CADTH

CADTH Health Technology Review

Internet-Delivered Cognitive Behavioural Therapy for the Management of Chronic Non-Cancer Pain

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About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada's health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.

Funding: CADTH receives funding from Canada's federal, provincial, and territorial governments, with the exception of Quebec.

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Protocol Amendments

Section	Amendment	Page number in protocol	Rationale
Study selection in the clinical review	We did not screen records retrieved by the electronic literature searches from clinical trials registries.	16	Literature searches conducted in clinical trials registries yielded a high number of results. Due to feasibility constraints, these were not screened using the methods outlined for the database and grey literature searches.
Data extraction in the clinical review	We used both Microsoft Word and Microsoft Excel for the data extraction process.	16	Due to the complexity of the detailed results data from the included trials, we conducted some of the data extraction using Microsoft Excel as we expected it would be easier to mange and interpret compared to data extracted in Microsoft Word.
Critical appraisal in the clinical review	We edited the RoBANS domain 'measurement of exposure' to instead address risk of bias due to deviations from the intended interventions.	17 to 18	Since our included study pertained to an intervention rather than an exposure, the domain in the original tool was not relevant. The addition ensured that all relevant key domains of risk of bias were assessed.
Data analysis and synthesis in the clinical review	As part of the data analysis and synthesis, we combined the results from the nRCT with the RCTs. Specifically, the presentation of data in Summary of Findings tables was not separated by study design and GRADE assessments for these study designs were conducted together. Outcome-comparisons that included data from the nRCT and RCTs started as high certainty evidence (i.e., prior to any rating down for concerns related to risk of bias, inconsistency across studies, indirectness, imprecision of effects, and/or publication bias following the GRADE approach).	18 to 20	We considered the RCTs alongside the 1 nRCT as this approach seemed to be more informative than presenting findings separately by design.

GRADE = Grading of Recommendations Assessment, Development and Evaluation; nRCT = non-randomized controlled clinical trial; RCT = randomized controlled trial; RoBANS = Risk of Bias for Non-Randomized Studies.

Abbreviations

ACT	acceptance and commitment therapy
BPI	Brief Pain Inventory
CBT	cognitive behavioural therapy
CPAQ-R	Chronic Pain Acceptance Questionnaire-Revised
FIQ	Fibromyalgia Impact Questionnaire
HADS	Hospital Anxiety and Depression Scale
HRQoL	health-related quality of life
HTA	Health Technology Assessment
iCBT	internet-delivered cognitive behavioural therapy
GRADE	Grading of Recommendations Assessment, Development and Evaluation
KMO	Knowledge Mobilization Officer
nRCT	non-randomized controlled clinical trial
PASS-20	Pain Anxiety Symptoms Scale-Short Form 20-Item
PCCL	Pain Coping and Cognition List
PCS	Pain Catastrophizing Scale
PHQ-9	Patient Health Questionnaire 9-Item
RCT	randomized controlled trial
RoB 2	revised Cochrane risk-of-bias tool for randomized trials
RoBANS	Risk of Bias Assessment Tool for Non-randomized Studies
SF12-MCS	Short Form 12-Item Mental Component Summary
SF12-PCS	Short Form 12-Item Physical Component Summary
SR	systematic review
VAS	Visual Analogue Scale
VC	videoconference

Summary

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Key Messages

When decision makers are navigating whether iCBT programs for chronic pain have a role in their jurisdictions, the following risks need to be considered:

- The high uncertainty in the clinical evidence makes it difficult to know the true effect of iCBT programs when compared to in-person CBT.
- iCBT programs prescribed alone are unlikely to be supportive, it is important for people living with chronic pain to have access to comprehensive multidisciplinary chronic non-cancer pain care.
- Little is known about the safety of iCBT relative to in-person CBT for people living with chronic pain. Prescribing iCBT too early may delay identifying a person's origin of pain, and iCBT programs are not suitable for people experiencing severe, untreated chronic pain or active suicidal ideation.

Clinical Review

- Our systematic review identified 4 primary studies that examined the clinical effectiveness of iCBT compared with in-person CBT.
- The clinical evidence on the balance of comparative benefits and harms of iCBT versus in-person CBT is very uncertain, meaning it is not a reliable indication of how effective iCBT is compared to in-person CBT.
- There is a lack of information on the comparative safety of iCBT compared with in-person CBT; the available evidence was from only a few iCBT programs, and none of the relevant studies included children.
- Higher quality research on the effectiveness of iCBT programs for chronic pain is needed. The certainty of the evidence could be improved through future clinical studies that use more rigorous methodological approaches, collect safety data, and to strive to lower participant drop out rate.
- The clinical data did not provide insight into how iCBT may contribute to health inequities or potentially widen existing inequities.

Patients' Experiences

- People living with chronic pain who were involved in this HTA felt iCBT has the potential to be a supportive treatment option if offered as part of comprehensive, multidisciplinary pain care rather than provided alone.
- Given the limited access to true multidisciplinary chronic pain care in Canada, increasing the availability of iCBT alone is unlikely to address issues with accessing effective chronic pain care.
- Referring people to iCBT before other treatment options could increase the risk of the root cause of the pain being missed and the most appropriate treatment not being offered. Whether to provide iCBT before other therapies should be determined on a case-by-case basis.
- Because people with pain are often dismissed and neglected within the Canadian health care system, offering iCBT before other treatments could further validate feelings of worthlessness for some individuals.
- When considering readiness for iCBT it is important to take account of treatments that have already been engaged and how these have helped (or not), whether one has the materials needed to engage with iCBT, and whether one needs or wants iCBT. As such, determining readiness for iCBT cannot be placed solely on the shoulders of persons living with chronic pain, but rather requires ongoing dialogue between care providers and their patients that draws on the contexts within which care is happening.

- A strong therapeutic relationship between patient and iCBT provider and a tailored approach to treatment might improve the success of iCBT treatment for chronic pain. It is important for the provider to specialize in chronic pain care.

Operational Aspects

- Our Environmental Scan identified 16 iCBT programs for chronic pain in Canada.
- The programs vary by level of therapist involvement, program length, number and length of modules, topics covered, funding, and patient reimbursement eligibility.
- Potential facilitators to implementing these programs include improving access to treatment, improving the treatment experience, efficiency, and convenience.
- Potential barriers to implementing these programs include patient or clinician preference for in-person or other treatment options as well as patients' concerns over privacy, lack of familiarity with technology, and lack of access to a device or adequate internet connection.

Abstract

Context and Decision Problem(s)

Cognitive Behavioural Therapy (CBT) aims to provide people with increased coping ability and self-efficacy by helping them identify and reshape their thoughts, emotions, and behaviours that can be detrimental to effective pain management or inhibit treatment progress. As defined in this HTA, internet-delivered CBT (iCBT) is psychotherapy based on CBT principles delivered exclusively through the internet via an app or a website on a computer or mobile device. This definition of iCBT also includes CBT that is delivered through the internet in real time by a therapist (e.g., videoconference). The scope of this Health Technology Assessment (HTA) includes guided and unguided iCBT (i.e., with or without therapeutic support by a trained professional) delivered via a computer or mobile device, either synchronously or asynchronously (i.e., involving delayed exchange of therapeutic communication between a trained professional and a client).

The importance of multidisciplinary care approaches in treatment of chronic pain is broadly recognized and emphasized in current recommendations and guidelines related to this condition. Psychological interventions, such as CBT, are increasingly integrated in care approaches for pain, but availability of these therapies in their traditional, in-person format is limited. Canadian jurisdictions have indicated that there is interest in exploring and using iCBT as an option for the management of chronic pain to improve access to psychological care. However, jurisdictions note that there is a need for reliable evidence and information to guide decisions regarding the integration of this intervention in care delivery for people living with chronic pain.

This HTA informs the following decision problems:

1. With a view to increasing access to CBT-based therapy, the purpose of this HTA is to inform decisions as to whether iCBT should be offered as a treatment option, as part of a multidisciplinary approach, in the delivery of care for chronic non-cancer pain when CBT would otherwise be provided.
2. Additionally, if evidence demonstrates that iCBT should be offered, the HTA could also inform whether there are criteria to guide decision-making regarding the suitability of iCBT for various pain conditions and people experiencing chronic pain, or other factors that should guide its implementation.

Clinical Effectiveness and Safety Evidence

We conducted a systematic review of primary studies examining the comparative clinical effectiveness and safety of iCBT versus in-person CBT for the management of chronic non-cancer pain. Eligible outcome domains were pain control, changes in use of pharmacotherapy, health-related quality of life or overall well-being, psychological or psychosocial function or symptoms, sleep,

physical function, participant acceptability or satisfaction with care, individual participation, and any measures of harms. We selected eligible outcomes following patient and clinical expert consultation.

In total, we identified 3 randomized controlled trials and 1 non-randomized controlled clinical trial for the clinical review. These clinical studies analyzed data from a total of 354 participants. We assessed all outcomes evaluated in the included clinical studies as having at least some concerns with risk of bias, with a majority being judged as having a high risk of bias. The evidence for all outcomes was very uncertain (as judged using the GRADE approach). This high level of uncertainty is primarily due to concerns related to risk of bias and imprecision, but there were also inconsistency and indirectness concerns for many outcome-comparisons. Based on the uncertainty of the evidence, there is a very high likelihood that the true effect of iCBT versus in-person CBT will be substantially different than what was observed in these trials. We identified no relevant studies regarding the comparative safety of iCBT versus in-person CBT. Additionally, there was no data on the comparative effectiveness of iCBT versus in-person CBT for children and for people with pain conditions that were not represented in the included studies, such as pain associated with migraine, rheumatoid arthritis, multiple sclerosis, or idiopathic chronic non-cancer pain. The generalizability of findings from the studies summarized in the Clinical Review to other populations may be limited.

Patient Engagement

CADTH involves patients, families, and patient groups to improve the quality and relevance of our assessments. The belief that patients have knowledge, perspectives, and experiences that are unique and contribute to essential evidence for HTA has guided our patient engagement activities.

Patients' perspectives gained through CADTH engagement processes were used to ensure relevance of outcomes of interest for the clinical review, to identify and learn from other patients with experience of iCBT, and to discuss other considerations to inform the discussion section of this report. The questions and subsequent discussion with the patient contributors helped to clarify the technology under review and comment on the relevance of the findings of this report to Canadians living with chronic pain due to a range of conditions. Furthermore, the patient contributors suggested other people with lived experience to participate in the Patients' Experiences section.

The involvement of patients enabled the research team to consider the evidence alongside an understanding of the wider experiences of chronic pain patients and their families and comment on the suitability of iCBT for various pain conditions and people experiencing chronic pain, or other factors that could support decision making.

Patients' Experiences

We conducted an interview study exploring people's expectations or experiences with iCBT for chronic pain. 5 women living with chronic, non-cancer pain in Canada participated in semi-structured interviews. Interview transcripts were analyzed with a modified framework analysis approach using the thematic categories identified in CADTH's previous 2 qualitative reviews on iCBT.

The women interviewed considered iCBT as a potentially beneficial intervention, but only when offered within the context of comprehensive chronic pain care. Access to such care was difficult for the women to obtain, with nearly all reporting experiences of being dismissed or neglected by various healthcare providers when seeking diagnoses or treatments related to their pain. Even once their healthcare providers acknowledged their pain, most of the women had trouble accessing affordable multidisciplinary pain care and relied strongly on self-advocacy and, in some cases, significant out-of-pocket expenses to obtain treatment.

The women also emphasized the potential harms of healthcare providers offering iCBT as a first-line or stand-alone treatment for pain. They described how healthcare providers offering iCBT as a first-line treatment might cause harm by potentially missing or failing to treat the root causes of pain, thus prolonging the pain experience. They also noted that people in severe, untreated pain would be unlikely to benefit from the intervention and may even contemplate suicide if they were to believe that iCBT was the only treatment option available to them.

Findings of the Patients' Experiences interview study also indicated that offering iCBT in the appropriate context and at the right time is dependent on the concept of readiness. The women reflected on how readiness—understood as an assemblage of treatment

history, available current care practices, material realities, and individual needs or desires—is best assessed within the context of a trusting therapeutic relationship. The women also considered a strong therapeutic relationship, wherein a provider assesses and actively tailors content to an individual's needs, as a vital component of successful engagement with the therapy. For this reason, they noted that people living with chronic pain may benefit most from provider-guided and at least partially synchronous programs. The women also emphasized the importance of these iCBT providers having specialized knowledge in managing and responding to the unique needs of people living with chronic pain. The women believed such providers would have the knowledge and skills necessary to help them live better with pain, which they understood to be the ultimate objective of the therapy.

Operational Aspects

An environmental scan was conducted to identify iCBT programs for the management of chronic non-cancer pain available or in development in Canada and describe their characteristics and related operational aspects. The environmental scan was informed by a limited literature search and survey. According to the results of the literature search and survey, there are at least 15 iCBT programs available or in development in various jurisdictions in Canada that support patients with chronic non-cancer pain. The characteristics of these programs vary in terms of the level of therapist involvement, overall program length, number and length of modules, and topics covered. Survey respondents identified a variety of patient-related, clinician-related, and organizational factors that act as facilitators or barriers to the implementation of iCBT. Commonly identified facilitators to iCBT implementation included reaching patients who would otherwise be unreachable, improvement in patients' experiences, efficiency (in clinical practice and use of resources), and convenience for patients. Commonly identified barriers to iCBT implementation included privacy concerns, preference for in-person or other treatment options (of both patients and clinicians), patients' lack of familiarity with technology, and patients' lack of available devices or adequate internet connection.

Conclusions and Implications for Decision- or Policy-Making

In the first instance, this review sought to analyze the available evidence to help determine whether iCBT should be offered as part of a multidisciplinary care approach for the treatment of chronic non-cancer when in-person CBT would have otherwise been provided. The clinical review suggests that the available evidence which compares the benefits of the virtual and in-person forms of CBT is very uncertain. Additionally, the review did not find any evidence on the safety of iCBT versus in-person CBT. These findings do not allow for drawing an evidence-based conclusion regarding whether iCBT represents a comparable alternative to in-person CBT that should be offered when CBT would be otherwise prescribed to address the psychological care needs of individuals with chronic non-cancer pain.

There is clear indication that in developing strategies for chronic pain care, decision-makers increasingly recognize the importance of making available programs and services that are aimed at treating and managing the psychological dimension of pain. Speaking to that point, the environmental scan conducted as part of this review identified 16 iCBT programs that currently exist in various Canadian jurisdictions and there is information to suggest that more of these programs may be implemented in the future. Working to improve access to psychological treatment for pain by leveraging virtual forms of CBT seems to be a promising avenue that is worth exploring. The people living with chronic pain who participated in this review consider that iCBT has the potential to be a helpful treatment option if it is offered in conjunction with other interventions in a multidisciplinary pain care approach. At the same time, the findings of the review suggest that more research is needed to be able to understand if iCBT programs are responding to the psychological care needs of people with chronic pain and are achieving the desired outcomes when compared to CBT delivered in person.

In a second instance, the review sought to identify and examine criteria that can help guide decisions about who and what pain conditions iCBT is suitable for and other factors that decision-makers should consider as they proceed with or continue implementing iCBT programs despite the very uncertain evidence regarding clinical benefits. As is commonly the case with internet-delivered psychological interventions, aspects such as patient readiness, a provider specialized in care for the condition (i.e., chronic pain, in this case), the strength of the therapeutic relationship between the patient and the provider, and tailoring the treatment to patient needs were identified in this review as notable factors that may impact the usefulness of iCBT programs. Additionally, iCBT programs are not suitable for people experiencing severe, untreated chronic pain or active suicidal ideation.

In examining the factors and considerations that should guide implementation of iCBT, this review adds to the body of literature that emphasizes the importance of a comprehensive multi-disciplinary approach for the treatment of chronic pain. As the availability of iCBT programs increases across Canadian jurisdictions, the findings of this review suggest that caution ought to be exercised not to view them on their own as a panacea for the ills that affect access to psychological care for pain in Canada. The review found that these programs appear to have limited ability to be helpful if they are offered as a 'quick fix', stand-alone intervention without providing access to other treatment options that may be more suitable and beneficial to the individual with chronic pain. The limited availability of multidisciplinary care programs for chronic pain in Canada is an issue that requires attention to improve the likelihood that iCBT programs would be better integrated with other pain treatments and be more helpful to people seeking care for this complex condition.

Introduction

Background and Rationale

Chronic pain affects approximately 19% of adults in Canada.[1] Prevalence estimates among children and adolescents range from 11% to 38%.[2] Available evidence suggests that the prevalence of chronic pain increases with age and is higher among women compared to men.[1-3] For people with employment, the type of occupation also correlates with prevalence rates, with people who are involved in manual work, deal with difficult job requirements, or have low job autonomy and satisfaction, among others, more likely to report experiencing chronic pain than those who perform non-manual work or who perceive their job situation as more satisfactory.[3] Studies also report that socioeconomic factors have an impact on the prevalence of chronic pain and rates tend to be higher among some populations due to socioeconomic inequalities.[2,3] Individuals living with chronic pain can experience substantial physical and psychological morbidity, which can contribute to reduced quality of life and increased socio-economic difficulties.[2,4] In addition, chronic pain is associated with a significant economic impact. In Canada, on an annual basis, more than $6 billion is spent on direct health care costs to address chronic pain, while the indirect costs to the overall economy are estimated at over $37 billion dollars.[4] Annual societal costs associated with chronic pain are estimated at between $560 and $600 billion in the United States.[5]

Chronic pain is commonly defined as pain that lasts or recurs for more than three months and is recognized as a disease in its own right by the World Health Organization.[6] The condition can be further classified as chronic primary pain and chronic secondary pain. Chronic primary pain is pain that affects one or more anatomical regions, persists or recurs for more than 3 months, is associated with significant emotional distress and/or significant functional disability, and for which symptoms are not better accounted for by another diagnosis.[6] Conditions considered as chronic primary pain include chronic widespread pain, complex regional pain syndrome, chronic primary headache or orofacial pain, chronic primary visceral pain, and chronic primary musculoskeletal pain.[6] Chronic secondary pain is defined as pain that originates as a symptom of another condition but the pain problem may persist and become a condition in its own right after the underlying condition has been treated.[7] Examples of chronic secondary pain syndromes include chronic cancer-related pain, chronic postsurgical or posttraumatic pain, chronic neuropathic pain, chronic secondary headache or orofacial pain, chronic secondary visceral pain, and chronic secondary musculoskeletal pain.[6] Chronic non-cancer pain, the focus of this HTA, is a broad category that includes chronic primary pain and chronic secondary pain conditions other than cancer-related pain. The management of cancer-related pain is commonly based on separate and different guidelines and protocols from those for non-cancer pain and is therefore beyond the scope of this HTA.

Pain is recognized as a complex, multi-dimensional condition that is characterized by an interplay of biological, psychological, and social factors.[2] People living with pain often experience comorbid mental health issues, such as depression and anxiety, which highlights the broad psychological facet of chronic pain as a disease.[8,9] Current recommendations and strategies to address pain emphasize the need for multi-disciplinary care approaches to target the different dimensions of pain and improve treatment outcomes.[2,4,10] Multi-disciplinary care strategies draw from a range of potential interventions like pharmacotherapy, physical and rehabilitative therapies, psychological therapy, medical devices, manual therapy, and self-management.[2] There are indications that availability of multidisciplinary care for chronic pain is limited in Canada. For example, a 2020 report of the Canadian Pain Task Force that examined current gaps and challenges in chronic pain care in Canada observed that while the importance of the multidisciplinary approach to chronic pain care is broadly recognized, there are considerable gaps in its application in practice, whether at the clinical level or in devising the policies for addressing the care needs of individuals with chronic pain.[11]

Cognitive behavioural therapy (CBT) is one of the most frequently used psychological interventions for the management of chronic pain.[12-14] Briefly, CBT aims to provide people with increased coping ability and self-efficacy by helping them identify and reshape their thoughts, emotions, and behaviours that can be detrimental to effective pain management or inhibit treatment progress.[13,15,16] In a 2019 CADTH Rapid Review Report (Summary with Critical Appraisal)[17] on the clinical effectiveness of CBT for the management of chronic non-cancer pain, 1 of the 5 identified systematic reviews (SRs) was a 2018 Cochrane SR[18] that investigated the effectiveness of in-person psychological therapies including CBT in the management of children living with chronic pain. Findings from this Cochrane SR[18] suggested that psychological therapies including CBT may be associated with decreases in pain intensity, anxiety, and disability post-treatment in children living with mixed pain conditions (e.g., recurrent abdominal pain, musculoskeletal pain) compared to usual care and wait-list controls. The authors of the Cochrane SR[19] that assessed the effectiveness of in-person

CBT for the management of chronic pain (excluding headache) in adults concluded that there is strong evidence for CBT having very small benefits at treatment end for pain and disability compared to active control and small benefits for pain, disability, and distress compared to treatment as usual. The authors of the review[19] stated that they were unable to make any meaningful translation of these effect sizes into clinically interpretable changes due to variability of outcome metrics within each domain and considerable heterogeneity at baseline (i.e., the clinical significance of these results was unclear). Although the benefits of in-person CBT were characterized as small or very small for individuals with chronic pain, there may be a large population benefit. The authors of this Cochrane SR[19] concluded that the body of evidence was sufficient (i.e., large and of moderate quality) to support the benefits of in-person CBT and was not likely to change with additional studies. Of note, in a previous edition[20] of this Cochrane SR, the authors stated that psychologically informed subgroup analyses may be helpful in identifying which individuals can benefit most from CBT, an important consideration given the therapeutic effect of CBT is likely to vary by individual.[21-23] The authors also evaluated the risk for adverse events related to CBT; however, the evidence was of very low certainty due to inconsistency and indirectness.

While psychological interventions, such as CBT, are increasingly integrated in care approaches for pain, a notable challenge stems from limited availability of these therapies in their traditional, in-person format. Financial barriers and the ability to pay, stigma, and long wait times are among factors that can deter those who need care from seeking and engaging in traditional psychotherapy.[24-29] Amid these various challenges, internet-based delivery of psychological treatments, such as CBT, is increasingly considered as an option that may help improve access to psychological care for chronic pain.[30-34] In this HTA, access is defined broadly, capturing not only factors related to the demand and supply sides of a health care service, such as the needs and desire for care or the availability of care, but also barriers and enablers that may impede or facilitate the use of, and ability to benefit from, that service, such as issues related to the affordability, physical accessibility, or acceptability of that service.[35,36]

Internet-delivered CBT (iCBT) is psychotherapy based on CBT principles delivered exclusively through the internet via an app or a website on a computer or mobile device. Available iCBT programs vary in terms of content, quality, and adherence to the principles of CBT. In the context of this HTA, the term 'internet-delivered cognitive behavioural therapy' (or iCBT) is used to encompass the various forms of CBT-based therapies that are provided over the internet. The delivery of iCBT programs may be self-guided or therapist assisted. The latter, which is also referred to as guided iCBT, includes therapeutic support provided by a trained therapist who may be a social worker, a psychologist, a psychotherapist, or other health professional. The support commonly consists of planned or ad hoc guidance and feedback to the person seeking care as they go through the internet-based treatment. Communication between the therapist and person seeking care is typically asynchronous but iCBT programs may also include synchronous interaction that occurs on an as-needed basis or at pre-defined steps in the therapy process.[32,34] In this HTA, iCBT also includes CBT that is delivered through the internet in real-time by a therapist (e.g., videoconference). In short, the scope of this HTA includes guided and unguided iCBT delivered via a computer or mobile device, either synchronously or asynchronously.

To help improve health care access to psychological care for chronic pain, including at times when public health measures require physical distancing, there may be a need to virtually deliver medical and mental health care services via internet, videoconference, or applications. The COVID-19 pandemic, particularly the unprecedented constraints that it has imposed on in-person care delivery, has highlighted the need for comprehensive integration of virtual care options in the health care system. Early assessments of the impact of the pandemic on the delivery of health services indicate that the situation may have spurred a significant increase in interest in, acceptability of, and adoption of virtual care in Canada and globally.[37,38] In May 2021, the Canadian Pain Task Force published an action plan which includes a number of recommended actions for integrating and scaling up virtual care programs and resources in the delivery of pain care in Canada.[39] Further, according to a 2021 report[40] published by the Canadian Institutes of Health Research (CIHR), there is a need to promote the use of high-quality evidence-based virtual care modalities for children living with chronic pain. The CIHR report[40] also suggested that engagement with children and their families would help facilitate the selection and implementation of virtual care for the management of chronic pain. Internet-delivered CBT (iCBT) programs for pain management are emerging in Canada and the number of providers offering such a service appears to be limited at the moment.[37-39,41-43] This suggests the current context is timely for CADTH to conduct an HTA to help inform discussions and decisions regarding the use of iCBT in treatment of chronic pain, with a view to increasing access to CBT-based therapy.

Canadian jurisdictions have indicated that there is interest in exploring and using iCBT as an option for the management of chronic pain in order to improve access to psychological care. However, jurisdictions note that there is a need for reliable evidence and information to guide decisions regarding the integration of this intervention in care delivery for people living with chronic pain. The 2020 Canadian Pain Task Force Report notes that outcomes are improved when multiple professionals and caretakers are involved in addressing chronic pain.[11] A key question that prevails around iCBT is whether this therapy should be offered as part of a multi-disciplinary (pharmacological and non-pharmacological) strategy for chronic pain management and care, when CBT-based therapies are being considered. There is also interest in determining who this therapy should be offered to and if there are individuals with

chronic pain for whom iCBT is not appropriate, for example due to co-occurring conditions, cognitive problems, goals, preferences, readiness, and unstable housing or lack of a reliable internet connection. A related question pertains to the circumstances in which iCBT should or should not be considered in the broader context of provision of care services for chronic pain. Finally, there is an interest in understanding the factors that could impact the implementation and uptake of iCBT and what conditions could promote or hinder achievement of the objective of improving access to psychological treatment.

Context and Decision Problem(s)

Decision Problem(s)

This HTA informs the following decision problems:

1. With a view to increasing access to CBT-based therapy, the purpose of this HTA is to inform decisions as to whether iCBT should be offered as a treatment option, as part of a multidisciplinary approach, in the delivery of care for chronic non-cancer pain when CBT would otherwise be provided.
2. Additionally, if evidence demonstrates that iCBT should be offered, the HTA could also inform whether there are criteria to guide decision-making regarding the suitability of iCBT for various pain conditions and people experiencing chronic pain, or other factors that should guide its implementation.

Objective

The objective of this HTA is to inform the decision problems with an assessment of the clinical effectiveness and safety of iCBT, the perspectives and experiences of patients and caregivers, and operational aspects associated with the use of iCBT in the management of chronic non-cancer pain when CBT-based therapies would otherwise be provided.

Research Question(s)

This HTA informs the decision problems by exploring the following research questions. Details on the specific interventions and outcomes are included in Table 1.

- Clinical Effectiveness and Safety
  1. What is the comparative clinical effectiveness of internet-delivered cognitive behavioural therapy versus in-person cognitive behavioural therapy for the management of chronic non-cancer pain?
  2. What is the comparative safety of internet-delivered cognitive behavioural therapy versus in-person cognitive behavioural therapy for the management of chronic non-cancer pain?
- Patients' Experiences
  - How do the experiences of people living with chronic non-cancer pain, and their caregivers, resonate (or not) with known experiences of iCBT for depression, anxiety, or PTSD, when CBT would otherwise be provided?
  - What do people living with chronic non-cancer pain and their caregivers expect to access or experience accessing (or not) with regard to iCBT for the management of chronic non-cancer pain, when CBT would otherwise be offered?
- Operational Aspects
  1. Which iCBT programs for the management chronic non-cancer pain are currently available or are in development in Canada, and what are their characteristics?
  2. What operational considerations contribute to the establishment and provision, or lack, of iCBT programs, specifically for the management of chronic non-cancer pain, at the system or site level in Canada and internationally?

Methods

To inform the conduct of this HTA, a preliminary scoping review of the existing literature — including HTAs and systematic reviews — was conducted. A protocol was written a priori, using appropriate reporting guidelines (e.g., the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols ([PRISMA-P]) for guidance on clarity and completeness and they were followed throughout the HTA process. Any deviations from the protocol were disclosed in this final report and updates were made to the PROSPERO submissions accordingly (Clinical Review: CRD42021283994).

The clinical review conducted a systematic review of the clinical literature looking at primary studies comparing iCBT to in-person CBT for the management of chronic non-cancer pain. For the Patients' Experiences study, we conducted an interview study exploring people's expectations of, or experiences with, iCBT as a component of care in the management of their chronic non-cancer pain. The environmental scan consisted of a limited literature search and a survey distributed to stakeholders involved in iCBT for chronic non-cancer pain.

Opportunities for Stakeholder Feedback

Stakeholders were given the opportunity to provide feedback on the draft-included studies list and the draft report.

Clinical Review

Overview

Research Questions

1. What is the comparative clinical effectiveness of internet-delivered cognitive behavioural therapy versus in-person cognitive behavioural therapy for the management of chronic non-cancer pain?

2. What is the comparative safety of internet-delivered cognitive behavioural therapy versus in-person cognitive behavioural therapy for the management of chronic non-cancer pain?

Key Messages

- We identified 3 randomized controlled trials and 1 non-randomized controlled clinical trial that examined the comparative clinical effectiveness of internet-delivered versus in-person cognitive behavioural therapy for the management of chronic non-cancer pain.
- The clinical evidence on the balance of comparative benefits and harms of internet-delivered versus in-person cognitive behavioural therapy is very uncertain, meaning it is not a reliable indication of how effective internet-delivered cognitive behavioural therapy is compared to in-person cognitive behavioural therapy.
- There is a lack of information on the comparative safety of internet-delivered versus in-person cognitive behavioural therapy; the available evidence was from only a few internet-delivered cognitive behavioural therapy programs and none of the relevant studies included children.
- Higher quality research on the effectiveness of internet-delivered cognitive behavioural therapy programs for chronic pain is needed. The certainty of the evidence could be improved through future clinical studies that use more rigorous methodological approaches, collect safety data, and to strive to lower participant drop out rate.
- The clinical data did not provide insight into how internet-delivered cognitive behavioural therapy may contribute to health inequities or potentially widen existing inequities.

Study Design

To inform the design of this clinical review, we conducted detailed scoping activities that included an informal scoping review of existing literature and CADTH Rapid Review Reports regarding the clinical effectiveness of iCBT for the management of chronic pain in adults published in December 2020[44] and CBT for chronic non-cancer pain in adults published in September 2019.[17] Details on the complete methodology for the Rapid Review Reports are available in their publications.[17,44]

We identified a considerable body of evidence pertaining to the clinical effectiveness of iCBT for chronic pain in the 2020 CADTH Rapid Review Report (Reference List).[44] Specifically, we identified 9 SRs (6 with meta-analyses), 28 randomized controlled trials (RCTs), and 5 non-randomized trials.[44] Five[14,16,45-47] of the 9 identified SRs included only RCTs. However, the available evidence was characterized by a notable degree of clinical heterogeneity, arising from grouping together different types of treatments (e.g., iCBT, in-person CBT, other psychological therapies, computer-based interventions,), different underlying pain conditions (e.g., mixed chronic pain, back pain, recurrent pain, fibromyalgia, headache), and various comparator groups (e.g., wait list, usual care, pharmacotherapy, internet-delivered education, in-person CBT). None of the available SRs fully addressed our current scope. For example, although findings from 1 SR[45] suggested that iCBT was superior to controls (i.e., wait list, attention control, usual care) in

improving mood and disability among people with fibromyalgia, there were no comparisons between iCBT and in-person CBT. Authors of another SR[14] found beneficial effects in internet-delivered psychological therapies, including iCBT, for pediatric populations with chronic headache and mixed pain conditions (e.g., musculoskeletal pain, neuropathic pain) compared to controls; however, the authors did not categorize the included studies by treatment or control type (e.g., active, wait list), making it difficult to draw meaningful conclusions that addressed our research questions. The existing literature provided limited discussion on the potential impact of iCBT on access to equitable health care, which was an important consideration for informing our decision problems.

Since there was a lack of up-to-date SRs addressing the comparison of interest for this review (i.e., iCBT versus in-person CBT) or matching the scope of the current research questions, we conducted a SR of primary studies comparing the effectiveness and safety of iCBT to in-person CBT to help provide Canadian decision-makers with evidence regarding the role of iCBT in the management of chronic non-cancer pain.

Methods

Review Conduct

We followed a protocol for this clinical review that was written a priori. We prospectively registered the protocol for the clinical review in the international repository PROSPERO (registration number: CRD42021283994). We have disclosed any deviations from the prospectively registered protocol in this final report (see Amendment Table). We have reported the clinical review in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses 2020 Statement (PRISMA 2020).[48]

Literature Search Strategy

The literature search for clinical studies was performed by an information specialist using a peer-reviewed search strategy according to the *PRESS Peer Review of Electronic Search Strategies* checklist.[49] The complete search strategy is presented in Appendix 1.

Published literature was identified by searching the following bibliographic databases: MEDLINE All (1946–) via Ovid, Embase (1974–) via Ovid, APA PyscINFO (1806–) via Ovid, and the Cochrane Central Register of Controlled Trials (CENTRAL) via Ovid. All Ovid searches were run simultaneously as a multi-file search. Duplicates were removed using Ovid deduplication for multi-file searches, followed by manual deduplication in Endnote. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were iCBT and chronic pain. Clinical trials registries were searched: the US National Institutes of Health's clinicaltrials.gov, World Health Organization's International Clinical Trials Registry Platform (ICTRP) search portal, Health Canada's Clinical Trials Database, and the European Union Clinical Trials Register.

CADTH-developed search filters were applied to limit retrieval to any types of clinical trials or observational studies, health technology assessments, systematic reviews, meta-analyses, or network meta-analyses. Retrieval was limited to English or French language results, published from January 01, 2001 onwards. Conference abstracts were excluded from the search results.

The initial search was completed on September 27, 2021. Regular alerts updated the database literature searches until the publication of the final report. The clinical trials registries search was updated prior to the completion of the last stakeholder feedback period. Studies meeting the selection criteria of the review and identified in the alerts prior to the completion of the last stakeholder feedback period were incorporated into the analysis of the final report. Any studies that were identified after the last stakeholder feedback period are described in the discussion, with a focus on comparing the results of these new studies with the results of the analysis conducted for this report.

Grey literature (literature that is not commercially published) was identified by searching sources listed in relevant sections of the *Grey Matters: A Practical Tool For Searching Health-Related Grey Literature* checklist,[50] which includes the websites of regulatory agencies, HTA agencies, clinical guideline repositories, systematic review repositories, patient-related groups, and professional associations. Google was used to search for additional internet-based materials. These searches were supplemented by reviewing

bibliographies of the included studies and systematic reviews closely aligning with the topic of interest, and through contacts with experts, as appropriate. The grey literature search was updated prior to the completion of the last stakeholder feedback period. See Appendix 1 for more information on the grey literature search strategy.

Study Eligibility Criteria

Table 1 shows the study eligibility criteria for the clinical research questions.

Table 1: Study Eligibility Criteria for Clinical Research Questions

Criteria	Description
Population	People (any age) with chronic non-cancer pain[a]
Interventions	Guided and unguided[b] iCBT delivered via a computer or mobile device, either synchronously or asynchronously[c] and in either individual or group settings, in combination with other interventions for the management of chronic non-cancer pain[a]
Comparators	In-person CBT, in combination with other interventions, for the management of chronic non-cancer pain[a]
Outcomes	**Question 1:** • pain control (e.g., intensity, severity, frequency, duration, time to improvement) • use of pharmacotherapy (e.g., cannabinoids, acetaminophen, non-steroidal anti-inflammatory drugs) • health-related quality of life or overall well-being (e.g., EQ-5D) • psychological or psychosocial function or symptoms (e.g., mood, depression, anxiety, pain-related self-efficacy, perceived injustice, pain experience [e.g., rumination, magnification, helplessness], resiliency) • sleep (e.g., quality, duration, sleep disorder) • physical function (e.g., mobility, ability to engage in activities of daily living, autonomy, disability) • participant acceptability or satisfaction with their care, as measured with any scale • individual participation (e.g., time to discontinuation) **Question 2:** • any harms (e.g., proportion of participants who experienced pain and/or psychosocial symptom worsening, substance use, emergency room visits, hospitalizations, unplanned tapering/discontinuation of other therapies [e.g., pharmacotherapy, physical and rehabilitative therapies], any adverse event) All instruments and all time points were eligible for inclusion
Setting	Any setting
Study design	Randomized and non-randomized comparative study designs, including: • RCTs (e.g., parallel group, crossover, cluster randomized) • non-randomized controlled clinical trials • controlled cohort studies • case-control studies Exclusions: • cross-sectional studies • single-arm before-and-after studies • single-arm cohort studies • single-arm interrupted time series studies • case reports and case series • review articles • editorials, letters, and commentaries • studies of any design published as conference abstracts, presentations, or thesis documents
Time frame	2001 to present[d]

CBT = cognitive behavioural therapy; iCBT = internet-delivered cognitive behavioural therapy; RCT = randomized controlled trial.

[a] Chronic non-cancer pain associated with health conditions such as (but not limited to) fibromyalgia, headache, migraine, rheumatoid arthritis, osteoarthritis, multiple sclerosis, surgical procedures, idiopathic chronic non-cancer pain, or injuries to muscle, nerve, or ligament. Chronic pain is commonly defined as lasting or recurring for at least 3 months,[6] however explicit reporting of the pain duration was not required for study inclusion.

[b] Guided iCBT programs involve support from a clinician or technician (e.g., via emails or phone calls), whereas unguided iCBT programs are delivered entirely by computer and driven by participants.[51]

[c] Asynchronous counselling refers to a delayed exchange of therapeutic communication between a licensed mental health care professional and the client.[52]

[d] As part of the detailed scoping process, a 2020 Rapid Review Report (Reference List)[44] identified SRs, which included primary studies dating back to the early 2000s. Therefore, studies published in or after the year 2001 were eligible as this was believed to capture all relevant literature of interest.

- Inclusion criteria:
  - Studies meeting the eligibility criteria outlined in Table 1 were included.
  - There were no restrictions placed on age, sex or gender, ethnicity, comorbidities, cause of chronic non-cancer pain, or severity of symptoms. We planned to conduct subgroup analyses based on underlying causes of chronic non cancer pain, severity of chronic non-cancer pain, population age, sex or gender, race and/or ethnicity, comorbidities (e.g., depression, anxiety), and place of residence.
  - Participants could receive CBT or iCBT in conjunction with usual care (e.g., pharmacological and non-pharmacological options) as part of a multidisciplinary approach. Usual care could vary between the CBT and iCBT arms within each study. Explicit reporting and a description of the multidisciplinary approach was not required for study inclusion
  - Traditional iCBT/CBT or psychotherapies firmly grounded in CBT approaches or based on "third wave" CBTs[53-56] were eligible for inclusion (e.g., acceptance and commitment therapy,[57] compassionate mind training, dialectical behavioural therapy, behavioural activation, metacognitive therapy, exposure-based CBT, mindfulness-based cognitive therapy, mindfulness-based stress reduction, or mindfulness-based CBT).[58]
- Exclusion criteria:
  - Participants using iCBT/CBT primarily for indications other than chronic non-cancer pain (e.g., primary diagnosis of major depressive disorder, anxiety disorder, posttraumatic stress disorder) were not included.
  - Any psychological interventions not based on CBT were excluded (e.g., interventions based on online psychoeducation or exposure alone, psychodynamic therapy, humanistic approaches [e.g., emotion-focused therapy, internal family systems-based interventions]).
  - Comparisons between interventions that differ in treatment protocols (e.g., dialectical behavioural therapy versus CBT) in addition to delivery method (i.e., in-person versus internet-delivered) were excluded.
  - Studies that did not measure outcomes of interest were excluded.

We limited the eligible study designs to RCTs and non-randomized comparative studies. Though RCTs offer the highest internal validity, we included non-randomized comparative studies to help capture populations that may not have been included in RCTs and could provide additional context (e.g., geographical, social, economic, cultural, political) pertaining to equity in access to iCBT.

We limited eligibility to studies published in English and French. While there is evidence[59,60] that suggests that excluding non-English publications from evidence synthesis on medical topics does not alter review conclusions, publications in French were also eligible, as CADTH has the capacity for reviewing in both languages.

Study Selection

We used the SR management software DistillerSR (from Evidence Partners in Ottawa, Canada) to facilitate study selection. Two reviewers independently screened titles and abstracts of all retrieved citations for relevance to the clinical research questions; due to feasibility constraints we did not screen records retrieved from clinical trial registries. A single reviewer scanned the reference lists of the included studies and relevant SRs to locate additional studies of potential interest. We retrieved full-text articles that at least 1 reviewer judged to be potentially relevant and independently assessed these for possible inclusion based on the pre-determined selection criteria outlined in Table 1 (i.e., if 1 reviewer believed the citation should be screened at the full-text level, it was moved forward to the next level of screening without conflict resolution). The 2 reviewers then independently examined all full-text articles and compared their decisions. The reviewers discussed discrepancies and reached consensus on the included studies. A third reviewer was consulted to resolve discrepancies for 4 studies. No attempts were made to contact study authors, as no information needed to assess study eligibility were deemed unclear or missing. We posted a list of studies selected for inclusion in the clinical review to the CADTH website for stakeholder review for 10 business days for feedback and planned to review any additional studies identified for potential inclusion, but no additional studies were identified.

We screened studies identified through search alerts using the aforementioned process and incorporated those meeting the selection criteria of the review into the analysis if they were identified before the end of the last stakeholder feedback period. We have described studies identified after the last stakeholder feedback period in the discussion, with a focus on comparing their results with those obtained from the synthesis of earlier reports included in the review.

We generated lists of included studies and excluded studies (with reasons) and have presented these in **Error! Reference source not found.** and Appendix 4.

Data Extraction

A single reviewer performed data extraction with independent verification for accuracy and completeness by a second reviewer. The reviewers resolved disagreements through discussion until consensus was reached. Reviewers extracted data directly into tables created in Microsoft Word and Microsoft Excel, which we piloted using data from 1 included study. As a result of piloting exercises, we made some modifications to data extraction tables, and we decided Microsoft Excel would be primarily used for extracting detailed results data. The information extracted included characteristics of the study (e.g., design, setting, funding source), population (number of participants, types of chronic non-cancer pain conditions, duration of pain, sex and/or gender, race and/or ethnicity, comorbidities, and place of residence), intervention and comparators (e.g., type of iCBT and in-person CBT, features of the iCBT and in-person CBT programs, treatment duration, types of concurrent interventions), outcomes and their ascertainment (e.g., instruments used for measurement), and results data regarding the outcomes and the subgroups of interest that follow.

Subgroups of Interest:

- underlying causes of chronic non-cancer pain (as defined by the International Association for the Study of Pain classification of chronic pain system)
- severity of chronic non-cancer pain
- population age (e.g., children, adolescents, adults, older adults)
- sex and/or gender
- race and/or ethnicity
- type of iCBT (e.g., self-guided or therapist-assisted, synchronous or asynchronous, face-to-face traditional CBT via videoconference versus online modules and without face-to-face contact, individual or group)
- components of iCBT (e.g., number of sessions, type of modules)
- length of follow-up after completion of iCBT
- presence and type of concurrent interventions
- presence of comorbidities (e.g., depression, anxiety)
- place of residence.

We extracted all data that were compatible with each relevant outcome domain at any duration of follow-up, including measures of treatment effects (e.g., mean changes in outcome scores from baseline to follow-up), and any results of statistical tests reported on those measures. Outcome measures such as Pain Catastrophizing Scale (PCS) and Pain Coping and Cognition List (PCCL) are used in literature relating to chronic pain. These scales include terminology (e.g., catastrophizing) that has negative connotations and perpetuates pain shaming.[61] In this report, when possible, we attempted to avoid such terminology with negative connotations, and we referred to pain catastrophizing as pain experience. However, when citing published literature related to data extracted from PCS and PCCL scales, we used such terms for clarity and consistency with the cited literature. We made no assumptions about the presence or absence of an outcome if it was not reported in the study. For example, we did not assume that no adverse events occurred only because the authors did not report on any. No attempts were made to contact study authors, as no relevant data were deemed unclear or missing and needed for data synthesis.

Critical Appraisal

Two independent reviewers assessed outcome-level risk of bias (or for groups of outcomes believed to be at similar risk of bias, for feasibility reasons) of RCTs from the intention-to-treat perspective using the revised Cochrane risk-of-bias tool for randomized trials, the RoB 2.[62] The RoB 2 assessment tool is structured into 5 domains to assist in evaluating biases arising from the randomization process, deviations from intended interventions, missing outcome data, measurement of the outcome, and selection of the reported result. For each domain, we assigned a judgment of low risk of bias, high risk of bias, or some concerns. We then judged the overall risk of bias of each trial as low risk of bias, some concerns, or high risk of bias based on the domain-level determinations. We predicted the direction of the potential risk of bias when possible and provide a rationale for decisions about the risk of bias for both the domain-level and overall assessments.

