COMMENTARY

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The changing role of patients, and nursing and medical professionals as a result of digitalization of health and heart failure care

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Abstract

Aim: The aim of the study is to discuss the changing role of patients, nurses and doctors in an era of digital health and heart failure care.

Background: With a growing demand for heart failure care and a shortage of health care professionals to meet it, digital technologies offer a potential solution to overcoming these challenges.

Evaluation: In reviewing pertinent research evidence and drawing on our collective clinical and research experiences, including the co-design and development of an autonomous remote system, DoctorME, we offer some reflections and propose some practical suggestions for nurturing truly collaborative heart failure care.

Key issues: Digital health offers real opportunities to deliver heart failure care, but patients and health care professionals will require digital skills training and appropriate health services technological infrastructure.

Conclusions: Heart failure care is being transformed by digital technologies, and innovations such as DoctorME have profound implications for patients, nurses and doctors. These include major cultural change and health service transformation.

Implications for nursing management: Nurse managers should create inclusive and supportive working environments where collaborative working and digital technologies in heart failure care are embraced. Nurse managers need to recognize, value and communicate the importance of digital health in heart failure care, ensuring that staff have appropriate digital skills training.

KEYWORDS
artificial intelligence, digitalization of heart failure care, heart failure, heart failure professional role, self-management

1 | INTRODUCTION

Care for patients with heart failure is being transformed with the introduction of digital technologies and digital care. For example, health care professionals now have instant access to patient data, and increasingly, face-to-face contacts are being replaced by on-line contacts. As digital technologies are being developed at a rapid pace, this has implications for the care of patients and the roles and relationships of them and their health care professionals, particularly nurses and doctors.

In the early stages of heart failure diagnosis and treatment, health care professionals prescribe treatment and educate the patient and family to effectively manage their condition. While the role of nurses (Blue et al., 2001) and self-care strategies (Moser et al., 2012) are well recognized, the active participation of the patient has become increasingly important and endorsed by the European Society of Cardiology (Fitzsimons, 2019). Accordingly, recent ESC-guidelines promote education and self-care support for patients with heart failure, enabling them to monitor their condition, detect subtle signs of deterioration and take aversive action, thus facilitating them to fully participate in managing their disease and to help them to integrate their illness into their daily lives (McDonagh et al., 2021).

As treatments continue to improve and people survive events that would have previously proved fatal, current care provision is challenged by the increasing volume of people diagnosed with heart failure and the complexity of their management. This is compounded by an exponential rise in the number of chronically ill patients and shortage of health care professionals (Healthcare Personnel Statistics—Nursing and Caring Professionals, 2020). Consequently, health care organizations are searching for sustainable solutions. It is inevitable that patients will play a greater role as they are the only constant factor in their own care process. However, not all patients are able to take on this role due to a range of issues such as frailty, cognitive impairment, fatigue lack of energy, limited health literacy and social isolation (Magnani et al., 2018; Siabani et al., 2013).

Contemporary health care systems recognize the need for new solutions to ensure the maintenance and support heart failure self-management that are accepted by patients and health care professionals. The search for solutions started almost two decades ago with the introduction of digital health into heart failure care, which yielded promising results (Cleland et al., 2005). Since then the use of digital health has been developed aiming to support self-care maintenance and prevent hospitalization (Bashi et al., 2017; Scherrenberg et al., 2021). The Topol review, 'Preparing the healthcare workforce to deliver the digital future' (Topol, 2019), asserted that for optimal implementation of digital care, there is a need to challenge the existing roles of patients, carers and health care professionals and for them to work together to develop, test and implement innovative solutions that put patients at the centre of their care.

2 | TELEHEALTH

The last two decades have seen a growing interest in novel ways to better support patients with heart failure at home. Clinical trials have embraced this approach by including structured telephone support, interactive symptom/vital signs monitoring, or invasive continuous monitoring (Abraham et al., 2011; Boyne et al., 2012; Galinier et al., 2020; Kasper et al., 2002). For example, in a US randomized trial (Kasper et al., 2002) of 200 patients with heart failure recently discharged from hospital, each patient received telephone calls from a nurse who adjusted their medications in line with an algorithm and according to a predefined schedule. In a Dutch multicentre study (Boyne et al., 2012) of 382 patients, 197 were randomized to a digital intervention to report symptoms, knowledge and behaviour to a nurse. Finally, in a French trial (Galinier et al., 2020) of 937 patients, 482 patients reported daily weight, symptoms and received personalized education. Not surprisingly, the results of each study varied in terms of effectiveness in reducing the incidence of hospitalizations or mortality and improving clinical outcomes, which may be attributed to different sample populations, interventions from different disciplines and different outcome measures.

