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eHealth In**t**erventions to Suppor**t** Self-Management **i**n those with **M**usculoskeletal Disord**e**rs:
A Scoping Review Protocol: **'eHealth: It's TIME'**

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Review Title

eHealth interventions to support self-management in those with musculoskeletal disorders: a scoping review protocol

Abstract

Objective: The objective of this scoping review is to explore existing literature related to the role of eHealth interventions in supporting self-management in those with musculoskeletal disorders in order to investigate and chart the evidence, and identify any gaps within the literature.

Introduction: Musculoskeletal disorders are one of the leading causes of disability worldwide. Self-management interventions are consistently recommended as a core component of treatment for people with musculoskeletal disorders. Given limited health care resources, there is increasing interest in the potential role of eHealth interventions to support self-management in this population.

Inclusion criteria: Studies that include adult participants (older than 18 years) with a musculoskeletal disorder will be considered. Studies that include participants with pain of specific pathological origin (eg, infection, malignancy, osteoporosis, inflammatory disease, fracture), those who are pregnant, or individuals following surgery will be excluded. The concept is eHealth interventions that support self-management conducted in any setting and geographical location. All settings and locations will be included.

Methods: The following electronic databases will be searched with no limit on publication date: MEDLINE, CINAHL, PsycINFO, Embase, Scopus and the Cochrane Database of Systematic Reviews. A structured search of the gray literature will also be conducted. Studies will be limited to those published in English. Two reviewers will undertake title and abstract screening, followed by full-text screening. Data extraction will be conducted utilizing a standardized form for included studies, and a narrative summary will accompany the charted results and will describe how the results relate to the review's objective.
Systematic review registration: Open Science Framework (https://osf.io/29rd6)

Keywords: digital health, eHealth; musculoskeletal pain; review; self-management

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Introduction

Musculoskeletal disorders (MSDs) are common, with significant personal, community, and societal consequences. The Global Burden of Disease Study of 2017 reported that MSDs were one of the leading causes of years lived with disability worldwide.[1] Chronicity is common and prevalence is greater in older adults. Consequently, the burden of MSDs is predicted to increase as the population ages,[2] thus increasing the strain on already overstretched health care services.

eHealth, broadly defined as a variety of information communication technologies utilized in the delivery of health services,[3] has received considerable attention as an option for delivering care to those with MSDs.[4] A major benefit of utilizing eHealth interventions to deliver health care is that some of the barriers to face-to-face treatment are reduced or potentially removed. An eHealth modality may improve treatment accessibility, reduce the waiting time, and be more cost-effective than face-to-face interventions.[5] In recent years, eHealth modalities have been developed and tested in a gradual fashion, with research often focused on barriers and facilitators.[6] However, at present, due to the COVID-19 pandemic, supporting people with non-urgent and long-term conditions at a distance from health care providers has become essential, with the rapid introduction of eHealth modalities reported across health care systems.[6]

Self-management is a treatment approach that encourages the individual to take a more proactive role with medical management, role management, or emotional aspects of their condition,[7] and is widely recognized and recommended in the management of MSDs.[8,9] eHealth has been proposed as one option by which self-management may be promoted and enabled, although, it has also been suggested that eHealth, also known as digital health, may increase dependence on health care professionals rather than promoting self-management.[10] The extent to which eHealth promotes self-management and the components of eHealth interventions that contribute to this goal remain unclear.

Supported self-management aims to give people with a long-term condition confidence in taking an active role in all aspects of managing their condition and health behaviors collaboratively with their care providers.[11] It is promoted as a strategy that can cost-effectively enable patients to contribute to the improvement of their own outcomes, playing a key role in the World Health Organization's Innovative Care for Chronic Conditions framework.[12] However, in much of the supported self-management literature, there is a broad failure to recognize MSDs as a long-term condition requiring access to integrated management in the same manner as other chronic diseases, such as diabetes, and this may partly explain why management of these conditions is inadequate in much of the world.[13]

