Videoconferencing of Movement-based and Psychologically Informed Interventions for Chronic Pain: A Systematic Review and Horizon Scan

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PREFACE

The VA Evidence Synthesis Program (ESP) was established in 2007 to provide timely and accurate syntheses of targeted health care topics of importance to clinicians, managers, and policymakers as they work to improve the health and health care of Veterans. These reports help:

- Develop clinical policies informed by evidence;
- Implement effective services to improve patient outcomes and to support VA clinical practice guidelines and performance measures; and
- Set the direction for future research to address gaps in clinical knowledge.

The program comprises four ESP Centers across the US and a Coordinating Center located in Portland, Oregon. Center Directors are VA clinicians and recognized leaders in the field of evidence synthesis with close ties to the AHRQ Evidence-based Practice Center Program. The Coordinating Center was created to manage program operations, ensure methodological consistency and quality of products, interface with stakeholders, and address urgent evidence needs. To ensure responsiveness to the needs of decision-makers, the program is governed by a Steering Committee composed of health system leadership and researchers. The program solicits nominations for review topics several times a year via the program website.

The present report was developed in response to a request from the Office of Rehabilitation and Prosthetic Services. The scope was further developed with input from Operational Partners (below), the ESP Coordinating Center, the review team, and the technical expert panel (TEP). The ESP consulted several technical and content experts in designing the research questions and review methodology. In seeking broad expertise and perspectives, divergent and conflicting opinions are common and perceived as healthy scientific discourse that results in a thoughtful, relevant systematic review. Ultimately, however, research questions, design, methodologic approaches, and/or conclusions of the review may not necessarily represent the views of individual technical and content experts.

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The authors are grateful to Liz Wing, MA, and Stacy Lavin, PhD, for editorial and citation management support, and the following individuals for their contributions to this project:

Operational Partners

Operational partners are system-level stakeholders who help ensure relevance of the review topic to the VA, contribute to the development of and approve final project scope and timeframe for completion, provide feedback on the draft report, and provide consultation on strategies for dissemination of the report to the field and relevant groups.

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Technical Expert Panel

To ensure robust, scientifically relevant work, the TEP guides topic refinement; provides input on key questions and eligibility criteria, advising on substantive issues or possibly overlooked areas of research; assures VA relevance; and provides feedback on work in progress. TEP members are listed below:

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The Coordinating Center sought input from external peer reviewers to review the draft report and provide feedback on the objectives, scope, methods used, perception of bias, and omitted evidence (see Appendix D for disposition of comments). Peer reviewers must disclose any relevant financial or non-financial conflicts of interest. Because of their unique clinical or content expertise, individuals with potential conflicts may be retained. The Coordinating Center works to balance, manage, or mitigate any potential nonfinancial conflicts of interest identified.

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INTRODUCTION

PURPOSE

The Evidence Synthesis Program (ESP) responded to a request from the Office of Rehabilitation and Prosthetic Services, the Office of Patient Centered Care and Cultural Transformation, and the Office for Pain Management and Opioid Safety for a review of effectiveness of videoconferencing to delivered nonpharmacological treatments for chronic pain. Findings from this review will be used to optimize the delivery of virtual care among Veterans with chronic pain.

BACKGROUND

With the onset of the COVID-19 pandemic, many health care professions needed to change their practice for the safety of the public at large in an attempt to decrease community exposures to the SARS-CoV-2 virus. Elective procedures were put on hold early in the pandemic due to overcrowding of hospitals; meanwhile, conservative care treatments were encouraged to adopt remote practice to maintain social distancing in adherence with local and national guidelines.[1] As a result, telehealth technology grew in prominence and has played a central role in maintaining the availability and continuity of care during pandemic times for providers across the health care continuum—from physicians to nurses to therapists—in settings ranging from primary care to specialty care. The Veterans Health Administration (VHA) was uniquely adept at applying this change in delivery, as it has long utilized telehealth services to deliver care to Veterans across the country.

Telehealth services are available on a variety of platforms, providing patients and practitioners with a range of resources to be connected to one another. Currently, the VHA offers telehealth services and communication with providers via instant messaging on MyHealtheVet, telephone calls, and videoconferencing on VA Video Connect (VVC). During the first 10 weeks of the pandemic, in-person ambulatory visits within the VHA decreased by nearly 56%.[2] Meanwhile, telephone visits increased by approximately 139% and VVC visits rose by about 72%.[2] Early in the pandemic, telephone appointments made up a significantly greater share of virtual care due to the lower complexity and ease of implementation of this virtual modality.[3] For VVC, implementation barriers include the need for hardware such as camera-enabled devices for both providers and patients, access to adequate connectivity for streaming video, and skills and confidence navigating a telehealth platform.[3]

Both within the VA Health Care System and in the civilian population, chronic pain is highly prevalent in the United States. Approximately 100 million adults in the United States live with some form of chronic pain, with the expectation that this number will continue to grow over the next decade.[4] Estimates of the prevalence of chronic pain in adults in the United States range from 15% to 64%,[5] with a higher prevalence of both chronic pain and high-impact chronic pain reported among women, older adults, those living in poverty or with public health insurance, and people residing in rural areas.[6] While pharmacological approaches to pain management can be effective, interest in nonpharmacological approaches is growing as an effective strategy to cope with chronic pain and to combat excessive opioid prescribing for pain-related conditions.[7,8] In

the case of chronic low back pain, the Clinical Practice Guideline on noninvasive treatments for low back pain recommends that clinicians and patients should initially select nonpharmacologic treatment with exercise, multidisciplinary rehabilitation, and other moderate-quality evidence treatment forms. Providers are only recommended to consider opioids when patients have failed nonpharmacologic treatment and nonsteroidal anti-inflammatory drugs.[9] Thus, early in the pandemic, treatment for chronic pain was a specific practice that was quickly pushed to adopt remote practice. Although face-to-face visits were discouraged, public health recommendations continue to encourage nonpharmacological pain management approaches such as behavioral therapy, exercise-based therapies, and self-management approaches to stem the use of prescription opioids. Yet this meant that the supply of nonpharmacological pain services needed to quickly pivot to meet the sustained high demand for this type of care. Telehealth has been used as a safe option for self-management of diabetes, heart failure, asthma, cancer, and other chronic disease management. The proposed benefits of telehealth include addressing concerns in the environment where they occur by treating patients in their homes or usual environment, improving adherence, and increasing cost effectiveness.[10] While the impact of using telehealth delivery has been examined for other chronic conditions, the benefits of virtual care for the nonpharmacological treatment of chronic pain remain less certain.[11]

Nonpharmacological approaches to pain management may be well suited for the virtual care environment. As a part of the Whole Health approach, the VHA is a leader in this area with the implementation of telehealth in complementary and integrative health services (Tele-CIH) to foster nonpharmacologic approaches to care. The application of videoconferencing for the delivery of nonpharmacological pain care is a promising area. Yet it is not widely understood if the effectiveness of this treatment modality translates to the virtual environment when delivered via videoconferencing. Thus, the purpose of this review is to examine the effectiveness of videoconferencing compared with in-person care for patients with chronic pain.

METHODS

TOPIC DEVELOPMENT

This topic was developed at the request of the Office of Rehabilitation and Prosthetic Services, the Office of Patient Centered Care and Cultural Transformation, and the Office for Pain Management and Opioid Safety. Key questions as outlined below were driven in particular by shifts in virtual care during the COVID-19 pandemic. Findings from this review will be used to optimize the delivery of virtual care among Veterans with chronic pain.

