Mobile and Connected Health Technologies for Older Adults Aging in Place

Based on a 2012 AARP survey, more than 90% of older adults want to stay in their own homes as long as possible. The emerging concept of aging in place supports older adults’ independence, autonomy, and connection to social support with the goal of balancing their physical, emotional, mental, and social needs in their own homes, rather than residential care (Wang, Carroll, Peck, Myneni, & Gong, 2016). With booming industry on smart home technology for older adults and remote monitoring technology for chronic disease management, aging in place is becoming a reality for many, regardless of income and mobility level.

Emerging mobile and connected health technologies for older adults cover a broad spectrum, including smart-home sensors, smartphone applications, wearable trackers, remote monitoring devices, online health communities, and tele-health platforms. Examples of such technologies include Bluetooth® or wireless blood pressure monitors with companion smartphone applications and links to data that patients can share with their families, caregivers, and/or clinicians; wristband fitness trackers with companion smartphone applications for diet and physical activity monitoring; and wireless or voice-enabled medication dispensers. Other modalities include pressure sensors and passive infrared motion sensors embedded in walls, ceilings, beds, and floors to detect motion, gait, and fall risk (Hanson, Takahashi, & Pecina, 2013). AARP online support communities for caregivers and electronic health record (EHR) systems with integrated patient-generated health data are among the technologies that provide ways to engage older adults in healthy lifestyle behaviors, perform activities of daily living, measure and monitor disease biomarkers for chronic disease management, assess risks for falls, and support social needs.

Often times, challenges are not in the development of the technology itself, but in its usability, interoperability, and integration to support a coherent treatment and monitoring plan for older adults and their families, caregivers, and clinicians. From the perspectives of older adults and their families and caregivers, safety, security, privacy, ease of use, perceived needs, and cost considerations all impact their willingness to adopt and continue using the technologies. Many technologies were initially designed to serve the rich and young, and later adopted for older adults. Developers did not necessarily consider special needs for older adults, especially underserved...
individuals with limited health literacy. Many fitness trackers and smart watches designed to measure physical activity levels can be too complex or problematic for older adults with vision issues. Blood glucometers can be overengineered to include advanced features to record situational parameters related to each blood glucose reading, but hard for older adults to choose from the large number of different situations. Older adults usually have multiple chronic conditions and physical, mental, and social needs that require an integrated platform to serve various needs of those involved in their care. For example, family members may need a system to manage multiple older adults from different households, whereas older adults may need a system to manage care transitions from hospital/nursing facility to home or vice versa, and caregivers may need a system to manage complex medication regimens for their care recipients.

As technology is typically a double-edged sword, the convenience level of using an integrated platform... is highly dependent on the usability of the system...

be considered in clinical care, the overwhelming information and data collected through these mobile, wearable, and remote monitoring technologies can bring unintended consequences, such as information overload, alert fatigue, and clinician burnout. More data are not necessarily associated with better health and outcomes. Using techniques such as machine learning and natural language processing to learn from the large amount of data and present only the right amount of information at the right time to the right individual can be challenging but achievable if patients and families are considered full partners in designing mobile and connected health technologies. In addition, iterative design and development processes must be taken through objective, evidence-based, and systematic usability evaluations (Wang & Zhang, 2015) to ensure use of the integrated systems to meet older adults’ needs and fit clinicians’ workflow. National and local policies that promote health care and technology also emphasize that usability is key to ensure the long-term adoption of connected health technologies.

The other challenge is lack of scientific evidence to support the efficacy and effectiveness of these mobile and connected health technologies in improving health and health care outcomes for older adults and in increasing their ability to age in place. A recent systematic review and meta-analysis showed that only remote monitoring technologies that had personalized coaching and were based on health behavior models were most effective in improving patient outcomes (Noah et al., 2018). Nurse scientists can play essential roles in designing future research to improve the design and use of mobile and connected health technologies and researching their effects on older adults’ health outcomes and ability to age in place.

In conclusion, mobile and connected health technologies are promising tools to support older adults aging in place; however, a person-centered, team-based solution is required, which emphasizes patient and family engagement, usability and interoperability of connected systems, and big data analytic engines to drive artificial intelligence to support clinician decision making. As these emerging mobile and connected health technologies infiltrate every area of future health care, concentrated efforts are needed to address safety, security, privacy, and ethical challenges. Scientific evidence in linking these emerging technologies with improved health and health care outcomes is needed before large scale implementation. Nurses are in a prime position to lead interprofessional teams of engineers, computer scientists, physicians, informaticians, social workers, community health workers, pharmacists, and other health professionals, and partner with patients and their families and caregivers, to design, develop, and implement mobile and connected health technology solutions
in a holistic and precise manner to support older adults aging in place. Clinicians should also take advantage of The Office of the National Coordinator for Health Information Technology Patient Engagement Playbook (access https://www.healthit.gov/playbook/pe), a tool for clinicians who want to leverage health information technology, particularly connected technology tools to engage patients and families in their own care.

REFERENCES


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