Self-management and its support comprise a wide range of potential activities and interventions.[14] A systematic overview of self-management interventions (Practical Reviews in Self-Management Support [PRISMS]) illustrated that self-management support interventions are complex and multifaceted, involve both the patient and health care professional, and need

to be tailored to the individual and their specific context and condition, with no single component of self-management interventions identified as being more important than others.[14] Furthermore, the detail and quality of reporting of these complex interventions was a barrier to the understanding of their effective components and wider implementation.[14] This, together with the lack of a suitable tool to evaluate the important components of self-management interventions, contributed to the development of the PRISMS taxonomy of self-management support.[15] This taxonomy identified 14 separate elements that may be modified and utilized to support self-management across a range of long-term conditions. Several of these components could be potentially delivered via digital health, and may be grouped and considered under the following headings[16]:

- Information provision and patient education
- Remote monitoring with feedback and action plans
- eHealth-facilitated clinical review
- Adherence support (eg, lifestyle intervention adherence)
- Psychological support
- Lifestyle interventions (eg, exercise, weight loss)

Although a number of systematic reviews exist evaluating eHealth modalities in MSDs,[17,18] they are often limited to a specific eHealth subgroup such as internet-based[18] or mobile phone applications.[17] All reviews involved those with a chronic musculoskeletal condition although some included other long-term conditions, such as diabetes and asthma.[19] As a result, little is known about the role of eHealth-mediated self-management support in those with acute and subacute MSDs despite evidence-based recommendations[9] and existing research indicating low self-efficacy as a predictor of long-term pain and disability.[20] Furthermore, no review to date details components of eHealth support in those with MSDs with reference to PRISMS taxonomy, which serves as a barrier to identifying key characteristics aligned with effective and ineffective interventions and wider implementation.[14]

Given the variety of options that eHealth includes, and the varied nature of self-management interventions, this review aims to outline a broad overview of the evidence for eHealth-mediated self-management support using scoping review methodology, the optimal approach to mapping literature that is predicted to be large and heterogeneous.[21]

A preliminary search of the Cochrane Library, MEDLINE and CINAHL databases found no existing scoping reviews on the topic. The quality of evidence will not be assessed due to the type of research question and given that this is not a priority for scoping reviews.

Review objectives

The primary aim of this scoping review is to characterize the available evidence on eHealth interventions to support self-management in persons with MSDs in order to map the available evidence base on eHealth modalities, musculoskeletal diagnosis, and outcomes. A secondary aim is to chart intervention characteristics, such as intervention provider, duration, and

frequency, together with information on outcomes descriptively described as improved, unchanged, or worse.

Inclusion criteria

Participants

Studies that include participants with a MSD will be considered. Musculoskeletal disorders comprise a broad range of conditions that affect muscles, bones, joints, and associated tissues with variable symptom duration. Studies that include children (younger than 18 years), participants with pain of specific pathological origin (eg, infection, malignancy, osteoporosis, inflammatory disease, fracture), those who are pregnant, or individuals following surgery will be excluded.

Concept

The key concept of this scoping review is the use of eHealth interventions to support self-management in those with MSDs. For the purpose of this review, all studies that report on the use of an eHealth intervention to support self-management will be considered. An eHealth modality is considered to be some specific form of technology that is applied in the context of health care.[3] Examples of eHealth modalities include internet-based (web-based) health interventions, telephone-supported (interventions with telephone support from health practitioners), interactive voice response (the use of a phone's touch-tone keypad to provide responses to automated scripts), virtual reality (a three-dimensional computer-generated environment that the individual can explore, interact with, and manipulate), videoconferencing (high-quality real-time video and audio connection via online internet networks), and mobile phone apps (mobile-based or mobile-enhanced programs) that deliver health-related services (Appendix I).

Self-management was defined as any intervention that aimed to empower patients to be active decision-makers who deal with social, emotional, or medical management of their condition with the aim of improving their independence and quality of life.[7] It is anticipated that few studies will identify self-management support specifically as an aim of the eHealth modality under consideration, and, therefore, studies will be included if self-management support is an implied mechanism or component of the eHealth modality and outcomes relevant to self-management are evaluated as part of the study. Studies that include eHealth modalities that simply involve remote monitoring without an explicit decision-making role on the part of the patient will be excluded. Studies in which patients were educated and supported to implement new coping strategies for example was considered self-management and, hence, included. Studies with or without a comparison group will be included in the review. Outcomes of interest include those relating to function, pain, quality of life, self-efficacy, and health care utilization.

