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Cognitive Functional Therapy: A new approach on chronic pain in people with musculoskeletal conditions – A scoping review

Beatriz Cunha Pinto Costa Castanho

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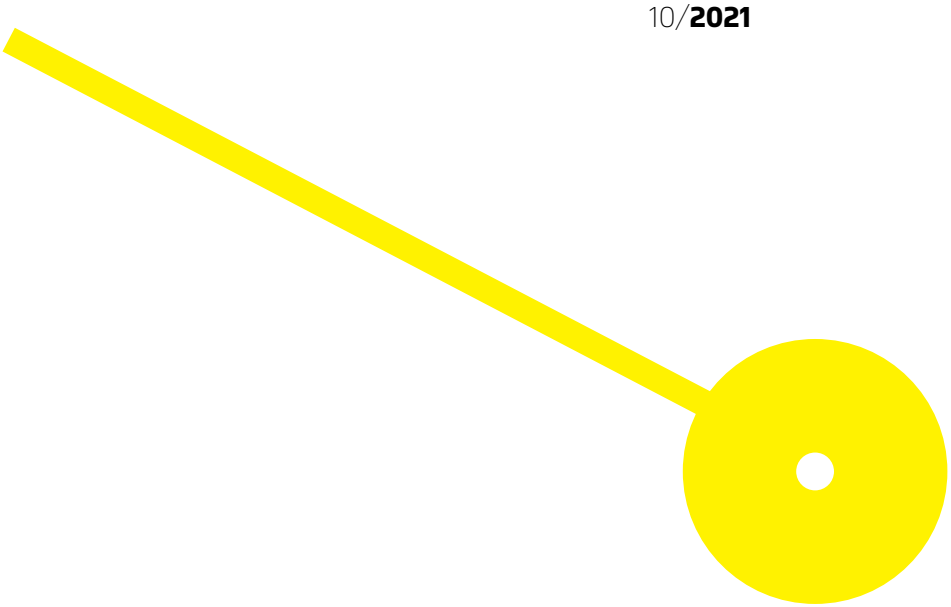

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Cognitive Functional Therapy: A new approach on chronic pain in people with musculoskeletal conditions – A scoping review

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Dissertação apresentada para cumprimento dos requisitos necessários à obtenção do grau de Mestre em **Fisioterapia** –Ramo de Especialização em **Terapia Manual Ortopédica** pela Escola Superior de Saúde do Instituto Politécnico do Porto.

RESUMO

Contexto: Embora alguns estudos tenham sido realizados anteriormente para avaliar a operacionalização da Terapia Cognitiva Funcional (TCF) em condições de dor crónica, este tópico está longe de ser estudado como área de pesquisa.

Objetivo: O presente estudo realiza uma revisão de escopo para: (1) mapear as evidências da TCF para identificar os principais conceitos, teorias, fontes e lacunas de conhecimento; (2) examinar a extensão, o alcance e a natureza da intervenção e verificar como ela é operacionalizada para o tratamento da dor crónica em pessoas com patologias músculo-esqueléticas.

Métodos e Análise: Esta revisão de escopo assume a estrutura metodológica de acordo com as diretrizes PRISMA-ScR. A pesquisa de artigos de relevância foi feita nas bases de dados *MEDLINE (PubMed)*, *Cochrane Library, PEDro* e *PsycInfo* , sem restrição de ano de publicação. Dois revisores selecionaram de forma independente os títulos e resumos de artigos considerados para inclusão com base na estrutura "População – Conceito - Contexto". A triagem de texto completo de artigos foi realizada por dois revisores.

Resultados: Um total de 14 estudos foram incluídos nesta revisão de escopo. A maioria das publicações incluídas nesta revisão são estudos de caso (28,6%; n = 4). Os restantes estudos quantitativos caracterizam-se por dois estudos randomizados controlados (RCT) (14,3%; n = 2), um estudo de desenho experimental de caso único (SCEDs), um estudo de desenho quasi-experimental (intervenção pré-teste pós-teste) e um estudo de coorte. Em relação aos estudos qualitativos, existem dois transversais não intervencionais (66,7%, n = 2) e uma revisão descritiva abrangente (33,3%; n = 1). Nos estudos de método misto, considerou-se um estudo de caso e um estudo série de casos.

Conclusões: TCF é uma abordagem comportamental integrada e flexível para individualizar o cuidado de pessoas com lombalgia incapacitante. É baseado numa estrutura de raciocínio clínico multidimensional projetada para identificar e direcionar fatores modificáveis que impulsionam a dor, angústia relacionada à dor e incapacidade. TCF leva os indivíduos com lombalgia incapacitante numa jornada clínica que fornece uma compreensão multidimensional da sua dor dentro do contexto da sua própria história. São utilizadas estratégias de controlo da dor e do comportamento para permitir que os indivíduos retornem às atividades funcionais e aos comportamentos de estilo de vida saudáveis.