KEY QUESTIONS

The following key questions (KQs) were the focus of this review:

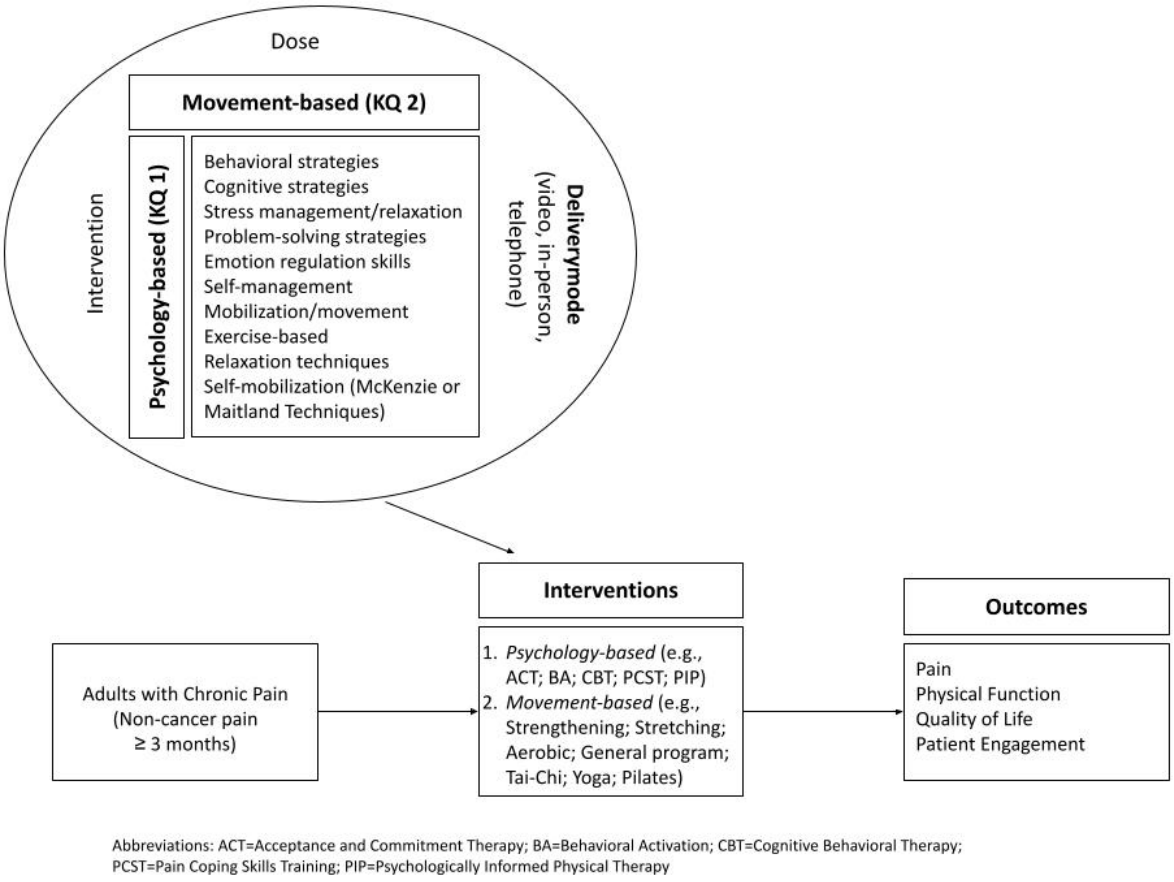
KQ1: Among patients with chronic pain, what is the effect of videoconference-delivered psychologically informed interventions for nonpharmacological chronic pain on pain, functionality, quality of life, and patient engagement?

KQ2: Among patients with chronic pain, what is the effect of videoconference-delivered therapeutic exercise and movement interventions for nonpharmacological chronic pain on pain, functionality, quality of life, and patient engagement?

ANALYTIC FRAMEWORK

The analytic framework shown in Figure 1 provides a conceptual overview of this review. The population of interest was adults with chronic pain. The interventions evaluated included nonpharmacological modalities for pain management that may be effective in the virtual care environment, including psychologically informed behavioral approaches like cognitive behavioral therapy (KQ1) and movement-based therapies like physical therapy (KQ2). The outcomes of interest were pain (*eg*, interference), physical function (*eg*, performance-based physical function and self-report), quality of life, and patient engagement (*eg*, home practice, session completion rates, self-reported engagement or satisfaction).

Figure 1. Analytic Framework



Abbreviations: ACT=Acceptance and Commitment Therapy; BA=Behavioral Activation; CBT=Cognitive Behavioral Therapy; PCST=Pain Coping Skills Training; PIP=Psychologically Informed Physical Therapy

PROTOCOL

A preregistered protocol for this review can be found on the PROSPERO international prospective register of systematic reviews (http://www.crd.york.ac.uk/PROSPERO/; registration number CRD42021279069).

DATA SOURCES AND SEARCHES

We conducted a primary literature search from inception to June 10, 2021, of MEDLINE (via Ovid), Embase (via Elsevier), CINAHL Complete (via EBSCO), and Cochrane Central Register of Controlled Trials (via Ovid) using a combination of database-specific controlled vocabulary and selected terms (*eg, chronic pain, videoconferencing)* to search titles and abstracts (see Appendix A for complete search strategies). To ensure completeness, search strategies were developed and executed by an expert medical librarian, with input from the other authors. We hand-searched previous systematic reviews conducted on this topic for potential inclusion.

STUDY SELECTION

Eligibility Criteria

Studies identified through our primary search were classified independently by 2 investigators for relevance to the KQs based on title and abstract from our *a priori* established eligibility criteria. All citations classified for inclusion by at least 1 investigator were reviewed at the full-text review level. The citations designated for exclusion by 1 investigator at the title and abstract level underwent screening by a second investigator. If both investigators agreed on exclusion, the study was excluded. All articles meeting eligibility criteria were included for data abstraction. All results were tracked in an electronic database (for referencing, EndNote, Clarivate Analytics, Philadelphia, PA; for data abstraction, DistillerSR; Evidence Partners Inc., Manotick, ON, Canada).

Table 1 describes the study eligibility criteria organized by PICOTS elements (population, intervention, comparator, outcome, timing, setting) and other criteria such as study design, language, and publication type. Specifically, for the intervention we sought to identify studies that evaluated the effect of synchronously delivered videoconferencing interventions explicitly focused on nonpharmacological pain management. We focused our review on psychologically informed and movement-based nonpharmacological approaches. Psychologically informed interventions encompassing psychological and behavioral therapies (*eg*, cognitive behavioral therapy [CBT]/acceptance and commitment therapy [ACT], meditation, mindfulness) and/or self-management education and support approaches[12] (*eg*, back school, pain education) are defined as tasks undertaken by patients to manage the symptoms, treatments, lifestyle changes, and physical and psychosocial consequences associated with chronic pain. Movement-based interventions included supervised exercise and movement therapies (*ie*, active, structured physical activity or activities designed to reduce impairments and improve movement-related function). We excluded studies that evaluated videoconferencing pain management compared with other video-based controls (*ie*, not in person), as the operations partners who commissioned this report were keenly interested in the comparison of videoconferencing care with in-person care.