Context

This scoping review aims to establish the breadth and extent of the current published

literature on the use of eHealth interventions to support self-management. Therefore, studies conducted in any setting and geographical location will be considered.

Types of studies

This scoping review will examine all qualitative, quantitative, or mixed methods studies that report on an eHealth intervention that supports self-management in persons with an MSD. Systematic and integrative reviews were identified for the purpose of reviewing their included studies for potential relevant studies.

Methods

This review will follow the JBI methodology for scoping reviews.[21] The protocol was registered prospectively with the Open Science Framework (https://osf.io/29rd6).

Search strategy

This scoping review will comprise a three-step search strategy.[21] Firstly, an initial limited search of MEDLINE (via EBSCO) has been undertaken using a preliminary search strategy containing keywords for telecommunications, musculoskeletal pain, and self-care. Records identified in this search were reviewed to highlight relevant papers. Words contained in the title and abstract along with index words utilized to describe the article were used to identify additional keywords to ensure all relevant literature is captured. One reviewer (MK) developed the search strategy, with assistance from two professional librarians. The search strategy will be adapted for each information source. The final search strategy for MEDLINE is presented in (Appendix II). Screening of citation and reference lists of included studies will be conducted to identify other potential studies that meet the inclusion criteria.

The databases to be searched electronically include MEDLINE (EBSCO), CINAHL (EBSCO), PsycINFO (EBSCO), Embase, Scopus, and the Cochrane Database of Systematic Reviews. . Databases will be searched from inception. Studies will be limited to those published in English. Using the Canadian Agency for Drugs and Technology Gray Matters approach,[22] Google Scholar, Health Technology Assessment agencies (Canada, Australia, Ireland, UK, and USA) along with OpenGrey will be searched for gray literauture.

Study selection

Identified studies will be uploaded into Covidence (Veritas Health Innovation. Melbourne, Australia) and duplicates deleted. Titles and abstracts will be screened by two review authors (MK and SMcM) independently for assessment against the inclusion criteria for the review. Any disagreements will be resolved by consensus or by decision of a third reviewer (JMcV). Studies that may meet the inclusion criteria will then be retrieved in full and assessed in detail against the inclusion/exclusion criteria by two review authors (MK and SMcM) independently. Papers that do not satisfy the criteria will be systematically and sequentially excluded; the reason for exclusion will be recorded. The results of the search will be reported in full in the final report and represented in a Preferred Reporting Items for Systematic Reviews and Meta-

Analyses (PRISMA) flow diagram.[23] Any disagreements between the reviewers will be resolved by discussion, and where a decision cannot be reached, a third reviewer (JMcV) will mediate.

Data extraction

Data will be extracted utilising a draft data extraction tool (Appendix III), based on the JBI data extraction tool[21] and the Template for Intervention Description and Replication checklist.[24] Data will be extracted from selected studies utilizing the aforementioned data extraction form by one reviewer (MK) and reviewed by another reviewer. Authors will be contacted to retrieve any missing or additional data where necessary. The draft data extraction tool will be modified as required during the data extraction process, with modifications detailed in the full scoping review report.

Data analysis and presentation

The findings will be presented in tabular or diagrammatic form, accompanied by a narrative summary, which will illustrate how the results relate to the review objective and questions in a manner that aligns with the objective and scope of this scoping review. The charts and tables will report on distribution of studies by eHealth modality, musculoskeletal diagnosis, and quantitative and qualitative outcomes. These will be presented in line with the International Classification of Functioning, Disability and Health framework.[25] For the quantitative analysis, we will map the interventions described in the included studies to the components of the PRISMS taxonomy of self-management support[15] and illustrate the frequency with which they are encountered in self-management support interventions. The overall study results will be categorized descriptively as improved, unchanged, or worse, and the category “mixed results” will be reported for studies that have more than one outcome measure (eg, one measure unchanged, another measure improved). This will be based on the results presented by the study authors, and interpretation of the results will be limited due to the nature of the review being undertaken. A qualitative thematic analysis will be undertaken to provide an overview of the literature. The planned presentation of findings is likely to develop as the study progresses; the final presentation will be justified in the full review report. Gaps and limitations of the current literature will be identified and presented.