Ética: Esta revisão de escopo executa uma análise secundária dos dados já coletados e não requer aprovação da comissão de ética.

Palavras-chave: Terapia Cognitiva Funcional; Fisioterapia; Dor crónica; Análise do escopo

ABSTRACT

Background: While some studies have been previously conducted to appraise the operationalization of Cognitive Functional Therapy (CFT) in chronic pain conditions, this topic is as far from being exhausted as a research area.

Objective: The present study undertakes a scoping review to: (1) map the evidence of CFT to identify main concepts, theories, sources and knowledge gaps; (2) examine the extent, range and nature of the intervention and ascertain how it is operationalized for the management of chronic pain in people with musculoskeletal conditions.

Methods and Analysis: This scoping review undertakes the methodological framework according to the PRISMA-ScR guidelines. Online databases *MEDLINE (PubMed), Cochrane Library, PEDro* and *PsycInfo* were searched, to identify papers published of relevance without year of publication restriction. Two reviewers used inclusion criteria based on the 'Population–Concept–Context' framework to independently screen titles and abstracts of articles considered for inclusion. Full-text screening of relevant eligible articles have been carried out by two reviewers.

Results: Ultimately, a total of 14 studies were included in this scoping review. Most publications included in this review are Case-reports (28,6%; n=4). The remaining quantitative studies were Randomized Controlled Trials (RCT) (14,3%; n=2), a Single Case Experimental Design study (SCEDs), a Quasi-experimental Design study (pretest-posttest intervention) and a Cohort study. Regarding the qualitative studies, there are two noninterventional Cross-sectional (66.7%, n=2) and a Descriptive comprehensive review (33.3%; n=1). Among the Mixed-method studies, there is a Case report and a Case series.

Conclusions: CFT is a flexible integrated behavioral approach for individualizing care for people with disabling LBP. It is based on a multidimensional clinical reasoning framework designed to identify and target modifiable factors that drive pain, pain-related distress, and disability. CFT takes individuals with disabling LBP on a clinical journey that provides a multidimensional understanding of their pain within the context of their own story. In addition, pain and behavioral control strategies are used to allow individuals to return to valued functional activities and healthful lifestyle behaviors. The aim of this process is to build self-efficacy to break the cycle of pain-related distress and disability.

Ethics: This scoping review will undertake a secondary analysis of data already collected and does not require ethical approval.

Keywords: Cognitive Functional Therapy; Physiotherapy; Chronic Pain; Scoping Review

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1. Introduction

1.1. Background

Musculoskeletal conditions are the leading contributors to disability worldwide, with low back pain being the single leading cause of disability globally (Ampiah et al., 2020; World Health Organisation, 2019). The global prevalence of musculoskeletal disorders is estimated between 20 and 33% (World Health Organisation, 2019); Some approaches range from pharmacological to non-pharmacological. However, the optimal management intervention(s) for musculoskeletal disorders have not been established (Ampiah et al., 2020).

It is recognized that interventions need to be individualized to the patient and that various factors inform decisions regarding choice of interventions (Ampiah et al., 2020). Current management approaches for musculoskeletal disorders have been proposed based on theory of the biopsychosocial (BPS) model. The BPS model, originally postulated by Engel, 1977, considers biological, psychological, and social factors in the diagnosis, and management of patients with chronic musculoskeletal disorders (Engel, 1977).

The BPS model of healthcare is a framework that considers the interactions between biological, social, and psychological factors to determine the manifestation, cause, management, and outcomes of a patient's condition (Engel, 1977). There is strong evidence to suggest that social and psychological factors predict patient outcomes regardless of the choice of intervention (Ampiah et al., 2020). Furthermore, substantial evidence suggests that positive changes in social (lifestyle, occupation, misconceptions, belief system, lack of social support), psychological (fear and avoidance of movement, anxiety, depression) and biological (physical activity) factors are mediators in the attainment of favorable outcomes for patients. This requires interventions that address these factors during management (Ampiah et al., 2020).

A multidimensional biopsychosocial (BPS) approach for the management of nonspecific chronic low back pain (NSCLBP) is commonly advocated (Cowell et al., 2019). There is strong evidence that NSCLBP is a multidimensional chronic health disorder where an interplay of psychological (e.g. negative beliefs, pain-related fear and emotional distress), social (e.g. life stress) and lifestyle factors (e.g. inactivity, poor sleep) coupled with unhelpful behavioral responses to pain (e.g. protective guarding and avoidance behaviors), lead to a vicious cycle of pain, distress and disability (O'Sullivan, 2018; Vibe Fersum et al., 2019). In response, there have been calls to manage NSCLBP as a chronic health disorder, through targeting negative illness perceptions, emotions and behavioral responses in order to help people self-manage their problem (O'Sullivan, 2018; Vibe Fersum et al., 2019).