Table 1. Study Eligibility Criteria

Study Characteristic	Inclusion Criteria	Exclusion Criteria
Population	Community-dwelling adults (≥18 years of age) with chronic (3+ months) non-cancer pain	• Inpatient populations (*eg*, tele-ICU, inpatient rehab) • Patients receiving care in an emergency room or tele-urgent care setting • Populations with less than 75% patients with chronic (3+ months) non-cancer pain • Postoperative patients
Intervention	All KQs: Synchronous videoconference care delivered over at least 2 encounters in which: 1. All (or the majority; *ie*, greater than 50%) of in-person	• Remote monitoring, wearables if not associated with virtual synchronous care • Telehealth interventions that do not involve synchronous

Study Characteristic	Inclusion Criteria	Exclusion Criteria
	nonpharmacological pain care is supplanted by virtual care. 2. Care is delivered remotely by a provider of a patient who is not physically present in the same location. 3. Care is administered within the context of longitudinal care provision (even if individual visits are for acute concerns). 4. Care is focused on pain management. * Interventions are not required to be exclusively virtual care by a provider as described above; rather, they may include the above with other asynchronous telehealth tools (*eg*, remote monitoring systems). KQ1: Behavioral interventions encompassing psychological and behavioral therapies and/or self-management education and support approaches KQ2: Therapeutic exercise and movement interventions*:* Supervised exercise and movement therapies	care delivered by provider to a patient (*eg*, one-way automated texts, reminder systems, self-management apps, or internet-based interventions that patients access outside their health care system) • Interventions delivered only by telephone • Majority not delivered by videoconferencing KQ1: Non-specific counseling even if focused on pain (*ie*, not manualized) KQ2: Non-evidence-based approaches as defined by current clinical guidance (*eg*, Up-to-Date)
Comparators	• In-person care without any videoconference delivery • Telephone delivered • Combination of in-person and telephone delivered	No comparator
Outcome	• Pain (*eg*, interference) • Physical function performance-based physical function and self-report • Quality of life • Patient engagement (*eg*, home practice, session completion rates, patient-reported engagement, satisfaction)	Any outcomes not listed
Timing	No limit	NA
Setting	Any outpatient setting (*ie*, general medical or specialty care clinic)	• Intervention delivered primarily in hospital inpatient setting (including emergency room) • Subacute rehabilitation
Study design	Randomized trials	• Not a clinical study (*eg*, editorial, letter to an editor) • Uncontrolled clinical study • Qualitative studies • Prospective or retrospective observational studies • Clinical guidelines • Measurement or validation studies

Study Characteristic	Inclusion Criteria	Exclusion Criteria
		• Studies self-identified as pilot or feasibility studies or studies of N <20
Countries	OECD[a]	Non-OECD
Publication types	Full publication in a peer-reviewed journal	Letters, editorials, reviews, dissertations, meeting abstracts, protocols without results

[a] OECD (2021) = Organization for Economic Co-operation and Development includes Australia, Austria, Belgium, Canada, Chile, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States

DATA ABSTRACTION AND ASSESSMENT

Data from published reports were abstracted into a customized DistillerSR database by 1 reviewer and over-read by a second reviewer. Disagreements were resolved by consensus or by obtaining a third reviewer's opinion when consensus was not reached between the first and second reviewers. Data elements include descriptors to assess applicability, quality elements, intervention details, and outcomes.

Key characteristics abstracted were participant descriptors (*eg*, age, sex, race), intervention characteristics (*eg*, provider type, movement-based or behavioral-based approach), comparator, and outcomes (See Appendix C for full list of outcomes reported in the identified literature). Multiple reports from a single study were treated as a single data point, prioritizing results based on the most complete and appropriately analyzed data. Key features relevant to applicability include the match between the sample and target populations (*eg*, age, Veteran status).

We used the Cochrane EPOC risk of bias 2 (ROB 2) tool, which is applicable to randomized studies.[13] These criteria are adequacy of randomization, deviation from indented interventions, missing outcome data, measurement of outcome, and selective outcomes reporting. We assigned a summary ROB score (low, some concerns, or high) to individual studies.

The strength of evidence was assessed using the approach described by Grading of Recommendations Assessment, Development and Evaluation (GRADE).[14] We limited GRADE ratings to those outcomes identified by the stakeholders and technical expert panel as critical to decision-making. In brief, this approach requires assessment of four domains: risk of bias, consistency, directness, and precision. Additional domains to be used when appropriate are coherence, dose-response association, impact of plausible residual confounders, strength of association (magnitude of effect), and publication bias. These domains were considered qualitatively, and a summary rating was assigned after discussion by 2 investigators as high, moderate, low, or very low strength of evidence. In some cases, high, moderate, low, or very low ratings are impossible or imprudent to make. In these situations, a grade of insufficient is assigned.

SYNTHESIS

We summarized the literature using relevant data abstracted from the eligible studies. Summary tables describe the key study characteristics of the primary studies: study design, patient demographics, and details of the intervention and comparator. We were unable to conduct quantitative synthesis (*ie*, meta-analysis) to estimate summary effects, given the paucity of literature that met edibility criteria.

We analyzed the data narratively, as quantitative synthesis was not feasible. The narrative synthesis focused on documenting the intervention components and outcome categories.

HORIZON SCAN

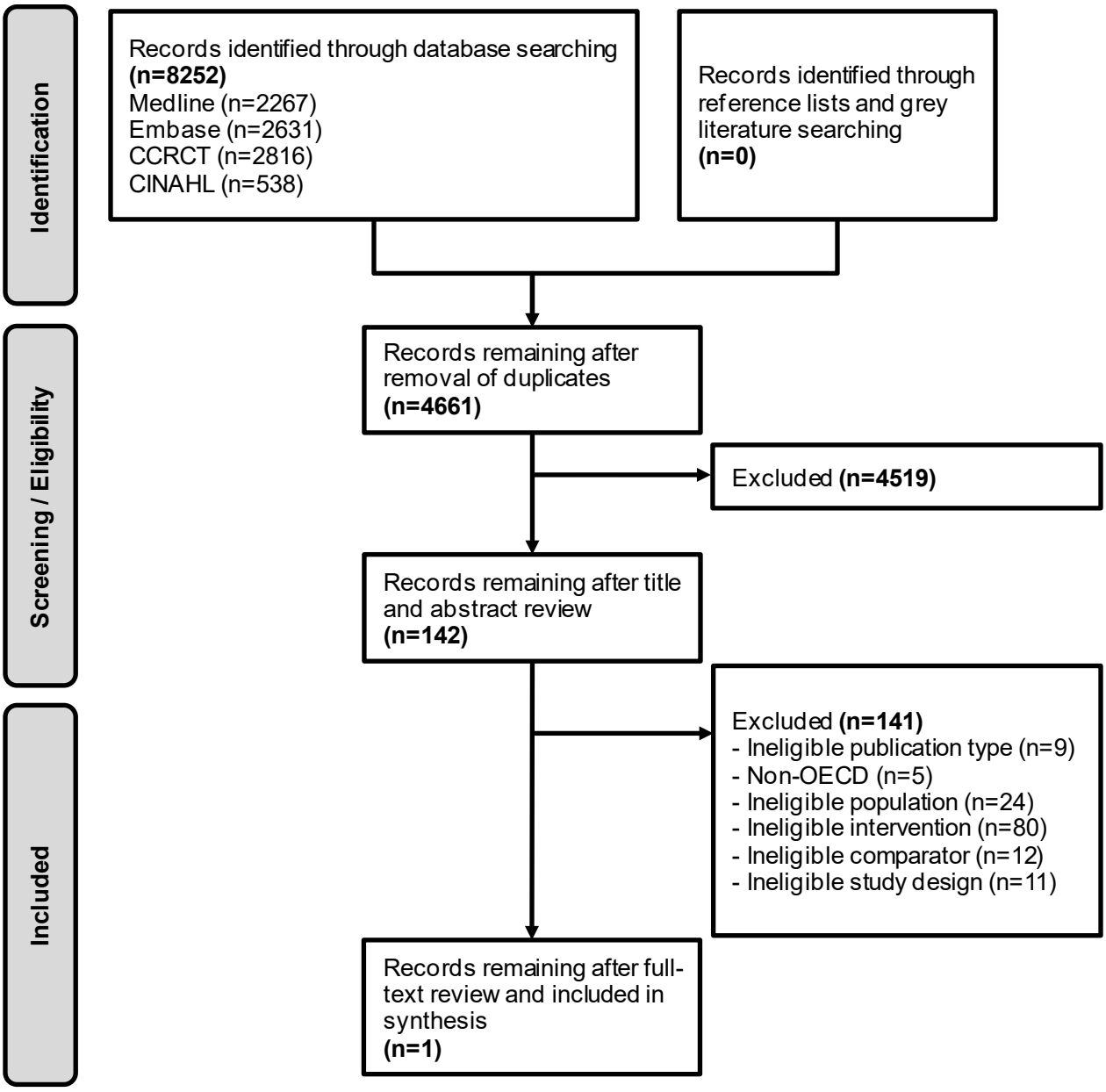
Given that little information meeting eligibility criteria was available in the published literature , we conducted a horizon scan to forecast when studies on this topic may become available in the published literature and the types of interventions likely to be forthcoming. We conducted a systematic search for potently relevant published pilot studies and protocol papers. We also conducted a search of protocol registrations in Cochrane Central Register of Controlled Trials for potential studies that may address the key questions of this review.