We assessed the outcome-level risk of bias in non-randomized studies using the Risk of Bias Assessment Tool for Non-randomized Studies (RoBANS).[63] RoBANS contains 8 domains that may be used to evaluate the risk of biases in a study based on participant selection, confirmation and consideration of confounding variables, measurement of exposure, blinding of outcome assessment, methods of measuring outcomes, incomplete outcome data, and selective reporting of outcomes. We selected this tool for its reliability, promising validity, and user-friendly design.[63] We assigned a judgment of low risk of bias, high risk of bias, or unclear risk of bias for each domain using the criteria provided in the instrument.[63] Since our included study pertained to an intervention rather than an exposure, instead of 'measurement of exposure' we assessed the risk of bias due to deviations from the intended interventions for this domain. We then classified the overall risk of bias for each study as low, some concerns, or high, based on the domain-level judgments about the risk of bias, following the RoB 2 guidance,[62] as RoBANS does not provide a specific approach for making study-level judgments. We predicted the direction of the potential risk of bias when possible and provided a rationale for decisions about the risk of bias for both the domain-level and overall assessments. No attempts were made to contact study authors to obtain or confirm information for the critical appraisals.

Reviewers resolved disagreements in the risk of bias for the domain-level and overall assessments through discussion. In evaluating the included studies, we considered other methodological weaknesses beyond the risk of bias. We did not exclude studies from the review based on the results of the critical appraisal. However, we incorporated the critical appraisal results into assessments of the certainty in the body of evidence for each outcome-comparison.

Data Analysis and Synthesis

We considered all trials reporting any data related to the outcome domains of interest to be eligible for synthesis within their respective domains. Data were available for multiple heterogeneous timepoints across the included trials, and we chose to synthesize data at the two timepoints that we believed to be most informative: directly post-program (i.e., posttreatment), and at longest follow-up. We considered other lengths of follow-up if the findings appeared to differ substantially compared to the longest follow-up, but this was not the case for any of the trials. The included trials reported outcomes continuously, and where possible we standardized the outcome measure used across studies to facilitate interpretation (where possible, using mean difference in change from baseline), using standard formulae.[64] This included calculating standard deviations when standard errors were reported (1 RCT[65]), and computing mean change from baseline when only baseline and follow-up measures were reported (3 RCTs[65-67]). We assumed a correlation coefficient of 0.5 between measurements in calculating the standard deviation of the when the correlation coefficients were not presented in the included trials.[64]

We considered clinical and methodological heterogeneity across the included trials, as well as the reported outcome measures, in our decision on whether to pool findings statistically via meta-analysis. As we rarely included more than 2 trials reporting on a single outcome, and measures of effect were presented heterogeneously across the trials (e.g., different tools), we did not perform a statistical synthesis. Instead, we performed a narrative synthesis of the results reported in the trials considering available guidance.[68,69] This included the presentation of study characteristics and findings by outcome within summary tables, together with descriptions in the main text. To synthesize study findings, we first grouped trials by outcome domain and timepoint of interest for the main comparison (iCBT vs. in-person CBT). We considered the RCTs alongside the 1 non-randomized controlled clinical trial (nRCT), as this approach seemed to be more informative than presenting findings separately by design, and inclusion of the nRCT did not negatively impact the certainty of the evidence for any outcome-comparison. We then developed a preliminary synthesis by

organizing the findings and identifying patterns in the size and direction of reported effects. We considered the sample size of the included trials and their risk of bias in determining the relative weight of each study's findings in the overall conclusion. Reviewers then came to consensus on a single overall conclusion across trials for each outcome-comparison (i.e., favouring either treatment, little-to-no difference).

When findings across the trials were heterogeneous (especially in terms of direction of observed effects), we had planned to explore this heterogeneity using within- and between-study subgroup analyses. No within-study subgroup analyses were reported in the included trials, and the small number of trials representing various subgroups precluded drawing credible conclusions about the potential sources of heterogeneity. Therefore, we drew conclusions based on the main comparison (iCBT vs. in-person CBT) and did not present separate conclusions by subgroups of the population or intervention. Instead, we considered this unexplained heterogeneity in our assessments of the certainty of the evidence.

We had planned to assess the risk of small study bias for meta-analyses containing at least 8 studies of variable size, but since we only included 4 trials and performed no meta-analysis, we were unable to complete this assessment.

Certainty of the Evidence

Two independent reviewers rated the certainty of the body of evidence for each outcome-comparison using the methods of the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group.[70,71] Reviewers discussed discrepancies until consensus was reached. No attempts were made to contact study authors to obtain or confirm information for the GRADE assessments.

Following the GRADE approach, RCTs started as high certainty evidence;[71,72] as noted previously, the syntheses for some outcome-comparisons included a single nRCT among the RCTs, as we considered this to be the most informative way to present the findings. These comparisons started as high certainty evidence despite the inclusion of the non-randomized trial. Outcome-comparisons including only the non-randomized trial started as low certainty evidence. Certainty in treatment effect estimates were then rated down for concerns related to risk of bias, inconsistency across studies, indirectness, imprecision of effects, and/or publication bias.[71,72] The possibility of rating up the certainty of evidence was considered, but was not appropriate for any outcome-comparison.[71,72] Ultimately, the GRADE approach resulted in an assessment of the certainty of a body of evidence in 1 of 4 grades:[73]

- High: We are very confident that the true effect lies close to that of the estimate of the effect.
- Moderate: We are moderately confident in the effect estimate; the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
- Low: Our confidence in the effect estimate is limited; the true effect may be substantially different from the estimate of the effect.
- Very low: We have very little confidence in the effect estimate; the true effect is likely to be substantially different from the estimate of effect.

The results of GRADE assessments are reported in Summary of Findings tables, which include footnotes to justify all decisions to rate down the certainty of the evidence for any given outcome-comparison. When providing summaries of the evidence in the text, we used the word "may" for low certainty evidence and "probably" or "likely" for moderate certainty evidence.[74] We described very low certainty evidence as "very uncertain".[74]

Results

Quantity of Research Available

We identified a total of 1,889 unique citations via the electronic literature search and excluded 1,770 records by title and abstract. We retrieved no additional records from the grey literature search or search alerts. From full-text review of the 119 potentially relevant articles, we excluded 115 and included 4 unique studies. No additional unique studies were identified during the stakeholder review of the included studies. The study selection process is outlined in Appendix 2 (Figure 1) using a PRISMA[75] flow chart. Lists of

included and excluded studies, with details describing the rationale for those excluded, are presented in **Error! Reference source not found.** and Appendix 4, respectively.

Trial and Participant Characteristics

Table 2 provides a high-level overview of trial and participant characteristics. Appendix 2 (Table 12) shows full details regarding the characteristics of included trials. Two trials included participants with a specific pain condition (i.e., fibromyalgia[67]) or pain location (i.e., chronic back pain[76]), while two trials included participants with a wide range of chronic pain conditions.[65,66] Participant race was reported in 2 trials conducted in the US, with the predominant races being Caucasian, African-American, and Hispanic.[65,76] None of the trials reported participants' place of residence (beyond the country in which the trial was conducted). Outcomes of interest included pain interference, pain control, health-related quality of life (HRQoL) or overall well-being, psychological or psychosocial function or symptoms (i.e., pain acceptance; anxiety, depression, or general psychological distress; self-efficacy; pain experience and coping; fatigue), sleep, physical activity level, physical function, prescription opioid misuse, satisfaction with care, and participation.[65-67,76] Various self-reported outcome scales were used such as Brief Pain Inventory (BPI) Interference and Severity Subscale, and Chronic Pain Acceptance Questionnaire-Revised (CPAQ-R). Detailed descriptions of all outcome measures are available in Table 13 of Appendix 2. No relevant studies were identified regarding the comparative safety of iCBT vs. in-person CBT.

Table 2: Overview of Trial Characteristics of Included Primary Clinical Trials

Trial Citation,[a] Country, Trial Design	Participant Characteristics	Relevant Intervention and Comparator	Length of Follow-Up
Randomized Controlled Trials			
Herbert et al. (2017)[65] United States Multicentre, open label, non-inferiority parallel-group RCT	Veterans (aged over 18 y) with a chronic, nonterminal pain condition and average pain severity and interference (BPI) rated >4 of 10 **n=129 randomized** **% male:** 82.2% **Mean (SD) age:** 52 (13.3) y	Manualized ACT intervention for chronic pain with the help of at-home assignments. **Intervention:** Therapist-delivered individual VC sessions **Comparator:** Therapist-delivered individual in-person sessions **Sessions:** 8 weekly sessions	Baseline, mid-, post-treatment, and 3 and 6 months after completion
Vallejo et al. (2015)[67] Spain Single centre, open label, parallel-group RCT	Adults (aged 18 y and over) with FM **n=60 randomized** **% female:** 100% **Mean (SD) age:** 49.8 (11.0) y	CBT with components such as psychoeducation about FM. **Intervention:** Self-directed online application (therapist available) **Comparator:** Therapist-delivered in-person group sessions **Sessions:** 10 weekly sessions	Baseline, post-treatment, and 3, 6 and 12 months after completion
de Boer et al. (2014)[66] The Netherlands Single centre, unblinded, non-inferiority parallel-group RCT	Adults (aged 18 y and over) with nonspecific chronic pain **n=72 randomized** **% female:** 68.2% (intervention) and 60.7% (comparator) **Mean (SD) age:** 50.6 (10.7) y (intervention) and 53.2 (11.7) y (comparator)	The course is focused on the cognitive-behavioural model of pain circle. **Intervention:** Self-directed internet course (psychologist available) **Comparator:** Psychologist-delivered in-person group sessions **Sessions:** 7 weekly sessions plus a booster session	Baseline, immediately after the 7-week course (i.e., treatment completion), and immediately after the booster session 2 months after completion
Non-Randomized Controlled Clinical Trial			
Mariano et al. (2021)[76] United States Single centre, open-label, parallel-group nRCT	Adults (aged 18 to 90 y) with daily back pain for more than 3 months, pain intensity rated ≥4 on a 0 to 10 scale (higher score = worse pain) **n=93 participants self-selected their treatment** **% female:** 70.2% (intervention group) and 57.8% (comparator group) **Mean (SD) age:** 54.5 (14.3) y (intervention group) and 59.7 (13.0) y (comparator group)	CBT intervention for chronic pain that included goal setting, skills training, relaxation exercises, group discussion, and practice assignments. **Intervention:** Group WebEx VC sessions accessed at home (MD- or PhD-level licensed facilitator) **Comparator:** Group in-person sessions (PhD-level licensed facilitator) **Sessions:** 8 weekly sessions	Baseline and at 2 (intervention group) or 3 (comparator group) months after completion

[a] Publications are organized according to trial design and in reverse chronological order.
ACT = acceptance and commitment therapy; BPI = Brief Pain Inventory; CBT = cognitive behavioral therapy; FM = fibromyalgia; n = number of participants; nRCT = non-randomized controlled clinical trial; RCT = randomized controlled trial; SD = standard deviation; VC = videoconference; y = years.

Critical Appraisal

Table 3 and Table 4 show a summary of the risk of bias assessments for the 3 RCTs and the 1 nRCT. Full details are in Table 14 and Table 15 of Appendix 2. Overall, all outcome domains from each of the included trials exhibited some concerns for risk of bias, with most outcome domains having a high risk of bias. A summary of the risk of bias assessments is provided below.

Risk of Bias in Randomized Controlled Trials

The risk of bias for each outcome domain within the 3 included RCTs[65-67] was assessed using the RoB 2 tool.[62]

All RCTs[65-67] were judged to be at high overall risk of bias for most outcomes (all outcomes except for individual participation in 2 RCTs[65,66]), primarily due to bias arising from the randomization process (2 RCTs[66,67]), bias due to missing outcome data (2 RCTs[66,67]), bias in the measurement of the outcomes (3 RCTs[65-67]), and bias in the selection of the reported results (3 RCTs[65-67]). There was concern about at least some risk of bias arising from the randomization process for 2 of the RCTs,[66,67] due to limited detail on methods of randomization provided by study authors and/or baseline imbalances in important prognostic factors suggesting failure of the randomization process. All outcomes reported in 2 RCTs (except for individual participation) were at a high risk of bias due to missing outcome data as data were unavailable for a substantial number of participants in the trials, there were imbalances in missing data between intervention groups, and it was likely that the missingness of these outcome data depended on their true values. Excluding outcomes related to individual participation, all outcomes measured in the 3 RCTs[65-67] were at a high risk of bias in their measurement because outcomes were self-reported by participants who were aware of their treatment allocation and it was likely that assessment of outcomes was influenced by this knowledge. There were some concerns with bias in the selection of reported results in 3 RCTs[65-67] as it was unclear if data that produced the results for all outcomes were analyzed in accordance with a prespecified analysis plan that was finalized before unblinding of outcome data. The overall predicted direction of bias for all outcomes was unclear. A summary of the results of the risk-of-bias assessments of the RCTs[65-67] is provided in Table 3.

Risk of Bias in Non-Randomized Studies

The risk of bias for each outcome domain within the included non-randomized study[76] was assessed using the RoBANS tool.[63]

All outcomes assessed in the nRCT[76] were judged to be at high overall risk of bias, primarily due to bias arising from the selection of target group comparisons, bias in the consideration of confounders, bias in outcome assessment, bias due to incomplete outcome data, and bias due to selective outcome reporting. The risk of selection bias due to the selection of an inappropriate comparison target group was judged to be high as the iCBT and in-person CBT groups differed in several important prognostic factors, such as severity of pain. Similarly, there was a high risk of selection bias due to inappropriate confounder confirmation and consideration as the authors did not adjust their analyses for potential confounders. The risk of confirmation bias due to inappropriate blinding of outcome assessors was high for all outcomes except for individual participation, which was judged to have a low risk of bias due to its objectivity. There was a high risk of attrition bias due to inappropriate handling of incomplete data for all outcomes except for individual participation due to the amount of missing data, the imbalance in missing data between intervention groups, and the lack of reporting on reasons for missing data. All outcomes were at an unclear risk of reporting bias due to selective outcome as there was no reference to a published protocol that could be used verify whether outcomes were reported according to a pre-specified plan. The overall predicted direction of bias for all outcomes was unclear. A summary of the results of the risk-of-bias assessments of the non-randomized study is provided in Table 4.

Table 3: Risk of Bias Summary — RCTs (RoB 2)

Study citation	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Herbert et al. (2017)[65]	All outcomes: Low risk	All outcomes: Low risk	P: Low risk All other outcomes: High risk [ND]	P: Low risk All other outcomes: High risk [?]	All outcomes: Some concerns [ND]	P: Some concerns [?] All other outcomes: High risk [?]
Vallejo et al. (2015)[67]	All outcomes: High risk [+]	All outcomes: Low risk [?]	All outcomes: Low risk	P: Low risk All other outcomes: High risk [?]	All outcomes: Some concerns [?]	All outcomes: High risk [?]
de Boer et al. (2014)[66]	All outcomes: Some concerns [?]	All outcomes: Low risk [?]	P: Low risk All other outcomes: High risk [ND]	P: Low risk All other outcomes: High risk [?]	All outcomes: Some concerns [ND]	P: Some concerns [?] All other outcomes: High risk [?]

P = individual participation; RCT = randomized controlled trial; RoB 2 = Version 2 of the Cochrane Risk of Bias Tool.
Note: the predicted direction of bias arising from each domain and the overall risk of bias is indicated in square brackets. [+] suggests the bias may favour the intervention (i.e., iCBT); [−] suggests the bias may favour the comparator (i.e., in-person CBT); [ND] suggests the bias may influence the result towards the null; [?] suggests the predicted direction is unclear.

Table 4: Risk of Bias Summary — Non-Randomized Controlled Clinical Trial (RoBANS)

Study citation	Bias in target group comparisons	Bias in target group selection	Bias in considerations of confounders	Bias due to deviations from intended interventions	Bias in outcome assessment(assessors)	Bias in outcome measurement (tools)	Bias due to incomplete outcome data	Bias due to selective outcome reporting	Overall risk of bias
Mariano et al. (2021)[76]	All outcomes: High risk [?]	All outcomes: Low risk	All outcomes: High risk [?]	All outcomes: Low risk	P: Low risk All other outcomes: High risk [?]	All outcomes: Low risk	P: Low risk All other outcomes: High risk [ND]	All outcomes: Unclear [?]	All outcomes: High risk [?]

P = individual participation; RoBANS = Risk of Bias for Non-Randomized Studies.
Note: the predicted direction of bias arising from each domain and the overall risk of bias is indicated in square brackets. [+] suggests the bias may favour the intervention (i.e., iCBT); [−] suggests the bias may favour the comparator (i.e., in-person CBT); [ND] suggests the bias may influence the result towards the null; [?] suggests the predicted direction is unclear.

Additional Limitations

Both RCTs[65,66] that were conducted as non-inferiority trials provided a seemingly arbitrary statistical basis for deciding on their non-inferiority margins or did not justify their selected non-inferiority margins, decreasing credibility in the non-inferiority conclusions made in these trials. Additionally, neither of the non-inferiority trials[65,66] provided a comparison of the effect of treatment with in-person CBT observed in the current trials to the effect observed in historical clinical studies that compared in-person CBT versus no treatment or standard care alone. Therefore, it was possible that the constancy assumption had been violated. Thus, the conclusions made in this report were not based on the 2 trials' non-inferiority findings. We did not incorporate the non-inferiority conclusions made by the authors of these RCTs[65,66] into our interpretation of the evidence synthesized in our clinical review due to their lack of credibility. In 1 trial,[65] the authors concluded that non-inferiority of individual videoconference (VC) acceptance and commitment therapy (ACT) versus in-person ACT was supported for pain interference, HRQoL, pain acceptance, depression, sleep, and physical activity at posttreatment; and pain interference, pain control, HRQoL, depression, and sleep at 6 months after treatment completion. Non-inferiority of individual VC ACT versus in-person ACT was not supported at posttreatment or 6 months for anxiety.[65] In another trial,[66] the authors indicated that non-inferiority of iCBT vs. in-person CBT was supported for pain experience at posttreatment and 2 months.

Findings for iCBT vs In-person CBT

Table 5 presents a high-level overview of the findings and certainty of evidence assessments for each outcome-comparison on the comparative clinical effectiveness of iCBT vs. in-person CBT for the management of chronic non-cancer pain (see Table 16 to Table 25 in Appendix 2 for detailed GRADE Summary of Findings tables which include an explanation of reasons for rating down the certainty of the evidence). We judged the evidence regarding the comparative clinical effectiveness of iCBT vs. in-person CBT on all reported outcomes to be very uncertain. We identified no relevant trials regarding the comparative safety of iCBT vs. in-person CBT.

Question 1: Clinical Effectiveness

Table 5: High-Level Overview of Trial Findings and GRADE Assessments

Outcome	Timepoint	Number of participants (trials)	Certainty of the evidence (reasons)	Conclusion
Pain interference	Posttreatment	293 (2 RCTs,[65,66] 1 nRCT[76])	⊕⊖⊖⊖ **VERY LOW** (a, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain interference at posttreatment, but the evidence is very uncertain.
	Longest follow-up (2 to 6 months)	293 (2 RCTs,[65,66] 1 nRCT[76])	⊕⊖⊖⊖ **VERY LOW** (a, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain interference at the longest follow-up, but the evidence is very uncertain.
Pain control	Posttreatment	293 (2 RCTs,[65,66] 1 nRCT[76])	⊕⊖⊖⊖ **VERY LOW** (a, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain interference at posttreatment, but the evidence is very uncertain.
	Longest follow-up (2 to 6 months)	293 (2 RCTs,[65,66] 1 nRCT[76])	⊕⊖⊖⊖ **VERY LOW** (a, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain interference at the longest follow-up, but the evidence is very uncertain.
HRQoL or overall well-being	Posttreatment	240 (3 RCTs)[65-67]	⊕⊖⊖⊖ **VERY LOW** (a, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on HRQoL and overall well-being at posttreatment, but the evidence is very uncertain.
	Longest follow-up (2 to 12 months)	240 (3 RCTs)[65-67]	⊕⊖⊖⊖ **VERY LOW** (a, c, d)	The findings for the effect of iCBT vs. IP CBT on HRQoL and overall well-being at the longest follow-up are heterogeneous, and the evidence is very uncertain.
Pain acceptance	Posttreatment	128 (1 RCT)[65]	⊕⊖⊖⊖ **VERY LOW** (a, b, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain acceptance at posttreatment, but the evidence is very uncertain.
	Longest follow-up (6 months)	128 (1 RCT)[65]	⊕⊖⊖⊖ **VERY LOW** (a, b, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain acceptance at the longest follow-up, but the evidence is very uncertain.
Anxiety, depression, or general psychological distress	Posttreatment	168 (2 RCTs)[65,67]	⊕⊖⊖⊖ **VERY LOW** (a, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on anxiety, depression, and general psychological distress at posttreatment, but the evidence is very uncertain.
	Longest follow-up (3 to 12 months)	261 (2 RCTs,[65,67] 1 nRCT[76])	⊕⊖⊖⊖ **VERY LOW** (a, c, d)	The findings for the effect of iCBT vs. IP CBT on anxiety, depression, and general psychological distress at the longest follow-up are heterogeneous, and the evidence is very uncertain.
Self-efficacy	Posttreatment	40 (1 RCT)[67]	⊕⊖⊖⊖ **VERY LOW** (a, b, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on self-efficacy at posttreatment, but the evidence is very uncertain.

	Longest follow-up (12 months)	40 (1 RCT)[67]	⊕⊖⊖⊖ **VERY LOW** (a, b, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on self-efficacy at the longest follow-up, but the evidence is very uncertain.
Pain experience	Posttreatment	112 (2 RCTs)[66,67]	⊕⊖⊖⊖ **VERY LOW** (a, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain experience at posttreatment, but the evidence is very uncertain.
	Longest follow-up (2 to 12 months)	112 (2 RCTs)[66,67]	⊕⊖⊖⊖ **VERY LOW** (a, b, c, d)	The findings for the effect of iCBT vs. IP CBT on pain experience at the longest follow-up are heterogeneous, and the evidence is very uncertain.
Coping with pain	Posttreatment	112 (2 RCTs)[66,67]	⊕⊖⊖⊖ **VERY LOW** (a, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on coping with pain at posttreatment, but the evidence is very uncertain.
	Longest follow-up (2 to 12 months)	112 (2 RCTs)[66,67]	⊕⊖⊖⊖ **VERY LOW** (a, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on coping with pain at the longest follow-up, but the evidence is very uncertain.
Fatigue	Posttreatment	72 (1 RCT)[66]	⊕⊖⊖⊖ **VERY LOW** (a, b, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on fatigue at posttreatment, but the evidence is very uncertain.
	Longest follow-up (2 months)	72 (1 RCT)[66]	⊕⊖⊖⊖ **VERY LOW** (a, b, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on fatigue at the longest follow-up, but the evidence is very uncertain.
Sleep	Posttreatment	128 (1 RCT)[65]	⊕⊖⊖⊖ **VERY LOW** (a, b, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on sleep at posttreatment, but the evidence is very uncertain.
	Longest follow-up (6 months)	128 (1 RCT)[65]	⊕⊖⊖⊖ **VERY LOW** (a, b, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on sleep at the longest follow-up, but the evidence is very uncertain.
Physical activity level	Posttreatment	128 (1 RCT)[65]	⊕⊖⊖⊖ **VERY LOW** (a, b, c, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on physical activity level at posttreatment, but the evidence is very uncertain.
	Longest follow-up (6 months)	128 (1 RCT)[65]	⊕⊖⊖⊖ **VERY LOW** (a, b, c)	IP CBT may be favoured vs. iCBT with respects to physical activity level at the longest follow-up, but the evidence is very uncertain.
Physical function	Posttreatment	No trials identified	Not applicable	No trials were identified containing data on physical function at posttreatment.
	Longest follow-up (3 months)	93 (1 nRCT)[76]	⊕⊖⊖⊖ **VERY LOW** (a, b, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on physical function at the longest follow-up, but the evidence is very uncertain.
Prescription opioid misuse	Posttreatment	No trials identified	Not applicable	No trials were identified containing data on prescription opioid misuse at posttreatment.

	Longest follow-up (3 months)	93 (1 nRCT)[76]	⊕⊖⊖⊖ **VERY LOW** (a, b, d)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on prescription opioid misuse at the longest follow-up, but the evidence is very uncertain.
Satisfaction with care	Posttreatment	200 (2 RCTs[65,66])	⊕⊖⊖⊖ **VERY LOW** (a, c)	There may be little-to-no difference in the effect of iCBT vs. IP CBT on satisfaction with care, but the evidence is very uncertain.
	Longest follow-up	No trials identified	Not applicable	No trials were identified containing data on satisfaction with care at timepoints other than posttreatment.
Individual participation	Posttreatment	333 (3 RCTs,[65-67] 1 nRCT[76])	⊕⊖⊖⊖ **VERY LOW** (a, c, d)	The findings for effect of iCBT vs. IP CBT on individual participation are heterogeneous, and the evidence is very uncertain.
	Longest follow-up	No trials identified	Not applicable	No trials were identified containing data on individual participation at timepoints other than posttreatment.

762 CBT = cognitive behavioural therapy; HRQoL = health-related quality of life; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; nRCT = non-randomized controlled clinical
763 trial; RCT = randomized controlled trial.
764 a = risk of bias; b = inconsistency; c = indirectness; d = imprecision.

Pain Interference

Three trials (2 RCTs,[65,66] 1 nRCT;[76] n=293), all with high risk of bias (unclear direction), reported on pain interference as measured by BPI Interference Subscale[65,76] or Visual Analogue Scale (VAS) Interference Scale.[66] The trials involved adult participants (mean age 50 to 59 years; primarily females in 2 trials;[66,76] veterans only, primarily male in 1 trial[65]) with various chronic pain conditions[65,66] or chronic back pain.[76] The CBT programs were highly variable with 2 trials comparing therapist-delivered VC ACT[65] or CBT[76] to content-matched in-person ACT (individual-based) or CBT (group-based), respectively, and the third trial comparing individual self-directed iCBT (psychologist-guided) to content-matched psychologist-delivered group in-person CBT.[66]

There may be little-to-no difference in the effect of iCBT versus in-person CBT on pain interference at posttreatment[65,66] and the longest follow-up (2 months,[66] 3 months,[76] or 6 months[65]), but the evidence is very uncertain due to very serious concerns for risk of bias, and serious concerns for indirectness and imprecision (Table 16). All trials were judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition) and self-reported subjective outcomes which may have been affected by the open-label nature of the trials.[65,66,76] We considered the comparison of iCBT to in-person CBT to be indirect in one trial, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison.[66] Finally, imprecision was difficult to judge due to a lack of formal between-group comparisons; however, within-group SDs were wide in all 3 trials.[65,66,76]

Pain Control

Three trials (2 RCTs,[65,66] 1 nRCT;[76] n=293), all with high risk of bias (direction unclear), reported on pain control as measured by the BPI Severity Subscale[65,76] or VAS Pain Intensity Scale.[66] The trials involved adult participants (mean age 50 to 59 years; primarily females in 2 trials;[66,76] veterans only, primarily males in 1 trial[65]) with various chronic pain conditions[65,66] or chronic back pain.[76] The CBT programs were highly variable with 2 trials comparing therapist-delivered VC ACT[65] or CBT[76] to content-matched in-person ACT (individual-based) or CBT (group-based), and the third trial comparing individual self-directed iCBT (psychologist-guided) to content-matched psychologist-delivered group in-person CBT.[66]

The evidence across the trials showed that there may be little-to-no difference in the effect of iCBT versus in-person CBT on pain control at posttreatment[65,66] and the longest follow-up (2 months,[66] 3 months,[76] or 6 months[65]), but the evidence is very uncertain due to very serious concerns for risk of bias, and serious concerns for indirectness and imprecision (Table 17). All trials were judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition) and self-reported subjective outcomes which may have been affected by the open-label nature of the trials.[65,66,76] We considered the comparison of iCBT to in-person CBT to be indirect in one trial, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison.[66] Finally, imprecision was difficult to judge due to a lack of formal between-group comparisons, however, within-group SDs were wide in all 3 trials.[65,66,76]

HRQoL or Overall Well-Being

Three RCTs (n=240),[65-67] all with high risk of bias (direction unclear), reported on HRQoL or overall well-being as measured by Short Form 12-Item Mental Component Summary (SF12-MCS) and Short Form 12-Item Physical Component Summary (SF12-PCS),[65] Fibromyalgia Impact Questionnaire (FIQ) (0 = no impairment to 100 = maximum impairment),[67] or Research and Development 36-Item Health Survey (RAND-36) (0 = worse to 100 = better health).[66] The trials included adult participants (mean age 49 to 53 years; primarily females in 2 trials;[66,67] veterans only, primarily males in 1 trial[65]) with various chronic pain conditions[65] or fibromyalgia.[67] The CBT programs were highly variable with 2 RCTs comparing content-matched individual self-directed iCBT to group in-person CBT (with guidance from therapist[67] or psychologist[66]), and the third RCT comparing content-matched individual VC ACT to individual in-person ACT.[65]

The evidence across the trials showed that there may be little-to-no difference in the effect of iCBT versus in-person CBT on HRQoL or overall well-being at posttreatment[65-67] and results at the longest follow-up (2 months,[66] 6 months,[65], or 12 months[67]) were heterogeneous, but at both timepoints the evidence is very uncertain due to very serious concerns for risk of bias, and serious concerns for indirectness and imprecision (Table 18). All trials were judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition)[65,66] and self-reported subjective outcomes which may have been affected by the open-label nature of

the trials.[65-67] We considered the comparison of iCBT to in-person CBT to be indirect in 2 trials, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison.[66,67] Finally, imprecision was difficult to judge due to a lack of formal between-group comparisons, however, within-group SDs were wide in all 3 trials.[65-67]

At the longest follow-up, 1 trial showed little-to-no difference in SF12-MCS and SF12-PCS,[65] 1 trial showed little-to-no difference except in 1 of the 9 RAND-36 subscales (individual iCBT was favoured in perceived health change; calculated mean change [SD] for individual iCBT and group in-person CBT: 22.50 [24.17] and 0 [32.67]; P<0.05),[66] and 1 trial showed individual iCBT to be favoured in mean FIQ change from posttreatment to the longest follow-up (ANOVA P<0.001; calculated mean change [SD] for individual iCBT and group in-person CBT: −5.12 [17.98] and −3.29 [18.76]).[67] Calculation methods for mean changes are described in the Data Analysis and Synthesis section of this report.

Psychological or Psychosocial Function or Symptoms

Pain Acceptance

One RCT (n=128),[65] with high risk of bias (direction unclear), reported on pain acceptance as measured by CPAQ-R. With an aim to change participants' expectations from living pain-free to living as well as possible with pain, this RCT compared individual VC ACT to individual in-person ACT (content-matched) in veterans (82.2% male; mean age 52 years) with a chronic, nonterminal pain condition.[65]

The trial showed that there may be little-to-no difference in the effect of individual VC ACT versus in-person ACT on pain acceptance at posttreatment and the longest follow-up (i.e., 6 months),[65] but the evidence is very uncertain due to very serious concerns for risk of bias, and serious concerns for inconsistency, indirectness, and imprecision (Table 19). This trial was judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition) and self-reported subjective outcomes which may have been affected by the open-label nature of the trial. There was limited of evidence of consistency as only one trial was available that reported on the outcome. We considered the comparison of iCBT to in-person CBT to be indirect, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison. Furthermore, this trial only included veterans and examined ACT; therefore, it is unclear if findings from this trial can be generalizable to other populations and types of CBT. Finally, there was a concern for imprecision due to wide between-group SDs.

Anxiety, Depression, or General Psychological Distress

Three trials (2 RCTs,[65,67] 1 nRCT;[76] n=261), all with high risk of bias (direction unclear), reported on anxiety, depression, or general psychological distress as measured by Patient Health Questionnaire 9-Item (PHQ-9),[65] Pain Anxiety Symptoms Scale-Short Form 20-Item (PASS-20),[65] Hospital Anxiety and Depression Scale (HADS),[67,76] or Beck's Depression Inventory (BDI) (0 = no depression to 63 = maximum depression).[67] The trials involved adult participants (mean age 49 to 59 years; primarily females in 2 trials;[67,76] veterans only, primarily males in the third trial[65]) with various chronic pain conditions,[65] chronic back pain,[76] or fibromyalgia.[67] The CBT programs were highly variable with 1 trial comparing individual VC ACT to individual in-person ACT,[65] 1 trial comparing group VC CBT to group in-person CBT,[76] and the third trial comparing individual self-directed iCBT to group in-person CBT (therapist-guided) (all content-matched between groups).[67]

The evidence across the trials showed that there may be little-to-no difference in the effect of iCBT versus in-person CBT on anxiety, depression, or general psychological distress at posttreatment[65,67] and heterogeneous results at the longest follow-up (3 months,[76] 6 months,[65] or 12 months[67]), and the evidence overall was very uncertain due to very serious concerns for risk of bias, and serious concerns for indirectness and imprecision (Table 19). All trials were judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition)[65,76] and self-reported subjective outcomes which may have been affected by the open-label nature of the trials.[65,67,76] We considered the comparison of iCBT to in-person CBT to be indirect in one trial, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison.[67] Finally, imprecision was difficult to judge due to a lack of formal between-group comparisons, however, within-group SDs were wide in all 3 trials.[65,67,76]

At the longest follow-up, 1 trial showed little-to-no difference in PHQ-9 and PASS-20,[65] 1 trial showed little-to-no difference in HADS,[76] and 1 trial showed little-to-no difference in HADS and individual iCBT to be favoured in mean BDI change from posttreatment to the longest follow-up (ANOVA P=0.004; calculated mean change [SD] for individual iCBT and group in-person CBT:

−6.90 [3.91] and −2.54 [6.22]).[67] Calculation methods for mean changes are described in the Data Analysis and Synthesis section of this report.

Self-Efficacy

One RCT (n=40),[67] with high risk of bias (direction unclear), reported on self-efficacy as measured by Chronic Pain Self-efficacy. With topics such as progressive relaxation training and cognitive restructuring, this RCT compared content-matched individual self-directed iCBT to group in-person CBT in adults (100% female; individual iCBT: mean age 49.82 years; group in-person CBT: mean age 53.50 years) with fibromyalgia.[67]

The findings of the trial showed that there may be little-to-no difference in the effect of iCBT versus in-person CBT on self-efficacy at posttreatment and the longest follow-up (i.e., 12 months),[67] but the evidence is very uncertain due to serious concerns for risk of bias, inconsistency, indirectness and imprecision (Table 19). This trial was judged to be at high risk of bias due to self-reported subjective outcomes which may have been affected by the open-label nature of the trial. There was limited of evidence of consistency as only 1 trial was available that reported on the outcome. We considered the comparison of iCBT to in-person CBT to be indirect, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison, Furthermore, this trial only included female participants; therefore, it is unclear if findings from this trial can be generalized to other populations. Finally, there was a concern for imprecision due to a lack of between-group comparisons and within-group SDs were wide.

Pain Experience

Two RCTs (n=112),[66,67] both with high risk of bias (direction unclear), reported on pain experience as measured by (global pain catastrophizing: 0 = no pain catastrophizing to 52 = maximum pain catastrophizing; rumination: 0 to 16; magnification: 0 to 12; helplessness: 0 to 24). The trials involved adult participants (mean age 49 to 53 years; only females in 1 trial;[67] and the second trial consisted of primarily female participants[66]) with various chronic pain conditions[66] or fibromyalgia.[67] The RCTs compared content-matched individual self-directed iCBT to group in-person CBT with guidance from therapist[67] or psychologist[66], and variable CBT program content.[66,67]

The evidence across the trials showed that there may be little-to-no difference in the effect of iCBT versus in-person CBT on pain experience at posttreatment[66,67] and heterogeneous results at the longest follow-up (2 months[66] or 12 months[67]), but the evidence is very uncertain due to very serious concerns for risk of bias, and serious concerns for indirectness and imprecision at posttreatment and the longest follow-up (Table 19). The trials were judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition)[66] and self-reported subjective outcomes which may have been affected by the open-label nature of the trials.[66,67] We considered the comparison of iCBT to in-person CBT to be indirect in both trials, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison.[66,67] Imprecision was difficult to judge due to a lack of formal between-group comparisons and wide within-group SDs in both trials, though it is suspected based on available data (completers analysis) that at least some imprecision exists.[66,67] Additionally, there were serious concerns for inconsistency at the longest follow-up as the findings of both trials differed,[66,67] and it was not possible to credibly explain the differences in subgroup analysis due to the small number of included trials.

In 1 trial, ANOVA group x time analyses were not statistically significant on PCS global score when comparing the change from baseline to 2 months posttreatment across groups.[66] Meanwhile, ANOVA group x time analyses for 12 months posttreatment relative to posttreatment in the second trial were statistically significant (favoured iCBT) for PCS global score (P<0.001) and 2 subscales (i.e., helplessness [P=0.009], magnification [P<0.001]) (no statistically significance in the rumination subscale; P>0.05).[67] Mean change scores (SD) for individual iCBT were −10.68 (4.97) pain catastrophizing, −4.10 (2.54) rumination, −4.53 (4.18), helplessness and −2.06 (1.98) magnification. Mean changes scores (SD) for group in-person CBT were −0.52 (12.47) pain catastrophizing, −1.33 (3.93) rumination, −0.76 (5.97) helplessness, and 1.58 (3.86) magnification. Findings showed maintenance or improvement in PCS global score and 3 subscales (i.e., rumination, helplessness, magnification) in the iCBT group. Meanwhile, in the in-person CBT group, scores were maintained or worsened (i.e., magnification subscale) at 12 months posttreatment.[67]

Coping with Pain

Two RCTs (n=112),[66,67] both with high risk of bias (direction unclear), reported on coping with pain as measured by Chronic Pain Coping Inventory[67] or PCCL.[66] The trials involved adult participants (mean age 49 to 53 years; only females in 1 trial;[67] and the second trial consisted of primarily female participants.[66]) with various chronic pain conditions[66] or fibromyalgia.[67] The RCTs compared content-matched individual self-directed iCBT to group in-person CBT with guidance from therapist[67] or psychologist[66], and variable CBT program content.[67]

The evidence across the trials showed that there may be little-to-no difference in the effect of iCBT versus in-person CBT on coping with pain at posttreatment and the longest follow-up (2[66] or 12 months,[67]) but the evidence is very uncertain due to very serious concerns for risk of bias, and serious concerns for indirectness and imprecision (Table 19). The trials were judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition)[66] and self-reported subjective outcomes which may have been affected by the open-label nature of the trials.[66,67] We considered the comparison of iCBT to in-person CBT to be indirect in both trials, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison.[66,67] Imprecision was difficult to judge due to a lack of formal between-group comparisons and wide within-group SDs in both trials.[66,67]

Fatigue

One RCT (n=72),[66] with high risk of bias (direction unclear), reported on fatigue as measured by VAS Fatigue Scale (0 = not at all to 10 = extremely). With a focus on the cognitive-behavioural model of pain circle, this RCT compared content-matched individual iCBT to group in-person CBT in adults (individual iCBT: 68.2% female, mean age 50.6 years; group in-person CBT: 60.7% female, mean age 53.2 years) with nonspecific chronic pain and/or chronic pain for which no somatic treatment could be offered.[66]

The findings of the trial showed that there may be little-to-no difference in the effect of iCBT versus in-person CBT on fatigue at posttreatment and the longest follow-up (i.e., 2 months),[66] but the evidence is very uncertain due to very serious concerns for risk of bias, and serious concerns for inconsistency, indirectness, and imprecision (Table 19). This trial was judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition) and self-reported subjective outcomes which may have been affected by the open-label nature of the trial. There was limited of evidence of consistency as only 1 trial was available that reported on the outcome. We considered the comparison of iCBT to in-person CBT to be indirect, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison. Finally, there was a concern for imprecision due to a lack of formal between-group comparisons and wide within-group SDs.

Sleep

One RCT (n=128),[65] with high risk of bias (direction unclear), reported on sleep as measured by Pittsburgh Sleep Quality Index. With an aim to change participants' expectations from living pain-free to living as well as possible with pain, this RCT compared individual VC ACT to individual in-person ACT (content-matched) in veterans (82.2% male; mean age 52 years) with a chronic, nonterminal pain condition.[65]

The findings of the trial showed that there may be little-to-no difference in the effect of individual VC ACT versus in-person ACT on sleep at posttreatment and the longest follow-up (i.e., 6 months),[65] but the evidence is very uncertain due to very serious concerns for risk of bias, and serious concerns for inconsistency, indirectness, and imprecision (Table 20). This trial was judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition) and self-reported subjective outcomes which may have been affected by the open-label nature of the trial. There was limited of evidence of consistency as only 1 trial was available that reported on the outcome. We considered the comparison of iCBT to in-person CBT to be indirect, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison. Furthermore, this trial only included veterans and examined ACT; therefore, it is unclear if findings from this trial can be generalized to other populations and types of CBT. Finally, there was a concern for imprecision due to a lack of formal between-group comparisons and wide within-group SDs.

Physical Activity Level

One RCT (n=128),[65] with high risk of bias (direction unclear), reported on physical activity level as measured by West Haven-Yale Multidimensional Pain Inventory Activity Subscale (0 to 6 with higher scores indicating greater levels of general activity). With an aim to change participants' expectations from living pain-free to living as well as possible with pain, this RCT compared individual VC

ACT to individual in-person ACT (content-matched) in veterans (82.2% male; mean age 52 years) with a chronic, nonterminal pain condition.[65]

The findings of the trial showed that there may be little-to-no difference in the effect of individual VC ACT versus in-person ACT on physical activity level at posttreatment,[65] but the evidence is very uncertain due to very serious concerns for risk of bias, and serious concerns for inconsistency, indirectness, and imprecision (Table 21). Meanwhile, in-person ACT may be favoured as shown by greater levels of general activity (between-group difference in change rates: 0.31 [95% CI, 0.02 to 0.60]; P=0.03) at the longest follow-up (i.e., 6 months), but the evidence is very uncertain due to very serious concerns for risk of bias, and serious concerns for inconsistency and indirectness.[65] At posttreatment and the longest follow-up, this trial was judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition) and self-reported subjective outcomes which main have been affected by the open-label nature of the trial. There was limited of evidence of consistency as only 1 trial was available that reported on the outcome. We considered the comparison of iCBT to in-person CBT to be indirect, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison. Furthermore, this trial only included veterans and examined ACT; therefore, it is unclear if findings from this trial can be generalizable to other populations and types of CBT. At posttreatment, there was a concern for imprecision due to a lack of formal between-group comparisons and wide within-group SDs.

Physical Function

One nRCT (n=93),[76] with high risk of bias (direction unclear), reported on physical function as measured by Oswestry Disability Index. With topics such as stress management, social support, and relapse management, this nRCT compared content-matched group VC CBT to group in-person CBT in adults (group VC CBT: 70.2% female, mean age 54.5 years; group in-person CBT: 57.8% female, mean age 59.7 years) with chronic back pain.[76]

The findings of the trial showed that there may be little-to-no difference in the effect of group VC CBT versus in-person CBT on physical activity level at the longest follow-up (i.e., VC CBT: 2 months; in-person CBT: 3 months),[76] but the evidence is very uncertain due to very serious concerns for risk of bias, and serious concerns for inconsistency and imprecision (Table 22). Posttreatment data was not reported in this trial. The trial was judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition) and lack of consideration of confounders. There was limited of evidence of consistency as only 1 trial was available that reported on the outcome. Finally, there was a concern for imprecision due to a lack of formal between-group comparisons and wide within-group SDs.

Prescription Opioid Misuse

One nRCT (n=93),[76] with high risk of bias (direction unclear), reported on prescription opioid misuse as measured by Current Opioid Misuse Measure. With topics such as stress management, social support, and relapse management, this nRCT compared content-matched group VC CBT to group in-person CBT in adults (group VC CBT: 70.2% female, mean age 54.5 years; group in-person CBT: 57.8% female, mean age 59.7 years) with chronic back pain.[76]

The findings of the trial showed that Ttere may be little-to-no difference in the effect of group VC CBT versus in-person CBT on prescription opioid misuse at the longest follow-up (i.e., VC CBT: 2 months; in-person CBT: 3 months),[76] but the evidence is very uncertain (Table 23). Posttreatment data was not reported in this trial. The trial was judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition) and lack of consideration of confounders. There was limited of evidence of consistency as only 1 trial was available that reported on the outcome. Finally, there was a concern for imprecision due to a lack of formal between-group comparisons and wide within-group SDs.