Cognitive functional therapy (CFT) was developed as a personalized behavioral self-management approach to NSCLBP that targets, in an individualized and graduated manner, the modifiable cognitive, emotional, physical, and lifestyle factors considered to drive pain sensitivity and disability behaviors in patients with NS-PLBP (Ussing et al., 2020). There is evidence for the efficacy of CFT in people with NSCLBP, with reductions in disability, pain intensity and pain-related fear as well as depression and anxiety maintained at 1-year follow-up when compared to manual therapy and exercise (O'Sullivan, 2018). While this approach has generally been applied to individuals with disabling lower back pain, it is also applicable for other painful musculoskeletal disorders, including chronic, non-specific neck pain.

It helps people to: make sense of their pain from a biopsychosocial perspective, build their confidence to engage with normal movement and activities related to their goals and adopt a healthy lifestyle (O'Sullivan, 2018; Vibe Fersum et al., 2019).

The methodology of CFT is based on a multidisciplinary clinical reasoning framework, developed by incorporating foundational behavioral psychology and neuroscience within physical therapy practice to normalize provocative movements while discouraging pain behaviors (Urits et al., 2019). The process of CFT provides patients with a comprehensive understanding of their pain while using pain and behavioral control strategies to encourage healthy lifestyle behaviors. Ultimately, the purpose is to develop self-efficacy in patients with disabling lower back pain, thus ending the cycle of pain-related distress and disability. Individuals can make sense of their pain and develop a personalized treatment plan that aligns with their personal goals (Urits et al., 2019).

There are three main components to the intervention:

1. **Making sense of pain:** This "cognitive component" of CFT helps the patient on "making sense" of their pain, based on the multidimensional factors that lead the patient a cycle of pain, distress, and disability - circumstances, negative beliefs regarding pain and maladaptive emotional and behavioral responses. These are identified within the interview and clinical examination. Realistic, self-motivated goals are generated, and individuals reflect on techniques to help them break the vicious cycle of pain.
2. **Exposure with "control":** The "exposure with control" component involves targeting and managing sympathetic responses and safety behaviors that occur during painful, feared, or avoided functional tasks, and it is considered experiential learning (O'Sullivan, 2018; Vibe Fersum et al., 2019). This approach progressively allows individuals to resume valued activities without escalation of their pain and distress. It consists of two phases:

a. (2a) *Functional movement exercises*: Provides strategies to normalize postural and movement behaviors that the patients nominated as painful, feared or avoided. This approach follows a "graded exposure" model, where the patient is gradually exposed to valued and previously pain provocative, feared

and or avoided tasks. At the same time, it is reinforced with feedback and awareness of disengaging in protective body responses (O'Sullivan, 2018; Vibe Fersum et al., 2019).

b. (2b) *Functional integration:* The new postural and movement behaviors have been integrated into the functional activities causing pain indicated by each person, linked to their goals, in order to generalize learning and build self-efficacy (O'Sullivan, 2018; Vibe Fersum et al., 2019).

3. **Lifestyle change:** This last component comprehends physical activity and lifestyle training and it is a key to CFT. An exercise program is personalized to fit an individual's preference and goals with an emphasis placed on normalization of movements when movement avoidance ensues. Sleep disturbances are also addressed by exploring body relaxation, breathing regulation, guided meditation, physical activity, and training of rolling and posturing in bed (O'Sullivan, 2018; Vibe Fersum et al., 2019).

1.2. Study Rationale

Giving the biopsychosocial impact aspect of musculoskeletal disorders, particularly on non-specific chronic low back pain, Cognitive functional therapy (CFT) was developed as a personalized behavioral self-management approach to NSCLBP (O'Sullivan, 2018).

While some studies have been previously conducted to appraise the operationalization of CFT in chronic pain conditions (Conway et al., 2019; Cowell et al., 2019; Ussing et al., 2020), this topic as far from being exhausted as a research area.

Therefore, the rationale for this review is to provide a comprehensive update of advances in the use of CFT and ascertain how it is operationalized for the management of chronic pain conditions.

1.3. Study Objective

A scoping review was conducted in order to systematically map the research done in this area, as well as to detect any existing gaps in knowledge. We established two main objectives:

1) Map the evidence of CFT in order to identify main concepts, theories, sources and knowledge gaps;
2) Examine the extent, range and nature of the intervention and ascertain how it is operationalized for the management of chronic pain in people with musculoskeletal conditions.

The following research question was formulated: "Does Cognitive Functional Therapy reduce chronic pain in people with musculoskeletal chronic pain conditions?"

More specifically we addressed the following questions:

- What characterizes CFT interventions (i.e., aims, target groups, settings and modules)?
- What outcome measures and results are described in the studies?
- What facilitators and barriers are described while implementing the CFT interventions?