RESULTS

LITERATURE FLOW

The literature flow diagram (Figure 2) summarizes the results of the study selection process. (See Appendix B for a list of excluded studies.)

Figure 2. Literature Flowchart



Abbreviations. CCRCT=Cochrane Central Register of Controlled Trials; CINAHL=Cumulative Index to Nursing and Allied Health Literature; OECD=Organisation for Economic Co-operation and Development

LITERATURE OVERVIEW

Our search identified 8,252 potentially relevant articles. We conducted our search in MEDLINE (via Ovid), Embase (via Elsevier), CINAHL Complete (via EBSCO), and Cochrane Central Register of Controlled Trials (via Ovid) (Figure 2). After removing duplicates, there was a total of 4,661 articles. After applying inclusion and exclusion criteria to titles and abstracts, 142 articles remained for full-text review. Of these, 1 study was retained for data abstraction. The randomized controlled trial was a VA study conducted in the United States (Table 2). We also identified 6 protocols in trial databases, 1 pilot, and 3 published protocols.

Table 2. Characteristics of the Included Study

Study Design	Sample Size *Follow-up*	Population	Intervention Characteristics	Comparator	Outcomes Assessed
Psychologically Informed Interventions					
Herbert, 2017[15] Noninferiority RCT	N=129 Veterans *Post-treatment or 6-month follow-up*	Male: 82.2% Mean age: 52 years (SD13.3) White: 47% Black: 28% Hispanic: 14% Asian: 5% Other: 5%	8-week individual acceptance and commitment therapy (ACT) intervention (60-min sessions) delivered by Master's level study therapist (delivered via video vs in person)	In-person ACT	BPI Interference; BPI Severity; PHQ-9; PASS-20; PSQI; SF12-MCS; SF12-PCS; MPI-Activity
Movement-Based Interventions					
None	–	–	–	–	–

Abbreviations. ACT=acceptance and commitment therapy; BPI=Brief Pain Inventory Short Form Interference Scale; MCS=Mental Component Summary; MPI=West Haven-Yale Multidimensional Pain Inventory; PASS=Pain Anxiety Symptoms Scale-Short Form; PCS=Physical Component Summary; PSQI=Pittsburgh Sleep Quality Index; RCT=randomized controlled trial; SD=standard deviation; SF=Medical Outcomes Study 12-Item Short Form Health Survey

KQ1: Among patients with chronic pain, what is the effect of videoconference-delivered psychologically informed interventions for nonpharmacological chronic pain on pain, functionality, quality of life, and patient engagement?

KEY POINTS

- One randomized noninferiority trial conducted within the VA was included which compared the delivery of acceptance and commitment therapy in-person compared with video teleconferencing.
- Pain interference improved within both treatment arms at 8 weeks and 6 months follow-up.
- No statistically significant difference in outcomes was found between treatment delivery modalities.

DETAILED FINDINGS

One unique study met eligibility criteria and was retained for data abstraction. This study was a noninferiority randomized trial conducted in the VA San Diego Healthcare System (VASDHS) facilities in the San Diego area.

CHARACTERISTICS OF INCLUDED STUDY

The included study by Herbert and colleagues compared videoconferencing with in-person delivery of acceptance and commitment therapy (ACT) in the VA San Diego Healthcare System.[15] The trial consisted of 8 60-minute weekly sessions of manualized ACT treatment delivered by a study therapist (at least master's level trained in psychology) either in-person or via videoconferencing. The intervention utilizes "experiential exercises to encourage psychological and behavioral flexibility," and ACT highlights the importance of at-home assignments to reinforce skills developed during treatment sessions.

The study recruited 129 Veterans 25-89 years of age with a diagnosis of chronic pain. Patients with severe psychiatric illness and suicidal ideation were excluded. Six (9%) patients in the in-person group and 18 (28%) in the videoconferencing group discontinued participation. Respectively, 3 and 5 patients were lost to 6-month follow-up. The patient population in this study closely resembled the system-wide VA patient population, with the majority of participants being male (82.2%) at an average age of 52 years old (standard deviation [SD]=13.3). Most patients were married (55%) and the largest proportion of participants (36%) reported an annual income under $20,000. Most patients were from underrepresented racial and ethnic groups with 28% Black, 14% Hispanic/Latino, 5% Asian, 2% Native Hawaiian/Other, 1% American Indian/Alaskan Native, and 3% multiracial. Most patients reported their baseline pain location as being in their low back (78%), with the top 3 specific pain conditions reported as degenerative disc disease (43%), osteoarthritis (20%), and musculoskeletal pain (12%).

Summary of Findings

For the purposes of this systematic review, the outcomes of interest were pain (*ie,* pain interference), physical function (*ie,* performance-based and self-reported), quality of life, and patient engagement. Herbert et al found that among primary outcomes (*ie*, pain interference) and secondary outcomes the videoconferencing group was noninferior to the in-person group at both ends of treatment assessments and 6-month follow-up within groups (Table 3). Secondary outcomes included mental and physical quality of life; pain acceptance; and a multidimensional measure of disability, functioning, and pain outcomes. All outcomes, with the exception of sleep quality and activity level, showed significant improvements over time regardless of treatment arm allocation, but there were no statistically significant between-group differences. While no significant differences in patient satisfaction were found, a statistically significant number of patients withdrew from the videoconferencing group compared to the in-person group from baseline to posttreatment at 8 weeks (46% vs 23%; p = 0.01).