Satisfaction with Care

Two RCTs (n=200),[65,66] both with high risk of bias (direction unclear), reported on satisfaction with care. The trials involved adult participants (mean age 50 to 53 years; primarily females in 1 trial;[66] veterans only, primarily males in the second trial[65]) with various chronic pain conditions. The CBT programs were highly variable with 1 RCT[66] comparing content-matched individual self-directed iCBT to group in-person CBT (psychologist-guided), and the second RCT comparing content-matched individual VC ACT to individual in-person ACT.[65]

The evidence across the trials showed that there may be little-to-no difference in the effect of iCBT versus in-person CBT on satisfaction with care,[65,66] but the evidence is very uncertain due to very serious concerns for risk of bias and serious concerns for indirectness (Table 24). The trials were judged to be at high risk of bias due to incomplete outcome data (large and unbalanced attrition) and self-reported subjective outcomes which main have been affected by the open-label nature of the trials.[65,66] We considered the comparison of iCBT to in-person CBT to be indirect in 1 trial, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison.[66]

Individual Participation

Two RCTs[65,66] with some risk of bias, and 1 RCT[67] and 1 nRCT[76] with high risk of bias (direction unclear), reported on individual participation in the interventions (n=333). The trials involved adult participants (mean age 49 to 59 years; primarily or all females in 3 trials;[66,67,76] veterans only, primarily males in the fourth trial[65]) with various chronic pain conditions,[65,66] chronic back pain,[76] or fibromyalgia.[67] The CBT programs were highly variable; 2 trials compared content-matched VC ACT[65] or CBT[76] to in-person ACT or CBT (the ACT was individual while the CBT was group-based), while 2 trials compared content-matched individual self-directed iCBT to group in-person CBT (with guidance from therapist[67] or psychologist[66]).

The results were heterogeneous in the effect of iCBT versus in-person CBT on individual participation,[65-67,76] and the evidence was judged to be very uncertain due to serious concerns for risk of bias, indirectness, and imprecision (Table 25). Specifically, the certainty of the evidence was rated down due concerns for risk of bias arising from the randomization processes.[65-67] We considered the comparison of iCBT to in-person CBT to be indirect in 2 trials, as there were differences in delivery format (individual versus group) across arms that may have confounded the comparison.[66,67] Finally, there was a concern for imprecision as the number of events did not meet the optimal information size (<300 events).[65-67,76] Compared to in-person CBT groups, participants in iCBT groups exhibited higher withdrawal rates in 3 RCTs (20-46%),[65-67] and lower withdrawal rates in the nRCT (14.9%).[76] The lower withdrawal rates in the iCBT group of the nRCT[76] may be attributed to participants' ability to self-select into their preferred group. Meanwhile, results on attendance rates (when reported) were heterogeneous with higher attendance rates (i.e., 95.2% attended all modules) in the iCBT group in 1 RCT,[66] and little-to-no difference in attendance rates (i.e., mean sessions attended) in the nRCT.[76]

Question 2: Safety

We identified no relevant studies that provided outcome data regarding the comparative safety of iCBT vs. in-person CBT.

Limitations

Due to feasibility constraints, we did not screen the search results from trial registries. There is a small risk that some relevant data would have been missed using this approach, and we cannot comment on ongoing studies of relevance.

We chose to synthesize data directly post-program (i.e., posttreatment) and at the longest follow-up reported in the included clinical trials. While we believe this approach is most informative, data were available for multiple heterogenous timepoints across trials. For example, longest follow-up ranged between 2 and 12 months after treatment completion within the included trials. However, we did not encounter any outcome-comparison where heterogeneity across studies could be explained by differences in the length of longest follow-up.

Another potential limitation to consider is the generalizability of the findings from the 4 included trials to all people with different forms of chronic non-cancer pain and various types and modes of delivery of iCBT.[65-67,76] Chronic non-cancer pain is a heterogenous condition that affects many different types of people and can be associated with various health conditions, such as fibromyalgia, headache, migraine, rheumatoid arthritis, osteoarthritis, multiple sclerosis, surgical procedures, idiopathic chronic non-cancer pain, or injuries to muscle, nerve, or ligament.[77] The trials included in the Clinical Review were specific to a small subset of chronic non-cancer pain populations, including veterans with nonterminal pain conditions,[65] adult females with fibromyalgia,[67] or adults with daily back pain[76] or nonspecific chronic pain.[66] Furthermore, pain acceptance, sleep, and physical activity level was reported in only 1 trial,[65] which included only veterans and examined ACT. It is unclear if these outcomes can be generalizable to non-veteran populations and other types of CBT.[65] Self-efficacy was reported in only 1 trial,[67] which included only female participants with fibromyalgia. Physical function and prescription opioid misuse was reported in only 1 trial,[76] which included participants with chronic

back pain. In all cases, the 4 trials[65-67,76] excluded people with various comorbidities, such as those with unstable medical conditions, mental health conditions (e.g., bipolar disorder, substance use disorder), or suicidal ideation. It is unclear if the findings from the included trials are generalizable to other chronic pain populations (e.g., adolescents, people who have comorbidities that would have prohibited them from participating in the clinical trials). Similarly, iCBT and in-person CBT programs can vary in their program content, number of modules, duration of sessions, number of sessions, format (i.e., individual vs. group-based), types of support (e.g., phone, email, VC, in-person), and frequency of support. It is unclear whether the results of the 4 included trials,[65-67,76] which examined 4 iCBT and in-person CBT interventions, are generalizable to other contexts. None of the trials reported on place of residence; thus, it is unclear if the results would differ for participants living in urban vs. rural settings. Additionally, none of the included primary trials[65-67,76] were conducted in Canada. While there was no strong indication that the findings from the included trials, which were conducted in Spain,[67] The Netherlands,[66] and the US,[65,76] would not apply to Canadian settings, there may be some differences (e.g., due to variations in health systems in these countries). In summary, there appeared to be little-to-no difference in the effect of iCBT vs. in-person CBT on most reported outcomes at posttreatment and the longest follow-up; however, due to the very low certainty of the evidence across all outcomes, the true effect of iCBT vs. in-person CBT may differ from the findings described in this clinical review. Furthermore, due to the lack of reporting on safety data, the overall findings in this report should be interpreted with caution.

Summary of Results

Three RCTs[65-67] and 1 nRCT[76] were identified regarding the comparative clinical effectiveness of iCBT vs. in-person CBT for the management of chronic non-cancer pain. No relevant studies were identified regarding the comparative safety of iCBT vs. in-person CBT for the management of chronic non-cancer pain. These trials included a small subset of chronic non-cancer pain populations, including veterans with nonterminal pain conditions,[65] adult females with fibromyalgia,[67] or adults with daily back pain[76] or nonspecific chronic pain.[66] The CBT programs were highly variable with 2 trials comparing content-matched VC ACT[65] or CBT[76] to in-person ACT (individual-based) or CBT (group-based), respectively, and 2 trials comparing content-matched individual self-directed iCBT to group in-person CBT.[66,67] The relevant outcomes reported included pain interference,[65,66,76] pain control,[65,66,76] HRQoL or overall well-being,[65-67] psychological or psychosocial function or symptoms (i.e., pain acceptance; anxiety, depression, or general psychological distress; self-efficacy; pain experience; coping with pain; fatigue),[65-67,76] sleep,[65] physical activity level,[65] physical function,[76] prescription opioid misuse,[76] satisfaction with care,[65,66] and individual participation.[65-67,76]

The certainty of evidence for all outcomes at posttreatment and at longest follow-up was very low, primarily due to very serious concerns related to risk of bias and large imprecision across most outcome-comparisons. Additionally, many comparisons were also affected by serious indirectness (i.e., there were differences across study arms that may have confounded the main comparison of interest) and inconsistency. The very low certainty suggests that the evidence does not provide a reliable indication of the likely treatment effect, and that there is a very high likelihood that the true effect of iCBT vs. in-person CBT could be substantially different than what is shown by the 4 included trials.

Patients' Experiences

Overview

Research Questions

1. How do the experiences of people living with chronic non-cancer pain, and their caregivers, resonate (or not) with known experiences of iCBT for depression, anxiety, or PTSD, when CBT would otherwise be provided?
2. What do people living with chronic non-cancer pain and their caregivers expect to access or experience accessing (or not) with regard to iCBT for the management of chronic non-cancer pain, when CBT would otherwise be offered?

Key Messages

By and large, the women we spoke with suggested that iCBT could become a supportive component of comprehensive chronic pain care when CBT would otherwise be provided. However, this potential benefit comes with some major caveats.

- The comprehensiveness of chronic pain care needs to be taken into consideration when contemplating iCBT, and iCBT should not be provided in isolation from other interventions. Given the limited availability of comprehensive multidisciplinary chronic pain care across Canada, simply making iCBT programming available is unlikely to address gaps around access to chronic pain care. Jurisdictions should consider the suite of multidisciplinary services available in their locales before determining whether iCBT programming would meet their needs relating to gaps in access.
- Referring people to iCBT too early risks causing harm by potentially missing root causes of their pain and failing to treat them accordingly. As people who have often been subjected to disbelief, dismissal, and neglect within the Canadian health care system while seeking care, this could serve to further validate feelings that they do not matter, and risks exacerbating suicidal ideation. There is the potential that some people living with pain would appreciate early engagement with iCBT, particularly those with secondary chronic pain, but determining appropriate candidates should be done on a case-by-case basis rather than as a standardized approach.
- Considerations about for whom and at what points iCBT might be considered an appropriate intervention pivot around the concept of readiness. Readiness can be understood as an assemblage of treatment history, available current care practices, material realities of one's condition, and individual needs or desires. Failure to develop policies around iCBT that take this assemblage into account could lead to harmful consequences of reinforced dismissal, neglect, and untreated pain in people living with chronic pain.
- As in previous reviews of iCBT for MDD, anxiety, and PTSD, a strong therapeutic relationship, and tailored approaches to iCBT programming were seen as vital components of successful engagement with iCBT. This suggests that iCBT should be provider-guided and provide enough space for the development and maintenance of a strong relationship. Our study further highlighted the importance of providers who are specifically trained in dealing with chronic pain.

Study Design

We conducted an interview study exploring people's expectations of, or experiences with, iCBT as a component of care in the management of their chronic non-cancer pain. Further details on study design have been published in the full HTA protocol.[78]

Invitation to Participate and Consent

As described with the Patient Engagement section of this HTA, patient collaborators meeting the following criteria were identified through connections to advocacy groups and organizations that had previously engaged with CADTH on other projects:

- Adults (i.e., 18 years of age or older) living with chronic non-cancer pain or involved in the care of a person living with chronic non-cancer pain;
- Individuals that had experienced (or had been offered) either CBT or iCBT as part of their pain management strategy in Canada.

While not identified as eligibility criteria, we also worked to include a diversity of people who could speak to whether iCBT (or in person CBT) for chronic pain accounts for (or not) how the presence of and care for chronic pain is gendered, racialized and differently distributed across socioeconomic dynamics.[2,11] Similarly, in light of iCBT's potential to offer treatment for the management of chronic non-cancer pain from anywhere, we worked to identify and engage with people living in geographically and demographically diverse areas (i.e., urban, rural, and remote).

To do this, the CADTH Patient Engagement team contacted Pain BC, the PEOPLE (Patients of Eastern Ontario Pain Lifestyle Education) Centre, Canadian Arthritis Patient Alliance (CAPA), Mind Beacon (a developer of iCBT), the YouthNet Chronic Pain Support Group at the Children's Hospital of Eastern Ontario, the Canadian Pain Task Force, the SPOR-funded Chronic Pain Network, and the Women's College Hospital Institute for Health System Solutions and Virtual Care to share the opportunity.

The Patient Engagement team obtained participants' informed consent to share their information and summarized comments with CADTH staff. An additional consent form described how the information provided would be used in the report. Prior to, or at the beginning of each interview, people were reminded that they might be asked to share personal or sensitive information and that they could raise their concerns or end the interview at any time. Collaborators were also offered an honorarium for their time and participation.

Participants

Five adults living with chronic non-cancer pain responded to our invitation to participate. Two were engaged earlier during protocol development as patient contributors for the entirety of the project and interviewed as part of the interview study. The remaining three were engaged and interviewed specifically for the interview study.

While we had actively worked to engage a diverse group of people, we were ultimately unsuccessful as all 5 participants described themselves as either White or Jewish women. Similarly, despite efforts to recruit participants from geographically diverse areas, all 5 women lived in metropolitan areas, three in Ontario, one in Quebec, and one in British Columbia. Of note, one participant moved from a rural to a metropolitan area to access specialized pain care.

Two women lived with forms of chronic primary pain and the remaining three lived with various forms of chronic secondary pain. Participants ranged from approximately 20 to 60 years old and had been living with chronic pain 6 and 30 years at the time of interview.

Interviews

We used semi-structured interviews guided by the research questions and thematic categories identified in CADTH's previous 2 iCBT qualitative reviews.[79,80] While these thematic categories were foundational to our work, in our interviews we kept open the opportunity for participants to highlight differences in their experiences and respond in ways that might not map onto these pre-established categories.

Interviews were conducted by the primary qualitative researcher, and all were done as videoconference calls. Interviews were recorded and notes were taken throughout with the consent of people being interviewed. Audio files, transcripts, and summaries of these interviews were shared with project team members working on other components of the HTA.

Analysis Methods

We used a modified framework analysis approach[81] to describe and summarize the perspectives and experiences of using iCBT for people living with chronic non-cancer pain. Using this approach allowed us to reflect on and explore the meaning of findings identified in our previous reports on iCBT for MDD or anxiety,[79] and PTSD[80] in the context of iCBT for chronic non-cancer pain. To do so, our

analysis developed around thematic categories identified in our previous iCBT reviews[79,80] while remaining open to new and emergent ideas. These thematic categories included expectations and experiences related to:

- Context: Involves experiences with the ways in which both personal (e.g., severity of condition) and structural (e.g., availability of intervention) situations influence engagement with iCBT.
- Relationality: Involves perceptions of and experiences with a provider or supporter throughout the use of iCBT.
- Process: Involves experiences with iCBT's accessibility, convenience, flexibility, anonymity, and privacy (or not). It also involves participants' perceptions on what is required for them to successfully engage with iCBT (or not), and experiences with completing these requirements in the given time frame.
- Content: Involves experiences with iCBT's modules and how these are designed to facilitate knowledge transfer (or not) to the participant. It also involves experiences regarding modes of communication within the intervention, the adaptability of the intervention to the participant, and the navigation skills necessary to use the intervention.

The analysis followed a stepped approach adapted to accommodate both deductive and inductive thinking. The primary and secondary qualitative researchers first read and familiarized themselves with 2 interview transcripts and notes taken throughout interviews, while memoing any analytical thoughts or impressions defined by the thematic categories identified in the 2 previous iCBT reviews. A third qualitative researcher concurrently read the 2 transcripts and independently noted key ideas informed by the same predefined categories. All researchers then met to critically reflect on and discuss emergent ideas, define the framework, and agree on a set of key ideas to apply to subsequent transcripts.

The primary and secondary qualitative researchers then read and applied the framework to all the transcripts, continuing to take notes and beginning to summarize the identified characteristics of and differences within and across ideas and thematic categories, interrogating predefined concepts and drawing out connections to explore their relationships. When potentially new thematic categories emerged, the framework was adapted to accommodate these emergent ideas after discussion with the team.

The primary and secondary qualitative researchers refined the analysis through critical reflection, memoing, and regular discussions with the study team to ensure that the researchers engaged with the material reflexively. The research team then shared with the patient contributors, and other consulted patients, the final synthesized report to ensure CADTH accurately represented people living with chronic non-cancer pain.

Results

Analysis

Of the 5 women who participated in this study, only 1 had experience with some form of iCBT. While technically meeting the definition of iCBT we have used throughout the report, it was only at the onset of the COVID-19 pandemic that she moved to online, synchronous videoconference with a provider she had already been working with in person for years. Of note, none of the women we interviewed had experienced unguided or asynchronous courses delivered entirely online.

Context

Previous qualitative CADTH reviews of iCBT have used the thematic heading of "context" to categorize peoples' descriptions of various structural and personal elements that had affected (or might affect) their engagement with iCBT. The following provides an exploration of the resonance of this category for people living with chronic pain and identifies where their expectations or experiences might diverge from those living with MDD, anxiety, or PTSD.

Structural Contextual Elements

CADTH reviews of iCBT for MDD or anxiety,[79] and PTSD,[80] describe how persistent stigma around the conditions under review, the limited treatment opportunities for people living with those conditions, and ongoing discrimination (e.g., sexism, racism, colonialism) towards some people living with these conditions were all common structural elements impacting the value of iCBT. For example, the persistence of stigma around MDD or anxiety was described by some people as contributing to their concern that being offered

iCBT too soon could feel like they were being sloughed off or not taken seriously by their providers.[79] This could be particularly challenging in situations where the limited availability of alternative interventions made iCBT one of the only treatment options they were offered. While people might have been willing to accept, at times, iCBT over waitlist for other treatments (or no treatment at all), many described wishing they had the opportunity to explore other options before engaging with iCBT.[79,80] Further compounding these condition-specific concerns, people also described how social determinants of health (e.g., age, race, gender, socioeconomic status, geographic location)[79] and colonialism[80] impact life with and potential treatment of those conditions with iCBT.[79,80]

The women included in this study validated what we learned from previous reviews and reiterated the importance of carefully considering how these structural elements might affect the utility of iCBT. Without this consideration it is unlikely that introducing iCBT will address jurisdictions' concerns around accessible and equitable comprehensive pain care. While the nuances of these elements might look different in the space of chronic pain care, women we spoke with described a similar series of structural concerns associated with iCBT becoming a supportive component of their care. Nearly all have struggled with either being recognized as living with chronic pain or having that pain cared for by their providers. But even after their pain became recognized as chronic, many described their own, or other people's, challenges not only accessing CBT or iCBT specifically, but comprehensive multidisciplinary chronic pain care broadly. And while none were explicit about how race or colonialism impacted chronic pain care in their lives, or their expectations around iCBT, we were periodically reminded of how being a woman could impact how they might need to respond or act differently around care providers to be seen as a legitimate patient.

The Challenge of Being Heard

The movement from acute to chronic pain involves a period of uncertainty where people must both be experiencing ongoing pain and not living with that ongoing pain quite long enough for it to be considered chronic. During this period, it is possible that people living with not-yet chronic pain could continue to receive care for pain that may eventually be identified as chronic. However, according to the women we spoke with, this period of uncertainty can also be distressing and is often filled with experiences of disbelief, dismissal, and neglect.

One reason suggested for why these are such common early experiences was that family doctors (or other providers with specialties outside of pain) receive limited training in how to care for people living with pain. This limited training, paired with what 1 woman described as "bad publicity" around opioids that continues to stigmatize people living with pain, can mean that "we're at a crossroads and the patient is caught in the middle." Caught between the limited training of their providers and this "bad publicity," women described how challenging it was to find find providers open (or able) to hear their concerns as more than "complaint" or "drug-seeking." This is particularly problematic given these providers' roles as both evaluators of whether someone has moved from acute to chronic pain and as gatekeepers to broader pain specific services.

A primary challenge, then, is being heard. For 1 woman (who lives with chronic primary pain) this meant modifying her behaviour so she would not be seen as helpless or over-the-top by her providers. She noted that her experience as a health care professional allowed her to see from the "other side of the table" and helped to pitch herself in a language that her providers could hear. But people do not always have previous experience working in health care or the bandwidth to both manage their pain and advocate for themselves in languages that their providers can hear. Instead, they may be pushed into defensive positions of self-advocacy that can be demoralizing and exhausting.

In a particularly distressing example, 1 woman described returning to her orthopedic surgeon every two weeks wondering why it felt like "someone literally soaked my arm in gasoline and lit it on fire." While she was ultimately diagnosed with a severe form of chronic primary pain, it took months of being brushed off with comments like "you're older now – pain hurts" and "stop exaggerating" before receiving this diagnosis. The problem was not necessarily in the length of time it took to be diagnosed with a chronic form of pain (technically this happened within a clinically acceptable time frame), but rather the need to undergo such dismissive behaviour and neglect to reach this stage. And though it may seem far removed from the opportunity to engage with iCBT (or not), she repeatedly described how this early experience has affected every treatment decision made since.

We work through this more in the section on "readiness" below, but for now it is important to acknowledge the necessity of understanding diagnostic pathways to chronic pain for any decision makers considering implementing iCBT in their jurisdictions. Harms that may happen along these pathways can have longstanding effects for people living with chronic pain and can affect the impact of future treatment opportunities – particularly those like iCBT that are not primarily focused on the physicality of chronic pain.

iCBT Needs to be Situated within Comprehensive and Multidisciplinary Care Approach

Once diagnosed with chronic pain, accessing the right treatment at the right time (if at all) was described as challenging given how fragmented, difficult to navigate, and expensive chronic pain care can be in Canada.

To this point, one woman described how family doctors may "refus[e] to take patients back" once they have been diagnosed with chronic pain given the challenges associated with caring for that chronic pain. If there are no pain clinics that can take them on, the person living with chronic pain might then be caught in a holding pattern where their pain can worsen before specialized care becomes available (if it ever does). While she felt that iCBT might be able serve as a stopgap for people stuck in these holding patterns, it should only be understood as a bare minimum that is meant to support people who might otherwise be presenting to the ER because "they just can't handle [the pain] and they're losing their cookies."

Ideally, however, all the women we spoke with were clear that iCBT should not be considered in isolation from the development of comprehensive, multidisciplinary care strategies. This makes sense when considering the biopsychosocial complexity of chronic pain. Focusing on the "psychosocial" without an equal commitment to "bio" may mean limiting the effectiveness of a psychological intervention like iCBT. As one woman living with chronic primary pain noted, the techniques learned in iCBT may help to alleviate some symptoms, but there's also the need for "pain management [so that] you're approaching pain from a number of different angles, right? You know, it's your thoughts, your behaviours, your total biopsychosocial – so it's hard to, sort of, pull apart specific pieces."

What was troubling for some of the women we spoke with, however, was just how easily iCBT could be offered outside of these comprehensive, multidisciplinary care approaches. Given the ability to deliver iCBT online and remotely, there is an assumption that iCBT is more accessible than in-person CBT and that the decreased time commitments from providers may free them to see more patients. While this is one of the greatest attractions of iCBT, women were concerned that this may also foster a slippage where iCBT becomes a "quick fix" solution and permanent stopgap rather than small component of a broader multidisciplinary approach. In the short-term, the referring provider may be able to feel that they have helped their patient, but in the long-term, as one woman worried, "they may be really harming the patient by taking the easier route and not investigating what the cause of that pain is."

With this in mind, the women we spoke with clearly felt iCBT could become a useful and supportive tool when situated within a broader multidisciplinary approach. While it is possible that offering iCBT early on may help keep some people out of the ER, using iCBT as a stopgap for everyone waiting on more specialized care to become available risks missing underlying causes of their chronic pain and reinforcing experiences of dismissal, disbelief, and neglect. Simply funding iCBT without reconsidering the broader chronic pain care practices, programming, and treatment options already publicly available (or not) in one's jurisdiction is unlikely to provide the necessary level of support for people living with chronic pain to flourish.

Personal Contextual Elements

In our previous reviews of iCBT,[79,80] personal factors included concerns around how the severity of one's condition, or the presence of comorbidities, might interfere with the work being done in iCBT. Without additional supports in place, or other interventions at the ready, people worried that those living through severe episodes might be discouraged, or even harmed, by iCBT given the demands of this form of "self-help" intervention (p. 32).[79] Similarly, those living with comorbidities might be better served by treating these separately first, or, potentially, by deliberately including them within programming. In iCBT for MDD or anxiety specifically, personal factors were also described as "physical and experiential barriers, such as illness challenge, concentration difficulty, apathy, mood, lack of motivation, discomfort writing, fatigue and pain."(p. 32)[79]

This resonates with much of what we heard regarding the use of iCBT for chronic pain. While people felt iCBT may be a valuable addition to chronic pain care strategies, they agreed that challenges with other comorbidities or the severity of pain might interfere with the ability of iCBT to be a supportive intervention.

For example, the type of pain, primary or secondary, may relate to the appropriateness of offering, or timing of when to offer, iCBT. For those living with chronic primary pain, it was important to exhaust every possible physical intervention before suggesting or engaging with iCBT because they worried if their pain were too severe they would not be able to focus on the work required to benefit from iCBT. But for women living with chronic secondary pain, there seemed to be a different sense of willingness to engage early.

Given that their chronic pain coincided with other chronic or degenerative illnesses, perhaps they had less of a need to explore exactly what was causing their pain as they already knew.

Chronic pain looks different for everyone and what this pain is attached to can, at times, be difficult to identify. This complexity around identifying an underlying cause or understanding how pain presents in different people's lives demonstrates how challenging it can be to know when to suggest iCBT.

Readiness

When considering what makes someone ready for iCBT, previous CADTH reviews[79,80] have primarily focused on understanding the responsibility that people with PTSD, MDD, or anxiety have when determining readiness. As an individualized responsibility, the person living with one of these conditions is required to both understand their own care needs (or desires), and how iCBT might have a role in meeting those needs (or desires).

While this understanding of readiness does resonate with much of what we heard from women living with chronic pain, here we examine how this individual positioning is also intimately entwined within the structural and personal contexts described above. As such, we understand the concept of readiness as describing a process under constant negotiation. Navigating this process cannot be the responsibility of the person living with pain alone but must involve a collective effort with providers that draws from an assemblage of treatment histories, available care practices, material realities of one's condition, and individual needs or desires.

As a process under constant negotiation, readiness for an intervention like iCBT would be best supported by repeat engagement with, and guidance from, care providers who are specialized in chronic pain. This is challenging given, as discussed above, how few people living with chronic pain have access to publicly funded specialists or specialized pain care in Canada. Similarly, building toward readiness becomes even more challenging when we consider the repeated, and potentially ongoing, dismissals people with chronic pain experience across their interactions with the health care system. As 1 woman put it, most people presenting with chronic pain have been "disrespected by a physician across the board. Every single one of us … particularly women. … And anything regarding health care, including [i]CBT will be viewed with that lens of distrust."

We understand this as a signal that the negotiation of readiness for iCBT is just as present in those initial interactions between general practitioner and the person presenting with pain as it is after years of specialist care. Thought of this way, readiness is as much about ongoing practice of things like trauma-informed care as it is about those moments where choices are made to prescribe and pursue iCBT.

But readiness is also about how these experiences with the health care system and supportive practices of health care providers might calcify at particular moments into specific choices and actions. As a facilitator of a peer-support group for people living with chronic pain, one woman in our study worked with people who were at all sorts of stages in their journey with chronic pain. This work, paired with her own experience of living with chronic pain, led her to believe that one of the more consistent differences between someone who might be "ready" for iCBT (or CBT) and someone who is not often comes down to how long they've been living with pain. Some people are "really interested in their patterns and their thinking. And examining those things. And other people [are] not ready for something like this yet because they're still looking for 'what's the medical fix?'"

Having struggled for so long "against" the pain, becoming ready for iCBT programming that is organized around coping with chronic pain requires an openness to seeing one's pain as something to be "liv[ed] with." Following years of specialist care and treatments through her pain management unit, 1 woman described how she knew she was ready to see a psychologist after a trial infusion of ketamine. Following her third infusion she decided "it's not worth it because I feel the pain goes away 100 percent, but then it comes back. And when it comes back it's worse because now I remember what it is to have no pain. And I needed, actually, to see a psychologist after that to deal with this pain now coming back."

With all other treatment options exhausted or already in play, the dissonance between her "almost out-of-body" experience with ketamine and the lived-in-body-with-pain was unbearable. While it is at this moment that her "readiness" to see a psychologist seemed to calcify into a particular decision/action, she described this as unthinkable without the years of trying that preceded this experience. To be ready, then, came once it had been proven that her being, and her pain, mattered and were cared for "because, if

you realize you've gotten to the end of the line for what they can do to help your pain and this is what most of your life is likely going to be like, it's not just acceptance therapy, it's what else can you do."

To be clear, readiness does not require some sort of out-of-body experience or even that all physical interventions must be attempted beforehand for everyone. While this woman's trajectory toward psychological help (for her, face-to-face group-based ACT) played out in this way, this moment also represents an assemblage of her treatment history, current care practices, material realities of one's condition and individual needs or desires. While this assemblage typically includes some sort of directed work on the physicality of pain so that one can tolerate reflecting on their thoughts or behaviors around pain, how complete this physical pain management is might vary by person and the type of pain or other condition(s) they are living with.

This variability can make the implementation, or prescription of iCBT challenging for policy makers and providers alike. While the women we spoke with did seem to think that iCBT could be a supportive addition to a larger suite of care practices and interventions around chronic pain, it was also seen as something that cannot do work in isolation from a more comprehensive approach. A failure to write policy around iCBT that understands readiness as an assemblage of treatment history, current care practices, material realities of one's condition and individual needs or desire could lead to harmful consequences of reinforced dismissal, neglect, and uncared for pain in people living with chronic pain.

Relationships

In Context we examined a variety of ways in which people described how their engagement with (or interest in) iCBT, or traditional CBT broadly, could be impacted by both the structural and personal circumstances people might be living through. Using the concept of "readiness" we demonstrated how these contexts might weave together to create the space for iCBT programming to become a realistic and supportive option (or not) for people living with chronic pain.

"Relationships" picks up on this thread and marks out both what is at stake in iCBT and how fundamental a strong therapeutic alliance is to holding (and working on) these stakes. When thinking of self and others, we are interested in further clarifying what it is that people thought iCBT could support. We identify how a strong therapeutic relationship with a particular provider can be supportive to an effective engagement with iCBT.

While none of the women we spoke with had experienced asynchronous, modular iCBT – with one woman who moved from traditional CBT to videoconference at the onset of COVID-19 – all were able to tie their experiences with CBT, or their expectations to iCBT.

Relationship with Self and Others

Shifting capacities of people living with chronic pain can make it challenging to fit within normalized, able-bodied standards of functional life. Women we spoke with described needing to step back from their careers or missing out on social and family life due to their chronic pain. Some people, as was the case for 1 woman we spoke with, may be faced with the impossible decision to move away from family to a larger city with more readily available supports for life with chronic pain. For others, there is a gradual isolation or separation from friends and family because, "if for the 14th time you're supposed to be going out with your friends and you say 'oh, I have to cancel, I don't know, I'm in too much pain' a lot of your friends disappear."

Not being able to be a part of life around them in the ways they used to be could lead to overwhelming sense of guilt for people living with chronic pain. As 1 woman we spoke with pointed out "There's a huge amount of guilt – especially if you're a, if you're a parent and can't play with your kids. Or lift your kids. Or brush your daughter's hair. Or, you know, there's a huge amount of guilt involved in that. And if you can't work, it's worse." So much of living with chronic pain, then, is self-protection or, as one participant put it, "wanting to cover and just seem capable."

But "cover[ing] and just seem[ing] capable" is not always possible and that can be devastating. The impossibility of always looking and behaving the same as before chronic pain can lead to thoughts of worthlessness or, potentially, suicide. Women described times where they felt their life was "a write-off" or that they were no longer "worth anything because I was no longer a professional." While clear to note that her thoughts were not driven by depression, 1 woman described moments where she contemplated the value of her life and whether it was worth living.

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Importantly, iCBT is not so much about working on pain as it is working on how someone relates to and manages living with that pain. As one participant put it, “… it was about how can you make things better for those around you so they’re not constantly worrying about you. And at the same time, what can you do to ask for support when you need support without feeling guilty about it – or without feeling like you’re ruining their lives because [there’s] a lot of guilt involved in chronic pain.” Within this understanding of iCBT (or in person CBT) programming, we might also see it as supporting a form of empowerment among people living with chronic pain.

One of the ways iCBT might be supportive in relating to and managing living with pain is by introduction and teaching techniques like pacing (described further in “Utility of Content” below). Pacing is about slowing down and tending to both your present and future self. A person living with chronic pain might learn that it is okay to say “no” or to delay some sort of action. But the difficult reality is that they are also always going to be outside of the norm. While they may learn to occupy that space and make it work for them, the challenge is that the world around them is still ableist.

One way of supporting people through losses associated with chronic pain is through a strong relationship with the person delivering iCBT (or traditional CBT).

Relationships with Provider

As with previous reviews of iCBT,[79,80] the women we spoke with consistently identified the development and maintenance of strong relationships with providers as pivotal components of successful iCBT programming. In the review of iCBT for PTSD,[80] strong therapeutic relationships were described as ones that are less focused on the provider’s expertise by way of unilateral knowledge sharing but are rather more on a shared sense of humanity or ensuring people feel heard in those clinical encounters. This is not to say that there is no exchange of “knowledge” in these clinical encounters, but rather that for this “knowledge” to mean, or do, anything it requires work, consistency, patience, and care.

Engaging with iCBT for chronic pain requires the same careful attention to the space shared between providers and the person receiving care. One participant used the language of “trust” to describe this shared space and emphasized how challenging this could be to build in the context of iCBT for chronic pain. As one of the goals of iCBT is to challenge assumptions or negative thought patterns people have toward their experience with pain, walking through this in a way that the person is not feeling blamed or that it’s all in their head requires delicacy and tact. Given the histories of dismissal and neglect carried by many people living with chronic pain, the difficulty is in demonstrating that providers are holding the realities of a person’s pain while also attending to the moments or places where beliefs or actions might be harmful.

One way trust could be fostered is through having providers that are specifically trained in how to work with chronic pain. Without this expertise, the women we spoke with were concerned that providers might stick too strictly to a script that was out of touch with their actual needs. People with chronic pain are so accustomed to being low, to no, priority that one woman we spoke with felt “if you throw a junior [physician] in the room, they’ll chew them up and spit them out.” In a way, then, strong relationships are built before the encounters actually happen.

Not only was trust fostered through reassurance that providers had pain-specific knowledge and experience, but once in the encounter providers also need to focus on the individual. As one participant put it, “there’s not just sort of one blanket approach that we are going to take. Like, there’s a curiosity and an interest in who you are as a person and how you live with pain and what is important to you in the quality of life.” Instead of “talking down to a person,” she believed iCBT providers should inquire about what a

person already knows about and does for their pain. The other participants all echoed this sentiment. Working with the uniqueness of chronic pain in one's life and taking one's whole being into consideration when walking through iCBT (or traditional CBT) is fundamental to building a successful relationship with a provider. This increases confidence in the person's ability to manage their condition: "It's building that trust that you are a smart, capable, high-functioning individual [and] that you understand what's happening."

Another way strong therapeutic relationships could be fostered in iCBT is through what one participant called "voice consistency." Even though people might be comfortable with asynchronous communication from their provider, people wanted to make sure they were developing a relationship with one provider. One participant described wanting to "be seeing the same person … [because] it's a vulnerable situation, being in therapy." As someone who provides psychotherapy herself, this participant emphasized that a single provider is better able to track a someone's progress and offer consistent approaches, as "two therapists can have very different understandings and [ways] they progress in their therapy." Another woman voiced concern that having inconsistent providers during iCBT might hinder the development of rapport and require a person to unnecessarily repeat vulnerable aspects of their story, the latter of which people living with chronic pain often must do when seeking healthcare.

Process

In previous CADTH reports on iCBT,[79,80] Process was intricately related to the themes of Context and Relationships. People living with MDD, anxiety, and PTSD found iCBT particularly convenient, given their ability to access the therapy from the comfort of their own home on a schedule that suited them.[79,80]This flexibility alleviated contextual challenges associated with accessing face-to-face therapy (e.g., the inability to physically commute to treatment or take time off work for therapy).[79,80] Accessing therapy from home also eliminated the need to obtain treatment in healthcare settings that users sometimes associated with unpleasant experiences.[79,80] However, these previous reports also emphasized that engaging with iCBT required time, effort, and energy on behalf of participants.[79,80] For this reason, successful continued engagement depended on buy-in, which, as detailed in the report on PTSD,[80] could be fostered within the context of a trusting, empathetic therapeutic relationship.

These findings resonated for the women we spoke with who reflected on how iCBT may be particularly convenient for people living with chronic pain as it could help to alleviate some of the challenges related to geographic proximity to chronic pain treatment. However, they emphasized that a therapeutic relationship, whereby a provider can assess the appropriateness of the therapy to the individual and foster buy-in by tailoring that therapy to their personal needs, facilitates successful engagement with iCBT.

Physical Accessibility and Convenience

As detailed in our discussion of Context, to successfully engage with iCBT, a person living with chronic pain will first need to navigate contextual challenges influencing their ability to access treatment that acknowledges and physically addresses their condition. Among these challenges are dismissal, general healthcare providers' lack of knowledge about chronic pain and its treatment, self-advocacy, and health literacy capabilities (which are often influenced by gendered, racial, and socioeconomic inequities), the monetary burden of out-of-pocket pain care, and geographic proximity (or lack thereof) to available treatments.

Some of the participants envisioned that pain care delivered over the internet might at least address contextual barriers related to one's geographic proximity to treatment options. One woman, for example, noted that having virtual access to pain services may have circumvented the need for her to move to a metropolitan area to gain treatment. Furthermore, another anticipated that therapies accessible online might eliminate the need to physically commute to treatment when in pain, noting that when she has a flare-up, "I'm not going anywhere. I want to be home." One participant similarly remarked how people living with chronic pain might find commuting to in-person treatments physically exhausting.

However, just as policymakers should be aware of contextual challenges that extend beyond a lack of geographic proximity and physical access to chronic pain therapies, they also should be cognizant that access to therapy does not necessarily mean that a person can engage with it successfully or safely. In our discussion on Relationships, we emphasized the importance of developing strong, consistent, and trusting therapeutic relationships built on a shared understanding of humanity within the context of iCBT for chronic pain. The women in this study conceptualized these therapeutic relationships as vital to their effective engagement, or anticipated engagement, with the intervention.

Assessment

Ongoing, consistent engagement in a therapeutic relationship with a provider invested in a person's needs may be helpful, even before an individual is offered iCBT. Continuous engagement ensures that providers can develop a therapeutic judgement that responds to and understands the needs and desires of people living with chronic non-cancer pain. Before offering iCBT to a person living with chronic pain, one participant noted an "actual living, breathing psychologist" should conduct a phone or video-based psychological assessment to ensure that the person will benefit from it. In her case, this assessment was not a series of pre-defined questions to clearly categorize her as someone who would benefit from the therapy. Instead, it was a therapeutic judgement formed by two psychologists who developed personal, ongoing relationships with her over the course of 10 to 11 individual sessions ranging from 1 to 1.5 hours each. She noted that CBT might not be appropriate for some individuals living with chronic pain. Had she been offered the therapy while in severe, untreated pain, she believes that she may have been more likely to contemplate suicide, as she would have thought, "is this [treatment] all there is?"

The depth of the initial assessment process may not be required in every instance where a provider considers offering iCBT to a person living with chronic pain. However, her statements emphasize the importance of iCBT providers' attention towards the needs of the individual before therapy begins. People living with chronic pain are more likely to uncover nuanced information relevant to this initial assessment within the context of a trusting therapeutic relationship rather than a brief conversation or survey. In this way, assessment, and the process of beginning iCBT, relates to readiness, as detailed in our discussion of Context.

This initial assessment of an individual's experience of pain not only allows a provider to decide whether it is appropriate to offer iCBT, but also may help them identify what needs to be worked on and when. One participant, for example, suggested that providers might consider where in their pain journey a person is situated before offering a particular program. She noted that a recently injured person might benefit from an introductory course, while someone with more experience managing their pain may benefit from a program with more advanced content. Furthermore, the participant suggested that people have the option to revisit course concepts after completion, as what is relevant to, and therefore retained by, a person evolves over time.

Tailoring and Buy-In

The concept of tailoring exists at the intersection of Process and Content. CADTH's report on iCBT for MDD or anxiety[79] emphasized the importance of programs adopting a malleable, rather than prescriptive, approach to fit each user's learning style and mental health engagement needs. The therapeutic relationship was a foundation for this tailoring. As reported in the review, study participants' perspectives about what designs, content, and levels of provider engagement were most beneficial to them varied; however, provider guidance could better align the intervention to the individual. Specifically, providers could critically think about the relevance of an iCBT program to the person accessing it; offer ongoing support, monitoring, and personalized responses to their progress; and tailor the program's content and level of support offered based on their unique needs.

Similarly, in the current study, participants believed that considering and responding to individual needs should occur throughout iCBT programming rather than being a one-time event occurring at the outset of treatment. One woman stated that because no two people have the same experience with chronic pain, "the assumption that [the experience of pain is] a little, like, interchangeable can be really problematic." Therefore, when reflecting upon what she would expect from an iCBT program, she emphasized that content would need to flexibly adapt to an individual's needs throughout the therapy rather than following a machine-like algorithm. Flexibly adapting a program to a person's needs would require a provider to conduct an ongoing assessment of those needs throughout the iCBT process. Ideally, the content of an iCBT program might be as diverse as the experiences of the people accessing it.

A thorough assessment and understanding of who might be engaging with an iCBT program is an important component of Process. As evidenced across previous reviews,[79,80] dropout is a concern in iCBT programs. One participant's experience illustrated how a provider may foster "buy-in" by considering and incorporating an individual's assets and needs into treatment. As detailed in our discussion of Relationships, she described how her CBT provider moved beyond a "blanket approach" to tailor her therapy effectively because of their genuine attention towards her personal pain experience, including what she already knew and did about her pain. Doing so allowed the provider to offer content built upon her strengths and knowledge. This ensured that she conceptualized content

as benefitting her specifically and that therapy was "not just another make-work project," which motivated her to continue engaging with the treatment.

This participant emphasized that CBT providers must understand that people living with chronic pain continuously calculate how much energy and resources they can expend to engage in new tasks: "You're always kind of negotiating if you're going to make space for a new activity…it's got to be realistic." To be motivated to engage with program content, including assigned homework (e.g., journaling, thought tracking activities, and practicing mindfulness), participants needed reassurance that assigned activities were both attainable and useful to them personally.

For this reason, 2 participants were insistent that the duty of care could not be satisfied by providing impersonal educational material alone or using apps run by artificial intelligence. They were concerned with how easily unguided iCBT might slot into the increased industrialization of healthcare that seems to deemphasize caring relationships with providers and leads to the loss of the wealth of knowledge and history developed through these relationships. As 1 of them put it, "we're not machines here … we're talking about very personal things" so having a real person who could actively tailor content throughout the course of the iCBT program could help foster a feeling they are being cared for and encourage them to continue with iCBT programing.

To support the process of tailoring, people living with chronic pain must share intimate details of their lived experience with their provider. As outlined in our discussion of Relationships, providers of CBT or iCBT must consider past traumas that people have experienced when disclosing their pain to others. For many people living with chronic pain, sharing their experiences may have resulted in being disbelieved, dismissed, neglected, or perceived as being less "able" or, as one woman we spoke with described, less likeable. For this reason, engaging in therapy demands vulnerability from those living with chronic pain. It follows that the process of engaging in therapy, and the information collected through it, must be private and protected.

When deciding whether to implement iCBT programs, healthcare decision-makers must ensure that processes are in place to protect the experiences and information of those receiving the care. One participant emphasized that it should be clear how personal information collected online will be accessed and stored and by whom. Additionally, she stated that, given the relative novelty of iCBT for chronic pain, people should be informed if they are participating in a program that is under development or being researched (i.e., to make an informed decision to engage in iCBT over traditional CBT) and whether their information (anonymized or not) will be shared with others. She also emphasized that, when receiving iCBT in the home, a person must have access to a private place where others cannot hear them. Finally, while we previously discussed the potential benefits of obtaining group-based CBTs for chronic pain, another participant emphasized the need to carefully vet people accessing virtual group therapy to reduce the risk of having an attendee maliciously collect personal information from those receiving treatment.

Content

Of the 5 participants in the current study, only one had experienced the phenomenon of interest, having received iCBT via videoconference synchronously guided by a neuropsychologist with whom she already had a therapeutic relationship. Of note, none of the women interviewed had experienced asynchronous, non-guided iCBT courses delivered entirely online. Therefore, this discussion of "content" is grounded primarily in the value participants attributed to the experienced or expected content and design of CBT for chronic pain, rather than iCBT specifically. The women we interviewed emphasized that iCBT content should be pain-specific, practical, and focused on living better with chronic pain, and ideally delivered synchronously with careful use of language through mediums that allow the provider and user to visualize each other.

The Necessity of Pain-Specific Content

As presented in our discussion of Process, the content of iCBT programs must be tailored to, and useful for, the individual receiving it. To ensure that content is useful for people living with chronic pain, it must specifically address the needs of those living with pain, rather than the needs of people living with mental health or substance use disorders. Two participants who participated in group-based, in-person CBT programs, emphasized that chronic pain (unlike MDD, anxiety, or PTSD) is a physical health issue that is exacerbated, rather than driven, by emotional and behavioural issues. While she acknowledged that mental health disorders may occur concurrently with chronic pain, one participant reflected on how there is a "misunderstanding that chronic pain is a mental health condition." While she noted that CBT for anxiety or depression seeks to address the "root cause" of a person's symptoms, "CBT [for pain] will be helping you deal with it better, but it's not going to…solve the underlying physical problem." It follows that the

content of iCBT programs for chronic pain must differ from that for programs treating mental health disorders. The two women we spoke with noted that since their CBT programs could not address the physical causes of pain, content instead focused on teaching skills required to live better with the condition.

