



## Review

## The role of digital health technologies in management of pain in older people: An integrative review



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## ABSTRACT

Pain is one of the most distressing and debilitating health issues faced by older people. The burden of unrelieved pain experienced by older people and its associated high symptom and economic costs demands consideration of new strategies to better this condition. As the global uptake of digital technology increases, exploring its potential to impact positively on older peoples' pain self-management practices warrants investigation. This integrative review aimed to evaluate the use of digital health technology for management of older people's pain across care-settings. Searches were conducted to identify relevant English language studies published in CINAHL, Medline, Academic Search Complete, EMBASE, Cochrane library databases, and Google and Google Scholar websites. A total of 1003 papers were identified, 9 met the inclusion criteria. The highest level of evidence (Level II) was generated by three Phase II randomized controlled trials. These trials demonstrated the feasibility of computer based interactive or instructive video interventions however there was limited evidence to support their use for reduction of pain intensity and interference. Qualitative evidence demonstrated older people's willingness to use mobile technologies (iPhone or digital pen) to help manage their pain, however, the need of device-use training and connectedness with clinicians were highlighted.

In conclusion, there is some evidence that integrating digital health technology into older peoples' pain self-management plan is feasible and acceptable. However, the provision of high-quality technological interventions informed by a thorough understanding of older people's digital technology pain management needs is required to ensure greater integration of this technology in clinical practice.

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## 1. Introduction

The global population is ageing rapidly and older people (people over 65 years of age) will shortly outnumber children under the age of five (World Health Organisation, 2012), with a fifth (13–17%) of older people living in high-income countries (Age UK, 2014; United States Department of Health and Human Services, 2011; Australian Institute of Health And Welfare, 2007). Older people often live with arthritic conditions, osteoporosis, back and/or cancer pain (Australian Bureau of Statistics, 2012). Chronic pain contributes to disability, decreased mobility, depression, and impaired quality of life (Patel, Guralnik, Dansie, & Turk, 2013), which is estimated to cost the Australian economy \$34 billion annually in health care expenses and lost productivity (Conway & Higgins, 2011).

Population ageing and high pain prevalence demands innovative and cost-effective pain self-management strategies targeted at older people, including the use of various digital health technologies (Free et al., 2013; Ruland et al., 2013). Digital health technologies are categorized into either: eHealth, which involves secure and cost effective use of computer-based information and communications systems to process, transmit and store data and information for health related matters (WHO, 2005, 2015); or mHealth, which is a component of eHealth and is defined as medical or public health practice supported by mobile devices (i.e. mobile phones, personal digital assistants, and other wireless devices) (WHO, 2015).

While digital health technology uptake among older people has been slow, this trend is being averted with the development of more user friendly devices (Pew Research Center, 2015; Smith, 2014). It is estimated that 60% of older adults now regularly use the internet, 18% own a smartphone and 18% own a tablet computer (Smith, 2014), and 30% regularly seeking health information online (Pew Research Center, 2015). Routine integration of digital technology into older people's health management strategies will increase as people have more digital experience (Currie, Philip, & Roberts, 2015).

While there has been a proliferation of randomized controlled trials (RCTs) testing various digital health technology based pain management interventions, most have been largely limited to younger cohorts (Buhrman, Nilsson-Ihrfeldt, Jannert, Ström, & Andersson, 2011; Pombo, Araújo, Viana, & DA Costa, 2013). As a consequence the use of digital health technology for pain management among older people is poorly understood.

### 1.1. Aim

To evaluate digital health technology interventions designed to improve older people's pain management across care-settings.

This integrative review set out to answer the following research questions:

1. What are the salient features of digital health technology that have been tested as part of a pain management strategy for older people?
2. Is there evidence to support the use of digital health technology in the management of pain in older people?
3. What are the barriers and facilitators to implementation of digital health technology among older people for pain management?

4. What are the gaps in the current evidence base and future research direction?

An integrative review was considered to be the most appropriate method to systematically analyze currently available research evidence, due to the small number of studies identified in the preliminary search (Whittemore & Knafl, 2005). This approach allowed for inclusion of experimental and non-experimental studies to fully understand the use of digital health technology in managing older peoples' pain, appraise the strengths of the evidence and identify research gaps (Whittemore & Knafl, 2005).

## 2. Methods

This integrative review adhered to the following five stages: (1) problem identification, (2) literature search, (3) data evaluation, (4) data analysis, and (5) presentation (Whittemore & Knafl, 2005). The reporting of this integrative review adheres to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement (Moher, Liberati, Tetzlaff, & Altman, 2009).

### 2.1. Eligibility criteria

Studies reporting empirical data related to the use of digital health technology in pain management of older people that were published in peer reviewed English language journals from 2000 to August 2015 were included (Table 1). This date range was selected because significant advances; and increased adoption of digital technologies have all occurred since 2000 (Oulasvirta, Rattenbury, Ma, & Raita, 2012).

### 2.2. Literature search

A search strategy was developed by two reviewers (PB and JLP) and checked by a librarian. One reviewer (PB) conducted the search on 02 August 2015 using the following databases: Academic Search Complete, Medline, CINAHL, EMBASE, and Cochrane Library using a combination of free-texts (as keywords) and MeSH terms

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