Table 3. KQ1 Results Table

Study	Intervention	Outcomes
Psychologically Informed Interventions		
Herbert, 2017[15]	8-week individual acceptance and commitment therapy (ACT) intervention (60-min sessions) delivered by Master's level study therapist (delivered via video vs in person).	***Pain 6-month follow-up*** BPI interference: 0.70 (-0.07 to 1.48) BPI severity: -0.06 (-0.72 to 0.60) PHQ-9: 1.22 (0.88 to 3.32) PASS-20: -4.01 (-11.01 to 3.00) PSQI: -0.14 (1.69 to 1.42)
		Quality of life 6-month follow-up SF12-MCS: .46 (3.59 to 4.50) SF12-PCS: -1.56 (-4.54 to 1.42)
		Functionality 6-month follow-up MPI-Activity: 0.31 (0.02 to 0.60)
		Patient engagement 6-month follow-up NR

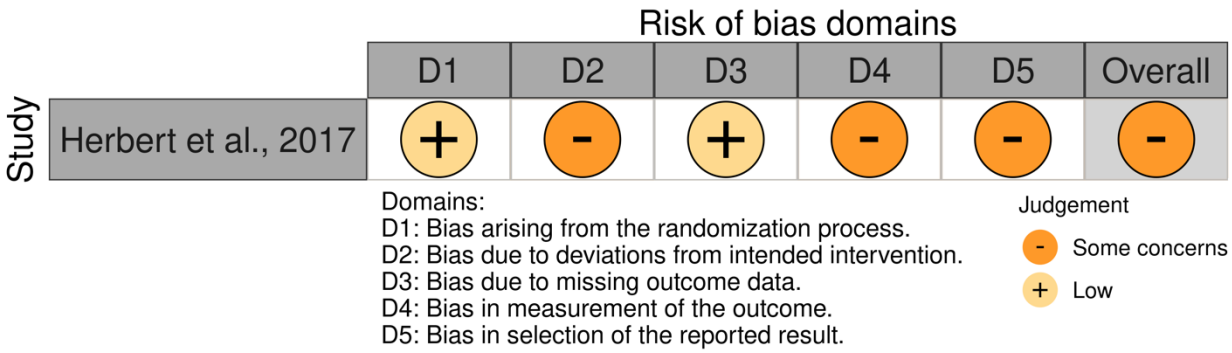
Abbreviations. BPI=Brief Pain Inventory Short Form Interference Scale; MCS=Mental Component Summary; MPI=West Haven-Yale Multidimensional Pain Inventory; PASS=Pain Anxiety Symptoms Scale-Short Form; PCS=Physical Component Summary; PHQ=Patient Health Questionnaire; PSQI=Pittsburgh Sleep Quality Index; SF=Medical Outcomes Study 12-Item Short Form Health Survey

QUALITY OF EVIDENCE FOR KEY QUESTION 1

The overall risk of bias (ROB) assessment as well as the rating by domain are outlined below (Figure 3). Our included study was rated as "some concerns" for the overall ROB. The sources of bias in this study were centered around concerns over participant retention. The study reported a substantial number of participants who discontinued participation in the study or were lost to follow-up (28% videoconferencing group vs 9% in person). The research staff did reach out to participants to gather reasons for participant drop-out, including time demands of the study, time and transportation, and lost interest and illness. There was also concern over the administration of outcomes, as patient-reported outcomes were likely administered differently in the in-person arm compared to the video teleconferencing arm. The study did not outline how the patient-

reported outcomes were administered for the video teleconferencing arm or the timeline with which these outcomes were returned to the study staff.

Figure 3. Risk of Bias Summary



KQ2: Among patients with chronic pain, what is the effect of videoconference-delivered therapeutic exercise and movement interventions for nonpharmacological chronic pain on pain, functionality, quality of life, and patient engagement?

No studies were identified that met eligibility criteria for KQ2.

HORIZON SCAN OF EMERGING STUDIES

KEY POINTS

- We identified 1 pilot study, 3 published protocols, and 6 protocols registered in trial databases of studies that could be potentially relevant to this topic.
- Most of the identified studies in the horizon scan planned to use movement-based approaches for nonpharmacological pain management. Only 1 identified protocol described an intervention that used a combination of behavioral and movement therapies.
- Most planned studies will be conducted outside the United States, but 2 identified registered protocols are for forthcoming studies within the VA.

DETAILED FINDINGS

Given that only 1 study was identified that met eligibility criteria, we evaluated pilot studies, protocol papers, and protocol registrations to provide some forecast for emerging research in this field. We identified 1 pilot study, 3 published protocols, and 6 protocols registered in trial databases. Of the 10 forthcoming studies, most (n=7) are focused on assessing movement-based approaches to nonpharmacological pain management delivered via videoconferencing. Of the 3 that have some behavioral components, all use approaches informed by CBT. All but 4 of these planned studies will be conducted outside the United States, and 2 of the US-based studies will be conducted within the VA.

Next we detail key aspects of the 3 approaches of the planned studies (*ie*, published pilot studies, published protocol papers, registered protocols). See Table 4 for the characteristics of these studies.

Pilot Studies

We identified 1 pilot study, which was a Canadian-based randomized trial comparing the feasibility and efficacy of a 12-week tele-prehabilitation and in-person program as compared to treatment as usual on pain and disability for 34 individuals waiting for a total knee or hip arthroplasty.[16] Prehabilitation is a phase of rehabilitation that takes place prior to a surgery. The goal of prehabilitation is to improve a patient's functional capacity so they are able to withstand inactivity following surgery and avoid associated functional decline. In both the in-person and tele-prehabilitation groups, participants met with a physiotherapist twice per week and followed an established and tailored protocol of exercises, including hip, knee, and proprioceptive muscle

range of motion and strengthening exercises, with a cardiovascular warm-up, as well as education about medication use and ice application. Participants were asked to repeat the exercises daily outside of sessions. Participants in the treatment as usual group met with a community-based physiotherapist for one home visit and received a booklet with information about the surgery, medication, and post-surgery rehabilitation.

This study was underpowered to detect differences between groups. Yet, 100% of participants in the tele-prehabilitation group reported that they felt their treatment goals were met, and 91% reported that they perceived their care to be just as good as in-person care. Compliance with the rehabilitation programs was high, ranging from 73% to 77% (unsupervised and supervised sessions, respectively) in the tele-prehabilitation group and 80 to 86% in the in-person group. Authors reported issues with the primary technology platform used for the study (Reacts Lite app), so alternative software (*eg*, Facetime, Skype) was used for 28 of the 191 tele-prehabilitation sessions, and 9 sessions were conducted by telephone. Authors also noted that four participants in the tele-prehabilitation group requested to be seen in person due to exacerbated pain, so guidance was given to these participants so that they could complete the exercise protocol through tele-prehabilitation as intended.

Published Protocol Papers

We identified 3 relevant published protocol papers describing studies that met our eligibility criteria.[17-19] Two of these were movement-focused only,[18,19] and 1 included both behavioral and movement components.[17] One study will recruit participants with persistent pain in any location,[17] while the other studies specified osteoarthritis pain of the knee[19] or knee and/or lower back.[18] All planned studies will be conducted outside the United States, with two set in New Zealand[17,19] and one in rural Australia.[18] Two studies were designed as noninferiority trials.[17,19]

In the only protocol to combine both movement and behavioral approaches, adults with persistent chronic pain (n=180) will be randomized to receive either an in-person or a virtual group-based pain management program.[17] The virtual program, called iSelf-help, will be conducted via videoconferencing platform (*ie*, Zoom) and will consist of 2 60-minute sessions weekly for 12 weeks. The first weekly session will be conducted by 2 pain management clinicians and will focus on CBT-informed educational content and guidance on exercises. The second weekly session is to be held by a peer-support facilitator and focus on self-reflection, goal setting, and fostering social support.