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Conflicts of interest

The authors declare no conflict of interest

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Appendix I: eHealth modality definitions/explanations

Telephone supported

These interventions typically involve telephone support from health care professionals with expertise in the specific subject matter to supplement a structured internet intervention. The main aim is to "provide support and encouragement for use of the internet intervention, and to address any concerns in relation to the internet-based content."[26]

Telephone-based

Intervention delivered via telephone calls between a patient and health care professional (two-way interaction) to support self-management[27] through knowledge exchange, goal setting, action planning, and maintenance.[28]

Internet-based

Structured programs that participants can interact with by utilizing mobile devices or computers. They can "support self-management by facilitating goal setting, self-monitoring and providing behavioral/symptom-related feedback."[26]

Virtual reality

A three-dimensional computer-generated environment, which facilitates an individual to interact with, explore, and manipulate objects by stimulating human senses.[29]

Interactive voice response

This technology is a "method for interaction between an individual and a computer through the medium of a telephone" using the touch-tone keypad. Typically an automated script poses questions and the caller keys in responses using the telephone keypad.[30]

Mobile phone applications

Mobile-based or mobile-enhanced programs that provide health-related services for tablets, smartphones, and other communication devices.

Video teleconferencing

This involves a combination of high-quality audio and video via internet protocol networks to enable real-time interactions between individuals, which can be utilized for clinical support, health care management, and diagnostic purposes.

Appendix II: Search strategy

Search conducted in MEDLINE (EBSCOhost)
Search date: 23 Apr 2020

Number	Search terms	Records retrieved
#1	MH “Telecommunications”	4,771
#2	AB ((Telecommunications)/ OR (telemedicine OR tele-medicine).mp OR (telehealth OR tele-health).mp OR (ehealth OR e-health).mp OR (mobile health OR mhealth OR m-health).mp OR (ICT).mp OR ((inform* OR communicat* OR interact*) adj6 (computer* OR technolog* OR software)).mp OR ((health* OR treat* OR therap* or intervention* OR assist* OR selfmanag* OR self-manag*) adj6 (computer* OR technolog* OR software)).mp OR (internet)/ OR (internet* OR world wide web OR www OR web-based OR email OR e-mail OR online).mp OR (telephone* OR phone* OR mobile* OR cellphone* OR cellular telephone* OR application* OR app* OR text* OR SMS OR smartphone* OR mobile operating system technolog* OR microcomputer*).mp OR (virtual reality OR augmented reality OR VR OR AR).mp OR (IVR OR interactive voice response OR voice response unit OR VRU OR speech recognition OR voice recognition).mp) OR TI ((Telecommunications)/ OR (telemedicine OR tele-medicine).mp OR (telehealth OR tele-health).mp OR (ehealth OR e-health).mp OR (mobile health OR mhealth OR m-health).mp OR (ICT).mp OR ((inform* OR communicat* OR interact*) adj6 (computer* OR technolog* OR software)).mp OR ((health* OR treat* OR therap* or intervention* OR assist* OR selfmanag* OR self-manag*) adj6 (computer* OR technolog* OR software)).mp OR (internet)/ OR (internet* OR world wide web OR www OR web-based OR email OR e-mail OR online).mp OR (telephone* OR phone* OR mobile* OR cellphone* OR cellular telephone* OR application* OR app* OR text* OR SMS OR smartphone* OR mobile operating system technolog* OR microcomputer*).mp OR (virtual reality OR augmented reality OR VR OR AR).mp OR (IVR OR interactive voice response OR voice response unit OR VRU OR speech recognition OR voice recognition).mp)	54,365
#3	MH “Self care”	32,701
#4	AB ("Self care" or "self care skills" or "self monitor*" or "education professional*" or "health education" or "health behaviour*" or "health behavior*" or "patient education*" or communication or "self manag*" or "self help technique*" or empowerment or "self efficacy" or "self concept*" or "patient participation" or "self help group*" or " professional patient relations" or "professional family relations" or "interpersonal communication*" or "client education" or "health knowledge" or "behaviour modification" or "care plan*" or "action plan" or CBT or psychoeducation or "peer support" or "social support*" or "emotional support*" or coping or "psychosocial support" or "case management" or "disease management" or "action planning" or "self initiated intervention*") OR TI ("Self care" or "self care skills" or "self monitor*" or "education professional*" or "health education" or "health behaviour*" or "health behavior*" or "patient education*" or communication or "self manag*" or "self help technique*" or empowerment or "self efficacy" or "self concept*" or "patient participation" or "self	505,347