For this reason, and as presented in our discussion of Relationships, both women stressed that providers specializing in chronic pain are best suited to develop and deliver relatable, relevant, and appropriate content for people living with the condition. When comparing CBT for pain and CBT for substance use disorders, one woman said, “There are some parallels, but it should be, in my opinion, black and white. It can’t be the same course. It can’t be the same people who deliver it.” She noted that while a provider specializing in substance use disorders might include content prioritizing independence from substances, one specializing in chronic pain would more appropriately acknowledge medications as one of many tools used to relieve symptoms and enhance functioning. She also discussed how providers with pain-specific knowledge and experience would be better able to provide practical and memorable information specific to chronic pain management (e.g., ways to reflect upon and manage how emotions and breathing patterns influenced, and are influenced by, pain). She raised the potential value of forming relationships with a patient-provider with "lived experience" of chronic pain to gain additional support while navigating treatments, including iCBT. She described these people as other potential providers who could better contextualize the concepts taught by pain specialists. This emphasizes the importance of having providers specialized in pain management create and provide iCBT programs for chronic pain.

Utility of Content

All participants that had received CBT for chronic pain noted that content focused on “living better with” the condition; however, the meaning and utility that the women ascribed to this content varied. While one participant did not provide specific details about her 12-week program, she noted that the skills gained through it allowed her to obtain a higher level of functioning on lower dosages of medications. She conceptualized these skills as a source of protection against being left without a way to manage pain when unable to access immediate medical care (e.g., during holiday periods when hospitals have fewer pain services or when in-between care providers). Another participant, in contrast, reflected on how the content of her 8-week program, which included teachings about positive thinking techniques, mindful mediation, and visualization exercises, allowed her to accept and cope with the fact that she had already explored all available treatment options to manage her physical pain symptoms.

Another participant provided perhaps the most direct reflections on how CBT content allowed her to live better with pain. Through the therapy, she learned how to challenge negative thoughts related to pain and focus on the “whole big picture” of where she found quality in life, rather than ruminating on the adverse experience of her symptoms and their consequences. Learning to challenge negative automatic thoughts also encouraged an improved self-concept, as she could now “reality test” beliefs such as “I’m not worth anything because I am no longer a professional” or the perception that her pain negatively impacted her likeability. Finally, learning the skill that she referred to as “pacing” allowed her to avoid all-or-nothing thinking and behaviours to engage more fully in activities she otherwise would have avoided. To describe the technique, she said, “I’m not going to walk around the whole block. I’m going to walk half of the block if that’s what I can do that day… so with pacing, you’re slowly kind of extending your endurance, for example, and you’re sort of teaching your body and your nervous system to find kind of credible safety in movement.” The principles of pacing and thought challenging also allowed her to set manageable goals and in social settings.

Effectively Delivering Content

The CADTH report on iCBT for PTSD[80] emphasized the importance of interventions that deliver content in a manner that considers and responds to the individual. For example, people living with PTSD valued therapy content that provided them with skills to gain control over their affective responses. Homework helped consolidate these skills but was sometimes challenging to engage with due to unrelatable language used to present information. The CADTH report proposed that providers consider each person’s ability to relate to the language used in a program before deciding whether they would benefit from it.

Participants in the current study similarly considered how modes and methods of communication might influence their experience engaging with CBT or iCBT for chronic pain. The language used to deliver content matters. As detailed in our discussion of

Relationships, most participants interviewed had interactions with healthcare providers who had not believed in their pain. For this reason, one participant emphasized that when teaching how thoughts influence pain, providers must explain concepts in a way that does not imply that a person is at fault for their symptoms.

The women we interviewed also expressed a desire to communicate with their iCBT providers synchronously. One participant anticipated that this method of communication would allow a provider to exercise clinical judgement to adapt program content in real-time to respond to the immediate needs of a person living with chronic pain. She raised that this immediate tailoring may be especially important if a person living with severe pain were to disclose that they had considered suicide to relieve their symptoms. Without a specialized provider guiding the session in real time, she expressed, "I'm very much afraid that the rest of the iCBT program would throw the patient into purely suicide prevention, which is not a place you want to send a chronic pain patient who is not suicidal because then you're potentially putting ideas in their head that aren't there."

Considering that pain is a phenomenon that originates in the body, some participants reflected on the importance of visual cues when delivering content. For example, one woman questioned whether a provider could effectively teach soft tissue manipulation or breathing techniques without viewing the entire body of a person receiving therapy while the person receiving therapy viewed them. Reflecting on her experience of CBT for trauma, one participant also noted the importance of non-verbal communication in establishing rapport with her provider. It follows that iCBT programs may benefit from incorporating videoconference technologies that allow the provider and person receiving care to see each other.

Finally, participants reflected upon other requisites for the effective delivery of iCBT content. Two participants commented that navigating an iCBT program would require, at minimum, basic computer skills. Another woman similarly anticipated that people receiving iCBT would need access to resources such as a reliable internet connection (a potential issue in rural communities) and appropriate software. Notably, she commented that some conditions causing pain (e.g., severe arthritis in the hands) might prevent a person from operating a computer, a concern previously identified in the CADTH report on iCBT for MDD and anxiety.[79,80] These reflections are important for decision-makers to consider, as they emphasize the need to keep the option of obtaining traditional, in-person CBT available and accessible to those who may not benefit from accessing content online.

Summary of Results

By and large, the women we spoke with think iCBT could become a supportive component of comprehensive chronic pain care when CBT would otherwise be provided. However, this potential benefit comes with some major caveats. While the particularities of these caveats represent the nuance distinguishing iCBT for chronic pain from CADTH's previous reviews of iCBT for MDD or anxiety[79] and iCBT for PTSD,[80] findings were largely resonate across all three reports. Paying attention to the particularities we have identified for chronic pain will help decision-makers tasked with determining whether iCBT could be a useful component of chronic pain care in their jurisdictions.

One particularity is the added pressure to pay attention to the availability of comprehensive, multidisciplinary chronic pain care across one's jurisdiction. Unlike MDD or anxiety and PTSD which are classified as mood disorders, pain (acute or chronic) is somatic. While MDD or anxiety and PTSD might be accompanied by somatic comorbidities, pain begins as somatic and can be exacerbated by behavioural responses and cognitive processes. As such, pain has often been treated by attending to physical symptoms first. While opioids became a panacea treatment of this physicality throughout the 1990s and early 2000s, given the ongoing "opioid crisis" recent moves within the pain care community have sought to limit their prescription and use in the context of chronic pain care.[82]

Whether warranted or not, moves to limit the use of opioids have led to a number of challenges for people living with chronic pain.[39] The women we spoke with described how one of these challenges stems from the lack of any real forethought around comprehensive chronic pain care that can fill the care voids being created by decreasing opioid prescriptions. They worried that without any real investment in comprehensive pain care that iCBT programming might become seen as a "quick fix" due to its assumed accessibility and low price-point. While it is indeed possible that iCBT could be a supportive component of chronic pain care for some people, without improving comprehensive multidisciplinary offering at the same time it is like to fall short of supporting people living with chronic pain to flourish. This resonates with literature around chronic pain that emphasizes the importance of

people having access to comprehensive, multidisciplinary care approaches that can target the multiple dimensions of pain and hopeful improve treatment outcomes.[2,4,10,39] With this in mind, jurisdictions considering implementing iCBT for chronic pain should consider the multidisciplinary services available in their locales before determining whether iCBT programming would meet their needs around gaps in access.

While this work of improving (or developing) comprehensive multidisciplinary pain services is vital to supporting people living with chronic pain, the question remains of whether iCBT could replace in person CBT all other things being equal. The Patients' Experiences portion of this study cannot answer this question alone, but it does seem possible that people living with chronic pain would support this when in person CBT is otherwise unavailable or undesirable. To be clear, however, while improving access to effective therapies is a key component of increasing health equity, if the effectiveness of a therapy is unknown or constrained by external contexts (e.g., limited supporting therapies) equity in access may not matter. This may be why it was so important for the women we spoke with to walk us through their diagnostic, early treatment, and current treatment experiences as we asked them questions about their expectations around iCBT (or in person CBT).

On a similar note, women were concerned that early offers of iCBT might risk causing further harm. As people who have often been subjected to disbelief, dismissal, and neglect within the health care system, prescribing iCBT too soon could validate feelings that they do not matter to their healthcare providers. Paired with the reality that many family physicians have limited training around pain, women were concerned that the simplicity of referring to iCBT could interfere with determining root causes of pain.[83-85] As family physicians are often people's primary point-of-contact with the health care system, receiving this script for iCBT too soon may exacerbate suicidal ideation if people believed iCBT was the best care they could expect. Some people living with pain may appreciate earlier engagement with iCBT, particularly those with chronic secondary pain, but determining appropriate candidates should be done on a case-by-case basis rather than as a standardized approach.

For whom and at what points iCBT might be considered an appropriate intervention necessarily pivots around the concept of readiness. Readiness can be understood as an assemblage of treatment history, available current care practices, material realities of one's condition, and individual needs or desires. Failure to develop policies around iCBT that take this assemblage into account could lead to harmful consequences of reinforced dismissal, neglect, and uncared for pain in people living with chronic pain.

As in previous reviews of iCBT for MDD, anxiety, and PTSD, a strong therapeutic relationship and tailored approaches to iCBT programming were seen as vital components of successful engagement with iCBT.[79,80] This suggests that iCBT should be provider guided and provide enough space for the development and maintenance of a strong relationship. This study further highlighted the importance of providers who are specifically trained in dealing with chronic pain. Without this expertise in pain, providers might struggle to be attentive to and understand the challenges of living with chronic pain, which could impact the development of a strong and trusting therapeutic relationship and ultimately the ability of that provider to tailor the programming to the needs of the person living with pain.

Decision-makers should also consider that our Patients' Experiences study had limitations that potentially impact the transferability of our findings. First, none of the women we interviewed had experienced asynchronous or non-guided iCBT for chronic pain. Furthermore, despite our efforts to include a diverse sample, all people interviewed identified as women and as White or Jewish. Furthermore, 4 of the 5 women interviewed reported having experience working in health care. While most of the women reported distressing experiences with health care providers and had difficulty accessing multidisciplinary pain care, it is possible the experiences of marginalized or racialized individuals attempting to access the same care would be different. Future qualitative research is needed on the experiences of people accessing iCBT for chronic pain, including those accessing non-synchronous and unguided iCBT programs. This research should include the voices of those who identify as male; are Black, Indigenous, and People of Colour; and people who experience marginalization and may be less likely to have access multidisciplinary pain care.[2,11]

Patient Engagement

Overview

CADTH involves patients, families, and patient groups to improve the quality and relevance of our assessments while ensuring that those affected by the assessments also have an opportunity to contribute. CADTH has adopted a Framework for Patient Engagement in HTA[86] that includes Standards for Patient Involvement in Individual HTAs and is used to support and guide our activities involving patients. For this HTA, the belief that patients have knowledge, perspectives, and experiences that are unique and contribute to essential evidence for HTA has guided our patient engagement activities. CADTH engaged two people living with chronic pain who had previously offered feedback on CADTH projects related chronic pain to offer insights on the current project.

Methods

Invitation to Participate and Consent

A CADTH Patient Engagement Officer contacted potential contributors by email to explore their interest in becoming involved. The preliminary request included the purpose and scope of this project, the purpose of engagement and the nature of engagement activities. The Patient Engagement Officer obtained the person's informed consent to share their lived experiences with CADTH staff. Compensation in the form of an honorarium was offered to the participants.

Engagement Activities

A person with experience of chronic pain reflected on their own personal experiences at several time points during assessment including:

- Prior to protocol finalization;
- During drafting of the initial reviews; and
- Upon completion of the draft final report during the feedback period

Results

Patients' perspectives gained through engagement processes were used to ensure relevance of outcomes of interest for the clinical assessment, to identify other patients with experience of iCBT, and to discuss other considerations to inform the discussion section. The questions and subsequent discussion with the patient contributors helped to clarify the technology under review and comment on the relevance of the findings to Canadians living with chronic pain due to a range of conditions. Furthermore, the patient contributors suggested other people with lived experience to participate in the Patients' Experiences section.

The involvement of patients enabled the research team to consider the evidence alongside an understanding of the wider experiences of patients with chronic pain and their families and comment on the suitability of iCBT for various pain conditions and people experiencing chronic pain, or other factors that could support decision making.

The patient collaborators, and the wider community were invited to provide feedback to the report during the last stakeholder feedback period. Patient engagement activities and the results of involving patients are reported in Table 6 using GRIPP2 Short Form reporting checklist.[87] to provide reflections and critical perspectives on the experience of the patients, other members of the chronic pain community, and the research team.

1696 **Table 6: Patient and Public Involvement in Internet-Delivered Cognitive Behavioural Therapy in the**
1697 **Treatment of Chronic Non-Cancer Pain**

Section and topic	Item	Reported in section
Aim	Two people with lived experience of chronic pain and cognitive behaviour therapy were involved in developing the protocol and commenting on outcomes important to patients living with chronic pain.	Patient Engagement
Methods	We engaged two people who met the following criteria: •Adults living with chronic non-cancer pain associated with health conditions such as fibromyalgia, headache or migraine, muscle, nerve, and ligament injuries, rheumatoid arthritis, osteoarthritis, multiple sclerosis, or surgical procedures. •Comfortable talking about their experiences with CADTH staff. •Connected to others with lived experience with chronic pain, for example, by volunteering with a patient support group or through advocacy. After giving informed consent, the people we engaged discussed their experience of chronic pain and their perspectives about the important aspects of cognitive behaviour therapy and multi-disciplinary care in the context of CADTH's plans for this report. The conversation took place via video teleconference and email communication. An honorarium was offered for participating in teleconferences and reviewing a summary of the discussion. These patients, and other community members were invited to provide stakeholder feedback on the draft of the full health technology assessment.	Patient Engagement Methods Opportunities for Stakeholder Feedback
Results of patient engagement	The researchers were made aware of the importance of several considerations about the interventions and outcomes. **Quality** The quality of the iCBT program matters to people. We heard that a good quality program means it is delivered with a therapist knowledgeable about chronic pain and that it can be customized for people to focus on the most relevant modules. It should be relevant to a person's condition and their goals, not something generic. **Timing** Behavioural interventions like iCBT should be offered after a full clinical examination and after efforts have been made to address the source of the pain. Ongoing support, and "booster" sessions should be made available to practice and maintain what was learned in the iCBT program. **Privacy** People need to be aware and informed of how their information will be stored and shared. If any information will be used for research or evaluation of the iCBT program, this also needs to be explained clearly and care needs to be taken with the information. People receiving care in their home also presents a risk to privacy since they may not have adequate personal space, or perhaps they used a shared device for accessing treatment. **The importance of trauma-informed care**	Key Messages Clinical Review: Outcomes in Table 1 Discussion: Risk 3

	One patient contributor shared that a trauma-informed approach should be considered. Clinicians delivering CBT should aware of the possibility that they may hold perceptions and assumptions that stigmatize patients. Trauma-informed care is a way of approaching patients that emphasizes safety and trust for patients. We heard that some groups of people, particularly women, may have experienced trauma at the hands of the health care system by having their concerns dismissed, or their pain minimized and treatment delayed while their symptoms worsened. **Equity issues** Fairness is an important value. We heard that if places were to offer iCBT, it would be important to also continue to offer in-person CBT for the people who can't access it, so people don't get left behind. Those who are physically disabled, lack transportation, and some rural-dwelling people may welcome an online option as opposed to driving into the city for a program. Sharing these concerns allowed the research team to consider the evidence in the context of the wider experiences of patients and caregivers when preparing the assessment.	
Discussion and conclusions	The two patient collaborators were highly engaged in the conversation with researchers. They had clear opinions and concerns during the teleconference. They shared that multidisciplinary care delivered by clinicians knowledgeable about chronic pain is not always available. The burden of coordinating their own appointments with multiple practitioners, in addition to significant self-management tasks of chronic pain can be substantial for some people. Ethical and equity issues are sometimes revealed in the telling of their experiences. Examples of factors that put some people at a disadvantage for accessing iCBT are lack of adequate technology or high quality internet connection, lack of ability or confidence to use technology, lack of support or instruction, lack of space at home for private, uninterrupted conversations with a therapist, disability, cognitive impairment, low literacy, speaking a language other than English or French, cultural or religious taboos about pain treatment.	Patient Experiences Results
Reflections/critical perspective	Success of patient involvement in this report is related to several factors. First, the patient contributors were briefed on the objectives of the project and their role. Second, they are supported by experienced Patient Engagement Officers who can support the use of their views and involvement with the research team. Established processes are in place, and compensation was offered for their time to participate in the project. However, there were limitations. The topic and research questions were already determined before engaging the patient contributors. People often have concerns that are not part of the project scope, such as the need for health care providers who are knowledgeable about chronic pain, and trained in trauma informed care, but the topic and question are already identified when the patient involvement begins. The schedule of the project team makes it difficult for patients to participate fully, on terms that work for them (e.g., daytime teleconferences). Due to the project schedule, patient contributors were invited to participate within a set time frame and other stakeholders were invited to provide feedback only during	Patient Engagement Methods

	a set timeframe. People need access to reliable technology, phone, and internet to collaborate with CADTH, possibly excluding some voices.	

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Operational Aspects

Overview

The objectives of this environmental scan were to identify internet-delivered cognitive behavioural therapy (iCBT) programs in Canada that are established or in development, their characteristics and related operational aspects associated with iCBT programs for the management of chronic non-cancer pain.

Research Question(s)

The following questions related to identifying operational aspects of iCBT implementation and delivery were addressed.

Research Questions:

1. Which iCBT programs for the management of chronic non-cancer pain are currently available or are in development in Canada, and what are their characteristics?
2. What operational considerations contribute to the establishment and provision, or lack, of iCBT programs, specifically for the management of chronic non-cancer pain, at the system or site level in Canada?

Key Messages

- Sixteen iCBT programs that support patients with chronic non-cancer pain were identified that are available or in development in Canada. Seven of the identified iCBT programs are available across Canada and 8 of the programs are available in specific provinces. One of the iCBT programs is in development.
- The majority of the iCBT programs identified provide care to a variety of chronic pain patients. The characteristics of the iCBT programs vary in terms of the level of therapist involvement, overall program length, number and length of modules, topics covered, funding model, and patient reimbursement eligibility.
- Commonly identified facilitators to iCBT implementation included reaching patients that would otherwise be unreachable, improvement in patients' experiences, efficiency (in clinical practice and use of resources), and convenience for patients.
- Commonly identified barriers to iCBT implementation included privacy concerns, preference for in-person or other treatment options (of both patients and clinicians), patients' lack of familiarity with technology, and patients' lack of available devices or adequate internet connection.

Methods

Study Design

An Environmental Scan was conducted to identify iCBT programs in Canada that are established or in development, their characteristics, and related operational aspects associated with iCBT programs for the management of chronic non-cancer pain. The findings of this Environmental Scan are based on a limited literature search, online survey, and stakeholder feedback. We used an iterative process to obtain feedback on the Environmental Scan draft report. We first sought feedback from stakeholders who responded to the survey and then from those involved with programs identified through the literature search and feedback to verify the reported information and address information gaps.

Literature Search Methods

A literature search was conducted by an information specialist on key Grey literature (literature that is not commercially published) resources. Grey literature was identified by searching sources listed in relevant sections of the *Grey Matters: A Practical Tool For Searching Health-Related Grey Literature* checklist, which includes the websites of regulatory agencies, HTA agencies, clinical guideline repositories, systematic review repositories, patient-related groups, and professional associations. Google was used to search for additional internet-based materials. The main search concepts were iCBT and chronic pain. The search was also limited to English language documents published between January 01, 2000 and September 21, 2021. See Appendix 1 for more information on the grey literature search strategy.

Selection Criteria

Table 7: Components for Literature Screening and Information Gathering

Criteria	Description
Population	Patients (any age) with chronic non-cancer pain, regulated health professionals, and decision-makers
Intervention	Guided and unguided iCBT delivered via a computer or mobile device, either synchronously or asynchronously, in combination with other interventions for the management of chronic non-cancer pain
Settings	Settings of care (e.g., primary, home, tertiary, community, long-term care) in rural, remote, and urban areas in Canada
Outcomes	· Descriptions of iCBT programs including but not limited to type of pain treated, how patients are referred, age of participants, number of modules and information covered, length of modules, and whether program is self-guided or therapist assisted · Operational aspects of iCBT programs, including but not limited to technical requirements, resource needs, logistical considerations, and operational constraints; Staffing, training, and accreditation issues (e.g., clinical specialties); Referral pathways and multidisciplinary patient management schemes; Design of public funding programs and models, including eligibility and prioritization criteria.

iCBT = internet delivered cognitive behavioural therapy

Screening and Selecting Publications for Inclusion

One author screened publications from the literature search for inclusion based on the criteria outlined in Table 7Table 7. Publications that described iCBT programs, and/or provided insights on the operational aspects associated with iCBT programs for the management of chronic non-cancer pain from the perspectives of Canadian patients, health professionals, and decision-makers, were eligible for inclusion. Programs that included patients using iCBT primarily for indications other than chronic non-cancer pain (e.g., primary diagnosis of major depressive disorder, anxiety disorder, post-traumatic stress disorder), and programs unavailable in Canada or that are in development outside of Canada were excluded for Research Question 1. For Research Question 2, publications that identified operational aspects of iCBT programs in Canada were eligible for inclusion. Publications that described experimental studies (e.g., randomized controlled trials) and those that did not provide a summary or describe Canadian iCBT programs for the management of pain were excluded.

Survey Methods

A 31-question online survey (**Error! Reference source not found.**) was developed to address the research questions of the Environmental Scan. The survey questions were developed based on a previous survey used in the 2018 CADTH Environmental Scan on iCBT for Major Depressive Disorder and Anxiety Disorders.[88] The survey included sections on demographic information and iCBT program characteristics as well as 3 sections on implementation considerations (facilitators, barriers, and access). Both open-ended and closed-ended questions were included in the survey. The questionnaire was distributed by email on October 14, 2021, and administered electronically using SurveyMonkey.[89] The questionnaire was only available in English. Respondents were identified through CADTH's Implementation Support and Knowledge Mobilization team networks, and other available networks via stakeholder and expert suggestions. Contacts were also identified by referral through other survey respondents. The goal of survey recruitment was to capture information relevant to each province or territory and from a wide range of stakeholders involved in iCBT for chronic non-cancer pain. These included regulated health professionals (e.g., physicians, nurses, psychotherapists, psychologists, occupational therapists, social workers, other mental health professionals, program managers), policymakers, decision-makers involved in program or practice development, information management professionals, employee assistance program providers, online CBT platform developers, and staff at community organizations that support people living with chronic non-cancer pain. Stakeholders from the following jurisdictions received the survey from CADTH: Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, Nova Scotia, Ontario, Quebec, and Saskatchewan. Responses to the survey were gathered from October 14 to October 29, 2021. A response was considered partially completed if 1 or more questions were not filled out by the respondent. If a respondent indicated they were not involved in the development, delivery, funding, or regulation of an iCBT program that supports patients with chronic non-cancer pain they were not eligible for the survey and were not asked to respond to further questions. Partial responses from those eligible to complete the survey were included. All respondents gave explicit written permission to use the provided information for the purpose of this report.

Synthesis Approach

The analysis of data collected from each of the data sources (i.e., literature search, survey) was performed by one reviewer. A descriptive analysis was conducted to respond directly to the research questions and produce a narrative summary that reflects the included data. Details on patient eligibility and program characteristics were extracted from publicly available information on iCBT program websites. For the survey data, descriptive statistics are provided for responses to closed-ended questions and narrative summaries are provided to summarize responses to open-ended questions. The demographic information for respondents who indicated they were not involved in the development, delivery, funding, or regulation of an iCBT program that supports patients with chronic non-cancer pain was excluded.

Findings

The findings are based on the literature search, survey, and stakeholder feedback and are presented by the research questions of this report. The literature search identified 3 websites that provided information on iCBT programs available in Canada that support patients with chronic non-cancer pain. The literature search did not yield any publications that provided information around the operational considerations of iCBT programs for the management of chronic non-cancer pain.

Thirty individuals received the survey directly from CADTH. After the removal of respondents who indicated that they are not involved with an iCBT program that supports patients with chronic non-cancer pain (6 responses), and respondents who only answered the demographic questions (2 responses) a total of 13 survey responses were retrieved. These included 11 complete responses and 2 partial responses. Respondents were from the following provinces: Alberta (4 responses), British Columbia (1 response), Newfoundland and Labrador (1 response), Nova Scotia (1 response), Ontario (4 responses), Quebec (1 response), and Saskatchewan (1 response). Additional characteristics of survey respondents are presented in **Error! Reference source not found.** The 11 complete responses represented stakeholders from all the aforementioned provinces. The most common settings that respondents indicated they work in were pain clinic (6 responses) and hospital or specialist clinic (6 responses). The most common professions/roles of the respondents were health care provider (6 responses) and researcher (5 responses). All of the respondents indicated that they were involved in either the development or delivery of one or more iCBT programs.

1. Which iCBT programs for the management of chronic non-cancer pain are currently available or are in development in Canada, and what are their characteristics?

Overview of iCBT Programs in Canada

Ten iCBT programs were identified through the survey and 3 programs (AbilitiCBT, Cognitive Behavior Therapy Institute of Manitoba, iCBT Program for Chronic Pain) were identified through the literature search.[90-92] Three additional programs (Live Plan Be, Live Plan Be+, and My Care Path) were suggested through stakeholder feedback on the Environmental Scan.[93,94] These 3 programs are self-directed and provide access to a variety of articles, videos, and other resources, some of which are based on CBT strategies. Thirteen survey respondents provided information on the iCBT programs available or in development in their respective jurisdiction.

An overview of the iCBT programs that were identified is provided in Table 8Table 8. Note that the programs included in the table vary in structure with some programs that are completely self-guided with access to a variety of resources and other programs that consist of structured modules with therapist support.

1807 **Table 8: Overview of iCBT Programs**

Program Name Website	Patient Age Range	Program Access/ Use of Program	Program Characteristics			
			Level of therapist involvement	Length	Number of modules	Patient reimbursement
Across Canada						
AbilitiCBT **https://myicbt.com/home**	16 and older	Unknown	Therapist assisted	Access to therapist for 12 weeks, access to program for 1 year	10	No cost for Ontario and Manitoba, reimbursed through insurance elsewhere
iCBT Program for Chronic Pain **https://cbt.drwilderman.com/icbt**	All ages	Unknown	Self-guided	Self-paced, access for 1 year	8	There is a cost to access the program, unknown if patients can be reimbursed
Kelty's Key – Chronic Pain Course **www.keltyskey.com/courses/chronic-pain/**	18 to 100	Self-referral by patients	Self-guided, therapist assisted	8 to 12 weeks	9	Publicly funded
Live Plan Be – Pain Education[a] **https://www.liveplanbe.ca/pain-education**	Adults	Self-referral by patients	Self-guided	Self-paced	Self-directed articles and videos	No cost
Live Plan Be+[a]	Adults	Self-referral by patients	Self-guided	Self-paced	Self-directed articles and videos	No cost
MindBeacon **www.mindbeacon.com/guided-cbt-programs**	16 and older	Self-referral by patients, referral by a clinician, as one component of a broader program, as a complement to standard care, as a stand-alone treatment, stay at work	Therapist assisted	12 weeks	10 to 12 with additional modules available	No upfront cost if publicly funded (Ontario), reimbursed if through insurance

		and return to work, disability management				
My Care Path[a] **https://mycarepath.ca/**	Youth/ adolescents	Self-referral by patients	Self-guided	Self-paced	Self-directed articles and videos	No cost
Alberta and Ontario						
Comfort Ability **www.thecomfortability.com**	10 to 17	Referral by a clinician, as one component of a broader program, as a stand-alone treatment	Therapist directed	3 weeks	3	Publicly funded
Alberta						
Calgary Pain Program **www.albertahealthservices.ca/services/Page11132.aspx**	18 and older	Referral by a clinician, as one component of a broader program	Therapist directed	4 to 8 weeks	4 to 8	Publicly funded
Manitoba						
Cognitive Behavior Therapy Institute of Manitoba[b] **https://cbtmanitoba.com/**	Unknown	Unknown	Therapist directed	Unknown	Unknown	Patients can seek reimbursement through insurance
Newfoundland and Labrador						
Therapy Assistance Online **https://nl.bridgethegapp.ca/adult/online-programs/tao-with-a-counsellor/**	18 to 65	As part of a clinical trial[95]	Therapist assisted	8 weeks	7	No cost
Nova Scotia						
Pain Self-Management Program **https://library.nshealth.ca/Patients/ChronicPain/Program**	18 and older	Self-referral by patients, referral by a clinician, as one component of a broader program, as a complement to standard care, as a	Therapist assisted	5 weeks	10	Publicly funded
Psychological Skills for Coping with Pain and Distress[c]				8 weeks	8	

		stand-alone treatment				
Quebec						
Traiter la douleur chez soi (treat your pain at home)[c]	18 to 99	As a stand-alone treatment	Therapist assisted	9 weeks	8	NA
Saskatchewan						
Chronic Conditions Course **www.onlinetherapyuser.ca/chronic-conditions**	18 and older	Self-referral by patients, referral by a clinician, as a stand-alone treatment	Therapist assisted	8 weeks of support, 5 months of access to program	5 core modules with additional modules available	Publicly funded
In development						
iCanCope **http://icancope.ca/**	11 to 25	Research study (participants can enrol through self-referral or referral by a clinician)	Self-guided	8 weeks (chronic pain and JIA) to 20 weeks (post-operative pain)	App uses short self-directed articles rather than modules	NA

iCBT = internet-delivered cognitive behavioural therapy; JIA = juvenile idiopathic arthritis; NA = not applicable
[a] Website that provides access to a variety of articles, videos, and other resources, some of which are based on CBT strategies
[b] Website states that sessions are available virtually due to pandemic
[c] Website not provided
Note: provincial and territorial availability was determined by information available on the program's website or survey responses in the case of programs without a website

These results indicate that iCBT programs that support patients with chronic non-cancer pain are currently available in all 13 provinces and territories. Four of the identified iCBT programs are available across Canada and the others are only available in specific provinces. To gain a better understanding of the characteristics of these iCBT programs, survey participants were asked several questions and their responses are summarized in the sections below.

Patient Eligibility

Survey participants were asked to provide information on the characteristics of patients that the iCBT program provides care to. This included questions about the geographical settings and health conditions of the patients eligible for the program. All 13 survey respondents provided an answer to the question about geographical settings and 11 respondents answered the question about health conditions. The results of these questions are summarized in Table 9Table 9. The age range of eligible patients for each of the programs are summarized in Table 8Table 8. The age range for most of the programs is patients aged 16 or 18 years and older. Patients with a variety of health conditions associated with chronic non-cancer pain are eligible for all the iCBT programs. One respondent indicated that in addition to several of the indications listed in Table 9Table 9, patients with juvenile idiopathic arthritis and post-surgical pain are eligible for the iCanCope program.

Table 9: Characteristics of Patients Eligible for iCBT Programs

Survey Question	Response	Number of Responses (% of Total)
Does the iCBT program you are involved with provide care to patients in one or more of these geographical settings?* (13 total responses, multiple answers accepted)[a]	Urban	13 (100%)
	Rural	12 (92.3%)
	Remote	8 (61.5%)
Are patients with chronic non-cancer pain associated with the following health conditions eligible for the iCBT program? (11 total responses, multiple answers accepted)	Fibromyalgia	11 (100%)
	Headache or migraine	11 (100%)
	Muscle and ligament injuries	10 (90.1%)
	Neuropathic pain	11 (100%)
	Rheumatoid arthritis	10 (90.1%)
	Osteoarthritis	10 (90.1%)
	Multiple sclerosis	10 (90.1%)
	Pelvic pain	11 (100%)
	Lower back pain	11 (100%)
	Abdominal pain	11 (100%)
	Other[b]	3 (27.3%)

iCBT = internet-delivered cognitive behavioural therapy

[a]Urban: area with a population of at least 1,000 and a population density of at least 400 persons per square kilometre.[96] Rural: not fitting the definition of "urban" or "remote." Remote: Health Canada defines various levels of remote, ranging from remote isolated (i.e., no scheduled flights or road access and minimal telephone or radio service) through to non-isolated remote (i.e., road access and less than 90 km away from physician service).[97] Self-identified based on the respondent's local understanding of the criteria for remote.

[b]Responses included: any type of pain; pediatric patient with chronic pain followed at the hospital; juvenile idiopathic arthritis; post-surgical pain

Access to and Use of iCBT Programs

Survey participants were asked how the iCBT program they are involved with is currently being used. Eleven respondents answered this question, and the results are summarized in **Error! Reference source not found.**. Respondents indicated that patients most commonly use iCBT through a referral by a clinician (7 responses, 63.6%). Five respondents (45.4%) indicated that iCBT is used through self-referral by patients. Approximately half (6 responses, 54.5%) of respondents indicated that iCBT is used as one component of a broader program and three respondents (27.3%) indicated that iCBT is used as a complement to standard care. Six respondents (54.5%) indicated that iCBT is used as a stand-alone treatment.

Characteristics of iCBT Programs

Survey respondents provided information on therapist characteristics (i.e., the level of therapist involvement and required therapist credentials and training) as well as how long it takes to complete the iCBT program, the number of modules, the topics covered, and

the technology requirements. Eleven respondents answered all the questions related to the characteristics of the iCBT programs. The responses to closed-ended questions related to the characteristics of iCBT programs are summarized in **Error! Reference source not found.**. Responses indicated that therapists were involved through pre-scheduled phone calls or e-mails, as needed support through asynchronous messaging or phone calls, facilitation/delivery of the iCBT program, and interaction with case manager (in cases of return to work) or referring clinician as needed. One respondent indicated that therapists developed and reviewed the content but are not directly involved in the program. Additionally, survey participants indicated that the credentials of the therapists included psychologists, psychotherapists, mental health clinicians, registered nurses, social workers, occupational therapists, certified counselors, and graduate students under supervision from a registered professional. One of the respondents specified that the graduate students must be enrolled in a clinical psychology program and be under supervision from a clinical psychologist with experience in chronic pain management. Another respondent specified that the course content was developed by psychologists, physiotherapists, registered nurses, and physicians. In regard to training, 1 respondent indicated that therapists receive 6 weeks of onboarding training.

Survey participants were also asked to specify the total length of time it takes to complete the iCBT program. Most of the responses ranged from 3 to 12 weeks to complete the program. One respondent indicated that the program takes up to 20 weeks for post-operative pain patients. When asked about the number of modules included in the iCBT program. respondents indicated a range from 3 to 12 modules. Three respondents indicated that additional supplemental modules can be added by the patient or therapist. One respondent indicated that the program uses short self-directed articles rather than modules. Participants were asked what topics are covered in the modules and the approximate time it takes to complete each module. Out of the 11 respondents, 10 provided information on the topics covered and 6 provided information on the time required to complete each module. Common topics included general information about chronic pain, relaxation, mindfulness, values, goal setting, pacing, communication, sleep, thoughts, emotions/mood, beliefs, and problem solving. Responses on the time required to complete each module ranged from 5 minutes to 3 hours.

Respondents were also asked about the technology requirements for the iCBT program. All 11 respondents indicated that an internet connection is required for the iCBT program. One respondent indicated that the program requires the use of a smartphone and 4 respondents indicated that either a phone, tablet, or computer can be used. Three respondents indicated that a device with video/audio capability is required.

2. What operational considerations contribute to the establishment and provision, or lack, of iCBT programs, specifically for the management of chronic non-cancer pain, at the system or site level in Canada?

Implementation Facilitators

Eleven survey respondents provided information on the patient-related, clinician-related, and organizational factors that have facilitated or would facilitate the implementation of iCBT. These results are summarized in **Error! Reference source not found.**.

Commonly identified patient-related facilitators to the implementation of iCBT were convenience (10 responses, 90.9%), preference (9 responses, 81.8%), satisfaction with care (9 responses, 81.8%), and access (9 responses, 81.8%). The most commonly identified clinician-related facilitators were reaching patients that would otherwise be unreachable (11 responses, 100%), efficiency in clinical practice (10 responses, 90.9%), and training, knowledge, or experience with iCBT (9 responses, 81.8%). Commonly identified organizational facilitators included improvement in patients' experiences (11 responses, 100%), more efficient use of resources (10 responses, 90.9%), and reaching more patients or serving a broader population (9 responses, 81.8%).

Participants were also asked if they had any additional comments about factors that facilitated or would facilitate iCBT in their facility or jurisdiction and 6 responses were received. Additional facilitators identified included resources such as information technology support, clerical support (for patient registration and maintenance of participation), and funding (to support outcome tracking). Personalized care, triage to the right care, assignment of a single therapist, health equity outreach, and consistent access to technology (for both provider and patient) were also mentioned as potential facilitators. One participant mentioned that the

intervention being available in French in Quebec was a facilitator. One participant identified having a self-referral option as a potential facilitator to iCBT due to centralized intake and physician referral creating a barrier to treatment access.

Barriers

Eleven survey respondents provided information on the patient-related, clinician-related, and organizational factors they have identified as barriers to the implementation of iCBT. These results are summarized in **Error! Reference source not found.**.

Commonly identified patient-related barriers to iCBT included privacy concerns (9 responses, 81.8%), lack of familiarity with technology (8 responses, 72.7%), and lack of available devices or adequate internet connection (8 responses, 72.7%). Preference for in-person or other treatment options was identified as a common patient-related (8 responses, 72.7%) and clinician-related (9 responses, 81.8%) barrier. Another commonly identified clinician-related barrier was lack of education or training on iCBT and delivering services via distance (7 responses, 63.6%). Organizational culture (5 responses, 45.4%) and resources (e.g., personnel, technology, funding) (5 responses, 45.4%) were the most commonly identified organizational barriers.

Survey participants were asked if they had any additional comments about barriers to the implementation of iCBT and 1 response was received. The respondent mentioned several potential barriers including reduced capacity for change management due to the COVID-19 pandemic, reluctance of provinces to be the first to implement a program, and lack of coverage for mental health under the Canada Health Act.

Access

Survey participants were asked whether any patient groups required specific considerations when considering access to iCBT. Participants were asked to specify the patient groups and whether there were any specific barriers or facilitators to accessing iCBT for these patients. Eleven respondents answered these questions, and the results are summarized in Table 10Table 10. Two respondents did not specify a patient group, however, mentioned additional facilitators and barriers. Several respondents indicated that patients living in rural/remote settings and patients unfamiliar with or without access to technology are groups that require specific considerations. Access to adequate internet/technology was highlighted as a barrier to iCBT for these patients. Potential facilitators that were identified for these groups were enabling content to be available offline, providing funding for technology resources, and learning sessions on the use of technology. Patients in crisis were also identified as a group that requires specific considerations. One survey respondent indicated that iCBT may not be suitable for patients who are actively suicidal.

Table 10: Facilitators and Barriers to Accessing iCBT for Specific Patient Groups

Patient Group(s)	Facilitators	Barriers
Patients in rural areas without reliable internet	Do not need to drive to a health centre, reduced cost of gas and parking	Lack of Internet access
Patients who live in remote areas where internet access is not reliable	Enabling the tools and resources to be available even when offline	None
Patients in remote areas, patients without access to privacy or an appropriate device	Finances for technology resources	Lack of finances
Patients in rural/remote areas; patients living in homes with many others (i.e., lack of privacy); patients who are 16 to 25 years old; patients who belong to one of the following groups: BIPOC, LGBTQ+, first responders/healthcare workers, students	Targeted outreach with associations and community organizations who can help develop content, culturally sensitive content, integration with traditional Indigenous healing	Lack of awareness, stigma, lack of integration with traditional Indigenous healing
Patients who do not speak English, patients who are not able to read at a grade 8 level	Phone calls to support patients who struggle with email	Lack of knowledge of the service
Patients with financial challenges, patients requiring interpretation services	Language Line which can be used over phone or video conference	Lack of data or minutes to use iCBT, some patients and providers are not

		familiar with how to use the technology available for interpretation
Patients unfamiliar with technology, patients with learning disabilities, patients with autism spectrum disorder	Learning sessions on use of technology, 1:1 support	No access to technology
Patients who are actively suicidal	Presence of a satisfactory, mutually agreed upon safety plan	NA
Patients in crisis, patients unfamiliar with technology	Easy and/or free access	Lack of motivation, technology
NA	Opportunities for shared decision making of in person versus virtual	Lack of access to internet/devices, decreased ability for participants to engage with each other, lack of time to attend program
NA	Population specific content and voice, self-referral versus centralized intake	Lack of knowledge that programs exist, centralized intake versus self-referral

BIPOC = Black, Indigenous, and people of colour; iCBT = internet-delivered cognitive behavioural therapy; LGBTQ+ = lesbian, gay, bisexual, transgender, and queer; NA = not applicable

Summary of Results

This environmental scan was informed by a literature search, survey, and stakeholder feedback. The literature search identified 3 websites that provided descriptions of iCBT programs available in Canada; however, no publications were identified that provided information on the operational considerations of iCBT programs that support patients with chronic non-cancer pain. A total of 13 survey responses (11 complete responses and 2 partial responses) that represented stakeholders involved in the funding, regulation, development, or delivery of iCBT were included in the analyses. Survey respondents were from Alberta, British Columbia, Newfoundland and Labrador, Nova Scotia, Ontario, Quebec, and Saskatchewan. Three iCBT programs were identified through stakeholder feedback.

In relation to the Decision Problems, the characteristics of the iCBT programs that were identified through this environmental scan could help inform decisions as to whether iCBT should be offered. Additionally, the barriers and facilitators identified may be factors that should guide the implementation of iCBT.

According to the results of the literature search, survey, and stakeholder feedback, there are at least 16 iCBT programs available or in development in various jurisdictions in Canada that support patients with chronic non-cancer pain. The characteristics of these programs vary in terms of the level of therapist involvement, overall program length, number and length of modules, and topics covered. All of the programs require internet access. Most of the programs are therapist-assisted or therapist directed with the level of therapist involvement ranging from as needed support to facilitation/delivery of the program.

The results of the survey highlighted some of the operational considerations of iCBT programs for the management of chronic non-cancer pain in Canada. Survey respondents identified a variety of patient-related, clinician-related, and organizational factors that act as facilitators or barriers to the implementation of iCBT. Commonly identified facilitators to iCBT implementation included reaching patients that would otherwise be unreachable, improvement in patients' experiences, efficiency (in clinical practice and use of resources), and convenience for patients. Commonly identified barriers to iCBT included privacy concerns, preference for in-person or other treatment options (of both patients and clinicians), patients' lack of familiarity with technology, and patients' lack of available devices or adequate internet connection.

Additionally, survey respondents identified patient groups that may require specific considerations when considering access to iCBT, such as people living in rural/remote settings and people unfamiliar with or without access to technology. Lack of access to adequate internet/technology was highlighted as a barrier to iCBT for these patients. Potential facilitators that were identified for these groups were enabling content to be available offline, providing funding for technology resources, and learning sessions on the use of technology.

The findings of this environmental scan were informed by the results of a limited literature search and survey distributed to stakeholders involved with iCBT programs that support patients with chronic non-cancer pain in Canada. Alternative research methods such as a systematic review or broader stakeholder engagement approach would provide a more comprehensive understanding around the operational considerations for the implementation of iCBT for the management of chronic non-cancer pain in Canada.

Limitations

This environmental scan presents an overview of iCBT programs for the management of chronic non-cancer pain in Canada, their characteristics, and related operational aspects. The findings are based on a survey and limited literature search. A comprehensive systematic review was not conducted as part of this environmental scan.

The survey was distributed directly to 30 stakeholders identified by CADTH. However, since the survey was distributed through our targeted efforts as well as referrals, the exact number of stakeholders who received the survey was not quantifiable. A total of 13 responses were received and included in the analysis (2 partial responses and 11 complete responses). Since the survey was sent to stakeholders identified by CADTH, it is likely that not all relevant stakeholders were identified and contacted. CADTH was not able to identify stakeholders from the following jurisdictions: Prince Edward Island, Northwest Territories, Nunavut, or Yukon. The survey results are based on a small sample of respondents that is not representative of all stakeholders across Canadian jurisdictions. Additionally, respondents were only able to answer the survey questions based on personal experiences with the iCBT program they are involved with. The responses may not reflect all iCBT programs available in Canada. The survey was not sent to people with lived experience with chronic pain and therefore, the perspectives of people with lived experience with chronic pain were not captured in the survey results. However, insights on iCBT from the perspective of people with lived experience with chronic pain were explored in the Patients' Experiences component of this HTA. Information on the clinical evidence supporting the iCBT programs was not collected as part of this Environmental Scan. The clinical evidence supporting iCBT programs for patients with chronic non-cancer pain was evaluated in the Clinical Review component of this HTA.

The literature search identified 3 websites that provided descriptions of iCBT programs available in Canada; however, no publications were identified that provided information on the operational considerations of iCBT programs that support patients with chronic non-cancer pain.

Considering these limitations, it is likely that not all iCBT programs that support patients with chronic non-cancer pain that are available in Canada were identified by this Environmental Scan.

Discussion

Overview

The evidence assessed across this report is intended to support Canadian jurisdictions faced with addressing the following decision problems:

1. With a view to increasing access to CBT-based therapy, the purpose of this HTA is to inform decisions as to whether iCBT should be offered as a treatment option, as part of a multidisciplinary approach, in the delivery of care for chronic non-cancer pain when CBT would otherwise be provided.