The other 2 published protocol papers described interventions focused on movement-based approaches to nonpharmacological pain management. In the first protocol, 394 participants with pain from knee osteoarthritis will be randomized to received 5 individual consultations with a physical therapist over 3 months delivered in-person or via videoconferencing.[19] The other movement-based protocol will randomize 156 rural Australians with chronic lower back or knee pain to a maximum of 8 videoconference consultations over 3 months with a physical therapist compared with usual care, which could vary based on what was available in the local community and was not restricted by the protocol.[18]

Registered Study Protocols

We identified 6 registered protocols in trial databases that met our search criteria.[20-25] Of the included registered protocols, 2 are psychologically informed intervention studies (KQ1)[21,23] and

3 are movement-based intervention studies (KQ2),[20,22,24,25] with 1 study combining psychologically informed physical therapy through the use of motivational interviewing.[20] The studies identified as registered protocols investigate multiple chronic pain diagnoses including knee pain/knee osteoarthritis,[20,22,25] chronic musculoskeletal pain,[21,24] and chronic pain associated with HIV.[23]

These studies are set in the United Kingdom,[22] Australia,[20,25] and the United States.[21,23,24] Of particular note, 2 protocols from the United States are studies taking place in the VA Health Care System—1 study utilizing cognitive behavioral therapy (KQ1)[21] and 1 utilizing telehealth for at-home yoga (KQ2).[24] Most of the studies are currently actively recruiting at their sites.[21,23,24] One study is listed as ongoing[22] and the remaining study is not yet recruiting.[20]

It important to note that, although no studies were identified at the full-text level for KQ2, our search through registered protocols in trial databases identified 4 studies that potentially meet our inclusion criteria for exercise and movement-based interventions. The registered protocols for movement-based interventions vary widely in their treatment approach from targeted physical therapy exercises to group exercise and activity tracking. The included studies with interventions related to KQ1 use cognitive behavioral management techniques.

Table 4. Horizon Scan Study Characteristics[a]

Study Design Country Registration #	Target Sample Size Recruitment Target Population Planned Duration	Intervention	Comparator	Primary Outcome Other Outcomes
Pilot Study				
Doiron-Cadrin, 2018[16] Pilot RCT Canada NCT02636751	N=34 Patients on a wait list for a hip or knee joint arthroplasty 2 sessions per week for 12 weeks	Group exercise delivered by a physical therapist. Participants were asked to repeat the same exercise program between visits at home and to write down the exercises in a logbook.	In-person prehab	Primary outcome: Lower Extremity Functional Scale (LEFS) Other outcomes: Patient-reported functional; physical performance
Protocol Papers				
Hinman, 2020[19] Noninferiority RCT Australia ACTRN12619001240134	N=394 Knee OA 5 sessions for 3 months	Physiotherapists will prescribe an individualized exercise program consisting of 5–6 strengthening exercises to be performed at home 3 times/week. Strengthening: quads, hip abductor/gluteal, hamstring/gluteal, calf, and balancing (if appropriate). Physiotherapists will also work with participants to come up with individual physical activity to increase/maintain physical activity at recommended articles. Patients are provided an “Exercise Booklet” in both arms as well as the "Knee Plan and Logbook." Patients receive education at all visits. The video consultations will take place using Zoom.	Face-to-face, clinic-based delivery of the same intervention	Primary outcome: Knee pain on walking; physical function Other outcomes: Pain; self-reported physical function; patient engagement; quality of life

Study Design Country Registration #	Target Sample Size Recruitment Target Population Planned Duration	Intervention	Comparator	Primary Outcome Other Outcomes
Hale, 2021[17] Noninferiority RCT New Zealand ACTRN12619000771156	N=180 Persistent non-cancer pain 2 group sessions weekly for 12 weeks	Each video session is composed of education, advice on guided exercises, and reflection and relaxation techniques. Education sessions will focus on knowledge and CBT-based self-management skills (eg, pain education, activity pacing, relaxation, and distraction techniques). Later in the same week, a 60-minute video session held by a peer-support facilitator will focus on self-reflection, goal setting, and the sharing of experiences with peers about what went well and what did not over the week and developing a peer support network. It will also provide an opportunity for practicing guided relaxation techniques and exercises.	In-person, group-based pain management program	Primary outcome: Roland Morris Disability Questionnaire Other outcomes: Pain; patient engagement; quality of life
Mesa-Castrillon, 2021[18] RCT Australia ACTRN12618001494224	N=156 Non-specific LBP; knee OA 8 sessions for 3 months	eHealth-delivered physical activity plan and a progressive resistance exercise program designed during remote video consultations with a physiotherapist.	Usual care (unrestricted by study protocol or rules)	Primary outcome: Patient-Specific Functional Scale (PSFS) Other outcomes: Pain; self-reported physical function; patient engagement
Registered Protocols in Trial Databases				

Study Design Country Registration #	Target Sample Size Recruitment Target Population Planned Duration	Intervention	Comparator	Primary Outcome Other Outcomes
Barton, 2019[25] Noninferiority RCT Australia Recruiting ACTRN12619000235101	Adults 45+ with knee OA 60 minutes twice a week; 8 weeks	The telerehabilitation intervention will be delivered via a validated system that allows clinicians to provide services to their patients via real-time videoconferencing into the home. Intervention details will include an 8-week exercise therapy and education program for people with OA (GLA:DTM), supported by evidence and clinical guidelines.	Active control (face-to-face)	Primary outcome: Knee-related burden (KOOS4)
Bayley, 2019[24] RCT US Active, not recruiting NCT04074109	Veterans 18+ years with chronic musculoskeletal pain 12 weeks	At home tele-yoga for musculoskeletal pain using tablet.	In-person yoga	Primary outcome: Treatment satisfaction; attrition
Groves-Williams, 2020[22] RCT UK Ongoing ISRCTN15564385	Age 45+, knee pain, and ability to connect to Skype/Zoom video calls. 7 sessions over 12 weeks; 45-60 minutes each	Group E-Rehab is an internet-delivered group exercise program. A physiotherapist will conduct sessions over Skype/Zoom. Attendees will be given lower limb strengthening exercises to complete 3 times a week at home. The intervention also includes self-paced interactive educational sessions via internet (4 modules).	Usual Care: one or two sessions with physiotherapist (may not be conducted face-to-face given COVID-19 restrictions)	Primary outcome: Feasibility
Palfai, 2020[23] RCT US Recruiting NCT04441593	Adults aged 18+ years engaged in HIV care, who exhibit heavy drinking and have chronic pain	Integrated behavioral telehealth intervention for heavy drinking & chronic pain delivered via videoconferencing. Intervention includes motivational and cognitive-	Usual care with psychoeducation and information about treatment resources	Primary outcome: Pain severity; pain interference; heavy drinking episodes; average drinks per week

Study Design Country Registration #	Target Sample Size Recruitment Target Population Planned Duration	Intervention	Comparator	Primary Outcome Other Outcomes
	3- and 6-month assessments	behavioral management of pain and alcohol.		
Damush, 2020[21] RCT US Recruiting NCT04613362	Veterans with chronic migraine 3 months	Intervention includes 6 sessions of telehealth-delivered cognitive behavioral therapy for migraines in addition to standard educational and self-management materials.	Usual Care Outpatient Cognitive Behavioral Therapy for Migraines Face to Face	Primary outcome: # of days of pain; implementation
Bell, 2021[20] RCT Australia Not yet recruiting ACTRN12621000267853	Diagnosis of knee osteoarthritis for participation in GLA:D is performed by a trained physiotherapist and guided by the NICE guidelines, that is: i) Aged >45 years ii) Activity-related knee pain iii) Morning stiffness of the knee which lasts less than 30 minutes or no knee stiffness; Have completed GLA:D in the past 12 months at time of recruitment Sessions occur in weeks 1,2,4,7,10	Motivational interviewing sessions led by physiotherapist. Sessions are individualized and may include components of engagement, focusing, evoking, and planning. Discussions may include personal barriers and enablers to physical activity and strategies to navigate these, reflections about personal change, and managing pain. Patients will receive Zoom or phone call depending on preference.	Controls do not have access to feedback website	Primary outcome: Feasibility

[a] While we identified protocol NCT03385083 registered by Zwibel in 2017, this protocol was listed as terminated in clintrials.gov and not included in the horizon scan table.