The study is to our knowledge the first attempt to describe in detail what may characterize Cognitive Functional Therapy interventions in a scoping review method.

2. Methods

Scoping reviews are suitable for charting a new territory between areas of research and in identifying issues worth of further attention. Scoping studies are defined as "*a form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts, types of evidence, and gaps in research related to a defined area or field by systematically searching, selecting, and synthesizing existing knowledge*" (Miake-Lye et al., 2016). In scoping studies researchers can incorporate a range of study designs and address questions beyond those related to intervention effectiveness and generate findings that can complement the findings of clinical trials. However, the quality of included studies is not assessed, nor are findings synthesized (Miake-Lye et al., 2016).

2.1. Protocol

Our protocol was drafted using the methodological framework proposed by Arksey and O'Malley (Arksey et al., 2007), as well as the amendments made to this framework by Levac *et al* (Levac et al., 2010) and by the Joanna Briggs Institute (JBI, 2015), accordingly conducted in five stages. The stages progress in an iterative process, requiring researchers to engage reflexively in each stage, repeating and revising each step whenever necessary to ensure that the literature and research questions are adequately illuminated. The final protocol can be accessed by request from the corresponding author (Beatriz Castanho. Contact by e-mail: 10190670@ess.ipp.pt)

2.1. Information sources

A systematic literature search was conducted according to the PRISMA-ScR guidelines (Tricco et al., 2018). To identify potentially relevant documents, the following bibliographic electronic databases were searched from March to June 2021: *PubMed (Medline), Cochrane Library, PEDro* and *PsycInfo*. Considering the rapidity of technological developments, we judged this period to be sufficient. Search strategies were drafted by one team member and further refined through team discussion. The search was carried out using a consistent search strategy across all databases (see Search strategy) and included key words from three main concepts: cognitive functional therapy (cognitive functional therapy, cft), chronic pain (chronic pain, chronic, pain) and musculoskeletal (musculoskeletal pain, musculoskeletal diseases). The Boolean operators "Or" and "And" were used to link the key words from each concept and to link the concepts themselves, respectively. Final search results were exported into EndNote, and duplicates were removed.

2.2. Search strategy

2.2.1. Final search strategy for MEDLINE (PubMed):

Search

("cognitive functional therapy" OR CFT) AND (("chronic pain"[MeSH] OR (chronic* AND pain) OR "chronic pain") OR ("musculoskeletal pain"[MeSH] OR (musculoskelet* AND pain) OR "musculoskeletal pain") OR "musculoskeletal diseases"[MeSH])

2.2.2. Final search strategy for Cochrane Library:

Search manager

	ID	Search	Hits
#1	("cognitive functional therapy" OR CFT)		360
#2	MeSH descriptor: [Chronic Pain] explode all trees		2669
#3	(chronic AND pain) OR "chronic pain"		32017
#4	MeSH descriptor: [Musculoskeletal Pain] explode all trees		1068
#5	(musculoskelet AND pain) OR musculoskeletal pain		10034
#6	MeSH descriptor: [Musculoskeletal Diseases] explode all trees		42651
#7	#1 AND (#2 OR #3 OR #4 OR #5 OR #6)		42

2.2.3. Final search strategy for PEdro:

New Search (Advanced)

Abstract & Title: "Cognitive Functional Therapy" OR CFT

Therapy: Behavioral Modification

Problem: Pain

Subdiscipline: Musculoskeletal

Topic: Chronic Pain

2.2.4. Final search strategy for PsycInfo:

Search

"cognitive functional therapy" OR CFT

2.3. Eligibility criteria

A comprehensive search strategy was developed to identify relevant literature, underpinned by key inclusion criteria. These are based on 'Population–Concept–Context (PCC)' framework recommended by the Joanna Briggs Institute for scoping reviews (JBI, 2015), described in Table 1.

Relevant studies were identified based on the research questions and purpose of the study. Due to our interest in mapping research-based literature, we chose to exclude gray literature.

We included peer-reviewed studies if they: (i) addressed dissemination or implementation strategies within CFT treatment or (ii) explored barriers and facilitators to dissemination or implementation and the strategies used to address them. We included interventional quantitative studies, interventional and noninterventional qualitative studies with recognized methods of data collection (e.g. interviews, focus groups) and synthesis (e.g. thematic or framework analysis, grounded theory) and mixed-method studies. Studies were restricted to articles in English or Portuguese languages and published in peer-reviewed journals in free-full text. No date limits were applied.

In order to be included, quantitative studies had to report on *implementation effectiveness,* i.e., the degree to which the implementation strategy of an innovation or intervention had been successful, rather than whether the intervention itself had been successful or effective. To capture the breadth of research in this area, context has been left open, so the evidence may come from any context (e.g., geographical, healthcare setting, sociocultural). Populations of interest included people with chronic musculoskeletal conditions. Papers were excluded if they did not fit into the conceptual framework of the study.