2. Additionally, if evidence demonstrates that iCBT should be offered, the HTA could also inform whether there are criteria to guide decision-making regarding the suitability of iCBT for various pain conditions and people experiencing chronic pain, or other factors that should guide its implementation.

To address these decision problems using the evidence presented in this report, we first discuss risks for decision-makers to consider when deciding whether to offer iCBT as a treatment option in the context of multidisciplinary chronic pain care. Then, we detail factors that might guide the implementation of this intervention in Canadian jurisdictions by suggesting potential strategies that may mitigate these risks.

Discussion

Should iCBT be a treatment option in multidisciplinary Chronic Pain Care?

The findings from the clinical review suggest that the available evidence on the balance of comparative benefits of iCBT versus in-person CBT is very uncertain and does not provide a reliable indication of how these treatments may compare. Additionally, we identified no evidence regarding the comparative safety of iCBT versus in-person CBT for the management of chronic non-cancer pain. However, when imagined within the contexts of multidisciplinary care, people living with chronic pain who participated in our interview study could see how iCBT might become a helpful tool as they worked to “live better” with their pain.

None of the evidence evaluated in this HTA can provide an answer to the question of whether iCBT *should (or should not)* be offered as a treatment option when in-person CBT would otherwise be offered. Again, while there may be potential for the use of iCBT for chronic non-cancer pain, the reported evidence suggests a series of risks that decision-makers will need to navigate as they consider whether iCBT is appropriate for implementation in their jurisdictions. Based on the evidence assessed for the various components included in this HTA, we understand these risks to be associated with uncertainty around the comparability between iCBT and in-person CBT in clinical benefit, the limited availability of publicly-funded multidisciplinary chronic non-cancer pain care across jurisdictions, and the potential for iCBT to be used in a manner that could cause further harm.

Risk 1: Uncertain Benefits

In our clinical review of the available evidence comparing iCBT to in-person CBT we located only 4 small trials of adults with chronic pain across which the certainty of evidence for all outcomes at posttreatment and at longest follow-up was very low due to very serious concerns related to risk of bias and large imprecision across most outcome-comparisons. Some comparisons were also affected by serious indirectness (i.e., there were differences across study arms that may have confounded the main comparison of interest) and unexplained heterogeneity. The very low certainty suggests that the evidence does not provide a reliable indication of the true comparative treatment effect, and that there is a very high likelihood that the true effect of iCBT vs. in-person CBT could be substantially different than what is shown by the 4 included studies. Additionally, the generalizability of our findings to all people with chronic pain and all types and modes of delivery of iCBT is uncertain as the included clinical trials were specific to a small subset of

chronic non-cancer pain populations (i.e., veterans with nonterminal pain conditions, adult females with fibromyalgia, and adults with daily back pain or nonspecific chronic pain) and we located no evidence about the comparative effectiveness of iCBT vs. in-person CBT among children, people specifically living in rural or remote areas, or specific disadvantaged groups for whom the effect of iCBT compared to in-person CBT could differ. As such, there is a risk that available evidence might be interpreted in ways that overemphasize the potential comparability of iCBT and in-person CBT while downplaying the uncertainty of this potential. There is also the risk that the availability of iCBT would preferentially improve access to some groups and not others, widening existing inequities.

Risk 2: Absence of Multidisciplinary Chronic Pain Care

While the low quality of available clinical evidence comparing iCBT to in-person CBT makes it challenging to speak definitively about the comparative effectiveness of iCBT versus in-person CBT, evidence from the Patients' Experiences study indicates that neither iCBT nor in-person CBT are likely to be supportive if prescribed in isolation from a larger field of multidisciplinary practice. This is consistent with current recommendations and strategies to address pain, which emphasize the need for multidisciplinary care approaches that target the many dimensions of pain and can improve treatment outcomes.[2,4,10] However, this is a risk needing direct consideration because, in practice, timely access to comprehensive multidisciplinary chronic pain care is not a norm across Canada.[2,11,39]

Risk 3: Potential to actively cause harm

Providing funding for iCBT without simultaneously improving multidisciplinary care programming across a jurisdiction runs the risk of expecting more of iCBT than it can offer. Paired with an absence of any high-quality clinical data around the comparability of iCBT and in-person CBT for chronic pain, we found no safety data on the potential comparative harms of iCBT versus in-person CBT. Jurisdictions considering iCBT should be aware that little is known about the safety of iCBT relative to in-person CBT for people living with chronic pain. Additionally, very little empirical evidence is available about the safety of in-person CBT itself,[20] so making indirect inferences from that treatment modality to iCBT is not possible.

Women interviewed in the Patients' Experiences study were concerned about a slippage between iCBT being available as a component of multidisciplinary care and iCBT becoming a "quick fix" option for providers with limited training in chronic pain. Referring someone to iCBT too early as a "quick fix" solution for chronic pain before identifying and treating its physical cause may harm a person by delaying the identification and treatment of the "root cause" of the pain, and might potentially prolong pain unnecessarily. Offering iCBT before addressing the "root cause" may also validate a person's concerns that health care providers may not take their pain or their experiences seriously.

Factors to guide implementation

Despite the risks detailed above (i.e., uncertainty of actual benefit, limited access to true multidisciplinary care, and potential for iCBT to cause further harm), some decision-makers may still choose to pursue publicly funded iCBT for chronic pain in circumstances where in-person CBT would otherwise be offered. As such, prioritizing the careful examination of these risks, and how they might be mitigated in practice, is vital to implementing iCBT programs that have the best chance of supporting people living with chronic pain. This HTA cannot provide a thorough and succinct list of what this mitigation will look like for each jurisdiction but, based on the evidence assessed across this review, we can highlight areas for consideration.

Risk 1: Uncertain Benefit – Mitigation Considerations

Importance of future research

One way of mitigating the risks associated with uncertainty around the comparability of iCBT and in-person CBT is to conduct further research on the comparative clinical effectiveness of iCBT versus in-person CBT. We would encourage future clinical studies to use more rigorous methodological approaches (e.g., robust participant allocation methods, and a priori protocols), deliberately collect safety data, make direct comparisons of iCBT and in-person CBT without other differences across treatment groups (e.g., the use of group and individual CBT across different study arms), and to strive to lower participant drop out rates. Given the first decision

problem being considered for this HTA is focused on whether iCBT could be an alternative to in-person CBT, future non-inferiority studies should use clinically meaningful and justified non-inferiority margins when testing the non-inferiority of iCBT vs. in-person CBT. We also encourage investigators of future trials to use consistent outcome measures, particularly those from core outcome domains that have been identified as clinically important.[98] This would facilitate comparisons across clinical studies and quantitative synthesis in systematic reviews. And finally, additional studies across heterogeneous populations, including children and underserviced populations, are needed, as the current clinical evidence can not be used to draw inferences on whether the effect of iCBT versus in-person CBT might vary by pain condition or population and does not provide insight on how iCBT could impact potential health inequities.

Dropout and how that might be mitigated

However, we also understand jurisdictions currently struggling to meet the care and treatment needs of people living with chronic pain might be looking for a more immediate option. So, for those decision-makers considering implementing iCBT despite the uncertain clinical evidence on the anticipated balance of benefits and harms, we encourage them to consider how high rates of study dropout might be understood and potentially mitigated.

Across all 3 included RCTs[65-67] participants being treated with iCBT were more likely to withdraw prior to study completion than those receiving in-person CBT. This is similar to findings from CADTH's Optimal Use of iCBT for PTSD where participants treated with iCBT were at a higher risk of dropout than those allocated to comparators (i.e., waitlist or usual care).[80] In that review, qualitative data suggested the higher dropout rates could potentially be connected to poorly developed therapeutic relationships and divergent, or untailored, treatment goals.[80] Evidence from the Patients' Experiences section of this HTA leads us to suggest that dropout from iCBT (or in-person CBT) might be exacerbated if providers are not specifically trained in chronic pain care or people are being prescribed iCBT (or CBT) before a sense of "readiness" has been reached.

Unlike CADTH's previous reviews assessing the use of iCBT for mood and anxiety disorders or PTSD,[80,99] pain (acute or chronic) is often rooted in the somatic. While MDD, anxiety and PTSD might be accompanied by physical comorbidities or symptoms, pain emerges as physical symptoms that can be exacerbated by cognitive and behavioural responses to that pain and sociocultural contexts. Attending to the biopsychosocial nature of chronic pain through comprehensive multidisciplinary care is vital to providing good care for people living with chronic pain. However, without an expertise, or at least specific training, in chronic pain as rooted in the body, people involved in the Patients' Experiences review worried that providers would struggle to be attentive to and understand the physical challenges of living with chronic pain. This could negatively impact the development of a strong and trusting therapeutic relationship and ultimately the ability of that provider to tailor the programming to the needs of the person living with pain. One way of attending to this challenge is by developing (or implementing) iCBT programs that are guided by therapists specifically trained in chronic pain (rather than unguided programs without therapist support). To be clear, we are not suggesting that this will resolve iCBT dropout or remove the risks of implementing iCBT in the absence of clear clinical evidence regarding the balance of benefits and harms, but it may help lessen them.

Fostering a sense of "readiness" might be a bit more challenging and require work beyond the implementation of a new iCBT program. In the Patients' Experiences section we describe readiness as an assemblage of treatment history, current care practices, material realities of one's condition, and individual needs or desires. This implies that building toward readiness for an intervention like iCBT happens from the moment someone presents with pain and continues throughout subsequent treatment (or lack thereof) experiences with the health care system. As such, developing a sense of readiness not only involves having access to comprehensive multidisciplinary care (which we discuss below), but also a demonstration that one's pain is believed and truly cared for by providers.

While we will talk about the importance of comprehensive, multidisciplinary chronic pain care in the next section, here we would suggest the importance of building pain care strategies that incorporate principles of trauma-informed care. Given a growing understanding of the pervasiveness of trauma in people's lives, the principles of trauma-informed care are meant to be applied throughout both clinical and organizational practice to support people seeking care regardless of whether there is a known history of traumatic experience.[100] This general application of trauma-informed care practices was also identified in the ethics review of CADTH's Optimal Use on iCBT for PTSD where the author noted that "fulfilling the ethical obligations of nonmaleficence in the context of PTSD therapy requires an approach that is trauma informed."(p.89)[80] Considering that, like most of the women we spoke

with for the Patients' Experiences study, people living with chronic pain may have had past experiences of dismissal or neglect by health care providers and those in their social spheres[101] and that childhood trauma is a possible risk factor for developing chronic pain,[102,103] this seems just as important in the context of chronic pain as PTSD. While approaches to and conceptualizations of trauma-informed care may vary,[100,104,105] finding ways to incorporate these principles throughout chronic pain care regimens may support decision-makers hoping to mitigate iCBT dropout. To be clear, however, this is not an all-encompassing solution and will not eliminate the risks posed by uncertain clinical data.

Risk 2: Absence of Multidisciplinary Care – Mitigation Considerations

Given this limited availability of comprehensive multidisciplinary chronic pain care across Canadian jurisdictions, simply making iCBT programming available runs the risk of maintaining status quo and is unlikely to resolve gaps around access to chronic pain care. For iCBT to have the best chance at becoming a supportive component of care for those living with chronic pain, it is important that decision-makers take stock of multidisciplinary services currently available in their jurisdictions and develop plans toward improving services broadly.

As such, we suggest reviewing the Canadian Pain Tasks Force's final report, An Action Plan for Pain in Canada, as a starting point.[39] Goal #2 seems particularly relevant to this work in relation to iCBT as it includes specific recommendations around virtual care within the context of broader system reform.[39] CADTH's recent Environmental Scan on "Models of Care for Chronic Pain"[106] may be another helpful starting point for understanding how other jurisdictions are approaching the challenges of comprehensive chronic pain care.

Risk 3: Potential to Actively Cause Further Harm – Mitigation Considerations

Suitability

One obvious way to mitigate the risk of causing further harm with iCBT is by building guidelines for providers without specific training in chronic pain regarding who might be a suitable candidate for iCBT. Survey respondents to CADTH's Environmental Scan for this HTA suggested that people in crisis may require specific considerations and that iCBT may not be suitable for people who are actively suicidal. This resonates with findings from the Patients' Experiences section in which women described being unlikely to benefit from iCBT when in severe physical pain. However, more research is necessary to provide specific suggestions regarding who might be most likely to benefit from iCBT.

Therapeutic relationship, shared decision-making, assessment and program length, tailoring

Another way decision-makers might consider mitigating the risks of causing further harm is by ensuring any programming that is publicly available fosters strong therapeutic relationships, encourages shared decision-making practices, and can be tailored to the needs of the person living with chronic pain.

In the absence of evidence clearly supporting the comparative clinical effectiveness and safety of iCBT versus in-person CBT for chronic pain, jurisdictions should ensure that resources are in place to assess individuals' readiness to engage with the therapy and promote shared decision-making. As we have already noted in our response to Risk #1, building toward a sense of readiness to engage with an intervention like iCBT begins from the first moment someone presents with pain and can be encouraged by finding ways to approach pain care through principles of Trauma Informed Care. When at the point of considering engaging with iCBT, women we spoke with for the Patients' Experiences study emphasized that readiness is best assessed within the context of a strong, trusting, ongoing therapeutic relationship with a provider specializing in chronic pain.

Not only does the importance of therapeutic relationships resonate with findings from CADTH's previous reviews of iCBT,[80,99] but it also sets the ground work for attending to the ideals of shared decision-making[107] that were important to the women we spoke with for the Patients' Experiences study. In our conversations with these women, they emphasized the value of knowing specifics about the content of iCBT programs, the expected effort required, and how this effort might benefit them in the long run before engaging with iCBT. This takes time and cannot be rushed. For decision-makers interested in pursuing iCBT despite the risks detailed in this Discussion, demonstrating their care for people living with chronic pain might involve creating programming that accounts for this slower pace.

This might involve longer assessment periods where provider and person living with chronic pain can get to know each other before diving into the meat of iCBT programming. All the women we spoke with for the Patients' Experiences study noted an appreciation for synchronous and in-depth assessments, but 1 in particular described an appreciation for her assessment period that took place over a series of weeks and involved 10+ hours with a therapist. While this may not be attainable (or necessary) for publicly funded iCBT programming, it does point to the importance of an assessment that is both synchronous and thorough. Similarly, we may have no clinical data indicating when study participants began noticing benefits (if they did at all), but women from the Patients' Experiences study described how it may be helpful to reengage with iCBT programming multiple times before all the modules can begin to make sense with their lived realities. As the Environmental Scan indicates that current programming available in Canada lasts anywhere from 3 to 20 weeks, decision-makers may want to consider programming that is on the longer end of that spectrum or includes the opportunity to revisit specific modules.

In addition to pace of assessment and programming, decision-makers may want to consider how rigid available iCBT programming is before implementing a particular program. As with previous CADTH reviews of iCBT,[80,99] women we spoke with for the Patients' Experiences study emphasized that iCBT program content must be tailored to the needs and desires of the individual. Active tailoring might involve the ongoing availability of a provider who is able to assess and respond to their client's needs. To allow for this real-time tailoring, they anticipated guided, and at least partially synchronous, iCBT programs would most benefit them.

The Environmental Scan found that the level of provider involvement of the identified iCBT programs could be wide-ranging and included 'as needed' support, asynchronous messaging, periodic phone calls, and videoconference delivery of the iCBT program. Despite the lack of comparative clinical safety data of iCBT versus in-person CBT, if pursuing the implementation of iCBT, decision-makers might consider programs that incorporate elements such as close monitoring, consistent guidance from a therapist, and coordination with a person's primary health care provider.

Privacy Concerns, Technological Challenges, and Equity

Information collected through our interviews and our Environmental Scan also identified privacy as being an area of concern for people engaging with iCBT. It follows that offering iCBT may not be appropriate when a person cannot engage with content in a private location, or in contexts where programs do not have methods of collecting and storing personal information in a secure way. The women we interviewed noted that privacy concerns could be addressed through carefully considering how information is collected and stored, and vetting participants of group iCBTs.

Decision-makers might want to consider contexts where iCBT is not appropriate. In our Patients' Experiences study, the women interviewed noted that iCBT would not be appropriate in cases where an intended user has limited computer skills or limited access to required hardware, software, or a stable internet connection. The Environmental Scan identified similar barriers to engaging with iCBT (i.e., a lack of familiarity with technology, a lack of access to devices required for engagement, and a lack of stable internet connection, especially in rural locations).

Respondents to the Environmental Scan offered some suggestions as to potential ways to mitigating barriers to engaging with iCBT, including providing funding for personal devices, enabling content to be available offline, and providing learning sessions on the use of technology. Furthermore, personal factors identified in our Patients' Experiences study and Environmental Scan, including preferences for in-person treatment options or pain conditions limiting the use of the hands, may limit someone's ability or willingness to engage with iCBT. For these reasons, jurisdictions should consider that, if offering iCBT, the option to receive in-person CBT also remains available and accessible.

The assumption that the availability of iCBT will improve access to CBT-based therapy has not been questioned in this review, and the results did not enable an improved understanding of how the availability of iCBT could narrow or widen existing inequities in access to care. In the absence of this information, it would still seem important to ensure that available iCBT programs have an inclusive and accessible design, and are relevant for people from a variety of sociocultural backgrounds.[108] This may help to improve access for underserved groups, and people who would otherwise have difficulty accessing iCBT programs.[108]

Conclusions and Implications for Decision - or Policy-Making

In the first instance, this review sought to analyze the available evidence to help determine whether iCBT should be offered as part of a multidisciplinary care approach for the treatment of chronic non-cancer when in-person CBT would have otherwise been provided. The clinical review suggests that the available evidence which compares the benefits of the virtual and in-person forms of CBT is very uncertain. Additionally, the review did not find any evidence on the safety of iCBT versus in-person CBT. These findings do not allow for drawing an evidence-based conclusion regarding whether iCBT represents a comparable alternative to in-person CBT that should be offered when CBT would be otherwise prescribed to address the psychological care needs of individuals with chronic non-cancer pain.

There is clear indication that in developing strategies for chronic pain care, decision-makers increasingly recognize the importance of making available programs and services that are aimed at treating and managing the psychological dimension of pain. Speaking to that point, the environmental scan conducted as part of this review identified 16 iCBT programs that currently exist in various Canadian jurisdictions and there is information to suggest that more of these programs may be implemented in the future. Working to improve access to psychological treatment for pain by leveraging virtual forms of CBT seems to be a promising avenue that is worth exploring. The people living with chronic pain who participated in this review consider that iCBT has the potential to be a helpful treatment option if it is offered in conjunction with other interventions in a multidisciplinary pain care approach. At the same time, the findings of the review suggest that more research is needed to be able to understand if iCBT programs are responding to the psychological care needs of people with chronic pain and are achieving the desired outcomes when compared to CBT delivered in person.

In a second instance, the review sought to identify and examine criteria that can help guide decisions about who and what pain conditions iCBT is suitable for and other factors that decision-makers should consider as they proceed with or continue implementing iCBT programs despite the very uncertain evidence regarding clinical benefits. As is commonly the case with internet-delivered psychological interventions, aspects such the person's readiness, a provider specialized in care for the condition (i.e., chronic pain, in this case), the strength of the therapeutic relationship between the person receiving CBT and the provider, and tailoring the treatment to individual person's needs were identified in this review as notable factors that may impact the usefulness of iCBT programs. Additionally, iCBT programs are not suitable for people experiencing severe, untreated chronic pain or active suicidal ideation.

In examining the factors and considerations that should guide implementation of iCBT, this review adds to the body of literature that emphasizes the importance of a comprehensive multi-disciplinary approach for the treatment of chronic pain. As the availability of iCBT programs increases across Canadian jurisdictions, the findings of this review suggest that caution ought to be exercised not to view them on their own as a panacea for the ills that affect access to psychological care for pain in Canada. The review found that these programs appear to have limited ability to be helpful if they are offered as a 'quick fix', stand-alone intervention without providing access to other treatment options that may be more suitable and beneficial to the individual with chronic pain. The limited availability of multidisciplinary care programs for chronic pain in Canada is an issue that requires attention to improve the likelihood that iCBT programs would be better integrated with other pain treatments and be more helpful to people seeking care for this complex condition.

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Appendix 1: Literature Search Strategy

Clinical Literature Search

Overview

Interface: Ovid

Databases

- MEDLINE All (1946-present)
- Embase (1974-present)
- Cochrane Central Register of Controlled Trials (CCTR)
- APA PsycINFO (1806-present)

Note: Subject headings and search fields have been customized for each database. Duplicates between databases were removed in Ovid.

Date of search: September 27, 2021

Alerts: Monthly search updates until project completion

Search filters applied: Systematic reviews; meta-analyses; network meta-analyses; health technology assessments; randomized controlled trials; controlled clinical trials; and observational studies.

Limits

- Publication date limit: 2001-present
- Humans
- Language limit: English- and French-language
- Conference abstracts: excluded

Table 11: Syntax Guide

Syntax	Description
/	At the end of a phrase, searches the phrase as a subject heading
MeSH	Medical Subject Heading
exp	Explode a subject heading
*****	Before a word, indicates that the marked subject heading is a primary topic; or, after a word, a truncation symbol (wildcard) to retrieve plurals or varying endings
?	Truncation symbol for one or no characters only
adj#	Requires terms to be adjacent to each other within # number of words (in any order)
.ti	Title
.ab	Abstract
.kf	Author keyword heading word (MEDLINE)
.kw	Author keyword (Embase); keyword (CCTR)

Syntax	Description
.dq	Candidate term word (Embase)
.id	Key concept (PyscINFO)
.yr	Publication year
medall	Ovid database code: MEDLINE All, 1946 to present, updated daily
oemezd	Ovid database code; Embase, 1974 to present, updated daily
cctr	Ovid database code; Cochrane Central Register of Controlled Trials
psyh	Ovid database code; APA PyscINFO, 1806 to present, updated weekly

Multi-Database Strategy

1. exp Cognitive Behavioral Therapy/ or Psychotherapy/ or Desensitization, Psychologic/ or Implosive Therapy/ or Dialectical Behavior Therapy/
2. (((cognitive or behavio* or facilitate* or guided or saturat* or unguided or dialectical* or acceptance* or commitment* or metacognitive or meta cognitive or exposure*) adj2 (therap* or psychotherap* or psycho-therap*)) or cognitive behavio* or cognition therap* or CBT* or mindfullness* or behavioural activation* or behavioral activation*).ti,ab,kf,kw.
3. (self-manag* or selfmanag* or self-help* or selfhelp*).ti,ab,kf,kw.
4. ((psycholog* adj3 desensiti*) or imaginal flooding* or (imager* adj3 exposure*)).ti,ab,kf,kw.
5. ((exposure or flooding* or implosive or saturation) adj3 therap*).ti,ab,kf,kw.
6. or/1-5
7. Internet/ or internet-based intervention/ or exp Computers/ or Therapy, Computer-Assisted/ or Computer-Assisted Instruction/ or Distance Counseling/ or exp Cell Phone/ or Mobile Applications/ or telemedicine/ or remote consultation/ or exp Videoconferencing/ or Medical Informatics Applications/
8. (internet* or digital* or app or apps or computer* or cyber-therap* or cybertherap* or e mail* or email* or electronic mail* or "Information and communication technology" or "Information and communication technologies" or emedicine or e medicine or ehealth* or e health* or emental health* or e mental health* or etherap* or e therap* or epsychiatr* or e psychiatr* or epsychol* or e psychol* or media deliver* or mobile* or phone* or online* or telephone* or tele phone* or cell phone* or cellphone* or smartphone* or smart phone* or smart watch* or smartwatch* or telemedicine or tele medicine or telehealth* or tele health* or telemental health* or tele mental health* or telecare or tele care or teletherap* or tele therap* or telepsychiatr* or tele psychiatr* or telepsychol* or tele psychol* or telepsycho-therap* or tele-psycho-therap* or telepsychotherap* or tele-psychotherap* or tele-coach* or telecoach* or m health* or mhealth* or virtual or virtualist? or webbased or web based or web deliver* or webdeliver*).ti,ab,kf,kw.
9. or/7-8
10. (iCBT* or cCBT* or eCBT* or dCBT*).ti,ab,kf,kw.
11. ((internet* or computer* or cyber* or digital* or digital* or web*) adj6 (CBT* or CPT*)).ti,ab,kf,kw.
12. ((internet* or computer* or cyber* or digital* or digital* or web* or technolog*) adj6 (cognitive behavior* or cognitive behaviour* or cognitive process*) adj6 (coach* or deliver* or intervention* or psychiatr* or psycho-dynamic or

psychodynamic or psycholog* or psycho-therap* or psychotherap* or therap* or technique* or training or treatment*)).ti,ab,kf,kw.

13. (MoodGym* or Mood Gym* or Big White Wall* or Togetherall* or Together All* or "Beating the Blues*" or Fear Fighter* or FearFighter* or E compass* or Ecompass* or mycompass* or my compass* or Deprexis* or Moodkit* or Mood kit* or "Living Life to the Full*" or Woebot* or AbilitiCBT* or ALAViDA* or TruReach* or Tru Reach* or Beacon* or MindBeacon* or Mind Beacon* or i-Volve* or iVolve* or Interapy* or CBT-I Coach* or CBTi Coach* or CPT Coach* or Life Armor* or "T2 Mood Tracker*" or SilverCloud* or Silver Cloud* or "What's Up*" or MindShift* or Mind Shift* or MoodMission* or Mood Mission* or Depression CBT* or Brave Online* or "Camp Code A Lot*" or BounceBack* or Bounce Back* or Pacifica* or iCANCOPE* or "i can cope*" or WebMap* or ManageMyPain or "Manage My Pain*" or ABC-Schema* or ABCSchema* or Aventurine Mood Improver* or "Catch It*" or CBT Diary* or CBT Journal* or CBT Thought Record* or Cgoni or Cognitive Diary or Cognitive Styles* or End Anxiety Hypnosis or Good Blocks* or Happify* or Happy Habits* or Jitters CBT* or Joyable* or Lantern* or Merrier* or Mindbliss* or Moodpath* or MoodTools* or See Betty* or TF-CBT* OT TFCBT* or Wysa* or Youper*).ti,ab,kf,kw.

14. or/10-13

15. Chronic Pain/ or exp Neuralgia/ or Nociceptive Pain/ or Pain, Intractable/ or Pain, Referred/ or exp Myofascial Pain Syndromes/ or exp Pain, Postoperative/ or Fibromyalgia/ or exp Arthritis/ or exp Inflammatory Bowel Diseases/ or Endometriosis/

16. exp Chronic Disease/ and (Back Pain/ or Musculoskeletal Pain/ or exp Headache Disorders/ or exp Headache/ or exp Cumulative Trauma Disorders/)

17. ((pain or pains or paining or painful or ache or aches or aching) adj5 (chronic* or subacute* or sub-acute* or recurr* or re-curr* or unresolv* or persist* or intractable or refract* or severe* or debilitat* or nociceptive* or neuropathic* or superficial* or visceral or burning or crushing or migratory or radiat* or splitting or somatic* or constant* or continu* or widespread or non malignant* or nonmalignan* or non-cancer* or noncancer* or myofascial* or prolong* or sustain*)).ti,ab,kf,kw.

18. ((chronic* or recurr* or re-curr* or unresolv* or persist*) adj5 (headache* or head ache* or back* or carpal tunnel* or cubital tunnel* or cephalalgia* or hemicrania* or cephalodynia* or cephalgia*)).ti,ab,kf,kw.

19. ((pain or pains or paining or painful or ache or aches or aching) adj5 (migraine* or arthriti* or osteoarthriti* or polyarthriti* or endometrioma* or endometrioses or endometriosis or colitis* or crohn* or fibromyalgia* or post operat* or postoperat* or post surg* or postsurg* or phantom*)).ti,ab,kf,kw.

20. ((repetitive stress* or repetitive strain* or repetition stress* or repetition strain* or overuse cumulativ*) adj5 (injur* or syndrome* or trauma*)).ti,ab,kf,kw.

21. ((pain or pains or paining or painful or ache or aches or aching or compress* or entrap*) adj5 nerve*).ti,ab,kf,kw.

22. or/15-21

23. 6 and 9 and 22

24. 14 and 22

25. or/23-24

26. use medall

27. 25 use cctr

28. limit 27 to yr=2001-current

29. exp Cognitive Behavior Therapy/ or Cognitive Therapy/ or psychotherapy/ or implosive therapy/ or exp exposure therapy/ or Dialectical Behavior Therapy/ or Mindfulness/ or Mindfulness-Based Interventions/

30. (((cognitive or behavio* or facilitate* or guided or saturat* or unguided or dialectical* or acceptance* or commitment* or metacognitive or meta cognitive or exposure*) adj2 (therap* or psychotherap* or psycho-therap*)) or cognitive behavio* or cognition therap* or CBT* or mindfullness* or behavioural activation* or behavioral activation*).ti,ab,id.
31. (self-manag* or selfmanag* or self-help* or selfhelp*).ti,ab,id.
32. ((psycholog* adj3 desensiti*) or imaginal flooding* or (imager* adj3 exposure*)).ti,ab,id.
33. ((exposure or flooding* or implosive or saturation) adj3 therap*).ti,ab,id.
34. or/29-33
35. exp internet/ or digital interventions/ or exp computers/ or exp Computer Assisted Therapy/ or exp Computer Assisted Instruction/ or Computer Assisted Instruction/ or exp Mobile Phones/ or exp mobile phones/ or mobile applications/ or exp Telemedicine/
36. (internet* or digital* or app or apps or computer* or cyber-therap* or cybertherap* or e mail* or email* or electronic mail* or "Information and communication technology" or "Information and communication technologies" or emedicine or e medicine or ehealth* or e health* or emental health* or e mental health* or etherap* or e therap* or epsychiatr* or e psychiatr* or epsychol* or e psychol* or media deliver* or mobile* or phone* or online* or telephone* or tele phone* or cell phone* or cellphone* or smartphone* or smart phone* or smart watch* or smartwatch* or telemedicine or tele medicine or telehealth* or tele health* or telemental health* or tele mental health* or telecare or tele care or teletherap* or tele therap* or telepsychiatr* or tele psychiatr* or telepsychol* or tele psychol* or telepsycho-therap* or tele-psycho-therap* or telepsychotherap* or tele-psychotherap* or tele-coach* or telecoach* or m health* or mhealth* or virtual or virtualist? or webbased or web based or web deliver* or webdeliver*).ti,ab,id.
37. or/35-36
38. (iCBT* or cCBT* or eCBT* or dCBT*).ti,ab,id.
39. ((internet* or computer* or cyber* or digital* or digital* or web*) adj6 (CBT* or CPT*)).ti,ab,id.
40. ((internet* or computer* or cyber* or digital* or digital* or web* or technolog*) adj6 (cognitive behavior* or cognitive behaviour* or cognitive process*) adj6 (coach* or deliver* or intervention* or psychiatr* or psycho-dynamic or psychodynamic or psycholog* or psycho-therap* or psychotherap* or therap* or technique* or training or treatment*)).ti,ab,id.
41. (MoodGym* or Mood Gym* or Big White Wall* or Togetherall* or Together All* or "Beating the Blues*" or Fear Fighter* or FearFighter* or E compass* or Ecompass* or mycompass* or my compass* or Deprexis* or Moodkit* or Mood kit* or "Living Life to the Full*" or Woebot* or AbilitiCBT* or ALAViDA* or TruReach* or Tru Reach* or Beacon* or MindBeacon* or Mind Beacon* or i-Volve* or iVolve* or Interapy* or CBT-I Coach* or CBTi Coach* or CPT Coach* or Life Armor* or "T2 Mood Tracker*" or SilverCloud* or Silver Cloud* or "What's Up*" or MindShift* or Mind Shift* or MoodMission* or Mood Mission* or Depression CBT* or Brave Online* or "Camp Code A Lot*" or BounceBack* or Bounce Back* or Pacifica* or iCANCOPE* or "i can cope*" or WebMap* or ManageMyPain or "Manage My Pain*" or ABC-Schema* or ABCSchema* or Aventurine Mood Improver* or "Catch It*" or CBT Diary* or CBT Journal* or CBT Thought Record* or Cgoni or Cognitive Diary or Cognitive Styles* or End Anxiety Hypnosis or Good Blocks* or Happify* or Happy Habits* or Jitters CBT* or Joyable* or Lantern* or Merrier* or Mindbliss* or Moodpath* or MoodTools* or See Betty* or TF-CBT* OT TFCBT* or Wysa* or Youper*).ti,ab,id.
42. or/38-41
43. chronic pain/ or exp neuralgia/ or exp Neuropathic Pain/ or exp Myofascial Pain/ or exp Fibromyalgia/ or exp arthritis/ or exp colitis/ or irritable bowel syndrome/
44. chronic illness/ and (back pain/ or exp headache/ or somatoform pain disorder/ or exp musculoskeletal disorders/)
45. ((pain or pains or paining or painful or ache or aches or aching) adj5 (chronic* or subacute* or sub-acute* or recurr* or re-curr* or unresolv* or persist* or intractable or refract* or severe* or debilitat* or nociceptive* or neuropathic* or superficial* or

visceral or burning or crushing or migratory or radiat* or splitting or somatic* or constant* or continu* or widespread or non malignant* or nonmalignan* or non-cancer* or noncancer* or myofascial* or prolong* or sustain*)).ti,ab,id.

46. ((chronic* or recurr* or re-curr* or unresolv* or persist*) adj5 (headache* or head ache* or back* or carpal tunnel* or cubital tunnel* or cephalalgia* or hemicrania* or cephalodynia* or cephalgia*)).ti,ab,id.

47. ((pain or pains or paining or painful or ache or aches or aching) adj5 (migraine* or arthriti* or osteoarthriti* or polyarthriti* or endometrioma* or endometrioses or endometriosis or colitis* or crohn* or fibromyalgia* or post operat* or postoperat* or post surg* or postsurg* or phantom*)).ti,ab,id.

48. ((repetitive stress* or repetitive strain* or repetition stress* or repetition strain* or overuse cumulativ*) adj5 (injur* or syndrome* or trauma*)).ti,ab,id.

49. ((pain or pains or paining or painful or ache or aches or aching or compress* or entrap*) adj5 nerve*).ti,ab,id.

50. or/43-49

51. 34 and 37 and 50

52. 42 and 50

53. or/51-52

54. use psyh

55. exp cognitive behavioral therapy/ or "acceptance and commitment therapy"/ or exp mindfulness/ or psychotherapy/ or exp exposure therapy/

56. behavior therapy/ and cognitive therapy/

57. (((cognitive or behavio* or facilitate* or guided or saturat* or unguided or dialectical* or acceptance* or commitment* or metacognitive or meta cognitive or exposure*) adj2 (therap* or psychotherap* or psycho-therap*)) or cognitive behavio* or cognition therap* or CBT* or mindfullness* or behavioural activation* or behavioral activation*).ti,ab,kw,dq.

58. (self-manag* or selfmanag* or self-help* or selfhelp*).ti,ab,kw,dq.

59. ((psycholog* adj3 desensiti*) or imaginal flooding* or (imager* adj3 exposure*)).ti,ab,kw,dq.

60. ((exposure or flooding* or implosive or saturation) adj3 therap*).ti,ab,kw,dq.

61. or/55-60

62. internet/ or web-based intervention/ or exp computer/ or computer assisted therapy/ or e-counseling/ or exp mobile phone/ or exp mobile application/ or telemedicine/ or teleconsultation/ or telediagnosis/ or telemonitoring/ or telepsychiatry/ or teletherapy/ or videoconferencing/ or webcast/

63. (internet* or digital* or app or apps or computer* or cyber-therap* or cybertherap* or e mail* or email* or electronic mail* or "Information and communication technology" or "Information and communication technologies" or emedicine or e medicine or ehealth* or e health* or emental health* or e mental health* or etherap* or e therap* or epsychiatr* or e psychiatr* or epsychol* or e psychol* or media deliver* or mobile* or phone* or online* or telephone* or tele phone* or cell phone* or cellphone* or smartphone* or smart phone* or smart watch* or smartwatch* or telemedicine or tele medicine or telehealth* or tele health* or telemental health* or tele mental health* or telecare or tele care or teletherap* or tele therap* or telepsychiatr* or tele psychiatr* or telepsychol* or tele psychol* or telepsycho-therap* or tele-psycho-therap* or telepsychotherap* or tele-psychotherap* or tele-coach* or telecoach* or m health* or mhealth* or virtual or virtualist? or webbased or web based or web deliver* or webdeliver*).ti,ab,kw,dq.

64. or/62-63

65. (iCBT* or cCBT* or eCBT* or dCBT*).ti,ab,kw,dq.

66. ((internet* or computer* or cyber* or digital* or digital* or web*) adj6 (CBT* or CPT*)).ti,ab,kw,dq.

67. ((internet* or computer* or cyber* or digital* or digital* or web* or technolog*) adj6 (cognitive behavior* or cognitive behaviour* or cognitive process*) adj6 (coach* or deliver* or intervention* or psychiatr* or psycho-dynamic or psychodynamic or psycholog* or psycho-therap* or psychotherap* or therap* or technique* or training or treatment*)).ti,ab,kw,dq.

68. (MoodGym* or Mood Gym* or Big White Wall* or Togetherall* or Together All* or "Beating the Blues*" or Fear Fighter* or FearFighter* or E compass* or Ecompass* or mycompass* or my compass* or Deprexis* or Moodkit* or Mood kit* or "Living Life to the Full*" or Woebot* or AbilitiCBT* or ALAViDA* or TruReach* or Tru Reach* or Beacon* or MindBeacon* or Mind Beacon* or i-Volve* or iVolve* or Interapy* or CBT-I Coach* or CBTi Coach* or CPT Coach* or Life Armor* or "T2 Mood Tracker*" or SilverCloud* or Silver Cloud* or "What's Up*" or MindShift* or Mind Shift* or MoodMission* or Mood Mission* or Depression CBT* or Brave Online* or "Camp Code A Lot*" or BounceBack* or Bounce Back* or Pacifica* or iCANCOPE* or "i can cope*" or WebMap* or ManageMyPain or "Manage My Pain*" or ABC-Schema* or ABCSchema* or Aventurine Mood Improver* or "Catch It*" or CBT Diary* or CBT Journal* or CBT Thought Record* or Cgoni or Cognitive Diary or Cognitive Styles* or End Anxiety Hypnosis or Good Blocks* or Happify* or Happy Habits* or Jitters CBT* or Joyable* or Lantern* or Merrier* or Mindbliss* or Moodpath* or MoodTools* or See Betty* or TF-CBT* OT TFCBT* or Wysa* or Youper*).ti,ab,kw,dq.

69. or/65-68

70. chronic pain/ or exp neuralgia/ or nociceptive pain/ or intractable pain/ or referred pain/ or myofascial pain/ or postoperative pain/ or fibromyalgia/ or exp arthritis/ or exp colitis/ or exp inflammatory bowel disease/ or endometriosis/

71. chronic disease/ and (exp backache/ or musculoskeletal pain/ or exp "headache and facial pain"/ or exp cumulative trauma disorder/)

72. ((pain or pains or paining or painful or ache or aches or aching) adj5 (chronic* or subacute* or sub-acute* or recurr* or re-curr* or unresolv* or persist* or intractable or refract* or severe* or debilitat* or nociceptive* or neuropathic* or superficial* or visceral or burning or crushing or migratory or radiat* or splitting or somatic* or constant* or continu* or widespread or non malignant* or nonmalignan* or non-cancer* or noncancer* or myofascial* or prolong* or sustain*)).ti,ab,kw,dq.

73. ((chronic* or recurr* or re-curr* or unresolv* or persist*) adj5 (headache* or head ache* or back* or carpal tunnel* or cubital tunnel* or cephalalgia* or hemicrania* or cephalodynia* or cephalgia*)).ti,ab,kw,dq.

74. ((pain or pains or paining or painful or ache or aches or aching) adj5 (migraine* or arthriti* or osteoarthriti* or polyarthriti* or endometrioma* or endometrioses or endometriosis or colitis* or crohn* or fibromyalgia* or post operat* or postoperat* or post surg* or postsurg* or phantom*)).ti,ab,kw,dq.

75. ((repetitive stress* or repetitive strain* or repetition stress* or repetition strain* or overuse cumulativ*) adj5 (injur* or syndrome* or trauma*)).ti,ab,kw,dq.

76. ((pain or pains or paining or painful or ache or aches or aching or compress* or entrap*) adj5 nerve*).ti,ab,kw,dq.

77. or/70-76

78. 61 and 64 and 77

79. 69 and 77

80. or/78-79

81. use oemezd

82. not conference abstract.pt.

83. 26 or 54 or 82

84. (Randomized Controlled Trial or Controlled Clinical Trial or Pragmatic Clinical Trial or Clinical Study or Adaptive Clinical Trial or Equivalence Trial).pt.

85. (Clinical Trial or Clinical Trial, Phase I or Clinical Trial, Phase II or Clinical Trial, Phase III or Clinical Trial, Phase IV or Clinical Trial Protocol).pt.
86. Multicenter Study.pt.
87. Clinical Studies as Topic/
88. exp Clinical Trial/ or exp Clinical Trials as Topic/ or Clinical Trial Protocol/ or Clinical Trial Protocols as Topic/ or exp "Clinical Trial (topic)"/
89. Multicenter Study/ or Multicenter Studies as Topic/ or "Multicenter Study (topic)"/
90. Randomization/
91. Random Allocation/
92. Double-Blind Method/
93. Double Blind Procedure/
94. Double-Blind Studies/
95. Single-Blind Method/
96. Single Blind Procedure/
97. Single-Blind Studies/
98. Placebos/
99. Placebo/
100. Control Groups/
101. Control Group/
102. Cross-Over Studies/ or Crossover Procedure/
103. (random* or sham or placebo*).ti,ab,hw,kf,kw.
104. ((singl* or doubl*) adj (blind* or dumm* or mask*)).ti,ab,hw,kf,kw.
105. ((tripl* or trebl*) adj (blind* or dumm* or mask*)).ti,ab,hw,kf,kw.
106. (control* adj3 (study or studies or trial* or group*)).ti,ab,hw,kf,kw.
107. (clinical adj3 (study or studies or trial*)).ti,ab,hw,kf,kw.
108. (Nonrandom* or non random* or non-random* or quasi-random* or quasirandom*).ti,ab,hw,kf,kw.
109. (phase adj3 (study or studies or trial*)).ti,ab,hw,kf,kw.
110. ((crossover or cross-over) adj3 (study or studies or trial*)).ti,ab,hw,kf,kw.
111. ((multicent* or multi-cent*) adj3 (study or studies or trial*)).ti,ab,hw,kf,kw.
112. allocated.ti,ab,hw.
113. ((open label or open-label) adj5 (study or studies or trial*)).ti,ab,hw,kf,kw.
114. ((equivalence or superiority or non-inferiority or noninferiority) adj3 (study or studies or trial*)).ti,ab,hw,kf,kw.

115. (pragmatic study or pragmatic studies).ti,ab,hw,kf,kw.
116. ((pragmatic or practical) adj3 trial*).ti,ab,hw,kf,kw.
117. ((quasiexperimental or quasi-experimental) adj3 (study or studies or trial*)).ti,ab,hw,kf,kw.
118. trial.ti,kf,kw.
119. or/84-118
120. exp animals/
121. exp animal experimentation/
122. exp models animal/
123. exp animal experiment/
124. nonhuman/
125. exp vertebrate/
126. animal.po.
127. or/120-126
128. exp humans/
129. exp human experiment/
130. human.po.
131. or/128-130
132. 127 not 131
133. 119 not 132
134. epidemiologic methods.sh.
135. epidemiologic studies.sh.
136. observational study/
137. observational studies as topic/
138. clinical studies as topic/
139. controlled before-after studies/
140. cross-sectional studies/
141. historically controlled study/
142. interrupted time series analysis/
143. exp seroepidemiologic studies/
144. national longitudinal study of adolescent health/
145. cohort studies/

146. cohort analysis/
147. longitudinal studies/
148. longitudinal study/
149. prospective studies/
150. prospective study/
151. follow-up studies/
152. follow up/
153. followup studies/
154. retrospective studies/
155. retrospective study/
156. case-control studies/
157. exp case control study/
158. cross-sectional study/
159. observational study/
160. quasi experimental methods/
161. quasi experimental study/
162. single-case studies as topic/
163. (observational study or validation studies or clinical study).pt.
164. (observational adj3 (study or studies or design or analysis or analyses)).ti,ab,kf,kw.
165. cohort*.ti,ab,kf,kw.
166. (prospective adj7 (study or studies or design or analysis or analyses)).ti,ab,kf,kw.
167. ((follow up or followup) adj7 (study or studies or design or analysis or analyses)).ti,ab,kf,kw.
168. ((longitudinal or longterm or (long adj term)) adj7 (study or studies or design or analysis or analyses or data)).ti,ab,kf,kw.
169. (retrospective adj7 (study or studies or design or analysis or analyses or data or review)).ti,ab,kf,kw.
170. ((case adj control) or (case adj comparison) or (case adj controlled)).ti,ab,kf,kw.
171. (case-referent adj3 (study or studies or design or analysis or analyses)).ti,ab,kf,kw.
172. (population adj3 (study or studies or analysis or analyses)).ti,ab,kf,kw.
173. (descriptive adj3 (study or studies or design or analysis or analyses)).ti,ab,kf,kw.
174. ((multidimensional or (multi adj dimensional)) adj3 (study or studies or design or analysis or analyses)).ti,ab,kf,kw.
175. (cross adj sectional adj7 (study or studies or design or research or analysis or analyses or survey or findings)).ti,ab,kf,kw.
176. ((natural adj experiment) or (natural adj experiments)).ti,ab,kf,kw.

