Emerging technologies for supporting person-centred integrated home health care

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Introduction

For people with chronic conditions, people recovering from an illness or surgery, frail older people with complex needs, and people with disabilities, quality home health care and community services are vital to help them to live independently and well in their homes.[1-3] Integrated care at home may help reduce their use of expensive inpatient care, help early discharge from hospitals and the delivery of rehabilitation programs.[3] From the viewpoint of healthcare professionals, the effective and continuous monitoring of patients' health status and communication with patients are the basis of providing appropriate diagnosis, treatment, and care.[4,5] However, home health care faces the challenges of patient education, patient self-management, patient-clinician communication and remote clinical monitoring.[6] Furthermore, it also requires health and social care workers from multiple backgrounds and different organizations and units (e.g. hospitals, subacute units, nursing homes, primary care services, community services) to work effectively together, but this has not been well achieved.[7] To improve the situation, significant attention and research effort has recently been focused on the development of emerging technologies for home health care to support

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person-centred integrated care, and more specifically, the development of technologies and virtual platforms to support the monitoring of patient conditions, remote delivery of home health care, improvement of patients' compliance to care programs as well as patient-clinician and clinician-clinician communications.[8–13]

The primary objective of this special issue is to foster focused attention in this emerging area and to serve as a forum for researchers and healthcare professionals to exchange and discuss the latest advances in technologies and issues in practices. This special issue targets on new models, novel technologies and systems that support patient monitoring and remote delivery of home health services, addressing design, user experience, implementation and impact. Our call for submissions had received positive responses from the community. After a rigorous peer-reviewed process, five papers were accepted based on their quality and relevance to the theme of this special issue. In the following sections, we introduce each of the special issue papers and conclude the editorial with future opportunities.

Contributions

This special issue features one article reporting on work developing medication distribution system to support existing home medication services that link convenience stores, lockers and home delivery in Taiwan.[14] The proposed system allows simultaneous determination of convenience store chains, pickup locations of convenience stores and lockers, vehicle routes for convenience stores and lockers, and vehicle routes for customers' homes. Initial simulation has showed that the system can potentially fit individual needs for customers, minimize operation costs and improve the efficiency of medication home delivery.

The second article in this special issue focuses on using an eHealth tool to support people with chronic obstructive pulmonary disease (COPD) and long-term oxygen treatment (LTOT) in their health monitoring, virtual consultation and remote exercise training services.[15] The mobile solution consists of self-monitoring of health parameters, e-round with multi-professional team and tailored programme for physical exercise training in a home environment. As one of the earliest studies to evaluate the feasibility of this particular digital intervention, positive effects have been shown with regard to the efficiency for e-rounds, collaborations and the participants' physical capacity.

The third article explores user interface and acceptance of a virtual assistance tool for electronic health data collection among older adults experiencing motor and cognitive difficulties.[16] This study evaluates two genetic disorders Family History (FHx) data collection platforms, the standard and the Virtual Conversational Agent (VGA), using both young and older adults to investigate how aging affects users' performance as well as their preferences. Their results show that although older adults are slower to complete the tasks on both interfaces, they perform better in VGA interface and prefer this interface due to decreased workload, better usability and context-based guidance. The results from this study have implications for the design of virtual assistants in other areas of data collection for the aging group.

This special issue also features a very interesting case study of using acoustic and prosodic information as an easy-to-record, ubiquitous and non-intrusive health sensor for home-based monitoring of bipolar disorder.[17] The study results show that the speech-based algorithm is a potential tool for predicting different mood statuses in patients with bipolar disorders. Moreover, an application, MoodRecord, is also featured in the solution to provide a new way to manage patient monitoring in addition to regular visits to clinics, leveraging the functions of estimating patient mood and a further monitoring and supervision of patients at home.

Finally, this special issue features an article focusing on evaluating experience of patients and clinicians in a care augmenting telemonitoring service, their perceived impact, and clinicians' perception on how the service can be introduced into their organizations.[18] The results reveal that an adapted approach is required for telemonitoring to fully incorporate into routine home health service delivery and become a core part of care pathways for chronic condition management. Embedded in a large multi-site trial of home telemonitoring, this work demonstrates the importance of evidence-based research and implementation evaluation in the development of technologies in home health care.

Conclusion and future opportunities

In conclusion, this special issue represents research pieces from passionate researchers actively work in the fields of technology design and evaluation in various aspects of home health care. It moves beyond descriptions of tools to discuss the design of technologies to support person-centred integrated care and improve efficiency, patient outcome and user experience. Future advances in home health care technologies have the potential not only to help integrate home health care into the overall health care system but also foster person-centred model of care and community-based independence for individuals. We have seen that more technology enabled services are being combined to build networks of independent elements for home health care delivery. There have been a growing research technology innovations and digital interventions which emphasize patient empowerment, patient self-monitoring and patient-clinician interaction. Person-centred integrated care is part of the wider system of the Internet of Things (IoT) – health monitoring devices, sensors and applications that connect to healthcare systems and provide various health data for better monitoring and early detection of risks and prediction of medical issues. Technology design is also moving towards addressing cognitive and accessibility challenges that aging and disability pose for older adults. Furthermore, the recent COVID-19 pandemic has challenged the way of home health care delivery and has provided a powerful incentive to adopt technologies and benefit from virtual care. It has reinforced the importance of forward-thinking technology innovations in home health care.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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