PCC element	
Population	People with chronic musculoskeletal pain conditions
Concept	a. Addressed dissemination or implementation strategies within CFT treatment b. Explored barriers and facilitators to dissemination or implementation and the strategies used to address them
Context	All settings (e.g., geographical, healthcare setting, sociocultural)

Table 1 - 'Population–Concept–Context (PCC)' framework

2.4. Selection of sources of evidence

In accordance with scoping study principles, selection was an iterative process of reviewing abstracts, refining the research strategy, and developing and revising inclusion criteria. The review process consisted in two levels of screening: (1) a title and abstract review and (2) full-text review.

For the first level of screening, two reviewers independently screened the title and abstract of all retrieved citations for inclusion against a set of minimum inclusion criteria. Any articles that were deemed relevant by either or both reviewers were included in the full-text review.

At the second step, all the potentially relevant studies were read in full text by the first author to determine if they met the inclusion/exclusion criteria. Two reviewers independently appraised all identified studies against the inclusion and exclusion criteria to determine final eligibility. Any discordant full-text articles were reviewed a second time and further disagreements about study eligibility at the full-text review stage were resolved through discussion with a third investigator until full consensus was obtained.

All articles were downloaded to the EndNote Reference management software and duplicates were removed. An adapted version of the PRISMA flow diagram was used to report final numbers in the resulting study publication. Reasons for exclusion were recorded at the full-text review stage (Moher et al., 2009), illustrated in Figure 1.

2.5. Data items, data charting process and synthesis of results

A draft charting form has been developed at the protocol stage to aid the collection and sorting of key pieces of information from the selected articles. It was pilot-tested and refined during the full-text screening to capture detailed information on each study. Additional categories that emerged during data extraction were added accordingly.

The abstracted data is presented in tables described within results. One initial table (table 2) was made to give a global overview of all the included studies collecting general data from study identification, demographic characteristics and study type. Three tables group the methodologic information distinguished from qualitative, quantitative and mix-method research. The quantitative (table 3) and mixed-method (table 5) tables comprehend the methodologic information from the studies of each intervention method, including intervention settings, population and modules; outcome measures, analysis method and follow up. The qualitative table (table 4) describes the framework of the study, including settings, population and aim/purpose, giving an overview of the main findings.

Consistent with the methods of scoping reviews, as described by Arksey and O'Malley (Arksey et al., 2007), we did not assess the methodological quality or risk of bias of included studies.

3. Results

3.1. Study selection

A total of 113 potential articles were identified from electronic bibliographic databases. After removing duplicates, a total of 89 citations remained. Based on the title and the abstract, 57 were excluded, with 32 full-text articles to be retrieved and assessed for eligibility. Of these, 18 were excluded for the following reasons: 7 full-text were not accessible and 11 for not being considered original quantitative research (7 trial/study protocol, 1 letter to the editor, 2 commentaries and 1 synopsis). The remaining 14 studies were considered eligible for this scoping review.

Results of the literature search, screening and selection processes are summarized in the PRISMA flow diagram (Moher D, Liberati A, Tetzlaff J, 2009) in Figure 1.