177. (quasi adj (experiment or experiments or experimental)).ti,ab,kf,kw.
178. ((non experiment or nonexperiment or non experimental or nonexperimental) adj3 (study or studies or design or analysis or analyses)).ti,ab,kf,kw.
179. (prevalence adj3 (study or studies or analysis or analyses)).ti,ab,kf,kw.
180. case series.ti,ab,kf,kw.
181. case reports.pt.
182. case report/
183. case study/
184. (case adj3 (report or reports or study or studies or histories)).ti,ab,kf,kw.
185. organizational case studies.sh.
186. or/134-185
187. (systematic review or meta-analysis).pt.
188. meta-analysis/ or systematic review/ or systematic reviews as topic/ or meta-analysis as topic/ or "meta analysis (topic)"/ or "systematic review (topic)"/ or exp technology assessment, biomedical/ or network meta-analysis/
189. ((systematic* adj3 (review* or overview*)) or (methodologic* adj3 (review* or overview*))).ti,ab,kf,kw.
190. ((quantitative adj3 (review* or overview* or synthes*)) or (research adj3 (integrati* or overview*))).ti,ab,kf,kw.
191. ((integrative adj3 (review* or overview*)) or (collaborative adj3 (review* or overview*)) or (pool* adj3 analy*)).ti,ab,kf,kw.
192. (data synthes* or data extraction* or data abstraction*).ti,ab,kf,kw.
193. (handsearch* or hand search*).ti,ab,kf,kw.
194. (mantel haenszel or peto or der simonian or dersimonian or fixed effect* or latin square*).ti,ab,kf,kw.
195. (met analy* or metanaly* or technology assessment* or HTA or HTAs or technology overview* or technology appraisal*).ti,ab,kf,kw.
196. (meta regression* or metaregression*).ti,ab,kf,kw.
197. (meta-analy* or metaanaly* or systematic review* or biomedical technology assessment* or bio-medical technology assessment*).mp,hw.
198. (medline or cochrane or pubmed or medlars or embase or cinahl).ti,ab,hw.
199. (cochrane or (health adj2 technology assessment) or evidence report).jw.
200. (comparative adj3 (efficacy or effectiveness)).ti,ab,kf,kw.
201. (outcomes research or relative effectiveness).ti,ab,kf,kw.
202. ((indirect or indirect treatment or mixed-treatment or bayesian) adj3 comparison*).ti,ab,kf,kw.
203. (meta-analysis or systematic review).md.
204. (multi* adj3 treatment adj3 comparison*).ti,ab,kf,kw.
205. (mixed adj3 treatment adj3 (meta-analy* or metaanaly*)).ti,ab,kf,kw.

206. umbrella review*.ti,ab,kf,kw.
207. (multi* adj2 paramet* adj2 evidence adj2 synthesis).ti,ab,kw,kf.
208. (multiparamet* adj2 evidence adj2 synthesis).ti,ab,kw,kf.
209. (multi-paramet* adj2 evidence adj2 synthesis).ti,ab,kw,kf.
210. or/187-209
211. 83 and 133
212. 83 and 186
213. 83 and 210
214. or/211-213
215. limit 214 to (english or french)
216. limit 215 to yr=2001-current
217. 28 or 216
218. remove duplicates from 217

Clinical Trials Registries

ClinicalTrials.gov

Produced by the U.S. National Library of Medicine. Targeted search used to capture registered clinical trials.
[Search -- Studies with results | iCBT OR cognitive therapy OR cognitive behavior OR cognitive behaviour OR behavior therapy OR acceptance therapy OR commitment therapy OR dialectical behavior OR dialectical therapy OR behavioral activation OR metacognitive therapy OR exposure-based | Recruiting, Not yet recruiting, Active, not recruiting, Completed, Enrolling by invitation, Unknown status Studies | pain OR headache OR migraine OR fibromyalgia OR arthritis OR osteoarthritis OR endometriosis]

WHO ICTRP

International Clinical Trials Registry Platform, produced by the World Health Organization. Targeted search used to capture registered clinical trials.
[Search terms -- (iCBT OR cognitive therapy OR cognitive behavior OR cognitive behaviour OR behavior therapy OR acceptance therapy OR commitment therapy OR dialectical behavior OR dialectical therapy OR behavioral activation OR metacognitive therapy OR exposure-based cognitive OR exposure therapy OR mindfulness) AND (pain OR headache OR migraine OR fibromyalgia OR arthritis OR osteoarthritis OR endometriosis)]

Health Canada's Clinical Trials Database

Produced by Health Canada. Targeted search used to capture registered clinical trials.
[Search terms – iCBT AND pain]

EU Clinical Trials Register

European Union Clinical Trials Register, produced by the European Union. Targeted search used to capture registered clinical trials.
[Search terms -- (iCBT OR "cognitive therapy" OR "cognitive behavior" OR "cognitive behaviour" OR "behavior therapy" OR "acceptance therapy" OR "commitment therapy" OR "dialectical behavior" OR "dialectical therapy" OR "behavioral activation" OR "metacognitive therapy" OR "exposure-based cognitive" OR "exposure therapy" OR mindfulness) AND (pain OR headache OR migraine OR fibromyalgia OR arthritis OR osteoarthritis OR endometriosis)]

Grey Literature

Search dates: October 12, 2021 – November 03, 2021

Keywords: (iCBT OR cognitive therapy OR cognitive behavior OR cognitive behaviour OR behavior therapy OR acceptance therapy OR commitment therapy OR dialectical behavior OR dialectical therapy OR behavioral activation OR metacognitive therapy OR

exposure-based cognitive OR exposure therapy OR mindfulness) AND (pain OR headache OR migraine OR fibromyalgia OR arthritis OR osteoarthritis OR endometriosis)

Limits: Publication years: 2001-present

Updated: Search updated prior to the completion of stakeholder feedback period

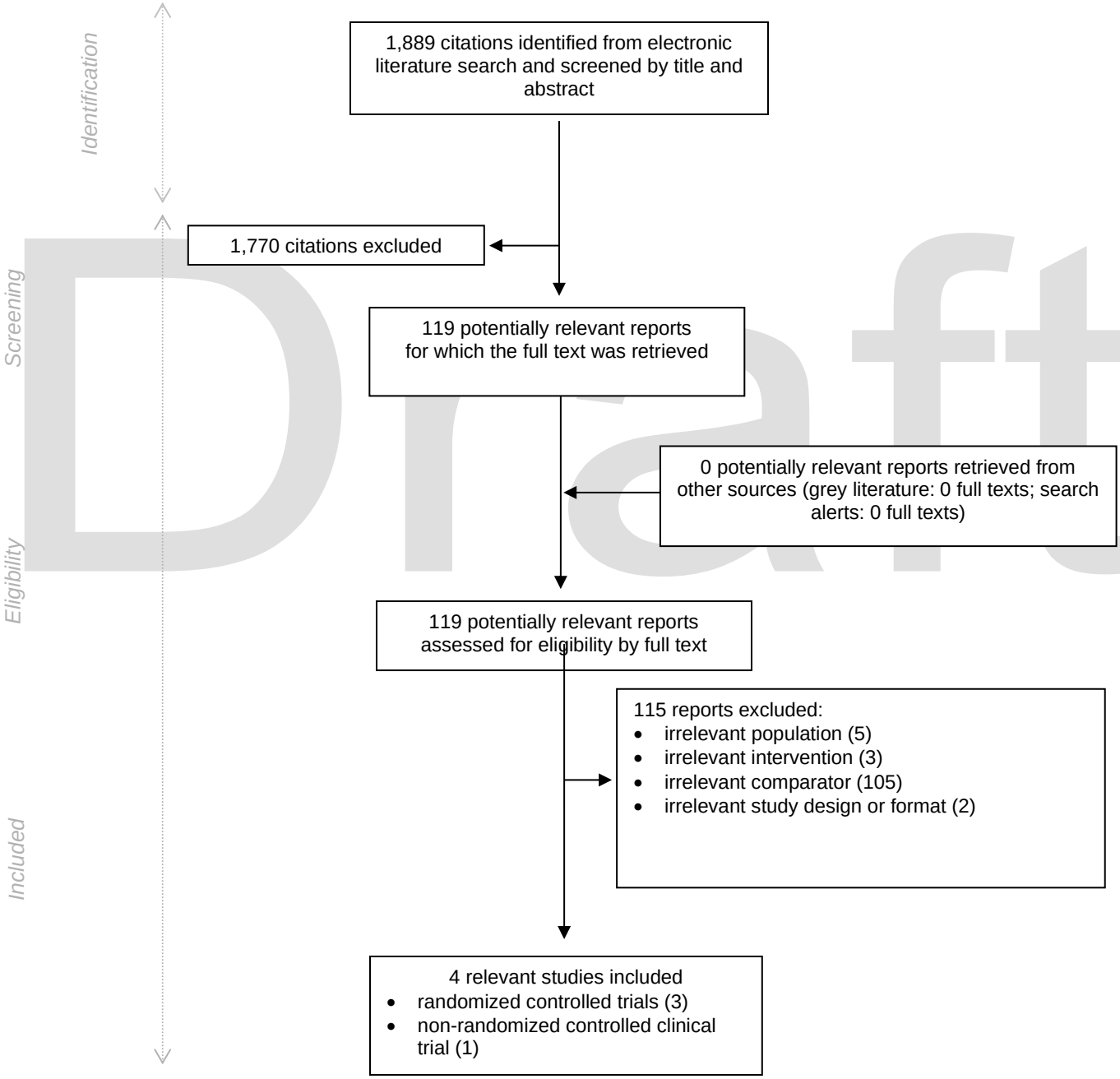
Relevant websites from the following sections of the CADTH grey literature checklist *Grey Matters: A Practical Tool for Searching Health-Related Grey Literature* were searched:

- Health Technology Assessment Agencies
- Clinical Practice Guidelines
- Clinical Trials Registries
- Databases (free)
- Health Statistics
- Internet Search
- Ethics
- Patient Involvement
- Open Access Journals

Appendix 2: Tables and Figures

Figure 1: PRISMA Flowchart of Selected Reports – Clinical Review

Alt text: 1,889 citations were identified in the electronic search. Following screening of titles and abstracts, 1,770 citations were excluded and 119 potentially relevant reports were retrieved for full-text review. No additional reports from the grey literature and search alerts were retrieved for full-text scrutiny. 115 were excluded for various reasons while 4 reports are included in the review.



Characteristics of Included Primary Trials — Clinical Review

Table 12: Study and Participant Characteristics of Included Primary Clinical Trials

Trial Citation,[a] Country, Funding Source	Trial Design and Setting	Participant Characteristics	Relevant Intervention and Comparator	Clinical Outcomes, Length of Follow-Up
Randomized Controlled Trials				
Herbert et al. (2017)[65] United States **Funding source**: US Department of Veterans Affairs	**Trial design**: Multicentre, open label, non-inferiority parallel-group RCT **Setting**: VA San Diego Healthcare System facilities (California, US). Participants were recruited between April 2010 and April 2013 using flyers, clinician referral, and word of mouth.	**Inclusion criteria**: Veterans (aged over 18 y) diagnosed with a chronic, nonterminal pain condition and exhibiting average pain severity and interference rated >4 of 10 over the past week (as measured using BPI) **Excluded**: Those with a serious or unstable medical or psychiatric condition or psychosocial instability that could impact trial participation; suicidal ideation; current participation in group psychotherapy for pain or individual psychotherapy of any type; previous ACT; or unwillingness to agree not to alter pain or mood treatments unless medically indicated **Number of participants**: 129 randomized and 128 analyzed; 82.2% male; mean (SD) age 52 (13.3) y **Most common pain conditions:** degenerative disc disease (43%), OA (20%), musculoskeletal pain (12%) **Common pain locations:** back (78%), upper extremity (48%), knee (45%), neck (38%), lower extremity (38%) (participants could report >1 pain location) **Duration of pain:** NR **Race:** White (47%), Black or African American (28%), Hispanic/Latino (14%), other (11%) **Medication usage:** psychotropic medications (55%), NSAIDs (53%), opioids (41%), muscle relaxants (20%) **Presence of comorbidities:** NR **Place of residence:** NR	Manualized ACT intervention for chronic pain with the help of at-home assignments. The ACT aimed to change participants' expectations from eliminating pain entirely to living as well as possible with chronic pain. Mindfulness exercises were designed to increase awareness of experiences other than pain. Metaphors and experiential exercises were used to encourage psychological and behavioral flexibility. Participants were encouraged to identify personal values, establish goals to improve quality of life and functioning, and live as well as possible with chronic pain. **Delivery method:** Individual videoconference sessions at a self-chosen VA site (intervention group [n=63]) or individual in-person sessions at the La Jolla Medical Centre (comparator group [n=65]) **Guidance:** Therapist-delivered ACT. **Number of sessions:** 8 weekly sessions **Treatment duration:** 60 minutes per week **Presence and type of concurrent interventions:** Both groups continued receiving usual care including medical	**Clinical Effectiveness Outcomes:** **Primary outcome**: - Pain interference (BPI Short Form Interference Subscale) **Secondary outcomes**: - Pain severity (BPI Pain Severity Subscale) - Mental and physical health-related quality of life (SF12-MCS and SF12-PCS) - Pain acceptance (CPAQ-R) - Activity level (MPI-Activity subscale on household chores, outdoor work, activities away from home, social activities) - Depression (PHQ-9) - Pain-related anxiety (PASS-20) - Sleep quality (PSQI) - Participant satisfaction (CSQ) - Individual participation **Safety Outcomes:** NR **Follow-up**: Participants were assessed at baseline,

Trial Citation,[a] Country, Funding Source	Trial Design and Setting	Participant Characteristics	Relevant Intervention and Comparator	Clinical Outcomes, Length of Follow-Up
		Demographic variables, pain conditions, and medication usage NR for each group.	treatment for pain (additional details for usual care NR)	mid-treatment, post-treatment, and 3 and 6 months after treatment completion
Vallejo et al. (2015)[67] Spain **Funding source**: Government of Spain	**Trial design**: Single centre, open label, parallel-group RCT **Setting**: Rheumatology Unit of the Institute of Rehabilitation at the Hospital Universitario "Gregorio Maranon" (Madrid, Spain). Methods used to recruit participants and the time period in which the trial was conducted were NR.	**Inclusion criteria:** Adults (aged 18 y and over) diagnosed with FM, exhibiting adequate reading comprehension, and with access and ability to use a computer **Excluded:** Those with a diagnosis of any mental health disorder, exhibiting suicidal ideation, prior or current psychological treatment for FM or other chronic pain syndromes, or surgery scheduled in the next 3 months **Number of participants**: 60 randomized and analyzed; 100% female; mean (SD) age 49.82 (11.01) y (intervention group) and 53.50 (8.56) y (comparator group) **Duration of FM diagnosis**: mean (SD) 8.6 (7.85) y (intervention group) and 8.8 (6.94) y (comparator group) **Duration of generalized pain**: mean (SD) 13.82 (9.89) y (intervention group) and 14.9 (11.07) y (comparator group) **Race:** NR **Medication usage**: NR **Presence of comorbidities**: NR **Place of residence**: NR	The main components of the CBT treatment protocol included psychoeducation about FM and pain, progressive relaxation training, emotional training, cognitive restructuring, and managing negative thoughts. Each session contained content, activities, and homework according to the multidimensional model of pain and multicomponent pain programs, with some adaptations for people with FM. **Delivery method:** Online application accessed individually (physical location of application access NR) (intervention group [n=20]) or in-person group sessions at the Rheumatology Unit of the Institute of Rehabilitation (comparator group [n=20]) **Guidance:** Therapist available for feedback and to respond to participants' online messages (synchronicity NR) (intervention group) or therapist-delivered CBT (comparator group) **Number of sessions:** 10 weekly sessions **Treatment duration:** Online modules made available in the appropriate week and remained available during the trial duration (time commitment for each module NR) (intervention group) or 120 minutes per week (comparator group) **Presence and type of concurrent interventions:** Both groups received	**Clinical Effectiveness Outcomes**: **Primary outcome**: - Global impact of FM (FIQ) **Secondary outcomes**: - General psychological distress (HADS) - Depression (BDI) - Pain experience (PCS) - Self-efficacy (CPSS) - Coping (CPCI) - Individual participation **Safety Outcomes:** NR **Follow-up**: Participants were assessed at baseline, post-treatment, and 3, 6 and 12 months after treatment completion

Trial Citation,[a] Country, Funding Source	Trial Design and Setting	Participant Characteristics	Relevant Intervention and Comparator	Clinical Outcomes, Length of Follow-Up
			standard care including conventional pharmacological treatments (additional details for standard care NR)	
de Boer et al. (2014)[66] The Netherlands **Funding source**: None	**Trial design**: Single centre, unblinded, non-inferiority parallel-group RCT **Setting**: Pain Centre of the University Medical Centre Groningen (Groningen, The Netherlands). Participants were recruited using clinician referral between October 2008 and September 2012.	**Inclusion criteria**: Adults (aged 18 y and over) with access to the Internet and nonspecific chronic pain and/or chronic pain for which no somatic treatment could be offered **Excluded**: Those with severe psychopathology (as measured by the Symptom Checklist 90 [cut-off score of 224] and a psychodiagnostic interview) or those that have not achieved primary education (since the course requires adequate reading and writing abilities and computer skills) **Number of participants**: 72 randomized and analyzed (50 completers also analyzed separately); 68.2% female (intervention group) and 60.7% female (comparator group); mean (SD) age 50.6 (10.7) y (intervention group) and 53.2 (11.7) y (comparator group) **Pain conditions:** NR **Common pain locations:** throughout the body (48.0%), head/neck (16.0%), back (10.0%), leg/hip/knee (10.0%), others (<10% each) **Origins of pain:** unknown (40.0%), strain (18.0%), accident (2.0%), pregnancy (2.0%), and other (38.0%) **Duration of pain:** mean (SD) 118.2 (121.7) months (intervention group) and 90.0 (77.1) months (comparator group) **Race:** NR **Medication usage:** NR **Presence of comorbidities:** NR **Place of residence:** NR Demographic variables, characteristics of pain, and pain duration data for 50 completers.	The "Learning to live with pain' course is described in a protocol and is focused on the cognitive-behavioural model of pain circle, which consists of various aspects of the pain experience (e.g., pain sensations, feelings, behaviour). Each session contained content, activities, and homework regarding various approaches used to escape this circle. **Delivery method:** Internet course accessed individually (physical location of Internet access NR) (intervention group [n=22]) or in-person group sessions in a meeting room at the hospital (comparator group [n=28]) **Guidance:** Psychologist available by email or telephone (intervention group) or psychologist-delivered CBT (comparator group) **Number of sessions:** 7 weekly sessions plus a booster session occurring 2 months after the last session **Treatment duration:** Online modules made available in the appropriate week (time commitment for each module and for how long each module is made available NR) (intervention group) or 120 minutes per week (comparator group) **Presence and type of concurrent interventions:** NR	**Clinical Effectiveness Outcomes:** **Primary outcome**: - Pain experience (PCS) **Secondary outcomes**: - Pain intensity (VAS Pain) - Pain interference (VAS Interference) - Fatigue (VAS Fatigue) - Pain coping, locus of control, and pain cognitions (PCCL) - Global health-related quality of life (RAND-36) - Participant satisfaction - Individual participation **Safety Outcomes:** NR **Follow-up**: Participants were assessed at baseline, immediately after the 7-week course (i.e., treatment completion), and immediately after the booster session 2 months after treatment completion
Non-Randomized Controlled Clinical Trial				

Trial Citation,[a] Country, Funding Source	Trial Design and Setting	Participant Characteristics	Relevant Intervention and Comparator	Clinical Outcomes, Length of Follow-Up
Mariano et al. (2021)[76] United States **Funding source**: None	**Trial design**: Single centre, open-label, parallel-group nRCT **Setting**: People attending Partners HealthCare hospital system (Boston, Massachusetts) who were interested in group CBT pain management were invited to participate in either arm of the trial. The time period in which the trial was conducted was NR.	**Inclusion criteria:** Adults (aged 18 to 90 y) with daily back pain for more than 3 months, pain intensity rated ≥4 on a 0 to 10 scale (details of scale NR), and ability to speak and understand English **Excluded:** Those with a current diagnosis of substance use disorder; diagnosis of bipolar disorder, schizophrenia, or other chronic psychotic condition that may impact trial participation; recent or scheduled back surgery in the next 4 months; current malignancy, infection, autoimmune disorder, or amyotrophic lateral sclerosis; visual or motor impairment that may impact computer usage; or any condition deemed by the investigators which may impact trial participation **Number of participants**: 93 participants self-selected their treatment condition and analyzed; 70.2% female (intervention group) and 57.8% female (comparator group); mean (SD) age 54.5 (14.3) y (intervention group) and 59.7 (13.0) y (comparator group) **Duration of pain:** mean (SD) 13.0 (10.6) y (intervention group) and NR (comparator group) **Race:** Caucasian (71.7%), Hispanic (17.4%), African-American (6.5%) (intervention group) and Caucasian (73.3%), Hispanic (4.3%), African-American (20.0%) (comparator group) **Medication usage:** NR **Presence of comorbidities:** NR **Place of residence:** NR	CBT intervention for chronic pain that included goal setting, skills training, relaxation exercises, group discussion, and practice assignments. Main topics discussed included Gate Control Theory, stress management, problem solving, social support, sleep and weight management, and relapse prevention. **Delivery method:** Group WebEx videoconference sessions accessed at home (intervention group [n=47]) or group in-person sessions (specific location NR) (comparator group [n=46]) **Guidance:** MD- or PhD-level licensed facilitator (intervention group) or PhD-level licensed facilitator (comparator group) **Number of sessions:** 8 weekly sessions **Treatment duration:** 120 minutes per week **Presence and type of concurrent interventions:** NR	**Clinical Effectiveness Outcomes:** **Primary outcomes**: - Pain intensity (BPI) - Pain interference (BPI Interference Subscale) - Anxiety and depression symptoms (HADS) - Physical function (ODI) - Prescription opioid misuse (COMM) **Secondary outcomes**: - Participant satisfaction (Helpfulness Questionnaire) - Individual participation **Safety Outcomes:** NR **Follow-up**: Participants were assessed at baseline and at 2 (intervention group) or 3 (comparator group) months after treatment completion

[a] Publications are organized according to trial design and in reverse chronological order.

ACT = acceptance and commitment therapy; BDI = Beck Depression Inventory; BPI = Brief Pain Inventory; CBT = cognitive behavioral therapy; COMM = Current Opioid Misuse Measure; CPAQ = Chronic Pain Acceptance Questionnaire-revised; CPCI = Chronic Pain Coping Inventory; CPSS = Chronic Pain Self-efficacy Scale; CSQ = Client Satisfaction Questionnaire; FIQ = Fibromyalgia Impact Questionnaire; FM = fibromyalgia; HADS = Hospital Anxiety and Depression Scale; iCBT = internet-delivered cognitive behavioral therapy; MPI = West Haven-Yale Multidimensional Pain Inventory; n = number of participants; NR = not reported; nRCT = non-randomized controlled clinical trial; NSAID = nonsteroidal anti-inflammatory drug; OA = osteoarthritis; ODI = Oswestry Disability Index; PASS-20 = 20-item Pain Anxiety Symptoms Scale-Short Form; PCCL = Pain Coping and Cognition List; PCS = Pain Catastrophizing Scale; PHQ-9 = 9-item Patient Health Questionnaire; PSQI = 19-item Pittsburgh Sleep Quality Index; RAND-36 = RAND 36-Item Health Survey; RCT = randomized controlled trial; SD = standard deviation; SF12-MCS = 12-Item Short Form Mental Component Summary; SF12-PCS = 12-Item Short Form Physical Component Summary; VA = Veteran Affairs; ; VAS = visual analogue scale; y = years.

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2897 **Table 13: Detailed Descriptions of Outcome Measurement Tools**

Measurement Tool	Description
BPI Short Form Pain Interference Subscale[109]	The BPI Short Form Interference Subscale consists of 7 items that evaluate the extent to which pain interferes with different aspects of life. A 0 (does not interfere) to 10 (completely interferes) scale was used to rate the degree of interference to general activity, mood, walking ability, normal work, relations with other people, sleep, and enjoyment of life.
BPI Pain Severity Subscale[109]	The BPI Pain Severity Subscale consists of 4 items that evaluate the severity of pain using a 0 (no pain) to 10 (pain as bad as you can imagine) scale. The 4 items include pain at its worst in the last 24 hours, pain at its least in the last 24 hours, pain on average, and pain right now.
SF12-MCS[110]	The Medical Outcomes Study SF12-MCS evaluates mental health-related quality of life outcomes (e.g., emotional well-being, social functioning). Scores for each item are recoded to a corresponding 0 to 100 scale with a higher score indicating a more favourable health state.
SF12-PCS[110]	The Medical Outcomes Study SF12-PCS evaluates physical health-related quality of life outcomes (e.g., physical functioning, role limitations due to physical health). Scores for each item are recoded to a corresponding 0 to 100 scale with a higher score indicating a more favourable health state.
CPAQ-R[111]	The CPAQ-R consists of 20 items that assess the degree to which respondents have accepted and adjusted to their pain in relation to their identity and lifestyle. Each item is scored on a 7-point Likert scale ranging from 0 (never true) to 6 (always true). The total score from all 20 items ranges from 0 to 120. Higher scores indicate higher levels of pain acceptance and predict better responses to rehabilitation programs.
MPI[112]	The MPI consists of 52 items forming 12 subscales, which evaluates pain interference, negative mood, pain intensity, life control, perceived support, responses of significant others, and activity level. MPI-Activity is a single measure that combines four subscales that assess different types of activities (i.e., household chores, outdoor work, activities away from home, social activities). Each item is scored from 0 to 6 and a general activity score is obtained by taking an average of all the scores. A higher score indicates a greater level of general activity.
PHQ-9[113]	Used to evaluate depressive symptoms, the PHQ-9 is based on Diagnostic and Statistical Manual of Mental Disorders Fourth Revision criteria for depressive disorders. Each item is scored from 0 (not at all) to 3 (nearly every day) with a total score ranging from 0 (none) to 27 (severe). A higher score indicates more severe depressive symptoms.
PASS-20[114]	Used to evaluate pain-related anxiety symptoms, the PASS-20 measures cognitive anxiety responses, escape and avoidance, fearful, thinking and physiological anxiety responses. Scores range from 0 (never) to 5 (always) for each item with total score ranging from 0 to 100. A higher score represents more severe anxiety symptoms.
PSQI[115]	The PSQI consists of 19 items and evaluates sleep quality to help distinguish good and poor sleepers. Each item is scored from 0 (no difficulty) to 3 (severe difficulty), which is added to yield a global score range of 0 to 21. A higher global score indicates more difficulty with sleep.
CSQ[116]	The CSQ consists of 8 items and measures treatment satisfaction. Each item is scored from 0 to 4, which is added to yield a total score ranging from 9 to 32. A higher total score indicates greater treatment satisfaction.
FIQ[117]	The FIQ consists of 10 items that evaluate the global impact of fibromyalgia on physical functioning, work status, depression, anxiety, sleep, pain, stiffness, fatigue, and well being. Since raw scores for the 10 items have different ranges, each of the 10 scores is normalized to range from 0 (no impairment) to 10 (maximum impairment). The total score ranges from 0 to 100, with a higher score indicating more impairment.

HADS[118]	The HADS consists of two subscales: anxiety (7 items) and depression (7 items). Scores for some items range from 0 (no not at all) to 3 (yes definitely), while other items are reverse scored ranging from 0 (yes definitely) to 3 (no not at all). The global HADS score is obtained by adding the anxiety and depression scales resulting in a range of 0 (no distress) to 42 (maximum distress).
BDI[119]	The BDI consists of 21 items used to evaluate the level of depression. Each item is scored from 0 to 3, with a total score ranging from 0 (no depression) to 63 (maximum depression).
PCS[120]	The PCS consists of 13 items across three subscales: rumination (4 items), magnification (3 items), and helplessness (6 items). The total score of the three subscales represents the global score of catastrophizing. Each item is scored from 0 (not at all) to 4 (all the time). Score ranges for rumination is 0 to 16, magnification is 0 to 12, helplessness is 0 to 24, and global score of catastrophizing is 0 (no pain catastrophizing) to 52 (maximum pain catastrophizing).
CPSS[121]	The CPSS consists of 22 items across three subscales: self-efficacy for pain management (5 items), self-efficacy for physical function (9 items), and self-efficacy for coping with symptoms (8 items). Scores for each subscale range from 10 (very uncertain) to 100 (very certain). A higher score indicates greater self-efficacy.
CPCI[122]	The CPCI 64-item scale (Jensen et al. 1995) uses 8 subscales to assess coping strategies. Scores ranged from 0 to 7, which indicates the total number of days that each coping strategy was used in the past week. These 8 subscales fall under two broad categories: illness-focused coping and wellness-focused coping. Responses to the illness-focused coping subscales (i.e., guarding, resting, asking for assistance) are considered maladaptive, where a lower score would indicate an improvement. Responses to the wellness-focused coping subscales (i.e., exercise/stretch, relaxation, task persistence, coping self-statements, and seeking social support) are considered adaptive, where a higher score would indicate an improvement.
VAS[66]	VAS scores ranged from 0 (not at all) to 10 (extremely). Three items were measured using VAS: pain intensity (How much pain did you experience during the last two days?); pain interference (To what extent did you experience interference in your daily activities because of your pain during the last two days?); and fatigue (How much fatigue did you experience during the last two days?).
PCCL[66]	The PCCL consists of 42 items that evaluate pain coping, locus of control, and pain cognitions. The PCCL contains four subscales: catastrophizing (higher score indicates more catastrophic thinking), pain coping (higher score indicates better coping), internal pain management (higher score indicates greater internal pain control), and external pain management (higher score indicates greater external pain control). Each item is scored from 1 to 6 and an average score is calculated to yield the subscale scores.
RAND-36[66]	Used to assess global health-related quality of life, RAND-36 consists of nine domains: physical functioning, social functioning, role impairment due to physical problems, role impairment due to emotional problems, mental health, vitality, pain, general health appraisal and perceived health change. Scores are recoded to a corresponding 0 to 100 scale for each domain with a higher score indicating better health.
ODI[123]	The ODI consists of 10 sections and is used to evaluate physical function and disability. Each section contains 6 statements with the first statement scored as 0 (no impairment) and the last statement scored as 5 (highest impairment). The total score ranges from 0 to 100.
COMM[124]	The COMM consists of 17 items and is used to identify people living with chronic pain currently on opioid therapy who may be misusing prescription opioids. Each item is scored from 0 (never) to 4 (very often) based on the respondent's behaviour in the past 30 days. The total score ranges from 0 to 68 with a cut-off score of ≥9 indicating a positive result (i.e., respondent may be misusing their opioid medication).

BDI = Beck Depression Inventory; BPI = Brief Pain Inventory; COMM = Current Opioid Misuse Measure; CPAQ-R = Chronic Pain Acceptance Questionnaire-Revised; CPCI = Chronic Pain Coping Inventory; CPSS = Chronic Pain Self-efficacy Scale; CSQ = Client Satisfaction Questionnaire; FIQ = Fibromyalgia Impact Questionnaire; HADS = Hospital Anxiety and Depression Scale; MPI = West Haven-Yale Multidimensional Pain Inventory; ODI = Oswestry Disability Index; PASS-20 = 20-item Pain Anxiety Symptoms Scale-Short Form; PCCL = Pain Coping and Cognition List; PCS = Pain Catastrophizing Scale; PHQ-9 = 9-item Patient Health Questionnaire; PSQI = 19-item Pittsburgh Sleep Quality Index; RAND-36 = Research and Development 36-Item Health Survey; SF12-MCS = Short Form 12-Item Mental Component Summary; SF12-PCS = Short Form 12-Item Physical Component Summary; VAS = visual analogue scale.

2904 ## Critical Appraisal of Included Primary Studies — Clinical Review

2905 ### Table 14: Risk of Bias in the Included Randomized Controlled Trials Assessed Using RoB 2

Study citation	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Herbert et al. (2017)[65]	**All outcomes: Low risk** 1.1 (Y). Allocation sequence was random (participants were assigned via random permuted blocks) 1.2 (Y). Allocation sequence was concealed until participants were enrolled and assigned to intervention 1.3 (PN). Probably no baseline differences between intervention groups did not suggest a problem with the randomization process	**All outcomes: Low risk** 2.1 (Y). Participants were aware of their assigned intervention during the trial (open-label) 2.2 (Y). Carers and people delivering the intervention were aware of the participants' assigned intervention during the trial (open-label) 2.3 (N). There were no reported deviations from the intended intervention that arose because of the trial context 2.6 (Y). Appropriate analysis was used to estimate the effect of assignment to intervention (ITT analysis)	**PI: High risk [ND]** **PC: High risk [ND]** **HRQoL: High risk [ND]** **PPFS: High risk [ND]** **Sleep: High risk [ND]** **PAL: High risk [ND]** **SC: High risk [ND]** **P: Low risk** 3.1 (N; Y for P). Across most outcomes (all except P), data were not available at 6 months for 35/64 (54.7%) and 18/65 (27.7%) participants assigned to iCBT and in-person CBT, respectively. Individual participation data was available for all enrolled participants 3.2 (N). There was no evidence (e.g., sensitivity analyses) to indicate that the results were not biased by missing outcome data 3.3 (Y). It is possible that missingness in the outcome depended on its true value 3.4 (PY). It is likely that missingness in the outcome depended on its true value.	**PI: High risk [?]** **PC: High risk [?]** **HRQoL: High risk [?]** **PPFS: High risk [?]** **Sleep: High risk [?]** **PAL: High risk [?]** **SC: High risk [?]** **P: Low risk** 4.1 (PN). Across all outcomes, the methods of measurement were probably appropriate (PI using BPI Interference; PC using BPI Pain Severity; HRQoL using SF12-MCS and SF12-PCS; PPFS using CPAQ-R, PHQ-9, and PASS-20; sleep using PSQI; PAL using MPI-Activity; SC using CSQ; PP using withdrawal rates) 4.2 (PN). It is not likely that the measurement or ascertainment of the outcome differed between intervention groups 4.3 (Y). Outcome assessors were aware of the intervention received by study participants. Most outcomes (all except for P) were self-reported. 4.4 (Y; N for P). The assessment of the outcome could have been influenced by knowledge of the intervention received (there is a high level of subjectivity for all outcomes assessed, excluding P) 4.5 (PY; N for P). Across most outcomes, it is likely that assessment of outcomes was influenced by knowledge of the intervention received	**All outcomes: Some concerns [ND]** 5.1 (NI). While a protocol for the trial was registered on ClinicalTrials.gov (NCT01055639), there was no information on whether the analysis plan was finalized before unblinded outcome data were available for analysis 5.2 (N). The numerical results being assessed were not likely to have been selected on the basis of results from multiple eligible outcome measurements within the outcome domain as the outcome measurements were pre-specified in the trial registry 5.3 (NI). There was no information available to judge if the numerical results being assessed were likely to have been selected on the basis of the results from multiple eligible analyses of the data	**P: Some concerns [?]** **All other outcomes: High risk [?]**

Vallejo et al. (2015)[67]	**All outcomes: High risk [+]** 1.1 (Y). Allocation sequence was random (participants were assigned using a computer-generated randomization schedule) 1.2 (NI). No information about whether the allocation sequence was concealed until participants were enrolled and assigned to interventions 1.3 (PY). The baseline differences between groups may suggest a problem with the randomization process (iCBT group seemed to have improved clinical status at baseline, such as decreased fibromyalgia-related impairment and less	**All outcomes: Low risk** 2.1 (Y). Participants were aware of their assigned intervention during the trial (open-label) 2.2 (Y). Carers and people delivering the intervention were aware of the participants' assigned intervention during the trial (open-label) 2.3 (N). There were no reported deviations from the intended intervention that arose because of the trial context 2.6 (Y). Appropriate analysis was used to estimate the effect of assignment to intervention (ITT analysis)	**HRQoL: Low risk** **PPFS: Low risk** **P: Low risk** 3.1 (Y). Across all outcomes, data was available for all, or nearly all participants randomized	**HRQoL: High risk [?]** **PPFS: High risk [?]** **P: Low risk** 4.1 (PN). Across all outcomes, the methods of measurement were probably not inappropriate (HRQoL using FIQ; PPFS using HADS, BDI, CPSS, PCS, and CPCI; P using lost to follow-up) 4.2 (PN). It is not likely that the measurement or ascertainment of the outcome differed between intervention groups 4.3 (Y). Outcome assessors were aware of the intervention received by study participants. Most outcomes (all except for P) were self-reported. 4.4 (Y; N for P). The assessment of the outcome could have been influenced by knowledge of the intervention received (there is a high level of subjectivity for all outcomes assessed, excluding P) 4.5 (PY; N for P). Across most outcomes, it is likely that assessment of outcomes was influenced by knowledge of the intervention received	**All outcomes: Some concerns [?]** 5.1 (NI). There was no information available to judge whether the data that produced the results were analyzed in accordance with a prespecified analysis plan that was finalized before unblinding of outcome data (i.e., there was no mention of a trial protocol) 5.2 (NI). There was no information available to judge if the numerical results being assessed were likely to have been selected on the basis of results from multiple eligible outcome measurements within the outcome domains 5.3 (NI). There was no information available to judge if the numerical results being assessed were likely to have been selected on the basis of the results from multiple eligible analyses of the data	**All outcomes: High risk [?]**

	severe depressive symptoms)					
de Boer et al. (2014)[66]	**All outcomes: Some concerns [?]** 1.1 (Y). Allocation sequence was random (participants were assigned using computer-generated permuted block randomization, with block sizes of 14) 1.2 (PY). Allocation sequence was likely concealed until participants were enrolled and assigned to intervention using sequential numbered, opaque, sealed envelopes (i.e., the block size was not likely deducible by trial personnel) 1.3 (PY). The baseline differences between groups may suggest a	**All outcomes: Low risk** 2.1 (Y). Participants were aware of their assigned intervention during the trial (open-label) 2.2 (Y). Carers and people delivering the intervention were aware of the participants' assigned intervention during the trial (open-label) 2.3 (N). There were no reported deviations from the intended intervention that arose because of the trial context 2.6 (Y). Appropriate analysis was used to estimate the effect of assignment to intervention (ITT analysis)	**PI: High risk [ND]** **PC: High risk [ND]** **HRQoL: High risk [ND]** **PPFS: High risk [ND]** **SC: High risk [ND]** **P: Low risk** 3.1 (N; Y for P). Across most outcomes (all except PP), data was not available at 14 weeks for 16/38 (42.1%) and 10/34 (29.4%) participants assigned to iCBT and in-person CBT, respectively. Individual participation data was available for all enrolled participants 3.2 (N). There was no evidence (e.g., sensitivity analyses) to indicate that the results were not biased by missing outcome data 3.3 (Y). It is possible that missingness in the outcome depended on its true value 3.4 (PY). It is likely that missingness in the outcome depended on its true value.	**PI: High risk [?]** **PC: High risk [?]** **HRQoL: High risk [?]** **PPFS: High risk [?]** **SC: High risk [?]** **P: Low risk** 4.1 (PN). Across all outcomes, the methods of measurement were probably appropriate (PI using VAS Interference; PC using VAS Pain; HRQoL using RAND-36; PPFS using PCS and PCCL; SC using an unnamed 10-point scale; P using attendance rates) 4.2 (PN). It is not likely that the measurement or ascertainment of the outcome differed between intervention groups 4.3 (Y). Outcome assessors were aware of the intervention received by study participants. Most outcomes (all except for P) were self-reported. 4.4 (Y; N for P). The assessment of the outcome could have been influenced by knowledge of the intervention received (there is a high level of subjectivity for all outcomes assessed, excluding P) 4.5 (PY; N for P). Across most outcomes, it is likely that assessment of outcomes was influenced by knowledge of the intervention received	**All outcomes: Some concerns [ND]** 5.1 (NI). There was no information available to judge whether the data that produced the results were analyzed in accordance with a prespecified analysis plan that was finalized before unblinding of outcome data (i.e., there was no mention of a trial protocol) 5.2 (NI). There was no information available to judge if the numerical results being assessed were likely to have been selected on the basis of results from multiple eligible outcome measurements within the outcome domains 5.3 (NI). There was no information available to judge if the numerical results being assessed were likely to have been selected on the basis of the results from multiple eligible analyses of the data	**P: Some concerns [?]** **All other outcomes: High risk [?]**

	problem with the randomization process (there were baseline imbalances in some characteristics, such as employment, length of pain, and origin of pain)					

BDI = Beck Depression Inventory; BPI = Brief Pain Inventory; CBT = cognitive behavioural therapy; CPAQ = Chronic Pain Acceptance Questionnaire-revised; CPCI = Chronic Pain Coping Inventory; CPSS = Chronic Pain Self-efficacy Scale; CSQ = Client Satisfaction Questionnaire; FIQ = Fibromyalgia Impact Questionnaire; HADS = Hospital Anxiety and Depression Scale; HRQoL = health-related quality of life; iCBT= internet-delivered cognitive behavioural therapy; MPI = West Haven-Yale Multidimensional Pain Inventory; N = no; NI = no information; NR = not reported; P = individual participation; PAL = physical activity level; PASS-20 = 20-item Pain Anxiety Symptoms Scale-Short Form; PC = pain control; PCCL = Pain Coping and Cognition List; PCS = Pain Catastrophizing Scale; PF = physical function; PHQ-9 = 9-item Patient Health Questionnaire; PI = pain interference; PPFS = psychological or psychosocial function or symptoms; PSQI = 19-item Pittsburgh Sleep Quality Index; PY = probably yes; RAND-36 = RAND 36-Item Health Survey; RoB 2 = Version 2 of the Cochrane Risk of Bias; SC = satisfaction with care; SF12-MCS = 12-Item Short Form Mental Component Summary; SF12-PCS = 12-Item Short Form Physical Component Summary; UoM = use of medication; VAS = visual analogue scale; Y = yes.

Note: the predicted direction of bias arising from each domain and the overall risk of bias is indicated in square brackets. [+] suggests the bias may favour the intervention (i.e., iCBT); [−] suggests the bias may favour the comparator (i.e., in-person CBT); [ND] suggests the bias may influence the result towards no difference between groups (i.e., favour the null hypothesis, or towards non-inferiority in non-inferiority trials); [?] suggests the predicted direction is unclear.

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Table 15: Risk of Bias in the Included Non-Randomized Study Assessed Using RoBANS

Study citation	Bias in target group comparisons	Bias in target group selection	Bias in consideration of confounders	Bias due to deviations from intended interventions	Bias in outcome assessment (assessors)	Bias in outcome measurement (tools)	Bias due to incomplete outcome data	Bias due to selective outcome reporting	Overall risk of bias
Mariano et al. (2021)[76]	**All outcomes: High risk [?]** Intervention groups differed in several baseline characteristics (e.g., pain, disability)	**All outcomes: Low risk** Participant recruitment strategy was consistent for both intervention groups (e.g., standardized inclusion and exclusion criteria were applied)	**All outcomes: High risk [?]** There was no adjustment in the analyses for potential confounders (e.g., age, body mass index, medication usage).	**All outcomes: Low risk** Participants and investigators were aware of the interventions, but it is unlikely that deviations from the intended intervention arose because of the trial context, and appropriate analysis was used.	**PI: High risk [?]** **PC: High risk [?]** **PPFS: High risk [?]** **PF: High risk [?]** **UoM: High risk [?]** **SC: High risk [?]** **P: Low risk** Outcome assessors were aware of the intervention received by study participants. For subjective outcomes (i.e., all except P), this is judged as potentially affecting outcomes	**PI: Low risk** **PC: Low risk** **PPFS: Low risk** **PF: Low risk** **UoM: Low risk** **SC: Low risk** **P: Low risk** Across all outcomes, the methods of measurement were probably appropriate (PI using BPI Interference; PC using BPI Pain; PPFS using HADS; PF using ODI; UoM using COMM; SC using an unnamed 7-item helpfulness questionnaire; P using attendance rates)	**PI: High risk [ND]** **PC: High risk [ND]** **PPFS: High risk [ND]** **PF: High risk [ND]** **UoM: High risk [ND]** **SC: High risk [ND]** **P: Low risk** Across most outcomes (all except PP), data was not available at 2 or 3 months for 15/47 (31.9%) and 24/46 (52.2%) participants assigned to iCBT and in-person CBT, respectively. Individual participation data was available for all enrolled participants	**All outcomes: Unclear [?]** Although the study reported on most of the expected main outcomes, there was no reference to a published protocol to confirm whether outcomes were selectively reported	**All outcomes: High risk [?]**

BPI = Brief Pain Inventory; CBT = cognitive behavioural therapy; COMM = Current Opioid Misuse Measure; HADS = Hospital Anxiety and Depression Scale; iCBT= internet-delivered cognitive behavioural therapy; ODI = Oswestry Disability Index; P = individual participation; PC = pain control; PF = physical function; PI = pain interference; PPFS = psychological or psychosocial function or symptoms; RoBANS = Risk of Bias for Non-Randomized Studies; SC = satisfaction with care; UoM = use of medication.
Note: the predicted direction of bias arising from each domain and the overall risk of bias is indicated in square brackets. [+] suggests the bias may favour the intervention (i.e., iCBT); [−] suggests the bias may favour the comparator (i.e., in-person CBT); [ND] suggests the bias may influence the result towards no difference between groups (i.e., favour the null hypothesis, or towards non-inferiority in non-inferiority trials); [?] suggests the predicted direction is unclear.