Controversy remains regarding the effectiveness and contribution that noninvasive or invasive support can play in the anticipation or management of decompensating heart failure symptoms (McDonagh et al., 2021). Patients who have access to a specialist multidisciplinary heart failure team may derive less benefit from telemonitoring compared with patients without ready access to such a specialist team. Health care systems, geographical location and funding often limit patients' options and choices on how their condition is treated (Dierckx et al., 2017). Nevertheless, considering that the age of patients with heart failure is increasing, frequent transportation to the health care setting for face-to-face review and titration of evidence-based medications can seem appropriate. During the COVID-19 pandemic, such patients were treated virtually through the use of video call and/or telephone support. Preliminary data from the United Kingdom showed that this enabled a reconfiguration of staff resources to best manage the new circumstances, with lessons learnt that will inform and improve future practice (Bromage et al., 2020). COVID-19 has accelerated the need to find urgent and innovative solutions to the organization and delivery of health care, especially for those patients with long-term, chronic conditions such as heart failure (Ski et al., 2021).

Telehealth has the potential to contribute to a personalized approach and improve access to heart failure care and overcome geographic inequalities. It can also improve self-management and empowerment for people and lead to greater efficiencies in the health care system (Silva-Cardoso et al., 2021). Teleconsultation, telemonitoring and the use of wearable devices and apps for heart failure health and lifestyle support are increasing rapidly, but caution is warranted regarding such technology, especially concerning issues such as data validity and privacy, and support for patients and clinicians using these technologies is an important consideration (Singhal & Cowie, 2021).

3 | CURRENT ROLE OF PATIENTS, NURSES AND DOCTORS

Digitalization of health care is transforming the conventional patient–clinician relationship from a traditionally medically-led model of care where 'doctor knows best', to an approach where patients are actively engaged and share decision making (Mackie et al., 2019). Indeed, patients are becoming more skilled in 'health literacy', and they more commonly research their conditions extensively, which is represented by the 1.6 million searches for health information on the NHS Choices website in 2019 (Topol, 2019). Moreover, patients with heart failure—and their informal caregivers—have demonstrated an interest in the incorporation of digital technologies into their treatment (Zippel-Schultz et al., 2021). From a health care professional perspective, the ability to provide optimal care, such as fortnightly titration of β-blockers as advocated in guidelines (McDonagh et al., 2021), is becoming impossible, as patient numbers increase and resources decline. Furthermore, heart failure specialists may lack the time and resources to periodically review data from noninvasive/invasive monitoring and provide necessary follow-up, when warranted. Digitalization of health care may alleviate these health care challenges by presenting an opportunity for participatory medicine (Barrett et al., 2019). Including patients in care-related decisions and empowering them to self-manage their condition would appear not only acceptable but expected from a patient's perspective (Wattel, 2018). In the current resource-restricted environment, this could be achieved, for example, through the integration of artificial intelligence, along with gamification to increase patient engagement and enable the effective titration of evidence-based medication, without the need for review by a heart failure specialist. The PASSION-HF project extends the concept of telemonitoring into a new era—that of personalized home-based patient care (Barrett et al., 2019). This contemporary form of patient-centred care may improve patient adherence to treatment (Evangelista & Shinnick, 2008), increase patient satisfaction (Hanucharurnkui & Vinya-nguag, 1991), reduce costs incurred by patients (e.g. travel and parking) (DeMonaco & von Hippel, 2007), enhance patient outcomes (Sarasohn-Kahn, 2013) and decrease health care costs (Sarasohn-Kahn, 2013). Ultimately, the majority, if not all, areas of health care will be influenced by the adoption of digital technologies over the next 20 years (Topol, 2019). Therefore, training in digital skills for health care staff is essential, with effort employed to avoid digital exclusion for patients and staff, which should facilitate equality of engagement across different geographies and socio-economic groups (NHS Digital, 2019).

4 | HOW THESE ROLES WILL LOOK IN CASE OF A WELL-FUNCTIONING DOCTORME

Given that the current roles in health care mainly consist of active monitoring or data collection (explicit data), it is expected that passive monitoring (implicit data) will play an important role in the future. And this will mainly involve noninvasive implicit data. This includes noninvasive biosensors and also sensors in smartwatches and smartphones. An advantage of collecting implicit data is that the patient and health care professionals are not burdened by it. After all, the patient does not notice it, and the health care professional does not have to do anything for it. This results in a direct increase of available patient data that can then be used to make health care decisions.

This increase in patient data also provides an opportunity to redirect health care provision towards preventive rather than reactive care. With the increase in pressure on care, one sees that only necessary care is provided, for instance care in response to a deterioration in a patient's condition. With the help of e-health and artificial intelligence, the focus can be more on predictive and preventive medicine (Barrett et al., 2019). This means that not only the current condition of a patient is treated, but the emphasis is also explicitly on the long-term treatment of patients.

Because artificial intelligence can make use of a lot of available data, it is not inconceivable that e-health applications will later become the gatekeeper for the patient. Patients increasingly have to deal with comorbidities, and these require complex treatments with extensive guidelines. Treating multiple comorbidities with the current complex guidelines is sometimes difficult enough.