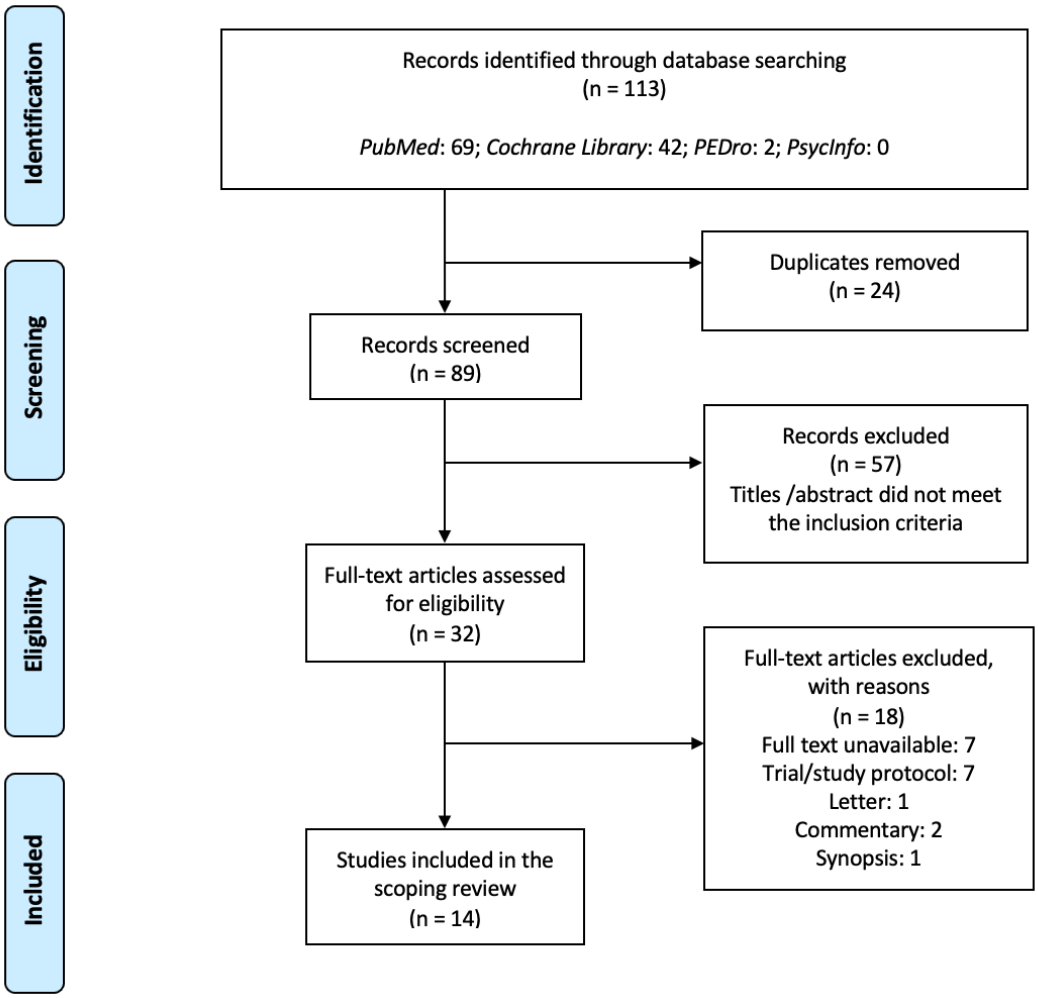

Figure 1 - Study selection process: Adapted version of the PRISMA flow diagram

RESEARCH TYPE	STUDY IDENTIFICATION (Country of lead author)	STUDIED INTERVENTION / AIM	SAMPLE CHARACTERISTICS					STUDY TYPE
			Size	M	F	Mean age (years)	Mean duration of CP (months)	
Quantitative study (n = 9)	(Irfan, 2015)	Cognitive Functional Therapy	1	1	0	57.0	4	Case report
	(Cañeiro et al., 2013)	Cognitive Functional Therapy	1	1	0	17.0	4	Case report
	(Meziat Filho et al., 2016)	Cognitive Functional Therapy	1	0	1	32.0	4	Case report
	(Caneiro et al., 2017)	Cognitive Functional Therapy	1	1	0	57.0	300	Case report
	(Sullivan et al., 2015)	Cognitive Functional Therapy	26	12	14	44.3	141	Cohort
	(Caneiro et al., 2019)	Cognitive Functional Therapy	4	1	3	56.2	258	Single-case experimental design
	(Khodadad et al., 2020)	Cognitive Functional Therapy and Lumbar Stabilization Treatment	52	52	0	44.3	NS	Pretest-posttest intervention
	(Vibe Fersum et al., 2013)	Cognitive Functional Therapy *versus* Manual Therapy and Exercise	121	58	63	40.2	NS	Randomized Controlled Trial
	(O'Keeffe et al., 2020)	Cognitive Functional Therapy *versus* Exercise and Education	206	54	152	48.7	60	Randomized Controlled Trial
		TOTAL	**413**	**180**	**233**	**46.0**	**110,1**	
Qualitative study (n = 3)	(Bunzli et al., 2016)	To compare the perspectives of participants who reported differing levels of improvement after CFT.	14	6	8	42.4	109.9	Noninterventional, Cross-sectional
	(Synnott et al., 2016)	To explore physiotherapists' perceptions of their identification and treatment of CLBP after intensive CFT training.	13	9	4	NS	NS	Noninterventional, Cross-sectional
	(Hadley & Novitch, 2021)	To provide a comprehensive update of recent advances in the use of both CFT and CBT for the management of chronic pain conditions.	NS	NS	NS	NS	NS	Noninterventional, Descriptive
		TOTAL	**27**	**15**	**12**	**42.4**	**109.9**	
Mixed Method (n = 2)	(O'Sullivan, 2018)	Cognitive Functional Therapy	3	2	1	39.3	16.3	Descriptive Case Series
	(O'Sullivan et al., 2019)	Cognitive Functional Therapy	1	1	0	16	4	Descriptive Case Report
		TOTAL	**4**	**3**	**1**	**27.7**	**10.2**	
		TOTAL	**444**	**198**	**246**	**42.6**	**23,0**	