GRADE Summary of Findings — Clinical Review

Table 16: GRADE Summary of Findings Table for Pain Interference

Outcome Follow-up, no. participants (trials)	Findings	Certainty of the evidence (GRADE)	What happens?
Pain Interference Follow-up: posttreatment[65,66] and 2 months,[66,76] 3 months,[76] and 6 months[65] after treatment completion 293 (2 RCTs, 1 nRCT)	Three trials (2 RCTs,[65,66] 1 nRCT;[76] n = 293), all with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on pain interference at posttreatment and longest follow-up (2[66] to 6 months[65]). The trials included people with heterogeneous chronic pain conditions. Participants had a mean age of 50 to 59 y across trials, and in 2 trials the participants were primarily females (60-70%);[66,76] the third trial included only veterans who were primarily males (82%).[65] The CBT programs were highly variable; 2 trials compared content-matched VC ACT[65] or CBT[76] to IP ACT or CBT (the ACT was individual while the CBT was group-based). A third trial compared individual self-directed iCBT to content-matched group IP CBT.[66] Across the 3 trials, there may be little-to-no difference in change in pain interference from baseline to posttreatment and the longest follow-up in pain interference, as measured by the BPI Interference Subscale (0 = does not interfere to 10 = completely interferes)[65,76] or VAS Interference Scale (0 = not at all to 10 = extremely).[66] Mean differences in change scores (reported or calculated*) were in the range of less than 1 point on these scales, with SDs indicating that neither treatment was favoured over the other.	⨁⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for indirectness and imprecision.[a]	There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain interference at posttreatment, but the evidence is very uncertain. There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain interference at the longest follow-up, but the evidence is very uncertain.

ACT = Acceptance and Commitment Therapy; BPI = Brief Pain Inventory; CBT = cognitive behavioural therapy; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; nRCT = non-randomized controlled clinical trial; RCT = randomized controlled trial; SD = standard deviation; VAS = visual analogue scale; VC = videoconference; vs. = versus.

Explanations:

* Calculation methods for mean changes are described in the Data Analysis and Synthesis section of this report.

[a] Pain Interference: rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcomes (participant reported subjective outcomes); no serious concerns for inconsistency; rated down once due to serious concerns for indirectness because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group) in 1 trial; rated down once due to serious concerns about imprecision, which was difficult to judge due to a lack of between-group comparisons, but findings across groups had wide within-group SDs; publication bias was not detected.

Table 17: GRADE Summary of Findings Table for Pain Control

Outcome Follow-up, no. participants (trials)	Findings	Certainty of the evidence (GRADE)	What happens?
Pain Control Follow-up: posttreatment[65,66] and 2 months,[66,76] 3 months,[76] and 6 months[65] after treatment completion 293 (2 RCTs, 1 nRCT)	Three trials (2 RCTs,[65,66] 1 nRCT;[76] n = 293), all with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on pain control at posttreatment and longest follow-up (2[66] to 6 months[65]). The trials included participants with heterogeneous chronic pain conditions. Participants had a mean age of 50 to 59 y across trials, and in 2 trials the participants were primarily females (60-70%);[66,76] the third trial included only veterans who were primarily males (82%).[65] The CBT programs were highly variable; 2 trials compared content-matched VC ACT[65] or CBT[76] to IP ACT or CBT (the ACT was individual while the CBT was group-based). A third trial compared individual self-directed iCBT to content-matched group IP CBT.[66] Across the 3 trials, there may be little-to-no difference in change in pain control from baseline to posttreatment and the longest follow-up in pain control, as measured by the BPI Severity Subscale (0 = no pain to 10 = pain as bad as you can imagine)[65,76] or VAS Pain Intensity Scale (0 = not at all to 10 = extremely).[66] Mean differences in change scores (reported or calculated*) were in the range of less than 1 point on these scales, with SDs indicating that neither treatment was favoured over the other.	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for indirectness and imprecision.[a]	There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain control at posttreatment, but the evidence is very uncertain. There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain control at the longest follow-up, but the evidence is very uncertain.

ACT = Acceptance and Commitment Therapy; BPI = Brief Pain Inventory; CBT = cognitive behavioural therapy; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; nRCT = non-randomized controlled clinical trial; RCT = randomized controlled trial; SD = standard deviation; VAS = visual analogue scale; VC = videoconference; vs. = versus.

Explanations:

* Calculation methods for mean changes are described in the Data Analysis and Synthesis section of this report.

[a] Pain Control: rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcomes (participant reported subjective outcomes); no serious concerns for inconsistency; rated down once due to serious concerns for indirectness because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group) in 1 trial; rated down once due to serious concerns about imprecision, which was difficult to judge due to a lack of between-group comparisons, but findings across groups had wide within-group SDs; publication bias was not detected.

Table 18: GRADE Summary of Findings Table for Health-Related Quality of Life or Overall Well-Being

Outcome Follow-up, no. participants (trials)	Findings	Certainty of the evidence (GRADE)	What happens?
HRQoL or overall well-being (change from baseline to posttreatment) Follow-up: posttreatment[65-67] and 2 months,[66] 3 months,[67] 6 months,[65,67] and 12 months[67] after treatment completion 240 (3 RCTs)	Three RCTs (n=240),[65-67] all with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on HRQoL or overall well-being at posttreatment. The trials included participants with heterogeneous chronic pain conditions. Participants had a mean age of 49 to 53 y across trials, and in 2 trials the participants were primarily females (60-100%);[66,67] the third trial included only veterans who were primarily males (82%).[65] The CBT programs were highly variable; 2 RCTs[66,67] compared content-matched individual self-directed iCBT to group IP CBT, while the third RCT compared content-matched individual VC ACT to individual IP ACT.[65] Across the 3 trials, there may be little-to-no difference in change in HRQoL or overall well-being from baseline to posttreatment, as measured by SF12-MCS and SF12-PCS (0 = less favourable to 100 more favourable health state),[65] FIQ (0 = no impairment to 100 = maximum impairment),[67] or RAND-36 (0 = worse to 100 = better health).[66] In two trials[65,66] there was no significant difference between groups in the change from baseline to post-program, with wide variation. In the last trial, there were no between-group comparisons, but within-group SDs suggested wide variation in scores across participants, and an overlap in the distribution of change scores across groups.[67]	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for indirectness and imprecision.[a]	There may be little-to-no difference in the effect of iCBT vs. IP CBT on HRQoL or overall well-being at posttreatment, but the evidence is very uncertain.
HRQoL or overall well-being (change from baseline to longest follow-up) Follow-up: posttreatment[65-67] and 2 months,[66] 3 months,[67] 6 months,[65,67] and 12 months[67] after treatment completion 240 (3 RCTs)	Three RCTs (n=240),[65-67] all with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on HRQoL or overall well-being at longest follow-up (2[66] to 12 months[67]). The trials included participants with heterogeneous chronic pain conditions. Participants had a mean age of 49 to 53 y across trials, and in 2 trials the participants were primarily females (60-100%);[66,67] the third trial included only veterans who were primarily males (82%).[65] The CBT programs were highly variable; 2 RCTs[66,67] compared content-matched individual self-directed iCBT to group IP CBT, while the third RCT compared content-matched individual VC ACT to individual IP ACT.[65] The results were heterogeneous with little-to-no difference in change in HRQoL or overall well-being from baseline to longest follow-up, as measured by SF12-MCS and SF12-PCS (0 = less favourable to 100 more favourable health state),[65] FIQ (0 = no impairment to 100 = maximum impairment),[67] or RAND-36 (0 = worse to 100 = better health),[66] in all trials with 2 exceptions. In 1 RCT, individual iCBT was favoured in 1 of the 9 RAND-36 subscales (perceived health change) at longest follow-up (calculated* mean change [SD] for individual iCBT and group IP CBT, completer analyses [ITT NR]: 22.50 [24.17] and 0 [32.67]).[66] In another RCT, individual iCBT was favoured in mean FIQ change from posttreatment to the longest follow-up (ANOVA analysis P<0.001).[67] In the final study, the calculated* mean changes (SD) in the RAND-36 role impairment physical domain were 21.45 (37.19) and 6.56 (30.97) for iCBT and IP CBT, respectively. No significant difference was found due to wide standard deviations (mean difference=14.89; P=0.218).	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for indirectness and imprecision.[b]	The findings for the effect of iCBT vs. IP CBT on HRQoL or overall well-being at the longest follow-up are heterogeneous, and the evidence is very uncertain.

ACT = Acceptance and Commitment Therapy; ANOVA = analysis of variance; CBT = cognitive behavioural therapy; FIQ = Fibromyalgia Impact Questionnaire; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; RAND-36 = Research and Development 36-Item Health Survey; RCT = randomized controlled trial; SD = standard deviation; SF12-MCS = Short Form 12-Item Mental Component Summary; SF12-PCS = Short Form 12-Item Physical Component Summary; VC = videoconference; vs. = versus.

Explanations:

* Calculation methods for mean changes are described in the Data Analysis and Synthesis section of this report.
[a] HRQoL or Overall Well-Being (change from baseline to posttreatment): rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcomes (participant reported subjective outcomes); no serious concerns for inconsistency; rated down once due to serious concerns for indirectness because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group) in 2 trials; rated down once due to serious concerns about imprecision, as between and within-group findings (when between-group were unavailable) were associated with wide variation; publication bias was not detected.
[b] HRQoL or Overall Well-Being (change from baseline to longest follow-up): rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcomes (participant reported subjective outcomes); no serious concerns for inconsistency; rated down once due to serious concerns for indirectness because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group) in 2 trials; rated down once due to serious concerns about imprecision, as between and within-group findings (when between-group were unavailable) were associated with wide variation;; publication bias was not detected.

2954 **Table 19: GRADE Summary of Findings Table for Psychological or Psychosocial Function or Symptoms**

Outcome Follow-up, no. participants (trials)	Findings	Certainty of the evidence (GRADE)	What happens?
Pain Acceptance Follow-up: posttreatment[65] and 6 months[65] after treatment completion 128 (1 RCT)	One RCT (n=128),[65] with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on pain acceptance at posttreatment and longest follow-up (i.e., 6 months). With an aim to change participants' expectations from living pain-free to living as well as possible with pain, this RCT compared individual VC ACT to individual IP ACT (content-matched) in veterans (82.2% male; mean age 52 y) with a chronic, nonterminal pain condition.[65] There may be little-to-no difference in change in pain acceptance from baseline to posttreatment and longest follow-up, as measured by CPAQ-R (0 to 120 with higher scores indicating higher levels of pain acceptance).[65] Mean differences in calculated* change scores were −1.84 (95% CI, −7.84 to 4.16) at posttreatment and 3.45 (95% CI, −3.13 to 10.03) at longest follow-up, with SDs indicating that neither treatment was favoured over the other.	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for inconsistency, indirectness and imprecision.[a]	There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain acceptance at posttreatment, but the evidence is very uncertain. There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain acceptance at the longest follow-up, but the evidence is very uncertain.
Anxiety, Depression, or General Psychological Distress (baseline to posttreatment) Follow-up: posttreatment[65,67] and 3 months,[67] 6 months,[65,67] and 12 months[67] after treatment completion 168 (2 RCTs)	Two RCTs (n=168),[65,67], both with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on anxiety, depression, or general psychological distress at posttreatment. The trials included participants with heterogeneous chronic pain conditions, and participants had a mean age of 49 to 53 y across trials. One trial included only veterans who were primarily males (82%),[65] while participants in the second trial were all female.[67] The CBT programs were highly variable; 1 trial compared individual VC ACT to individual IP ACT,[65] while the second trial compared individual self-directed iCBT to group IP CBT (all content-matched between groups).[67] Across the 2 trials, there may be little-to-no difference in change in anxiety, depression, or general psychological distress from baseline to posttreatment, as measured by PHQ-9 (0 to 27 with higher scores indicating more severe depressive symptoms),[65] PASS-20 (0 to 100 with higher scores representing more severe anxiety symptoms),[65] HADS (0 = no distress to 42 = maximum distress),[67] or BDI (0 = no depression to 63 = maximum depression).[67] Mean differences in change scores in one trial were −0.51 (95% CI, −2.42 to 1.40) on the PHQ-9 and −4.20 (95% CI, −10.58 to 2.17) on the PASS-20. In the second trial, calculated* the mean (SD) changes scores for iCBT and in-person CBT were −5.10 (3.22) and −1.51 (5.07) respectively for the HADS, and −6.52 (4.03) and −5.11 (6.06) respectively for the BDI.	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for indirectness and imprecision.[b]	There may be little-to-no difference in the effect of iCBT vs. IP CBT on anxiety, depression, or general psychological distress at posttreatment, but the evidence is very uncertain.

Anxiety, Depression, or General Psychological Distress (baseline to longest follow-up) Follow-up: posttreatment[65,67] and 2 months,[76] 3 months,[67,76] 6 months,[65,67] and 12 months[67] after treatment completion 261 (2 RCTs, 1 nRCT)	Three trials (2 RCTs,[65,67] 1 nRCT;[76] n=261), all with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on anxiety, depression, or general psychological distress at longest follow-up (3[76] to 12 months[67]). The trials included participants with heterogeneous chronic pain conditions. Participants had a mean age of 49 to 59 y across trials, and in 2 trials the participants were primarily females (57-100%);[67,76] the third trial included only veterans who were primarily males (82%).[65] The CBT programs were highly variable; 1 trial compared individual VC ACT to individual IP ACT,[65] 1 trial compared group VC CBT to group IP CBT,[76] and 1 trial compared individual self-directed iCBT to group IP CBT (all content-matched between groups).[67] The results were heterogeneous with little-to-no difference in change in anxiety, depression, or general psychological distress from baseline to longest follow-up, as measured by PHQ-9 (0 to 27 with higher scores indicating more severe depressive symptoms),[65] PASS-20 (0 to 100 with higher scores representing more severe anxiety symptoms),[65] HADS (0 = no distress to 42 = maximum distress),[67,76] or BDI (0 = no depression to 63 = maximum depression),[67] in 2 trials.[65,76] In 1 RCT, individual iCBT was favoured in mean BDI change from posttreatment to the longest follow-up (ANOVA analysis P=0.004).[67]In the other 2 trials, no significant between-group differences were reported. Mean differences in change scores (reported or calculated*) were 1.07 (PHQ-9), 4.01 (PASS-20), 5.41 (HADS), and 4.36 (BDI), with SDs indicating that neither treatment was favoured over the other.	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for indirectness and imprecision.[c]	There were heterogeneous results for the effect of iCBT vs. IP CBT on anxiety, depression, or general psychological distress at the longest follow-up, and the evidence is very uncertain.
Self-Efficacy Follow-up: posttreatment[67] and 3 months,[67] 6 months,[67] and 12 months[67] after treatment completion 40 (1 RCT)	One RCT (n=40),[67] with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on self-efficacy at posttreatment and longest follow-up (i.e., 12 months). With topics such as progressive relaxation training and cognitive restructuring, this RCT compared individual iCBT to group IP CBT (content-matched) in adults (individual iCBT: 100% female, mean age 49.82 y; group IP CBT: 100% female, mean age 53.50 y) with FM.[67] There may be little-to-no difference in change in self-efficacy from baseline to posttreatment and longest follow-up, as measured by CPSS (10 to 100 with higher scores indicating greater self-efficacy).[67] At posttreatment, mean change scores (SD) in global self-efficacy were calculated* to be 6.54 (13.96) and 3.55 (17.99) for individual iCBT and group IP CBT, respectively. At the longest follow-up, mean change scores (SD) in global self-efficacy were calculated* to be 7.65 (11.80) and −1.11 (17.21) for individual iCBT and group IP CBT, respectively.	⊕⊖⊖⊖ **VERY LOW** due to serious concerns for risk of bias, inconsistency, indirectness and imprecision.[d]	There may be little-to-no difference in the effect of iCBT vs. IP CBT on self-efficacy at posttreatment, but the evidence is very uncertain. There may be little-to-no difference in the effect of iCBT vs. IP CBT on self-efficacy at the longest follow-up, but the evidence is very uncertain.
Pain Experience (change from baseline to posttreatment)	Two RCTs (n=112),[66,67], both at high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on pain experience at posttreatment. One trial included people with nonspecific chronic pain or chronic pain for which somatic treatment could not be offered,[66] and the other included people affected by fibromyalgia.[67] Participants had a mean age of 49 to 53 y across trials; one trial enrolled only females,[67] and the other was a mixed population (60%	⊕⊖⊖⊖ VERY LOW due to very serious concerns for risk of bias, serious concerns	There may be little-to-no difference in the effect of iCBT vs. IP CBT on pain experience at

112 (2 RCTs)[66,67]	female).[66] The RCTs compared content-matched individual self-directed iCBT to group IP CBT, with CBT program content being variable.[66,67] Across the 2 RCTs, there may be little-to-no difference in the change from baseline to posttreatment in pain experience as measured by pain catastrophizing scales. In the trial by de Boer et al., ANOVA group x time analyses were not statistically significant on the PCS global pain catastrophizing scale.[66] Vallejo et al. did not statistically compare the change in PCS scores across groups, but changes in the global score and well as subscales of the PCS did not appear to differ substantially between groups, given wide variability (SDs) in change scores.[66,67]	for indirectness and imprecision.[e]	posttreatment, but the evidence is very uncertain.
Pain Experience (change from baseline to longest follow-up) Follow-up: 2[66] to 12[67] months after treatment completion 112 (2 RCTs)[66,67]	Two RCTs (n=112),[66,67], both at high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on pain experience at longest follow-up (2[66] to 12 months[67]). One trial included people with nonspecific chronic pain or chronic pain for which somatic treatment could not be offered,[66] and the other included people affected by fibromyalgia.[67] Participants had a mean age of 49 to 53 y across trials; one trial enrolled only females[67], and the other was a mixed population (60% female).[66] The RCTs compared content-matched individual self-directed iCBT to group IP CBT, with CBT program content being variable.[66,67] Across the 2 RCTs, the findings relating to change from baseline to longest follow-up in pain experience as measured by pain catastrophizing scales were heterogeneous. In the trial by de Boer et al., ANOVA group x time analyses were not statistically significant on the PCS global pain catastrophizing scale when comparing the change from baseline to 2 months posttreatment across groups.[66] Meanwhile, ANOVA group x time analyses for 12 months posttreatment relative to posttreatment in the Vallejo et al. trial were statistically significant (favoured iCBT) for global catastrophizing and 2 subscales (i.e., helplessness, magnification) (not statistically significant for the rumination subscales).[67] Findings showed maintenance or improvement in global catastrophizing as well as subscales of the PCS (rumination, helplessness, magnification) in the iCBT group. Meanwhile, in the IP CBT group, scores were maintained or worsened (magnification subscale) at 12 months posttreatment.[67]	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for inconsistency, indirectness and imprecision.[f]	The results were heterogeneous for the effect of iCBT vs. IP CBT on pain experience at the longest follow-up, and the evidence is very uncertain.
Coping with pain Follow-up: posttreatment[66,67] and 2 months,[66] 3 months,[67] 6 months,[67] and 12 months[67] after treatment completion 112 (2 RCTs)	Two RCTs (n=112),[66,67], both at high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on coping with pain at posttreatment. One trial included people with nonspecific chronic pain or chronic pain for which somatic treatment could not be offered,[66] and the other included people affected by fibromyalgia.[67] Participants had a mean age of 49 to 53 y across trials; one trial enrolled only females[67], and the other was a mixed population (60% female).[66] The RCTs compared content-matched individual self-directed iCBT to group IP CBT, with CBT program content being variable.[66,67] Across the 2 RCTs, there may be little-to-no difference in the change in coping with pain from baseline to posttreatment and longest follow-up (2[66] to 12 months[67]), as measured by various coping scales. In the trial by de Boer et al., ANOVA group x time analyses were not statistically significant (P>0.05) for the PCCL subscales related to coping with pain.[66] Vallejo et al. did not statistically compare the change in CPCI scores across groups, but changes in the global score and well as subscales of the CPCI did not appear to differ substantially between groups, given small within-group changes and some variation (SDs) in change scores.[67] Furthermore, ANOVA group x time analyses for 12 months posttreatment relative to posttreatment were not statistically significant (P>0.05) for any of the CPCI subscales.[67]	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns imprecision and indirectness.[g]	There may to be little-to-no difference in the effect of iCBT vs. IP CBT on coping with pain at posttreatment, but the evidence is very uncertain. There may be little-to-no difference in the effect of iCBT vs. IP CBT on coping with pain at the longest follow-up,

			but the evidence is very uncertain.
Fatigue Follow-up: posttreatment[66] and 2 months after treatment completion[66] 72 (1 RCT)	One RCT (n=72),[66] with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on fatigue at posttreatment and longest follow-up (i.e., 2 months). With a focus on the cognitive-behavioural model of pain circle, this RCT compared individual iCBT to group IP CBT (content-matched) in adults (individual iCBT: 68.2% female, mean age 50.6 y; group IP CBT: 60.7% female, mean age 53.2 y) with nonspecific chronic pain and/or chronic pain for which no somatic treatment could be offered.[66] There may be little-to-no difference in change in fatigue from baseline to posttreatment and longest follow-up, as measured by VAS Fatigue Scale (0 = not at all to 10 = extremely).[66] The calculated* mean change (SD) for individual iCBT and group IP CBT were −0.35 (2.44) and 0.02 (2.15) at posttreatment; and −0.43 (2.36) and 0.25 (2.28) at longest follow-up (completer analyses; ITT NR).[66]	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for inconsistency, indirectness and imprecision.[h]	There maybe little-to-no difference in the effect of iCBT vs. IP CBT on fatigue at posttreatment, but the evidence is very uncertain. There may be little-to-no difference in the effect of iCBT vs. IP CBT on fatigue at the longest follow-up, but the evidence is very uncertain.

ACT = Acceptance and Commitment Therapy; ANOVA = analysis of variance; BDI = Beck's Depression Inventory; CBT = cognitive behavioural therapy; CPAQ-R = Chronic Pain Acceptance Questionnaire-Revised; CPCI = Chronic Pain Coping Inventory; CPSS = Chronic Pain Self-efficacy Scale; HADS = Hospital Anxiety and Depression Scale; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; nRCT = non-randomized controlled clinical trial; PASS-20 = Pain Anxiety Symptoms Scale-Short Form 20-Item; PCS = Pain Catastrophizing Scale; PCCL = Pain Coping and Cognition List; PHQ-9 = Patient Health Questionnaire 9-Item; RCT = randomized controlled trial; SD = standard deviation; VAS = visual analogue scale; VC = videoconference; vs. = versus.

Explanations:

* Calculation methods for mean changes are described in the Data Analysis and Synthesis section of this report.

[a] Pain Acceptance: rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcome (participant reported subjective outcome); rated down once due to serious concerns for inconsistency because of limited of evidence of consistency as only one trial was available that reported on the outcome; rated down once due to serious concerns for indirectness because the trial involved only veterans and examined ACT (unclear generalizability); rated down once due to serious concerns about imprecision, because of wide between-group SDs; publication bias was not detected.

[b] Anxiety, Depression, or General Psychological Distress (change from baseline to posttreatment): rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcomes (participant reported subjective outcomes); no serious concerns for inconsistency; rated down once due to serious concerns for indirectness because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group) in 1 trial; rated down once due to serious concerns about imprecision, as between and within-group findings (when between-group were unavailable) were associated with wide variation; publication bias was not detected.

[c] Anxiety, Depression, or General Psychological Distress (change from baseline to longest follow-up): rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcomes (participant reported subjective outcomes); no serious concerns for inconsistency; rated down once due to serious concerns for indirectness because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group) in 1 trial; rated down once due to serious concerns about imprecision, as between group comparisons were associated with wide variation; publication bias was not detected.

[d] Self-Efficacy: rated down once for risk of bias due to serious concerns about the potential for bias in measurement of the outcome (participant reported subjective outcome); rated down once due to serious concerns for inconsistency because of limited of evidence of consistency as only one trial was available that reported on the outcome; rated down once due to serious concerns for indirectness, because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group) and all participants being female (generalizability concern); rated down once due to serious concerns about imprecision, which was difficult to judge due to a lack of between-group comparisons, but findings across groups had wide within-group SDs; publication bias was not detected.

[e] Pain Experience (change from baseline to posttreatment): rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcomes (participant reported subjective outcomes); no serious concerns about inconsistency; rated down once due to serious concerns about

indirectness because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group); rated down once due to serious concerns about imprecision, which was difficult to judge due to a lack of presentation of data for between-group findings in the two trials, but findings across groups had wide within-group SDs; publication bias not detected.

[f] Pain Experience (change from baseline to longest follow-up): rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcomes (participant reported subjective outcomes); rated down once due to serious concerns about inconsistency, as the findings of both trials differed, and it was not possible to credibly explain the differences in subgroup analysis due to the small number of included trials; rated down once due to serious concerns about indirectness because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group); rated down once due to serious concerns about imprecision, which was difficult to judge due to a lack of presentation of data for between-group findings in the two trials, but findings across groups had wide within-group SDs, though it is suspected based on available data (completers analysis) that at least some imprecision exists; publication bias not detected.

[g] Pain Coping: rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcomes (participant reported subjective outcomes); no serious concerns about inconsistency; rated down once due to serious concerns about indirectness because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group); rated down once due to serious concerns about imprecision, which was difficult to judge due to a lack of presentation of data for between-group findings in the two trials, but findings across groups had wide within-group SDs; publication bias not detected.

[h] Fatigue: : rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcome (participant reported subjective outcome); rated down once due to serious concerns for inconsistency because of limited of evidence of consistency as only one trial was available that reported on the outcome; rated down once due to serious concerns for indirectness, because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group); rated down once due to serious concerns about imprecision, difficult to judge due to a lack of presentation of data for between-group findings but within-group SDs were wide; publication bias was not detected.

Table 20: GRADE Summary of Findings Table for Sleep

Outcome Follow-up, no. participants (trials)	Findings	Certainty of the evidence (GRADE)	What happens?
Sleep Follow-up: posttreatment[65] and 6 months[65] after treatment completion 128 (1 RCT)	One RCT (n=128),[65] with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on sleep at posttreatment and longest follow-up (i.e., 6 months). With an aim to change participants' expectations from living pain-free to living as well as possible with pain, this RCT compared individual VC ACT to individual IP ACT (content-matched) in veterans (82.2% male; mean age 52 y) with a chronic, nonterminal pain condition.[65] There may be little-to-no difference in change in sleep from baseline to posttreatment and longest follow-up, as measured by PSQI (0 to 21 with higher scores indicating more difficulty with sleep).[65] At posttreatment, mean PSQI change scores (SD) were calculated* to be −0.69 (4.47) and −0.90 (4.08) for individual VC ACT and individual IP ACT, respectively. At the longest follow-up, mean PSQI change scores (SD) were calculated* to be −0.57 (4.79) and −0.70 (4.21) for individual VC ACT and individual IP ACT, respectively .	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for inconsistency, indirectness and imprecision.[a]	There may be little-to-no difference in the effect of iCBT vs. IP CBT on sleep at posttreatment, but the evidence is very uncertain. There may be little-to-no difference in the effect of iCBT vs. IP CBT on sleep at the longest follow-up, but the evidence is very uncertain.

ACT = Acceptance and Commitment Therapy; CBT = cognitive behavioural therapy; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; PSQI = Pittsburgh Sleep Quality Index; RCT = randomized controlled trial; SD = standard deviation; VC = videoconference; vs. = versus.

Explanations:

* Calculation methods for mean changes are described in the Data Analysis and Synthesis section of this report.

[a] Sleep: rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcome (participant reported subjective outcome); rated down once due to serious concerns for inconsistency because of limited of evidence of consistency as only one trial was available that reported on the outcome; rated down once due to serious concerns for indirectness because the trial involved veterans and examined ACT (unclear generalizability); rated down once due to serious concerns about imprecision, which was difficult to judge due to a lack of between-group comparisons, but within-group SDs were wide; publication bias was not detected.

Table 21: GRADE Summary of Findings Table for Physical Activity Level

Outcome Follow-up, no. participants (trials)	Findings	Certainty of the evidence (GRADE)	What happens?
Physical Activity Level (change from baseline to posttreatment) Follow-up: posttreatment[65] and 6 months[65] after treatment completion 128 (1 RCT)	One RCT (n=128),[65] with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on physical activity level at posttreatment. With an aim to change participants' expectations from living pain-free to living as well as possible with pain, this RCT compared individual VC ACT to individual IP ACT (content-matched) in veterans (82.2% male; mean age 52 y) with a chronic, nonterminal pain condition.[65] There may be little-to-no difference in change in MPI-Activity from baseline to posttreatment, as measured by MPI-Activity (0 to 6 with higher scores indicating greater levels of general activity).[65] At posttreatment, mean MPI-Activity change scores (SD) were calculated* to be 0.33 (0.96) and 0.18 (0.89) for individual VC ACT and individual IP ACT, respectively (mean difference=0.15).	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for inconsistency, indirectness and imprecision.[a]	There may be little-to-no difference in the effect of iCBT vs. IP CBT on physical activity level at posttreatment, but the evidence is very uncertain.
Physical Activity Level (change from baseline to longest follow-up) Follow-up: posttreatment[65] and 6 months[65] after treatment completion 128 (1 RCT)	One RCT (n=128),[65] with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on physical activity level at longest follow-up (i.e., 6 months). With an aim to change participants' expectations from living pain-free to living as well as possible with pain, this RCT compared individual VC ACT to individual IP ACT (content-matched) in veterans (82.2% male; mean age 52 y) with a chronic, nonterminal pain condition.[65] Individual IP ACT was favoured (P=0.03) in physical activity level at longest follow-up relative to baseline.[65] The calculated* mean change (SD) in MPI-Activity (0 to 6 with higher scores indicating greater levels of general activity) for individual VC ACT and individual IP ACT were −0.05 (1.01) and 0.26 (0.93), respectively (mean difference 0.31 [95% CI, 0.02 to 0.60]).	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for inconsistency, and indirectness.[b]	IP ACT may be favoured vs. IP ACT with respects to physical activity level at the longest follow-up, but the evidence is very uncertain.

ACT = Acceptance and Commitment Therapy; CBT = cognitive behavioural therapy; CI = confidence interval; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; MPI = West Haven-Yale Multidimensional Pain Inventory; RCT = randomized controlled trial; SD = standard deviation; VC = videoconference; vs. = versus.

Explanations:

* Calculation methods for mean changes are described in the Data Analysis and Synthesis section of this report.

[a] Physical Activity Level (change from baseline to posttreatment): rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcome (participant reported subjective outcome); rated down once due to serious concerns for inconsistency because of limited of evidence of consistency as only one trial was available that reported on the outcome; rated down once due to serious concerns for indirectness because the trial involved veterans and examined ACT (unclear generalizability); rated down once due to serious concerns about imprecision which was difficult to judge due to a lack of between-group comparisons, but within-group SDs were wide; publication bias was not detected.

[b] Physical Activity Level (change from baseline to longest follow-up): rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcome (participant reported subjective outcome); rated down once due to serious concerns for inconsistency because of limited of evidence of consistency as only one trial was available that reported on the outcome; rated down once due to serious concerns for indirectness because the trial involved veterans and examined ACT (unclear generalizability); no serious concerns about imprecision; publication bias was not detected.

Table 22: GRADE Summary of Findings Table for Physical Function

Outcome Follow-up, no. participants (trials)	Findings	Certainty of the evidence (GRADE)	What happens?
Physical Function Follow-up: 2 and 3 months after treatment completion[76] 93 (1 nRCT)	One nRCT (n=93),[76] with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on physical function at longest follow-up (i.e., 2 and 3 months). With topics such as stress management, social support, and relapse management, this nRCT compared group VC CBT to group IP CBT (content-matched) in adults (group VC CBT: 70.2% female, mean age 54.5 y; group IP CBT: 57.8% female, mean age 59.7 y) with chronic back pain.[76] There may be little-to-no difference in change in physical function from baseline to the longest follow-up, as measured by ODI (0 to 100 with higher scores indicating more impairment).[76] The mean ODI change scores (SD) were 0.1 (3.9) and 3.0 (5.8) for group VC CBT and group IP CBT, respectively.	⊕⊖⊖⊖ **VERY LOW** due to serious concerns for risk of bias, inconsistency, and imprecision.[a]	There may be little-to-no difference in the effect of iCBT vs. IP CBT on physical function at posttreatment, but the evidence is very uncertain. There may be little-to-no difference in the effect of iCBT vs. IP CBT on physical function at the longest follow-up, but the evidence is very uncertain.

CBT = cognitive behavioural therapy; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; nRCT = non-randomized controlled clinical trial; ODI = Oswestry Disability Index; SD = standard deviation; VC = videoconference; vs. = versus.

Explanations:

[a] Physical Function: rated down once for risk of bias due to very serious concerns about the potential for bias arising from incomplete outcome data and lack of consideration of confounders adjustment rated down once due to serious concerns for inconsistency because of limited evidence of consistency as only one trial reported the outcome; no serious concerns for indirectness; rated down once due to serious concerns about imprecision, which was difficult to judge due to a lack of between-group comparisons, but within-group SDs were wide; publication bias was not detected.

Table 23: GRADE Summary of Findings Table for Changes in Use of Pharmacotherapy

Outcome Follow-up, no. participants (trials)	Findings	Certainty of the evidence (GRADE)	What happens?
Prescription Opioid Misuse Follow-up: 2 and 3 months after treatment completion[76] 93 (1 nRCT)	One nRCT (n=93),[76] with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on prescription opioid misuse at longest follow-up (i.e., 2 and 3 months). With topics such as stress management, social support, and relapse management, this nRCT compared group VC CBT to group IP CBT (content-matched) in adults (group VC CBT: 70.2% female, mean age 54.5 y; group IP CBT: 57.8% female, mean age 59.7 y) with chronic back pain.[76] There may be little-to-no difference in prescription opioid misuse at longest follow-up, as measured by COMM (0 to 68 with a cut-off score of ≥9 indicating that the respondent may be misusing their opioid medication).[76] The mean COMM change scores (SD) were 1.4 (5.4) and 3.1 (5.0) for group VC CBT and group IP CBT, respectively.	⊕⊖⊖⊖ **VERY LOW** due to serious concerns for risk of bias, inconsistency, and imprecision.[a]	There may be little-to-no difference in the effect of iCBT vs. IP CBT on prescription opioid misuse at posttreatment, but the evidence is very uncertain. There may be little-to-no difference in the effect of iCBT vs. IP CBT on prescription opioid misuse at the longest follow-up, but the evidence is very uncertain.

CBT = cognitive behavioural therapy; COMM = Current Opioid Misuse Measure; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; nRCT = non-randomized controlled clinical trial; SD = standard deviation; VC = videoconference; vs. = versus.

Explanations:

[a] Prescription Opioid Misuse: rated down once for risk of bias due to very serious concerns about the potential for bias arising from incomplete outcome data and lack of consideration of confounders; rated down once due to serious concerns for inconsistency because of limited of evidence of consistency because only one trial reported the outcome; no serious concerns for indirectness; rated down once due to serious concerns about imprecision which was difficult to judge due to a lack of between-group comparisons, but within-group SDs were wide ; publication bias was not detected.

Table 24: GRADE Summary of Findings Table for Satisfaction with Care

Outcome Follow-up, no. participants (trials)	Findings	Certainty of the evidence (GRADE)	What happens?
Satisfaction with Care 200 (2 RCTs[65,66])	Two RCTs (n=200),[65,66] both with high risk of bias (predicted direction of bias unclear), reported on the impact of iCBT vs. IP CBT on satisfaction with care. The trials included participants with heterogeneous chronic pain conditions, and participants had a mean age of 50 to 53 y across trials. One trial included only veterans who were primarily males (82%),[65] while participants in the second trial were primarily females (60-68%).[66] The CBT programs were highly variable; 1 trial compared individual VC ACT to individual IP ACT,[65] while the second trial compared individual self-directed iCBT to group IP CBT (all content-matched between groups).[66] There may be little-to-no difference between groups in satisfaction with care.[65,66] In 1 trial, mean (SD) in CSQ for individual VC ACT and individual IP ACT were 4.40 (0.57) and 4.47 (0.41), respectively (P=0.53).[65] In the second trial, mean (SD) in overall course rating (1 = very bad to 10 = excellent) for individual iCBT and group IP CBT were 7.37 (1.50) and 7.46 (0.78), respectively (P=0.800).[66] Furthermore, participants rated the degree (very well to very bad) to which they were able to proceed independently with the course instructions (statistical comparison NC); 0% of participants responded “very well,” 55% responded “well,” 40% responded “reasonably well,” 0% responded “badly,” and 5% responded “very badly” in the individual iCBT group, while 12.5% responded “very well,” 37.5% responded “well,” 41.7% responded “reasonably well,” 8.3% responded “badly,” and 0% responded “very badly” in the group IP CBT group.[66]	⊕⊖⊖⊖ **VERY LOW** due to very serious concerns for risk of bias, serious concerns for indirectness.[a]	There may be little-to-no difference in the effect of iCBT vs. IP CBT on satisfaction with care, but the evidence is very uncertain.

CBT = cognitive behavioural therapy; CI = confidence interval; CSQ = Client Satisfaction Questionnaire; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; RCT = randomized controlled trial; SD = standard deviation; VC = videoconference; vs. = versus.

Explanations:

[a] Satisfaction with Care: rated down twice for risk of bias due to very serious concerns about the potential for bias arising from a large quantity of missing outcome data and bias in measurement of the outcomes (participant reported subjective outcomes); no serious concerns for inconsistency; rated down once due to serious concerns for indirectness because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group) in 1 trial; no serious concerns about imprecision; publication bias was not detected.

Table 25: GRADE Summary of Findings Table for Individual Participation

Outcome Follow-up, no. participants (trials)	Individual Participation	Certainty of the evidence (GRADE)	What happens?
Individual Participation 333 (3 RCTs,[65-67] 1 nRCT[76])	Two RCTs[65,66] with some risk of bias, and 1 RCT[67] and 1 nRCT[76] with high risk of bias, all with unclear predicted direction of bias, reported on individual participation (n=333). The trials included people with heterogeneous chronic pain conditions, and participants had a mean age of 49 to 59 y across trials. In 3 trials the participants were primarily females (57-100%);[66,67,76] the fourth trial included only veterans who were primarily males (82%).[65] The CBT programs were highly variable; 2 trials compared content-matched VC ACT[65] or CBT[76] to IP ACT or CBT (the ACT was individual while the CBT was group-based), while 2 trials compared individual self-directed iCBT to content-matched group IP CBT.[66,67] The results on individual participation were heterogeneous with higher withdrawal rates in the iCBT vs. IP CBT group in 3 RCTs (46% vs. 23%,[65] 20% vs. 15%,[67] and 33.3% vs. 6.7%[66]), and lower withdrawal rates in the iCBT vs. IP CBT group in the 1 nRCT (14.9% vs. 34.8%).[76] Furthermore, results on attendance rates (when reported) were heterogeneous with higher attendance rates (i.e., 95.2% vs. 46.4% attended all modules) in the iCBT vs. IP CBT group in 1 RCT,[66] and little-to-no difference in attendance rates (i.e., mean sessions attended [SD] iCBT 5.2 [2.9] vs. IP CBT 4.1 [3.4], P=0.09) in the 1 nRCT.[76]	⊕⊖⊖⊖ **VERY LOW** due to serious concerns for risk of bias, indirectness, and imprecision.[a]	The results were heterogenous about the effect of iCBT vs. IP CBT on individual participation, but the evidence is very uncertain.

ACT = Acceptance and Commitment Therapy; CBT = cognitive behavioural therapy; CI = confidence interval; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; nRCT = non-randomized controlled clinical trial; RCT = randomized controlled trial; SD = standard deviation; VC = videoconference; vs. = versus.

Explanations:

[a] Individual Participation: rated down once for risk of bias due to serious concerns about the potential for bias arising from the randomization process; no serious concerns for inconsistency; rated down once due to serious concerns for indirectness, because the effect of the intervention (iCBT vs. IP CBT) cannot be isolated due to differences in the delivery format (individual vs. group) in 2 trials; rated down once due to serious concerns about imprecision as the number of events did not meet the optimal information size (<300 events); publication bias was not detected.

Detailed Outcome Data — Clinical Review

Table 26: Summary of Detailed Findings Table for Pain Interference

Outcome Follow-up, no. participants (trials)	Detailed Findings
Pain Interference Follow-up: posttreatment[65,66] and 2 months,[66,76] 3 months,[76] and 6 months[65] after treatment completion 293 (2 RCTs, 1 nRCT)	Three trials (2 RCTs,[65,66] 1 nRCT[76]) provided evidence for pain interference as measured by the BPI Interference Subscale[65,76] or VAS Interference Scale.[66]
	Mariano et al., 2021[76] Between-group comparisons in average interference change scores (calculated as baseline score minus follow-up score) NC. However, change scores (SD) as measured by the BPI Interference Subscale (ITT n=93) were reported: Group VC CBT (2 months after treatment completion): 0.6 (1.3) Group IP CBT (3 months after treatment completion): 0.6 (1.7)
	Herbert et al., 2017[65] Between-group differences in change rates in BPI Interference (ITT n=128): Posttreatment: 0.32 (95% CI, −0.34 to 0.98) 6 months after treatment completion: 0.70 (95% CI, −0.07 to 1.48)
	de Boer et al., 2014[66] Mean changes (SD) in VAS Interference Scale NR for ITT analyses. ANOVA effects (group x time interaction) (ITT n=72) were reported: Posttreatment: ANOVA effects (group x time interaction) P>0.05 2 months after treatment completion: ANOVA effects (group x time interaction) P>0.05

ANOVA = analysis of variance; BPI = Brief Pain Inventory; CBT = cognitive behavioural therapy; CI = confidence interval; IP = in-person; ITT = intent to treat; NC = not conducted; NR = not reported; nRCT = non-randomized controlled clinical trial; RCT = randomized controlled trial; SD = standard deviation; VAS = visual analogue scale; VC = videoconference.

Table 27: Summary of Detailed Findings Table for Pain Control

Outcome Follow-up, no. participants (trials)	Detailed Findings
Pain Control Follow-up: posttreatment[65,66] and 2 months,[66,76] 3 months,[76] and 6 months[65] after treatment completion 293 (2 RCTs, 1 nRCT)	Three trials (2 RCTs,[65,66] 1 nRCT[76]) provided evidence for pain severity as measured by the BPI Severity Subscale[65,76] or VAS Pain Intensity Scale.[66]
	Mariano et al., 2021[76] Between-group comparisons in change scores (calculated as baseline score minus follow-up score) NC. However, change scores (SD) as measured by the BPI Pain Severity Subscale (ITT n=93) were reported: Group VC CBT (2 months after treatment completion): worst 0.7 (1.4), least −0.1 (1.4), average 0.1 (1.1), right now −0.4 (1.7) Group IP CBT (3 months after treatment completion): worst 1.4 (2.5), least 0.1 (2.1), average 0.4 (1.9), right now 0.1 (2.5)
	Herbert et al., 2017[65] Between-group differences in change rates in BPI Interference (ITT n=128): Posttreatment: −0.38 (95% CI, −0.99 to 0.22) 6 months after treatment completion: −0.06 (95% CI, −0.72 to 0.60)
	de Boer et al., 2014[66] Mean changes (SD) in VAS Interference Scale NR for ITT analyses. ANOVA effects (group x time interaction) (ITT n=72) were reported: Posttreatment: ANOVA effects (group x time interaction) P>0.05 2 months after treatment completion: ANOVA effects (group x time interaction) P=0.070

ANOVA = analysis of variance; BPI = Brief Pain Inventory; CBT = cognitive behavioural therapy; CI = confidence interval; IP = in-person; ITT = intent to treat; NC = not conducted; NR = not reported; nRCT = non-randomized controlled clinical trial; RCT = randomized controlled trial; SD = standard deviation; VAS = visual analogue scale; VC = videoconference.