E-health is already reducing burden on patients and health care professionals (e.g., by reducing the administrative burden) and will generate more data on which preventive (and personalized) health care can be applied. This in turn will give patients the opportunity (with the help of e-health education) to get to know their illness better and deal with it better, which in turn will increase the patient's confidence in self-care. Health care professionals will have more time for the patient with more complex needs, and also for their circumstances, not just their illness.

5 | DOCTORME AS AN ALTERNATIVE DELIVERY OF CARE VERSUS ADJUNCT TO USUAL CARE

In 2018, the PASSION-HF consortium, consisting of clinical heart failure specialists, software developers and academic researchers, embarked on the co-design and development of a medical device, with the potential to revolutionize the delivery of modern-day heart failure management. The study, funded by Interreg NWE, is due to complete in 2023. Members recognized that over the last two decades, telemonitoring has been an adjunct to usual care, whereby the patient remotely engages with the health care system; however, direction in terms of medications and lifestyle remained at the discretion of the health care professional who receives his/her data. As a result, gaps remain in the 'real world', in terms of the timely application of current evidence-based therapies (Bayes-Genis et al., 2018) as often health care professionals delayed decisions pending additional clinical data (blood pressure, renal function) or uncertainty regarding follow-up.

DoctorME will alleviate the burden on heart failure specialist, allowing them to focus on the most complex conditions, by offering safe and effective titration of evidence-based medications based on

artificial intelligence and guideline-based algorithms, with the ability to provide personalized advice directly to the patient. As an autonomous remote system, DoctorME will provide 24/7 support and education to patients with heart failure (Ski et al., 2020). No longer will guidance be limited to Monday–Friday, 9:00 AM–5:00 PM, rather it will be immediate, though with onward referral to a heart failure specialist if DoctorME detects an acute deterioration in the patient's condition. The PASSION-HF consortium is using artificial intelligence as an enabler to optimize effective heart failure care in consideration of disease complexity. DoctorME promotes joint decision making through upskilling, educating and subsequently empowering patients to achieve optimal self-management (Ski et al., 2021).

A recent qualitative study of 49 patients and 33 of their informal caregivers aiming to explore determinants of their acceptance regarding a system such as DoctorME—found four main themes: (1) needs and expectations, giving information about the expected benefits; (2) preferences regarding the care process, dominated by the perceived benefits of the familiar patient–doctor relationship and the human aspects of care process as a reflection of the necessary learning effort or the change in behaviour to be made, when using the system; (3) perceived risk, focusing on possible errors; and (4) trust, based on the belief that the doctor-at-home delivers what is promised. Participants expressed a desire for reassurance and a wish for more support in the management of heart failure, envisioning such a system as a potential daily companion supporting their daily routines. They were receptive to changes to the current health care process, though trust was identified as an important basis for acceptance and use. Perceived risk for decision-making errors, which may be potentially life-threatening, was a major concern and a barrier to adoption of such a system. However, overall patients and informal caregivers were receptive and saw clear benefits of digitalization in health care and that an interactive decision-making system for patients could empower and enable effective self-care (Zippel-Schultz et al., 2021).

These findings are generally congruent with those of recent reviews of technology-based support for caregivers of stroke patients (Lobo et al., 2021) and for nurses (Gan, 2020). In their rapid review, Lobo et al. (2021) highlight the influences of technology in improving stroke caregiving and the need to include user-centred design principles to create a meaningful, actionable and feasible system for caregivers, specifically its delivery process and ability to meet the needs of the individual. With regard to health care professionals, Gan (2020) found that technology, specifically telehealth and telementoring, can help nurses monitor patients remotely and contribute to patient education and counselling, as well as maximize mentoring opportunities, the provision of support and learning among nurses. The growing shortage of nurses demands flexibility of care and staffing and that alternative and creative ways of working are considered. Nurse managers want to deliver safe, quality care while containing staffing levels and avoiding unnecessary costs. Digital health technologies such as described offer nurse managers alternative, creative ways of working, which can alleviate some of the physical and emotional demands of traditional bedside nursing, prove more rewarding and job-enriching, improve continuity of care and be cost-effective.

As noted by Lobo et al. (2021), the purpose of these systems is to promote person-centred care (Dyb et al., 2021) and transform current health care practices through the promotion of information delivery, expansion of care and empowerment of individuals to manage their health (Mermelstein et al., 2017). Digital technologies and innovations such as DoctorME offer a practical, innovative means of achieving these.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

Nurse managers are challenged with creating inclusive and supportive working environments where collaborative working and digital technologies in heart failure care are embraced. To ensure this happens, nurse managers need to communicate a clear message of the importance of valuing digital health, ensuring staff have the appropriate digital skills training.

7 | CONCLUSION

Heart failure care is being transformed by digital technologies, and innovations such as DoctorME have profound implications for patients, nurses and doctors. These include cultural change and health service transformation. There will be a need for patients and health care professionals to acquire some element of digital skills and for health services to have the appropriate technological infrastructure.

CONFLICT OF INTEREST
The authors have no conflict to declare.

DATA AVAILABILITY STATEMENT
Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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