilitate decision making will be important to look for intended and unintended consequences Nursing leadership should redesign EHRs to reduce burden of documentation
Mobile health	Coaching patients via applications can improve short term outcomes	Perceived lack of affordability and reliability of mobile applications for clinical decision support Concerns over the professional image of nursing when using mHealth, particularly in hospital settings	Need to develop policies and a professional culture that supports use of mobile devices in clinical practice. Where relevant, these should be integrated with EHRs and other related technologies
Telehealth/ telemedicine	Beneficial in nursing homes during outbreaks of infectious diseass, eg, during the COVID-19 pandemic to reduce isolation and keep residents and nursing staff safe	Nurses' technical skills and negative attitudes towards telemedicine can be a barrier, as can their concerns around data privacy and confidentiality	Nurses should support the co-design of telehealth systems and emerging virtual models of care with patients and carers
Personalised/ precision healthcare	Treatment tailored to individual patients enables nurses to deliver more personalised care	Pace of technological change and equity issues related to technology access could undermine precision health developments	Nurses should advocate for patients and families to have equitable access to their genomic health data for use in personalised and precision healthcare solutions
Social media and online information (internet)	Diverse pools of health information facilitate nursing processes and support patient and student education	Quality and reliability of online health information, particularly on social media, varies, and it can be risky or unsafe	Nurses should be educated about appropriate use of social media and online health information and support patients' use of these technologies to improve their self-management
Virtual and augmented reality	Virtual reality training can improve knowledge in nursing education and be used in paediatric and adult populations as a treatment tool or clinical intervention	Can cause simulation sickness, including dizziness and visual disturbances	Low-cost devices and software should be developed by nurses and educators that can integrate with existing mobile, internet, and other digital technologies

Note: Adapted from Booth et al (2021)

- In 2018, around 85% of respondents reported issues with mobile connectivity. In 2022, this figure was around 87%
- In 2018, 32.7% reported problems with lack of compatibility between different computer systems. In 2022, the figure had risen to 43.1%
- In 2018, 29.5% reported problems with device battery life. In 2022, the figure was almost 53% (Leary and Bushe, 2023).

Overall, the community nursing workforce showed a high level of digital literacy; poor user experience appeared to be around design and function, rather than a lack of computer literacy or enthusiasm (Leary and Bushe, 2023). The challenges regularly encountered by community nurses included short battery life, unsuitable hardware and software, old and cumbersome laptops, authentication challenges, use of multiple platforms, lack of integration and repetition of data entry (Leary and Bushe, 2023). Electronic Health Records (EHRs) and similar platforms were not viewed positively by many community nurses – perceptions were mixed around productivity gains and work capture, and systems were felt to be impersonal and poorly designed, acting as a barrier to interaction with patients (Leary and Bushe, 2023).

Overcoming obstacles

To counter these barriers, *Nursing in the Digital Age* (Leary and Bushe, 2023) presented the following recommendations:

- Obsolete hardware should be replaced with up-to-date models by employers
- Nurses should be consulted at an early stage in the

choice of hardware and the development of software for everyday use in community settings
- Healthcare provider organisations, commissioners and policymakers should undertake national, regional and local reviews of Wi-Fi internet connectivity in all areas where their services are delivered
- All healthcare providers should have a nurse who is appropriately experienced and skilled to lead on the use of digital technology within the organisation.

Furthermore, in a longitudinal qualitative and interpretive study analysing the ways in which e-health initiatives have proven difficult due to the complexity and lack of involvement and integration from stakeholders, it was found that categorisation of stakeholders into two dimensions (external–internal) and by their degree of integration (core, support and peripheral stakeholders) proved beneficial. The categorisation facilitated the creation of arenas and routines for co-creation during implementation and the easy identification of the different needs for information and communication between stakeholder groups (Nilsen et al, 2020). **BJCN**

Basi L. The atlas of shared learning (case study): using technology to improve patient care in district nursing services. 2019. https://www.england.nhs.uk/atlas_case_study/using-technology-to-improve-patient-care-in-district-nursing-services/ (accessed 30 July 2024)

Booth RG, Strudwick G, McBride S, O'Connor S, Solano López AL. How the nursing profession should adapt for a digital future. BMJ; 2021;373:n1190. https://doi.org/10.1136/bmj.n1190

Grindle KR. Impact of technology on community nursing during the pandemic. Br J Community Nurs. 2021;26(3):110–115. https://doi.org/10.12968/bjcn.2021.26.3.110

Leary A, Bushe D. Nursing in the digital age 2023: using technology to support patients in the home. 2023. https://qni.org.uk/news-and-events/news/digital-technology-still-failing-community-nursing-teams/ (accessed 30 July 2024)

Nilsen ER, Stendal K, Gullslett MK. Implementation of ehealth technology in community health care: the complexity of stakeholder involvement. BMC Health Serv Res. 2020;20:395. https://doi.org/10.1186/s12913-020-05287-2