Table 28: Summary of Detailed Findings Table for Health-Related Quality of Life or Overall Well-Being

Outcome Follow-up, no. participants (trials)	Detailed Findings
HRQoL or Overall Well-being Follow-up: posttreatment[65-67] and 2 months,[66] 3 months,[67] 6 months,[65,67] and 12 months[67] after treatment completion 240 (3 RCTs)	Three RCTs[65-67] provided evidence for HRQoL or overall well-being as measured by SF12-MCS and SF12-PCS,[65] FIQ,[67] or RAND-36.[66]
	Herbert et al., 2017[65] Between-group differences in change rates (ITT n=128): *SF12-MCS* Posttreatment: 0.46 (95% CI, −3.59 to 4.50) 6 months after treatment completion: −1.72 (95% CI, −6.13 to 2.70) *SF12-PCS* Posttreatment: −1.56 (95% CI, −4.54 to 1.42) 6 months after treatment completion: −2.20 (95% CI, −5.46 to 1.07)
	Vallejo et al., 2015[67] Between-group comparisons in change scores NC. However, mean change scores (SD) as measured by FIQ (ITT n=40) were calculated*: Posttreatment: Individual iCBT: 0.35 (19.05) Group IP CBT: −10.23 (19.06) 12 months after treatment completion: Individual iCBT: −5.12 (17.98) Group IP CBT: −3.29 (18.76) ANOVA effects (time x group interaction) at 12 months relative to posttreatment: P<0.001 (favoured individual iCBT)
	de Boer et al., 2014[66] Mean changes (SD) in VAS Interference Scale NR for ITT analyses. ANOVA effects (group x time interaction) (ITT n=72) were reported: Posttreatment: P>0.05 for all subscales (i.e., physical functioning, social functioning, role impairment physical, role impairment emotional, mental health, vitality, pain, general health appraisal, perceived health change) 2 months after treatment completion: P>0.05 for all subscales except perceived health change P<0.05 (specific P value NR) (favoured iCBT)

ANOVA = analysis of variance; CBT = cognitive behavioural therapy; CI = confidence interval; FIQ = Fibromyalgia Impact Questionnaire; HRQoL = health-related quality of life; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; ITT = intent to treat; NC = not conducted; NR = not reported; RAND-36 = Research and Development 36-Item Health Survey; RCT = randomized controlled trial; SD = standard deviation; SF12-MCS = Short Form 12-Item Mental Component Summary; SF12-PCS = Short Form 12-Item Physical Component Summary; VC = videoconference.

* Calculation methods for mean changes are described in the Data Manipulation section of this report.

3090 **Table 29: Summary of Detailed Findings Table for Psychological or Psychosocial Function or Symptoms**

Outcome Follow-up, no. participants (trials)	Detailed Findings
Pain Acceptance Follow-up: posttreatment[65] and 6 months[65] after treatment completion 128 (1 RCT)	One RCT[65] provided evidence for pain acceptance as measured by CPAQ-R.[65]
	Herbert et al., 2017[65] Between-group differences in change rates (ITT n=128): Posttreatment: −1.84 (95% CI, −7.84 to 4.16) 6 months after treatment completion: 3.45 (95% CI, −3.13 to 10.03)
Anxiety, Depression, or General Psychological Distress Follow-up: posttreatment[65,67] and 2 months,[76] 3 months,[67,76] 6 months,[65,67] and 12 months[67] after treatment completion 261 (2 RCTs and 1 nRCT)	Three trials (2 RCTs,[65,67] 1 nRCT[76]) provided evidence for anxiety, depression, or general psychological distress as measured by PHQ-9,[65] PASS-20,[65] HADS,[67,76] or BDI.[67]
	Mariano et al., 2021[76] Between-group comparisons in change scores (calculated as baseline score minus follow-up score) NC. However, change scores (SD) as measured by HADS (ITT n=93) were reported: Group VC CBT (2 months after treatment completion): Anxiety 0.5 (2.6), depression 0.2 (2.4) Group IP CBT (3 months after treatment completion): Anxiety −0.5 (5.5), depression −0.3 (5.2)
	Herbert et al., 2017[65] Between-group differences in change rates in BPI Interference (ITT n=128) were reported: *PHQ-9* Posttreatment: −0.51 (95% CI, −2.42 to 1.40) 6 months after treatment completion: 1.22 (95% CI, −0.88 to 3.32) *PASS-20* Posttreatment: −4.20 (95% CI, −10.58 to 2.17) 6 months after treatment completion: −4.01 (95% CI, −11.01 to 3.00)

	Vallejo et al., 2015[67] Between-group comparisons in change scores NC. However, mean change scores (SD) as measured by HADS and BDI (ITT n=40) were calculated*: *HADS* Posttreatment: Individual iCBT: −5.10 (3.22) Group IP CBT: −1.51 (5.07) 12 months after treatment completion: Individual iCBT: −5.36 (3.05) Group IP CBT: 0.05 (4.67) ANOVA effects (time x group interaction) at 12 months relative to posttreatment: P>0.05 *BDI* Posttreatment: Individual iCBT: −6.52 (4.03) Group IP CBT: −5.11 (6.06) 12 months after treatment completion: Individual iCBT: −6.90 (3.91) Group IP CBT: −2.54 (6.22) ANOVA effects (time x group interaction) at 12 months relative to posttreatment: P=0.004 (favoured individual iCBT)
Self-Efficacy Follow-up: posttreatment[67] and 3 months,[67] 6 months,[67] and 12 months[67] after treatment completion 40 (1 RCT)	One RCT[67] provided evidence for self-efficacy as measured by CPSS.
	Vallejo et al., 2015[67] Between-group comparisons in change scores NC. However, mean change scores (SD) as measured by CPSS (ITT n=40) were calculated*: Posttreatment: Individual iCBT: pain self-efficacy 5.52 (15.36), coping symptoms 7.63 (16.11), physical function 4.86 (17.47), and global self-efficacy 6.54 (13.96) Group IP CBT: pain self-efficacy −0.47 (17.25), coping symptoms 5.77 (20.51), physical function 4.50 (20.91), and global self-efficacy 3.55 (17.99) 12 months after treatment completion: Individual iCBT: pain self-efficacy 7.31 (11.81), coping symptoms 7.37 (15.67), physical function 6.60 (16.88), and global self-efficacy 7.65 (11.80) Group IP CBT: pain self-efficacy −4.00 (16.23), coping symptoms 0.95 (18.66), physical function −10.64 (20.44), and global self-efficacy −1.11 (17.21) ANOVA effects (time x group interaction) at 12 months relative to posttreatment: P>0.05 (all subscales)
	Two RCTs[66,67] provided evidence for pain experience as measured by PCS,[66,67] CPCI,[67] or PCCL.[66]

Pain Experience and Coping Follow-up: posttreatment[66,67] and 2 months,[66] 3 months,[67] 6 months,[67] and 12 months[67] after treatment completion 112 (2 RCTs)	**Vallejo et al., 2015[67]** Between-group comparisons in change scores NC. However, mean change scores (SD) as measured by PCS and CPCI (ITT n=40) were calculated*: *PCS* Posttreatment: Individual iCBT: pain catastrophizing −3.84 (5.25), rumination −1.79 (2.50), helplessness −1.06 (4.21), and magnification −1.00 (2.34) Group IP CBT: pain catastrophizing −6.95 (10.26), rumination −2.57 (3.37), helplessness −3.14 (5.25), and magnification −1.24 (2.91) 12 months after treatment completion: Individual iCBT: pain catastrophizing −10.68 (4.97), rumination −4.10 (2.54), helplessness −4.53 (4.18), and magnification −2.06 (1.98) Group IP CBT: pain catastrophizing −0.52 (12.47), rumination −1.33 (3.93), helplessness −0.76 (5.97), and magnification 1.58 (3.86) ANOVA effects (time x group interaction) at 12 months relative to posttreatment: pain catastrophizing (P<0.001), helplessness (P=0.009), and magnification (P<0.001) all favoured individual iCBT; rumination (P>0.05) *CPCI* Posttreatment: Individual iCBT: guarding 0.16 (1.20), resting 0.03 (1.41), asking for assistance 0.06 (1.37), seeking social support 0.05 (1.44), relaxation 0.74 (1.28), task persistence 0.16 (1.51), exercise/stretch 0.21 (1.79), coping self-statements −0.26 (1.55) Group IP CBT: guarding −0.29 (1.20), resting −0.40 (1.22), asking for assistance 0.05 (1.50), seeking social support 0.19 (1.53), relaxation 1.24 (1.74), task persistence −0.15 (1.35), exercise/stretch 0.29 (1.67), coping self-statements −0.09 (1.67) 12 months after treatment completion: Individual iCBT: guarding 0.24 (1.18), resting 0.70 (1.44), asking for assistance −0.05 (1.39), seeking social support −1.00 (1.50), relaxation 0.37 (1.16), task persistence −0.15 (1.38), exercise/stretch 0 (1.80), coping self-statements −1.31 (1.52) Group IP CBT: guarding 1.01 (1.38), resting 0.61 (1.23), asking for assistance 0.38 (1.46), seeking social support 0.05 (1.51), relaxation 0.86 (1.81), task persistence −0.24 (1.32), exercise/stretch 0.10 (1.59), coping self-statements −0.90 (1.60) ANOVA effects (time x group interaction) at 12 months relative to posttreatment: P>0.05 (all subscales)
	de Boer et al., 2014[66] Mean changes (SD) in PCS and PCCL NR for ITT analyses. ANOVA effects (group x time interaction) (ITT n=72) were reported: *PCS* Posttreatment: ANOVA effects (group x time interaction) P>0.05 2 months after treatment completion: ANOVA effects (group x time interaction) P=0.315 *PCCL* Posttreatment: ANOVA effects (group x time interaction): pain catastrophizing P>0.05, pain coping P>0.05, internal pain management P>0.05, external pain management P>0.05 2 months after treatment completion: ANOVA effects (group x time interaction): pain catastrophizing P>0.05, pain coping P=0.121, internal pain management P>0.05, external pain management P>0.05
Fatigue Follow-up: posttreatment[66] and 2 months after treatment completion[66] 72 (1 RCT)	One RCT[66] provided evidence for fatigue as measured by VAS Fatigue Scale.[66]
	de Boer et al., 2014[66] Mean changes (SD) in VAS Fatigue Scale NR for ITT analyses. ANOVA effects (group x time interaction) (ITT n=72) were reported: Posttreatment: ANOVA effects (group x time interaction) P>0.05 2 months after treatment completion: ANOVA effects (group x time interaction) P>0.05

ANOVA = analysis of variance; BDI = Beck's Depression Inventory; CBT = cognitive behavioural therapy; CI = confidence interval; CPAQ-R = Chronic Pain Acceptance Questionnaire-Revised; CPCI = Chronic Pain Coping Inventory; CPSS = Chronic Pain Self-efficacy Scale; iCBT = internet-delivered cognitive behavioural therapy; HADS = Hospital Anxiety and Depression Scale; IP = in-person; ITT = intent to treat; NC = not conducted; NR = not reported; nRCT = non-randomized controlled clinical trial; PASS-20 = Pain Anxiety Symptoms Scale-Short Form 20-Item; PCCL = Pain Coping and Cognition List; PCS = Pain Catastrophizing Scale; PHQ-9 = Patient Health Questionnaire 9-Item; RCT = randomized controlled trial; SD = standard deviation; VAS = visual analogue scale; VC = videoconference.

* Calculation methods for mean changes are described in Data Manipulation section of this report.

Table 30: Summary of Detailed Findings Table for Sleep

Outcome Follow-up, no. participants (trials)	Detailed Findings
Sleep Follow-up: posttreatment[65] and 6 months[65] after treatment completion 128 (1 RCT)	One RCT[65] provided evidence for sleep as measured by PSQI.
	Herbert et al., 2017[65] Between-group differences in change rates in BPI Interference (ITT n=128): Posttreatment: −0.21 (95% CI, −1.63 to 1.20) 6 months after treatment completion: −0.14 (95% CI, −1.69 to 1.42)

CI = confidence interval; ITT = intent to treat; PSQI = Pittsburgh Sleep Quality Index; RCT = randomized controlled clinical trial.

Table 31: Summary of Detailed Findings Table for Physical Activity Level

Outcome Follow-up, no. participants (trials)	Detailed Findings
Physical Activity Level Follow-up: posttreatment[65] and 6 months[65] after treatment completion 128 (1 RCT)	One RCT[65] provided evidence for physical activity level as measured by MPI-Activity.
	Herbert et al., 2017[65] Between-group differences in change rates in BPI Interference (ITT n=128): Posttreatment: −0.15 (95% CI, −0.41 to 0.11) 6 months after treatment completion: 0.31 (95% CI, 0.02 to 0.60, P=0.03, favoured IP ACT)

CI = confidence interval; ITT = intent to treat; MPI = The West Haven-Yale Multidimensional Pain Inventory; RCT = randomized controlled clinical trial.

Table 32: Summary of Detailed Findings Table for Physical Function

Outcome Follow-up, no. participants (trials)	Detailed Findings
Physical Function Follow-up: 2 and 3 months after treatment completion[76] 93 (1 nRCT)	One nRCT[76] provided evidence for physical function as measured by ODI.
	Mariano et al., 2021[76] Between-group comparisons in change scores (calculated as baseline score minus follow-up score) NC. However, change scores (SD) as measured by ODI (ITT n=93) were reported: Group VC CBT (2 months after treatment completion): 0.1 (3.9) Group IP CBT (3 months after treatment completion): 3.0 (5.8)

CBT = cognitive behavioural therapy; IP = in-person; ITT = intent to treat; NC = not conducted; nRCT = non-randomized controlled clinical trial; ODI = Oswestry Disability Index; SD = standard deviation; VC = videoconference.

Table 33: Summary of Detailed Findings Table for Changes in Use of Pharmacotherapy

Outcome Follow-up, no. participants (trials)	Detailed Findings
Prescription Opioid Misuse Follow-up: 2 and 3 months after treatment completion[76] 93 (1 nRCT)	One nRCT[76] provided evidence for prescription opioid misuse as measured by COMM.
	Mariano et al., 2021[76] Between-group comparisons in change scores (calculated as baseline score minus follow-up score) NC. However, change scores (SD) as measured by COMM (ITT n=93) were reported: Group VC CBT (2 months after treatment completion): 1.4 (5.4) Group IP CBT (3 months after treatment completion): 3.1 (5.0)

CBT = cognitive behavioural therapy; COMM = Current Opioid Misuse Measure; IP = in-person; ITT = intent to treat; NC = not conducted; nRCT = non-randomized controlled clinical trial; SD = standard deviation; VC = videoconference.

Table 34: Summary of Detailed Findings Table for Satisfaction with Care

Outcome No. participants (trials)	Detailed Findings
Satisfaction with Care 200 (2 RCTs[65,66])	Two RCTs[65,66] provided evidence for data on satisfaction with care.
	Herbert et al., 2017[65] Mean (SD) in CSQ for each group (P=0.53): Individual VC ACT: 4.40 (0.57) Individual IP ACT: 4.47 (0.41)
	de Boer et al., 2014[66] Participants rated the course as a whole from 1 (very bad) to 10 (excellent) (P=0.800): Individual iCBT: 7.37 (1.50) Group IP CBT: 7.46 (0.78) Participants rated the degree to which they were able to proceed independently with course instructions (statistical comparison NC). Individual iCBT: 0 (0%) participants responded “very well,”, 11 (55%) responded “well,” 8 (40%) responded “reasonably well,” 0 (0%) responded “badly,” and 1 (5%) responded “very badly” Group IP CBT: 3 participants (12.5%) responded “very well,” 9 (37.5%) responded “well,” 10 (41.7%) responded “reasonably well,” 2 (8.3%) responded “badly,” and 0 (0%) responded “very badly”

ACT = acceptance and commitment therapy; CBT = cognitive behavioural therapy; CSQ = Client Satisfaction Questionnaire; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; RCT = randomized controlled trial; SD = standard deviation; VC = videoconference.

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3115 **Table 35: Individual Participation**

Outcome No. participants (trials)	Individual Participation
Individual Participation 333 (3 RCTs,[65-67] 1 nRCT[76])	Three RCTs[65-67] and 1 nRCT[76] provided data on individual participation.
	Mariano et al., 2021[76] Withdrawal rates for each group (statistical comparison NC): Group VC CBT: Seven (14.9%) participants completed baseline assessment, but withdrew from trial without attending any sessions (reason NR) Three (6.4%) withdrew after attending a few sessions due to scheduling conflicts (specific number of sessions NR) Four (8.5%) were unresponsive to repeated requests to complete the follow-up questionnaire Group IP CBT: Sixteen (34.8%) participants completed baseline assessment, but withdrew from trial without attending any sessions (reason NR) Two (4.3%) withdrew after attending a few sessions (specific number of sessions and reason NR) Six (13.0%) were unresponsive to repeated requests to complete the follow-up questionnaire Mean (SD) sessions attended (counting those who consented that did not attend any sessions) for each group were reported (P=0.09). Group VC CBT: 5.2 (2.9) Group IP CBT: 4.1 (3.4) Age-related participation comparison: Older participants tended to select the VC CBT intervention more often than younger participants (P<0.05) (additional details NR)
	Herbert et al., 2017[65] Withdrawal rates for each group (P=0.01): Individual VC ACT: 29/63 (46%) Reasons: Time demands of trial (6), transportation (2), time and transportation (5), protocol violation (4), conflict with employment (1), development of a serious medical illness (3), therapy not effective (1), adverse life event (1), lost interest or illness (5), no specific reason (2) Individual IP ACT: 15/65 (23%) Reasons: Time demands of trial (2), transportation (2), time and transportation (3), conflict with employment (1), lost interest (2), protocol violation (4), development of a serious medical illness (1)
	Vallejo et al., 2015[67] Loss to follow-up rates (reasons NR) for each group were reported (statistical comparison NC). Individual iCBT: 4/20 (20%) Group IP CBT: 3/20 (15%)
	de Boer et al., 2014[66] Withdrawal rates (i.e., started but did not complete treatment) for each group were reported (statistical comparison NC). Individual iCBT: 11/33 (33.3%) Group IP CBT: 2/30 (6.7%) Full attendance rates (i.e., attended all modules/session) for each group were reported (P<0.001). Individual iCBT: 95.2% Group IP CBT: 46.4%

ACT = acceptance and commitment therapy; CBT = cognitive behavioural therapy; iCBT = internet-delivered cognitive behavioural therapy; IP = in-person; NC = not conducted; NR = not reported; nRCT = non-randomized controlled clinical trial; RCT = randomized controlled trial; SD = standard deviation; VC = videoconference.

Appendix 3: List of Included Publications — Clinical Review

The citations provided in this list are the publications that were included in this clinical review (in reverse chronological and alphabetical order).

Mariano TY, Wan L, Edwards RR, Lazaridou A, Ross EL, Jamison RN. Online group pain management for chronic pain: preliminary results of a novel treatment approach to teletherapy. J Telemed Telecare. 2021;27(4):209-216.

Herbert MS, Afari N, Liu L, et al. Telehealth versus in-person acceptance and commitment therapy for chronic pain: a randomized noninferiority trial. J Pain. 2017;18(2):200-211.

Vallejo MA, Ortega J, Rivera J, Comeche MI, Vallejo-Slocker L. Internet versus face-to-face group cognitive-behavioral therapy for fibromyalgia: a randomized control trial. J Psychiatr Res. 2015;68:106-113.

de Boer MJ, Versteegen GJ, Vermeulen KM, Sanderman R, Struys MM. A randomized controlled trial of an Internet-based cognitive-behavioural intervention for non-specific chronic pain: an effectiveness and cost-effectiveness study. Eur J Pain. 2014;18(10):1440-1451.

Appendix 4: List of Excluded Publications and Reasons for Exclusion — Clinical Review

The citations provided in this list are studies that were excluded after full-text review by two independent reviewers as part of the clinical review (in reverse chronological and alphabetical order).

Irrelevant Population (n = 5):

Hoefnagels JW, Fischer K, Bos RAT, et al. A feasibility study on two tailored interventions to improve adherence in adults with haemophilia. Pilot and Feasibility Studies. 2020;6(1) (no pagination).

Chadi N, Weisbaum E, Malboeuf-Hurtubise C, et al. In-person vs. Ehealth mindfulness-based intervention for adolescents with chronic illnesses: A pilot randomized trial. Adolesc Psychiatry. 2019;9(1):11-23.

Levy RL, Langer SL, van Tilburg MA, et al. Brief telephone-delivered cognitive behavioral therapy targeted to parents of children with functional abdominal pain: A randomized controlled trial. Pain. 2017;158(4):618-628.

Mikocka-Walus A, Bampton P, Hetzel D, Hughes P, Esterman A, Andrews JM. Cognitive-behavioural therapy has no effect on disease activity but improves quality of life in subgroups of patients with inflammatory bowel disease: a pilot randomised controlled trial. BMC Gastroenterol. 2015;15:54.

Ammerlaan J, van Os-Medendorp H, Scholtus L, et al. Feasibility of an online and a face-to-face version of a self-management program for young adults with a rheumatic disease: experiences of young adults and peer leaders. Pediatr Rheumatol Online J. 2014;12:10.

Irrelevant Intervention (n = 3):

Gomez-Perez MC, Garcia-Palacios A, Castilla D, Zaragoza I, Suso-Ribera C. Brief Acceptance and Commitment Therapy for Fibromyalgia: Feasibility and Effectiveness of a Replicated Single-Case Design. Pain Res Manag. 2020;2020:7897268.

Heapy AA, Higgins DM, Goulet JL, et al. Interactive Voice Response-Based Self-management for Chronic Back Pain: The COPES Noninferiority Randomized Trial. JAMA Intern Med. 2017;177(6):765-773.

Igna R, Stefan S, Onac I, Onac I, Ungur R-A, Szentagotai Tatar A. Mindfulness-based cognitive-behavior therapy (MCBT versus virtual reality (VR) enhanced CBT, versus treatment as usual for chronic back pain. A clinical trial. Journal of Evidence-Based Psychotherapies. 2014;14(2):229-247.

Irrelevant Comparator (n = 105):

Baumeister H, Paganini S, Sander LB, et al. Effectiveness of a Guided Internet- and Mobile-Based Intervention for Patients with Chronic Back Pain and Depression (WARD-BP): A Multicenter, Pragmatic Randomized Controlled Trial. Psychother Psychosom. 2021;90(4):255-268.

Carvalho SA, Trindade IA, Duarte J, et al. Efficacy of an ACT and Compassion-Based eHealth Program for Self-Management of Chronic Pain (iACTwithPain): Study Protocol for a Randomized Controlled Trial. Front Psychol. 2021;12:630766.

Colomina J, Drudis R, Torra M, et al. Implementing mhealth-enabled integrated care for complex chronic patients with osteoarthritis undergoing primary hip or knee arthroplasty: Prospective, two-arm, parallel trial. J Med Internet Res. 2021;23(9) (no pagination).

Friesen LN. A randomized controlled trial of internet-delivered cognitive behaviour therapy for individuals with fibromyalgia. Dissertation Abstracts International: Section B: The Sciences and Engineering. 2021;82(9-B):No Pagination Specified.

Gohir SA, Eek F, Kelly A, Abhishek A, Valdes AM. Effectiveness of Internet-Based Exercises Aimed at Treating Knee Osteoarthritis: The iBEAT-OA Randomized Clinical Trial. JAMA netw. 2021;4(2):e210012.

Goren G, Schwartz D, Friger M, et al. Randomized Controlled Trial of Cognitive-Behavioral and Mindfulness-Based Stress Reduction on the Quality of Life of Patients With Crohn Disease. Inflammatory bowel diseases. 2021;13.

Macfarlane GJ, Beasley M, Scott N, et al. Maintaining musculoskeletal health using a behavioural therapy approach: a population-based randomised controlled trial (the MAmMOTH Study). Ann Rheum Dis. 2021;80(7):903-911.

Palermo TM, Law EF, Topazian MD, et al. Internet Cognitive-Behavioral Therapy for Painful Chronic Pancreatitis: A Pilot Feasibility Randomized Controlled Trial. Clin Transl Gastroenterol. 2021;12(6):e00373.

Rini C, Katz AWK, Nwadugbo A, Porter LS, Somers TJ, Keefe FJ. Changes in Identification of Possible Pain Coping Strategies by People with Osteoarthritis who Complete Web-based Pain Coping Skills Training. Int J Behav Med. 2021;28(4):488-498.

Wicksell R. Make friends with your pain monster: Internet-delivered acceptance- and value-based exposure in chronic pain: Model and treatment. Dissertation Abstracts International: Section B: The Sciences and Engineering. 2021;82(9-B):No Pagination Specified.

Winhusen T, Wilson M, Dolor RJ, et al. Design considerations for a remote randomized multi-site clinical trial evaluating an e-health self-management program for chronic pain patients receiving opioid therapy. Contemp Clin Trials. 2021;101:106245.

van Hooff ML, Vriezekolk JE, Kroeze RJ, O'Dowd JK, van Limbeek J, Spruit M. Targeting self-efficacy more important than dysfunctional behavioral cognitions in patients with longstanding chronic low back pain; a longitudinal study. BMC Musculoskelet Disord. 2021;22(1):824.

Xie H, Guarino H, Moore SK, et al. Web-based cognitive behavior therapy for chronic pain patients with aberrant drug-related behavior: How did it work and for whom? Journal of behavioral medicine. 2021;12.

Carleton RN, Asmundson GJG, Korol SL, et al. Evaluating the efficacy of an attention modification program for patients with fibromyalgia: a randomized controlled trial. Pain. 2020;161(3):584-594.

Curtis ME. Evaluating a mindfulness meditation smartphone app among chronic pain patients. Dissertation Abstracts International: Section B: The Sciences and Engineering. 2020;81(7-B):No Pagination Specified.

Dharmasri CJ, Griesemer I, Arbeeva L, et al. Acceptability of telephone-based pain coping skills training among African Americans with osteoarthritis enrolled in a randomized controlled trial: a mixed methods analysis. BMC Musculoskelet Disord. 2020;21(1):545.

Ezenwa MO, Yao Y, Nguyen MT, et al. Randomized Pilot Study: a Mobile Technology-based Self-management Intervention for Sickle Cell Pain. West J Nurs Res. 2020;42(8):629-639.

Forbes G, Newton S, Cantalapiedra Calvete C, et al. MEMPHIS: a smartphone app using psychological approaches for women with chronic pelvic pain presenting to gynaecology clinics: a randomised feasibility trial. BMJ Open. 2020;10(3):e030164.

Gentili C, Zetterqvist V, Rickardsson J, Holmstrom L, Simons LE, Wicksell RK. ACTsmart - development and feasibility of digital Acceptance and Commitment Therapy for adults with chronic pain. npj digit. 2020;3:20.

Jonassaint CR, Kang C, Prussien KV, et al. Feasibility of implementing mobile technology-delivered mental health treatment in routine adult sickle cell disease care. Transl Behav Med. 2020;10(1):58-67.

Moman RN, Hooten WM. The Major Barrier Facing Patients and Clinicians Who Are Interested in Utilization of Electronic and Mobile Health Technologies. Pain Medicine (United States). 2020;21(2):E243-E246.

Palermo TM, de la Vega R, Murray C, Law E, Zhou C. A digital health psychological intervention (WebMAP Mobile) for children and adolescents with chronic pain: results of a hybrid effectiveness-implementation stepped-wedge cluster randomized trial. Pain. 2020;161(12):2763-2774.

Sander LB, Paganini S, Terhorst Y, et al. Effectiveness of a Guided Web-Based Self-help Intervention to Prevent Depression in Patients With Persistent Back Pain: The PROD-BP Randomized Clinical Trial. JAMA Psychiatry. 2020;77(10):1001-1011.

Sodermark M, Linton SJ, Hesser H, Flink I, Gerdle B, Boersma K. What Works? Processes of Change in a Transdiagnostic Exposure Treatment for Patients With Chronic Pain and Emotional Problems. Clin J Pain. 2020;36(9):648-657.

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Appendix 5: Survey Questions

iCBT for Chronic Pain Survey

General

1. In which jurisdiction do you primarily work?

   - Alberta
   - British Columbia
   - Manitoba
   - New Brunswick
   - Newfoundland and Labrador
   - Northwest Territories
   - Nova Scotia
   - Nunavut
   - Ontario
   - Prince Edward Island
   - Quebec
   - Saskatchewan
   - Yukon
   - Federal
   - Other (please specify):

2. Do you work in one or more of these settings? (Please select all that apply)

   - Pain clinic
   - Primary care clinic
   - Hospital or specialist clinic
   - Long-term care facility
   - Health authority
   - Provincial ministry of health
   - Other (please specify):

3. What is your profession or role? (Please select all that apply)

   - Health care provider (e.g., nurse, therapist, physician)
   - Hospital or health facility administrator (e.g., director or manager)
   - Software or online platform developer
   - Technical services personnel (e.g., technician or information technologist)
   - Researcher
   - Policymaker
   - Public funder
   - Private insurance or Employee Assistance Program (EAP) representative
   - Other (please specify):

4. What level of involvement do you have with iCBT programs that support people living with chronic non-cancer pain? (Please select all that apply)

- Involved in the delivery of one or more iCBT program(s)
- Involved in the development of one or more iCBT program(s)
- Involved in the funding or regulation of one or more iCBT program(s)
- None of the above

5. Please specify the name of the iCBT program you are involved with and if possible, a URL to the website:

6. Does the iCBT program you are involved with provide care to patients in one or more of these geographical settings? (Please select all that apply)

Note: Health Canada defines various levels of remote, ranging from remote isolated (i.e., no scheduled flights or road access and minimal telephone or radio service) through to non-isolated remote (i.e., road access and less than 90 km away from physician service).

- Urban (i.e., area with a population of at least 1,000 and a population density of at least 400 persons per square kilometre)
- Rural (i.e., not fitting the definition of “urban” or “remote”)
- Remote (please self-identify based on your local understanding of the aforementioned criteria)

iCBT Program Characteristics

The following questions pertain to the iCBT program for the management of chronic non-cancer pain that you are involved with (through development, delivery, funding, or regulation).

7. Are patients with chronic non-cancer pain associated with the following health conditions eligible for the iCBT program? (Please select all that apply)

- Fibromyalgia
- Headache or migraine
- Muscle and ligament injuries
- Neuropathic pain
- Rheumatoid arthritis
- Osteoarthritis
- Multiple sclerosis
- Pelvic pain
- Low back pain
- Abdominal pain
- Other (please specify):

8. Please specify the age range of participants who are eligible for the iCBT program.

9. How is the iCBT program currently being utilized? (Please select all that apply)

- Self-referral by patients
- Referral by a clinician
- As one component of a broader program
- As a complement to standard care
- As a stand-alone treatment
- Other (please specify):

- Not applicable

10. Is the iCBT program self-guided or therapist assisted?

    - Self-guided
    - Therapist assisted
    - Therapist directed
    - Other (please specify):
    - Not applicable

11. Please specify the level of therapist involvement. (e.g., pre-scheduled calls, as-needed support, delivery of the iCBT program, etc.)

12. What are the required credentials and/or training for the therapists?

13. Was the iCBT program co-developed with people with lived experience with chronic non-cancer pain?

    - Yes
    - No
    - Not applicable

14. How many weeks does it take to complete the iCBT program?

15. How many modules are included in the iCBT program?

16. Please list the modules, topics covered, and approximate time it takes to complete each module.

17. What are the technology requirements for the iCBT program (e.g., internet connection, device requirements, etc.)?

18. What is the funding model of the iCBT program?

    - Public
    - Not-for-profit
    - Private/for-profit
    - Other (please specify):
    - Not applicable

19. How is the iCBT program reimbursed for patients?

    - Patients pay out-of-pocket
    - Publicly funded
    - Privately funded (i.e., through private insurance)
    - Other (please specify):
    - Not applicable

Implementation Considerations – Facilitators

20. What patient-related factors have facilitated or would facilitate the implementation of iCBT in your facility or jurisdiction? (Please select all that apply)

    - Privacy (compared with face-to-face CBT)
    - Insurance coverage and reimbursement

- Other financial benefits (e.g., transportation cost savings, not missing work)
- Preference (over face-to-face CBT)
- Clinical effectiveness
- Satisfaction with care (including educational materials and follow-up support)
- Recommended by a health care provider
- Access (e.g., 24-hour availability of care, access from any place with internet connectivity including rural or remote settings)
- Convenience (e.g., does not require taking time off work or school and can access outside of regular business hours)
- Involves greater self-management
- Option for choice of language of instruction
- Absence of feasible alternatives (have not benefitted from other types of services)
- Other (please specify):
- Do not know

21. What clinician-related factors have facilitated or would facilitate the implementation of iCBT in your facility or jurisdiction? (Please select all that apply)

- Efficiency in clinical practice (e.g., allows clinician to care for more patients)
- Financial benefits (e.g., additional income if reimbursed)
- Preference for this treatment option over other forms of therapy
- Reaching patients that would otherwise be unreachable
- Therapy fits into patient's routine schedule
- Desire to improve skills
- Training, knowledge, or experience with iCBT
- Other (please specify):
- Do not know

22. What organizational factors have facilitated or would facilitate the implementation of iCBT in your facility or jurisdiction? (Please select all that apply)

- Within mandate or policy
- Allows more efficient use of resources
- Improvement in patients' experiences
- Improvement in clinicians' experiences
- Financial benefit (e.g., return on investment if reimbursed)
- Reaching more patients or serving a broader population (including patients in rural and remote areas)
- Commitment to improving services
- Easier option to track outcomes
- Interest of funders in technology-based solutions
- Other (please specify):
- Do not know

23. Do you have any additional comments about factors that facilitated or would facilitate the implementation of iCBT?

Implementation Considerations – Barriers

24. What patient-related factors have you or your organization identified as barriers to the implementation of iCBT? (Please select all that apply)

- Privacy concerns (e.g., unable to access iCBT in a private location)
- Preference for in-person or other treatment options
- Negative perceptions about effectiveness
- Financial issues (e.g., lack of coverage/reimbursement, cost of internet access)
- Lack of knowledge about iCBT
- Unfamiliar with technology
- Lack of available devices or adequate connection to the internet
- Difficulty understanding the program (because of limited reading and writing skills)
- Limited availability in options for language instruction
- Higher severity and complexity of diagnosis
- Other (please specify):
- Do not know

25. What clinician-related factors have you or your organization identified as barriers to the implementation of iCBT? (Please select all that apply)

- Professional liability
- Preference for in-person treatment or other treatment options
- Lack of education or training on iCBT and delivering services via distance
- Financial losses (e.g., inadequate compensation)
- Lack of available devices or adequate connection to the internet
- Difficulty using the program (because of limited computer skills)
- Other (please specify):
- Do not know

26. What organizational factors have you or your organization identified as barriers to the implementation of iCBT? (Please indicate relevant examples, e.g., time, funds, devices, personnel, internet connectivity in the text box below)

- Not within mandate or lack of relevant policies and procedures on how to deliver iCBT
- Legal issues/liability
- Organizational culture
- Resources (please indicate relevant examples, e.g., time, funds, devices, personnel, internet connectivity)
- Other (please specify):
- Do not know

27. Do you have any additional comments about barriers to the implementation of iCBT?

Implementation Considerations – Access

28. When considering access to iCBT programs, are there any patient groups that require specific considerations (e.g., patients living in rural or remote settings, patients that belong to a marginalized group)? If yes, please specify the patient group(s).

29. Are there any specific facilitators to accessing iCBT for these patients?

30. Are there any specific barriers to accessing iCBT for these patients?

General

31. Can you suggest any other individuals who (or organizations that) would be willing to be consulted further on this topic, and/or complete this survey?

Appendix 6: Information on Survey Respondents

Table 36. Characteristics of Survey Respondents

Survey Question	Response	Number of Responses (% of Total)
In which jurisdiction do you primarily work? (13 total responses)	Alberta	4 (30.8%)
	British Columbia	1 (7.7%)
	Manitoba	0
	New Brunswick	0
	Newfoundland and Labrador	1 (7.7%)
	Northwest Territories	0
	Nova Scotia	1 (7.7%)
	Nunavut	0
	Ontario	4 (30.8%)
	Prince Edward Island	0
	Quebec	1 (7.7%)
	Saskatchewan	1 (7.7%)
	Yukon	0
	Other	0
Do you work in one or more of these settings? (13 total responses, multiple answers accepted)	Pain clinic	6 (46.1%)
	Primary care clinic	0
	Hospital or specialist clinic	6 (46.1%)
	Long-term care facility	0
	Health authority	1 (7.7%)
	Provincial ministry of health	0
	Other[a]	7 (53.8%)
What is your profession or role? (13 total responses, multiple answers accepted)	Hospital or health facility administrator (e.g., director or manager)	2 (15.4%)
	Health care provider (e.g., nurse, therapist, physician)	6 (46.1%)
	Software or online platform developer	1 (7.7%)
	Technical services personnel (e.g., technician or information technologist)	0
	Researcher	5 (38.5%)
	Policymaker	0
	Public funder	0

	Private insurance or Employee Assistance Program (EAP) representative	0
	Other[b]	5 (38.5%)
What level of involvement do you have with iCBT programs that support people living with chronic non-cancer pain? (Please select all that apply) (13 total responses, multiple answers accepted)	Involved in the delivery of one or more iCBT program(s)	9 (69.2%)
	Involved in the development of one or more iCBT program(s)	9 (69.2%)
	Involved in the funding or regulation of one or more iCBT program(s)	0
	None of the above	0

[a]Responses included: research lab affiliated with pain clinic, Online Therapy Unit clinic, private clinic, academic/research/private practice, university, digital mental health provider

[b]Responses included: completing survey on behalf of clinician/scientist, psychologist, professor/psychologist/researcher, public sector business development

Appendix 7: Survey Results

Table 37. Use of iCBT Programs for Chronic Non-Cancer Pain in Canada

Response	Number of Responses (% of Total)[a]
Self-referral by patients	5 (45.4%)
Referral by a clinician	7 (63.6%)
As one component of a broader program	6 (54.5%)
As a complement to standard care	3 (27.3%)
As a stand-alone treatment	6 (54.5%)
Other[b]	3 (27.3%)
Not applicable	0

iCBT = internet-delivered cognitive behavioural therapy
[a]11 total responses, multiple answers accepted
[b]Responses included: stay at/return to work; disability management; clinical trial/research study

Table 38. Characteristics of iCBT Programs for Chronic Pain Available or in Development in Canada

Survey Question	Response	Number of Responses (% of Total)
Is the iCBT program self-guided or therapist assisted? (11 total responses[a])	Self-guided	2 (18.2%)
	Therapist assisted	7 (63.6%)
	Therapist directed	3 (27.3%)
	Other	0
	Not applicable	0
Was the iCBT program co-developed with people with lived experience with chronic non-cancer pain? (11 total responses)	Yes	6 (54.5%)
	No	5 (45.4%)
	Not applicable	0
What is the funding model of the iCBT program? (11 total responses)	Public	6 (54.5%)
	Not-for-profit	2 (18.2%)
	Private/for-profit	0
	Other[b]	3 (27.3%)
	Not applicable	0
How is the iCBT program reimbursed for patients? (11 total responses)	Patients pay out-of-pocket	0
	Publicly funded	6 (54.5%)
	Privately funded (i.e., through private insurance)	0
	Other[c]	3 (27.3%)

	Not applicable	2 (18.2%)

iCBT = internet-delivered cognitive behavioural therapy
[a]One respondent indicated that the program was both self-guided and therapist assisted
[b]Responses included: combination of public and private; research grant; publicly funded in Ontario and privately funded elsewhere
[c]Responses included: no cost; no upfront cost if publicly funded and reimbursed if covered by insurance; publicly funded in Ontario and privately funded through extended health benefits and employers elsewhere

Table 39. Facilitators to the Implementation of iCBT for Chronic Pain in Canada

Survey Question	Response	Number of Responses (% of Total)
What patient-related factors have facilitated or would facilitate the implementation of iCBT in your facility or jurisdiction? (11 total responses, multiple answers accepted)	Privacy (compared with face-to-face CBT)	5 (45.4%)
	Insurance coverage and reimbursement	2 (18.2%)
	Other financial benefits (e.g., transportation cost savings, not missing work)	8 (72.7%)
	Preference (over face-to-face CBT)	9 (81.8%)
	Clinical effectiveness	8 (72.7%)
	Satisfaction with care (including educational materials and follow-up support)	9 (81.8%)
	Recommended by a health care provider	6 (54.5%)
	Access (e.g., 24-hour availability of care, access from any place with internet connectivity including rural or remote settings)	9 (81.8%)
	Convenience (e.g., does not require taking time off work or school and can access outside of regular business hours)	10 (90.9%)
	Involves greater self-management	7 (63.6%)
	Option for choice of language of instruction	3 (27.3%)
	Absence of feasible alternatives (have not benefitted from other types of services)	5 (45.4%)
	Other[a]	3 (27.3%)
	Do not know	0
What clinician-related factors have facilitated or would facilitate the implementation of iCBT in your facility or jurisdiction? (11 total responses, multiple answers accepted)	Efficiency in clinical practice (e.g., allows clinician to care for more patients)	10 (90.9%)
	Financial benefits (e.g., additional income if reimbursed)	3 (27.3%)
	Preference for this treatment option over other forms of therapy	6 (54.5%)
	Reaching patients that would otherwise be unreachable	11 (100%)
	Therapy fits into patient's routine schedule	8 (72.7%)
	Desire to improve skills	7 (63.6%)
	Training, knowledge, or experience with iCBT	9 (81.8%)
	Other[b]	1 (9.1 %)
	Do not know	0
	Within mandate or policy	8 (72.7%)

What organizational factors have facilitated or would facilitate the implementation of iCBT in your facility or jurisdiction? (11 total responses, multiple answers accepted)	Allows more efficient use of resources	10 (90.9%)
	Improvement in patients' experiences	11 (100%)
	Improvement in clinicians' experiences	8 (72.7%)
	Financial benefit (e.g., return on investment if reimbursed)	2 (18.2%)
	Reaching more patients or serving a broader population (including patients in rural and remote areas)	9 (81.8%)
	Commitment to improving services	8 (72.7%)
	Easier option to track outcomes	6 (54.5%)
	Interest of funders in technology-based solutions	6 (54.5%)
	Other[c]	1 (9.1%)
	Do not know	0

iCBT = internet-delivered cognitive behavioural therapy
[a]Responses included: all the listed facilitators exist to varying degrees; COVID risk; difficulty accessing platform
[b]Response: interoperability; comorbidity with other mental health conditions; stepped care integration
[c]Response: billing code; centralized intake; collection of outcome measures

Table 40. Barriers to the Implementation of iCBT for Chronic Pain in Canada

Survey Question	Response	Number of Responses (% of Total)
What patient-related factors have you or your organization identified as barriers to the implementation of iCBT? (11 total responses, multiple answers accepted)	Privacy concerns (e.g., unable to access iCBT in a private location)	9 (81.8%)
	Preference for in-person or other treatment options	8 (72.7%)
	Negative perceptions about effectiveness	5 (45.4%)
	Financial issues (e.g., lack of coverage/reimbursement, cost of internet access)	4 (36.4%)
	Lack of knowledge about iCBT	5 (45.4%)
	Unfamiliar with technology	8 (72.7%)
	Lack of available devices or adequate connection to the internet	8 (72.7%)
	Difficulty understanding the program (because of limited reading and writing skills)	4 (36.4%)
	Limited availability in options for language instruction	5 (45.4%)
	Higher severity and complexity of diagnosis	5 (45.4%)
	Other[a]	2 (18.2%)
	Do not know	0
What clinician-related factors have you or your organization identified	Professional liability	2 (18.2%)
	Preference for in-person treatment or other treatment options	9 (81.8%)
	Lack of education or training on iCBT and delivering services via distance	7 (63.6%)
	Financial losses (e.g., inadequate compensation)	2 (18.2%)

as barriers to the implementation of iCBT? (11 total responses, multiple answers accepted)	Lack of available devices or adequate connection to the internet	3 (27.3%)
	Difficulty using the program (because of limited computer skills)	3 (27.3%)
	Other[b]	4 (36.4%)
	Do not know	1 (9.1%)
What organizational factors have you or your organization identified as barriers to the implementation of iCBT? (11 total responses, multiple answers accepted)	Not within mandate or lack of relevant policies and procedures on how to deliver iCBT	3 (27.3%)
	Legal issues/liability	2 (18.2%)
	Organizational culture	5 (45.4%)
	Resources (please indicate relevant examples, e.g., time, funds, devices, personnel, internet connectivity)	5 (45.4%)
	Other[c]	6 (54.5%)
	Do not know	1 (9.1%)

iCBT = internet-delivered cognitive behavioural therapy

[a]Responses included: patient hesitation due to virtual mental health care being a relatively new modality; employers may think employee assistance programs are sufficient; confusion with other virtual services that are not as rigorous; centralized intake

[b]Responses included: patient hesitation given relatively new modality; threat to livelihood; dissonance of multiple platforms that have emerged; patients not as engaged and/or distracted; learning curve to use new virtual technology; clinicians do not face barriers to using iCBT due to convenience as well as compensation and resources provided

[c]Responses included: shortage of psychologists/assessors; restrictive policies for fee for service/hourly and do not recognize added value of platform; COVID policies; resource for technology; centralized intake versus self-referral; providers do not have computers with cameras/microphones; lack of funds to advertise and increase uptake