Legend: Male (M); Female (F); Chronic Pain (CP); United States of America (USA); Cognitive Functional Therapy (CFT); Chronic Low Back Pain (CLBP); Cognitive Behavioral Therapy (CBT); Low Back Pain (LBP); Not Stated (NS))

Table 2 - General characteristics of included studies

STUDY	INTERVENTION			OUTCOME MEASURES	ANNALASIS METHOD AND FOLLOW UP
	Settings	Population	CFT Modules		
(Irfan, 2015)	12 sessions in 12-wk	CLBP ≥ 4 months	Explanation of the relationship of the mal-adaptive posture with the symptoms; Relaxation strategies with normal diaphragmatic breathing; PPT; Active rehabilitation strategies.	**Reported pain and disability measures** Oswestry Disability Index (ODI) **Physical measures** Bending/Sitting/Walking: patient's self-reported tolerance	Start and end frames comparison; 12-wk follow up.
(Cañeiro et al., 2013)	5 sessions during 8-wk intervention	CLBP ≥ 4 months	Cognitive component consisting of education regarding the pain mechanism; Functional component orientated to train body awareness and to provide alternative strategies to normalize postural and movement patterns.	**Reported pain and disability measures** Pain intensity: 11-point Numerical Rating Scale (NRS) Roland-Morris Disability Questionnaire (RMDQ) Patient-Specific Functional Scale (PSFS) **Physical measures** Hip, pelvic and trunk kinematics (15-min ergometer row) Back muscle endurance (Biering-Sørensen Test) Lower-limb muscle endurance (Isometric squat and hip flexor muscle test) Sit-and-Reach test	Preintervention and 8-wk Postintervention; 12-wk follow-up.
(Meziat Filho, 2016)	12 sessions in 40 days	CLBP ≥ 4 months	Cognitive component: Explanation of MRI results; Reflective questioning; Experience of painless exercises; Pain reconceptualization. Functional and movement component: Graded exposure exercises. Lifestyle component: Walking daily.	**Reported pain and disability measures** Visual Analogue Scale (VAS) Oswestry Disability Index (ODI) **Physical measures** Bending/Sitting/Walking **Psychosocial measures** Fear-Avoidance Beliefs Questionnaire (FABQ)	Start and end frames comparison; 3-wk follow-up by e-mail.
(Caneiro et al., 2017)	6 sessions in a 12-wk period; Initial session: 60min; 2-4wk: 45 min; 6-12wk: 30min	CLBP ≥ 25 years	Making sense of pain: Explanation delivered within context of person's story; Dethreatening of radiological imaging. Exposure with "control": Functional retraining; Body relaxation awareness; Build confidence. Lifestyle change: Promote activity participation, sleep hygiene, and social interaction in a positive, relaxed and confident manner.	**Reported pain and disability measures** Bending-related fear, pain expectancy, and pain experience - 11-point Numerical Rating Scale (NRS) Tampa Scale of Kinesiophobia (TSK) (pain-related fear) Örebro Musculoskeletal Pain Screening Questionnaire Short Form (OMPSQ-SF)	Start and end frames comparison; 6-, 12- and 18-mo follow-up.
(Sullivan et al., 2015)	Phase A1: baseline period with no intervention; Phase B: 8 sessions during 12-wk intervention; Phase A2: 3, 6 and 12-month follow-up. 60 min sessions.	CLBP ≥ 6 months	Cognitive training: Discussing the multidimensional nature of persistent pain; Functional movement and postural training: Behavioral modification approach to rehabilitation (body awareness, relaxation/breathing exercises, relaxing tense postures) during tasks they reported as being pain provocative. Functional integration of these new functional patterns in activities of daily life. Physical activity and lifestyle advice.	**Reported pain and disability measures** Owestry Disability Index (ODI) Pain intensity: 11-point Numerical Rating Scale (NRS) Nordic Musculoskeletal Questionnaire Pain Catastrophizing Scale (PCS) Pain Self-Efficacy Questionnaire (PSEQ) Fear-Avoidance Beliefs Questionnaire (FABQ)(physical activity subscale) STarT Back screening tool **Physical measures** Sitting posture **Psychosocial measures** Depression, Anxiety and Stress scale Back Beliefs Questionnaire (BBQ)	Measurement during A1 phase, collected on 3 occasions over 3-mo; 3-, 6- and 12-mo follow-up.
(Caneiro et al., 2019)	Phase A: 8-wk baseline period with no intervention; Phase B: 12-wk	CLBP ≥ 6 months	Making sense of pain: reflective process that combines the person's own narrative and experience to disconfirm unhelpful beliefs and responses to pain. Exposure with "control": process of behavioral change through experimental learning following a 'graded exposure' model. Lifestyle change: behavioral	**Reported pain and disability measures** Owestry Disability Index (ODI) Tampa Scale of Kinesiophobia (Pain-related beliefs) Pain Anxiety Symptoms Scale (PASS-20) Pain Catastrophizing Scale (PCS)	Weekly assessments during baseline phase and treatment phase; 12-wk follow up.