DISCUSSION

In the United States, approximately 100 million adults live with some form of chronic pain.[4] Chronic pain disproportionately impacts older adults, those living in rural areas, women, and people living in poverty.[6] To curb excessive opioid prescribing for pain-related conditions, nonpharmacological approaches such as movement-based therapies (*eg*, physical therapy) and psychologically informed behavioral approaches (*eg*, cognitive behavioral therapy) have been adopted.[7,8] Nonpharmacological approaches to pain management may be well suited for the virtual care environment. Yet it is not widely understood if the effectiveness of this treatment modality translates to the virtual environment when delivered via videoconferencing. Videoconferencing, and telehealth more broadly, present unique limitations associated with these platforms. Barriers such as limited internet connection, lack of access to technology, or lack of education on use of associated technology may impact clinicians' ability to provide nonpharmacologic treatment as well as patients' ability to access care remotely. Thus, the purpose of this review was to examine the comparative effectiveness of videoconferencing to in-person care for patients with chronic pain.

KEY QUESTION 1 SUMMARY

Only 1 study met inclusion criteria for nonpharmacological pain interventions delivered over videoconferencing. Specifically, the study evaluated acceptance and commitment therapy (ACT) in-person compared with video teleconferencing. No difference was detected between arms. The outcomes reported included 5 pain measures, 2 quality-of-life measures, and 1 function measure. Findings from this single study indicate that the impact of virtually delivered pain management is a possible substitute for in-person care. Overall, the evidence was rated as low certainty. These categories were rated down for possible risk of bias and imprecision. Additional research in this area is likely to change the GRADE ratings.

HORIZON SCAN SUMMARY

We identified 1 pilot study that assessed videoconferencing delivered prehabilitation. While underpowered to detect differences between arms for pain, function, disability, physical performance, or satisfaction outcomes, this study found the in-person and videoconferencing delivery to be equivalent. The 3 protocol papers identified on this topic indicate that future research will focus on real-time physiotherapy, group exercise, guided exercise, reflection, and relaxation techniques. Of the 6 protocols identified via trial registration databases, 2 are psychologically informed intervention studies, and 4 are movement-based intervention studies. These protocols similarly suggest that this is a burgeoning field of research likely to yield results in coming years.

Table 5. Certainty of Evidence

Outcome	Number of Studies (N)	Findings	Certainty of Evidence (Rationale)
Psychologically Informed Interventions			
Pain	1 (128)	BPI interference: 0.70 (95% CI -0.07 to 1.48) BPI severity: -0.06 (95% CI -0.72 to 0.60) PHQ-9: 1.22 (95% CI 0.88 to 3.32) PASS-20: -4.01 (95% CI -11.01 to 3.00) PSQI: -0.14 (95% CI 1.69 to 1.42)	**Low certainty** (rated down for serious risk of bias and serious imprecision)
Quality of life	1 (128)	SF12-MCS: 0.46 (95% CI 3.59 to 4.50) SF12-PCS: -1.56 (95% CI -4.54 to 1.42)	**Low certainty** (rated down for serious risk of bias and serious imprecision)
Functionality	1 (128)	MPI-activity: 0.31 (95% CI 0.02 to 0.60)	**Low certainty** (rated down for serious risk of bias and serious imprecision)
Patient engagement	0	–	–
Movement-based Interventions			
Pain	0	–	–
Quality of life	0	–	–
Functionality	0	–	–
Patient engagement	0	–	–

Abbreviations. BPI=Brief Pain Inventory Short Form Interference Scale; MPI=West Haven-Yale Multidimensional Pain Inventory; PASS=Pain Anxiety Symptoms Scale-Short Form; PCS=Physical Component Summary; PHQ=Patient Health Questionnaire; PSQI=Pittsburgh Sleep Quality Index; SF=Medical Outcomes Study 12-Item Short Form Health Survey

PRIOR SYSTEMATIC REVIEWS

To our knowledge, there is only 1 prior review of the effects of videoconferencing on chronic pain.[26] This recent review focused on group-based format and identified only 3 studies. All were deemed to be of low methodological quality due to study designs (*ie*, nonrandomized, pre-post only). Only 1 of the included studies reported outcome data on effectiveness; the other 2 were focused on program descriptions. Thus, this review provides little information on the impacts of nonpharmacological pain management delivered via videoconferencing. When comparing our findings to reviews of non-videoconference telemedicine on chronic pain, our findings are consistent with prior reviews evaluating effectiveness.[27,28] Adamse and colleagues identified 14 unique trials reporting that telemedicine was noninferior compared with usual care or in addition to usual care for chronic pain.[27] Eight studies were included in the meta-analysis, which revealed a significant effect (mean difference [MD] -0.57; 95% CI -0.81 to -.034) of telemedicine compared with no intervention on pain. Telemedicine compared with usual care (MD -0.08; 95%

CI -0.41 to 0.26) or in addition to usual care (MD -0.25; 95% CI -1.50 to 1.00) showed no significant difference. However, no studies were included that used videoconferencing as the intervention. The included studies that assessed telemedicine interventions were delivered asynchronously through telephone, email, or website. Additionally, Dario and colleagues identified 8 unique trials reporting that telehealth-based interventions were noninferior to minimal intervention (*eg*, non-health or low back pain information) for non-specific low back pain.[28] Four studies were included in the meta-analysis that revealed a short-term effect (MD -2.61; 95% CI -5.23 to 0.01) and medium-term effect (MD -0.94; 95% CI -6.71 to 4.84) on pain compared with minimal intervention. However, interventions in the included trials were delivered asynchronously through e-mail, web-based self-management programs, and telephone. There were no included trials that evaluated videoconferencing for non-specific low back pain. Our review identified 1 study assessing videoconferencing for chronic pain reporting noninferior effectiveness compared to in-person therapy.

CLINICAL AND POLICY IMPLICATIONS

Our review identified limited evidence on the use of videoconferencing to deliver nonpharmacological behavioral and movement-based interventions for chronic pain. The horizon scan identified 6 protocols of relevant studies that will likely contribute evidence on the acceptability, feasibility, and effectiveness of these types of interventions. The 1 included study indicated that delivering a behavioral-based videoconference intervention for Veterans with chronic pain was no less beneficial than the in-person intervention.[15] While videoconferencing interventions offer the opportunity to improve access to specialty care and are potentially not inferior to in-person care, gaps exist with patient engagement in these interventions. For example, in the included study, 56% of individuals randomized to the videoconference intervention arm did not start the intervention, discontinued it, or were lost to follow-up. Factors contributing to the attrition of participants in this study included lack of interest, time demands, and development of medical illness. Beyond this single study, known factors that contribute to barriers engaging in technology-based interventions include lack of internet or sufficient cellular data, digital device access, and digital health literacy.[29] Understanding barriers to engage or continue engagement in videoconferencing is especially prudent among at-risk populations with higher prevalence of chronic pain, such as those living in rural settings and low-income populations.[30-32]

LIMITATIONS

Our review has several strengths, including a protocol-driven design, a comprehensive search, broad inclusion of chronic pain etiology, careful quality assessment via established risk of bias tools, and key input from an expert panel consisting of clinicians and researchers with expertise in virtual care and experts in approaches to nonpharmacological pain management. Yet our findings should be considered within the context of limitations of the included studies and of our methodologic approach. We identified only 1 study that met our eligibility criteria. Given the small number of studies, statistical methods to detect publication bias are not useful. Other strategies, such as searching ClinicalTrials.gov for completed but unpublished studies, are not a particularly effective way to identify publication bias.[33] Thus, we did not conduct a formal analysis of publication bias. To combat this scant literature, we conducted a prior horizon scan of forthcoming studies on this topic, which yielded 10 potentially relevant studies in the planning phase.