	help group*" or " professional patient relations" or "professional family relations" or "interpersonal communication*" or "client education" or "health knowledge" or "behaviour modification" or "care plan*" or "action plan" or CBT or psychoeducation or "peer support" or "social support*" or "emotional support*" or coping or "psychosocial support" or "case management" or "disease management" or "action planning" or "self initiated intervention*")	
#5	MH “Musculoskeletal Pain”	3,128
#6	AB ("musculoskeletal pain*" OR "musculoskeletal disorder*" OR "musculoskeletal injur*" OR "musculoskeletal condition*" OR "musculoskeletal dysfunction*" or "musculoskeletal problem*" OR "musculoskeletal diseas*" OR "chronic Fibromyalgia" OR neuralgia or "back pain*" OR "neck pain*" OR "knee pain*" OR "shoulder pain*" OR "hip pain*" OR "multi site pain" OR "widespread pain*" OR "wrist pain*" OR "elbow pain"OR "hand pain") OR TI ("musculoskeletal pain*" OR "musculoskeletal disorder*" OR "musculoskeletal injur*" OR "musculoskeletal condition*" OR "musculoskeletal dysfunction*" or "musculoskeletal problem*" OR "musculoskeletal diseas*" OR "chronic Fibromyalgia" OR neuralgia or "back pain*" OR "neck pain*" OR "knee pain*" OR "shoulder pain*" OR "hip pain*" OR "multi site pain" OR "widespread pain*" OR "wrist pain*" OR "elbow pain"OR "hand pain")	103,234
#7	#1 OR #2	58,340
#8	#3 OR #4	520,797
#9	#5 OR #6	104,588
#10	#7 AND #8 AND #9	95
#11	#10 Filters: English	93

Appendix III: Draft data extraction tool

Author(s)		
Year		
Country of origin		
Aims/purpose		
Study design Quantitative: ☐ RCTs ☐ quasi-RCTs ☐ interrupted time series ☐ controlled before and after ☐ observational: ☐ cohort ☐ cross sectional Qualitative Mixed methods		
Components of the interventions mapped to PRISMS taxonomy • Information provision and patient education • Remote monitoring with feedback and action plans • eHealth-facilitated clinical review • Adherence support and lifestyle interventions • Training and rehearsal of psychological strategies		
Intervention development • Use of framework/theory • Codesigned with patient		
	Intervention	**Comparator (if applicable)**
Sample size (after recruitment)		
Loss to follow-up # (%)		

DEMOGRAPHICS:		
Mean age (standard deviation)		
Female # (%)		
DIAGNOSIS # (%):		
Mean duration of symptoms		
Intervention		
What materials (provided to participants, used in intervention delivery or training) Where materials can be accessed (eg, website)		
What procedures (including any enabling or support activities)		
Who provided (including expertise, background, and training) • Nurse • Social worker • Physiotherapist • Psychologist • Primary care physician • Patient volunteer/mentor • Other		
eHealth-modality type • Telephone-supported • Telephone-based • Internet-based • Virtual reality • Interactive voice response • Mobile phone application • Video teleconferencing		
Format • Via eHealth only • Mixture of face-to-face and eHealth		
Where		

• Outpatient • Not specified • Community (non-clinic setting, such as gym, grocery store, study room) • Patient home • Multiple locations • Inpatient		
When and how much (number of times over what period including duration, intensity, dose)		
Tailoring (personalized for audience – explain)		
Modifications Any during course of study (describe changes)		
How well – planned (if adherence/fidelity assessed; how and by whom, and any strategies to maintain/improve)		
How well – actual (extent to which intervention delivered as planned)		
OUTCOMES*: (we anticipate that there will be heterogeneity regarding outcomes – these are possible outcomes that may be extracted) (improved/unchanged/worse)		
Body functions (eg, pain intensity, pain interference, anxiety, depression, sleep, self-efficacy)		
Activities and participation (e,g, stress management, walking, function, employment)		
Environmental factors (eg, medication, health care utilization)		

OUTCOMES for qualitative studies		
Key concepts/themes identified by authors		
Key findings that relate to the review questions		
*Based on the International Classification of Funcitoning, Disability and Health framework		