Despite these strengths, limitations exist to our approach. Informed by the information needs of our stakeholder partners from VA operations, we only included randomized studies and those that compared videoconferencing to in-person or telephone nonpharmacological pain-management care. Yet, other comparative study designs may have findings relevant to the provision of nonpharmacological pain management via videoconferencing. We excluded a relatively small number of articles for study design, and a recent rapid review on videoconferencing for group-based chronic pain management with no exclusions for study designs yielded only 3 papers.[26] Of these papers, only 1 presented outcome data on effects of the intervention. It is possible that there may be a proliferation of additional studies conducted since the onset of the COVID-19 pandemic that may provide useful information. However, our horizon scan identified only 10 potentially eligible studies. Thus, we feel confident we identified the most relevant information to address the key questions of this review.

Applicability of Findings to the VA Population

The findings of this review are highly relevant to the VA population. The single included study was conducted with Veterans and in the VHA. Of the 10 planned studies identified in the horizon scan, most will be conducted in countries with nationalized health care, which may make findings of these studies more applicable to the VHA health care environment. Additionally, 2 planned studies will be conducted within the VHA.

FUTURE RESEARCH

We identified several areas in need of further exploration in order to strengthen future research in this area. To systematically identify these gaps in the current literature, we used an existing framework by Robinson and colleagues[34] that proposes to identify gaps categorically using the PICOTS framework (population, intervention, comparator, outcome, timing, and setting). In addition, they include standardized reasons that the current literature is insufficient to answer the question at hand (insufficient or imprecise information, biased information, inconsistency, and/or not the right information).

Overall, there is scant comparative literature that assesses the impact of nonpharmacological pain-management approaches delivered via videoconferencing. We identified no published studies of movement-based approaches and only 1 published study of an intervention that used psychologically informed behavioral approaches (*ie*, ACT). In our horizon scan, we identified 6 studies in the planning phase that will focus on movement-based approaches and 2 that will assess videoconferencing interventions using a combination of movement and behavioral approaches. Further studies are needed, and these studies need to have complete descriptions of interventions (*eg*, content, dose, frequency) and details on implementation considerations, including training of the interventionist and patients on maximizing the virtual care environment. Such details will be needed to implement approaches into practice. Our prior work details several implementation considerations for remotely delivered health care that may serve as a useful blueprint.[35]

While the focus of this review was on comparing the effectiveness of videoconferencing to other synchronous care modalities (*eg*, in-person care), future studies may want to investigate how best to blend virtual and in-person care to optimize patient, provider, and system outcomes. Contextualizing videoconferencing care as adjunctive or replacement care has different implications for how that care is constructed and by whom it is delivered. Another key

consideration of future studies is the need to include system-important and patient-important outcomes in the evaluation of approaches. In collaboration with our operations stakeholder partners, we prioritized pain, function, quality of life, and patient engagement as key patient-level outcomes. At a minimum, future studies should seek to explore these. Yet there are key provider and system outcomes that should also be considered in future studies to optimize. When assessing key outcomes, careful attention should be paid to designing studies that are powered to detect subgroup difference by key populations such as women, underrepresented racial and ethnic groups, those living in rural areas, or by severity and length of chronic pain conditions to assure that the potential benefits of such approaches are shared across populations. Such careful attention to designing future studies could help in developing videoconferencing approaches to chronic pain management that maximize ability to attain the quadruple aim of improving the patient care experience, improving the health of a population, reducing per capita health care costs, and improving the work life of health care providers, including clinicians and staff.[36] Table 6 describes some of these future research considerations.

Table 6. Evidence Gaps and Areas for Future Research Consideration

Evidence Gap/Area for Future Exploration	Reason	Types of Studies to Consider
Population		
• Patients with various levels of comfort with technology or have other telehealth equity issues (*eg*, bandwidth, hardware) • Patients from rural areas • Patients from traditionally underrepresented racial and ethnic backgrounds • Patients who are earlier in their experiences with chronic pain	Insufficient information/not the right information	Well-designed subgroup analyses or individual patient-data meta-analysis from randomized trials Qualitative and mixed methods studies
Interventions		
• Therapeutic exercise and movement interventions (*eg.*, physical therapy) delivered via videoconferencing • Interventions that combine therapeutic exercise /movement and behavioral health approaches delivered via videoconferencing • Videoconferencing care to replace *some portion* of in-person chronic pain management care • Videoconferencing to replace *all* of in-person or telephone-delivered chronic pain management care • Different models of combining video-based and telephone-based care with in-person care for chronic pain management • Interventions using currently available and widely used virtual care platforms • Videoconferencing interventions using group classes or peer-led models	Insufficient or imprecise information	Randomized trials Non-randomized trials Qualitative and mixed methods studies
Comparators		

• Routine in-person care • Telephone-based care • Static website or video recorded session • Group-based sessions	Insufficient information	Randomized trials Non-randomized trials
Outcomes		
• Patient engagement (*eg*, session attendance, home practice, patient satisfaction, therapeutic alliance) • Patient utilization (*eg,* downstream in-person care including hospitalization, urgent care visits, opioid use) • Process variables (*eg,* time providing direct and indirect care, number of missed visits, consultation time) • Costs (including infrastructure and implementation costs, staff training costs) • Clinician satisfaction • Clinical workflow • Harms (delayed care, falls/injury, depression) • Fidelity to treatment delivered (*eg,* topics covered, care delivered)	Insufficient information/imprecise information; inconsistent information	Randomized trials Non-randomized trials Qualitative and mixed methods studies
Setting		
• Community gym or wellness centers • Variety of clinical settings (*eg*, large health care systems, smaller community-based practices)	Insufficient information	Randomized trials Non-randomized Trials

CONCLUSIONS

The VHA is the largest integrated health system and largest provider of telehealth in the country. As such, the VHA has a keen interest in optimizing the use of virtual care modalities, such as videoconferencing. The VHA has been a leader in the deployment of virtual care due to the mission to provide quality health care for all who have served in in the military. This review sought to identify and synthesize the evidence on the impact of deploying chronic pain management care via videoconferencing technologies. Yet, we found scant research. Prior systematic reviews showed that telephone-delivered care or other asynchronous modalities are noninferior to usual care approaches for pain management.[27,28] It is likely that videoconferencing may also be noninferior to usual care approaches.

In non-pandemic times, telehealth technologies were utilized to bridge barriers surrounding physical distance and to increase the quality of care available to patients in rural communities, where specialized health care was often unavailable or difficult to access.[37] These benefits are likely to extend into the post-COVID era, and can be hypothesized to have more widespread utilization after such extensive efforts have been made to establish these practices. Yet, a central consideration about the accelerated implementation of virtual modalities to deliver care is the possibility that such changes may serve to increase health inequities and disparities, especially among patient groups who have experienced historical and structural bias and racism by the health care system. Populations already on the margins due to existing health care access

disparities and technology barriers (*eg*, lack of broadband, computer cameras, comfort in using technology) will no doubt have greater barriers to meaningfully engaging in videoconferencing as a modality of care delivery.

Further research is needed to investigate the effectiveness of behavioral and movement-based videoconferencing interventions for chronic pain. Likely research is also needed to understand patient preferences as well as the facilitators and barriers for successful implementation and scalability of such interventions within a variety of settings. The VHA is well positioned to conduct needed evaluations of chronic pain management care delivered via videoconferencing given its mission-driven focus, diverse patient populations, robust virtual care infrastructure, and wealth of administrative data. Such evaluations will be needed to guide clinical and operations practice to optimize equitable deployment and access to high-quality health care delivered via videoconferencing.

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