	period of CFT (range 7-12 sessions); Phase A': 12-wk follow-up; Phase B': 5 CFT 'booster' sessions. Initial session 60min; Follow-up 30-45min.		modification addressing unhelpful lifestyle factors aimed at increasing physical activity levels based on preference, social participation, and regulation of tension and sleep.	Back Pain Attitudes Questionnaire (BackPAQ) Brief Illness Perception Questionnaire (B-IPQ) Fremantle Back Awareness Questionnaire (FreeBAQ) Patient-Specific Functional Scale (PSFS) **Behavioral Risk Factors** Sleep Distress (depression, anxiety and pain bothersomeness)	
(Khodadad et al., 2020)	3 sessions per week; 8-wk intervention. 1h30 min sessions.	CLBP (time not specified)	Cognitive stage: education on pain mechanisms, brain exercises, identification of key faulty movements and postures linked to the pain disorder, and retraining components of these movements and postures. Associative stage: identifies and retrains faulty provocative postures and movement patterns, gradually progressive exercise circuit.	**Reported pain and disability measures** Owestry Disability Index (ODI) Pain intensity: 11-point Visual Analogue Scale (VAS) **Physical measures** Lumbar movement control (LMC) **Behavioral Risk Factors** Weight, obesity, smoking, physical inactivity and risky alcohol consumption	Start and end frames comparison; No follow-up.
(Vibe Fersum et al., 2013)	2/3 sessions wk - 1 session per 2/3 wks; 12-wk intervention. Initial session: 1h; Follow-ups: 30-45min	CLBP ≥ 3 months	Cognitive component: for each patient, their vicious cycle of pain was outlined in a diagram based on their findings from the examination and the OMPQ; Specific movement exercises designed to normalize maladaptive movement behaviors as directed by the movement classification; Targeted functional integration of activities in their daily life, reported to be avoided or provocative by the patient; Physical activity program tailored to the movement classification.	**Reported pain and disability measures** Owestry Disability Index (ODI) Pain intensity: 11-point Numerical Rating Scale (NRS) **Physical measures** Total lumbar spine range of motion (ROM) **Psychosocial measures** Hopkins Symptoms Checklist (anxiety and depression) Fear-Avoidance Beliefs Questionnaire (FABQ)	Start and end frames comparison; 3- and 12-month follow-up.
(O'Keeffe et al., 2020)	6- to 8-wk intervention	CLBP ≥ 6 months	Cognitive component: making sense of pain; Exposure with 'control'; Lifestyle change. (Intervention described in detail in the published protocol)	**Reported pain and disability measures** Owestry Disability Index (ODI) Pain intensity: 11-point Numerical Rating Scale (NRS) Pain Self-Efficacy Questionnaire Nordic Musculoskeletal Questionnaire Örebro Musculoskeletal Pain Screening Questionnaire - Short Form (OMPSQ-SF) **Psychosocial measures** Fear-Avoidance Beliefs Questionnaire (FABQ) Coping Strategies Questionnaire Subjective Health Complaints Inventory (single item questions) Depression, Anxiety and Stress scale (stress subscale)	Start and end frames comparison; 6- and 12-month follow-up.

Legend: Cognitive Functional Therapy (CFT); Lumbar Spinal Stenosis (LSS); Chronic Low Back Pain (CLBP); Lumbar Stabilization Treatment (LST); Manual Therapy (MT); Exercise (EX); Education (ED); Not Accessed (NA); month (mo); week (wk); hour (h); minutes (min); Posterior Pelvic Tilting (PPT)

Table 3 - Methodological data extracted from quantitative studies

STUDY	FRAMEWORK			MAIN FINDINGS
	Settings	Population	Aim/Purpose	
(Bunzli et al., 2016)	Noninterventional. One-on-one, face to face semi structured interviews.	Individuals who had participated in a CFT intervention	Investigate participants' experience of CFT by comparing participants who reported differing levels of improvement after participation in CFT.	In analyzing the narratives of participants, the codes that appeared important in achieving an optimal outcome were grouped into 2 themes: (1) changing pain beliefs and (2) achieving independence. Changing beliefs included the codes therapeutic alliance, body awareness and pain control. Achieving independence included the codes problem solving, self-efficacy, fear, stress coping, and normality.
(Synnott et al., 2016)	Noninterventional Semi-structured telephone and Skype interviews.	Physiotherapists who had received specific CFT training	What are physiotherapists' perspectives on treating the biopsychosocial dimensions of chronic low back pain after receiving intensive biopsychosocial training?	Four main themes were identified in the data: self-reported changes in understanding and attitudes; self-reported changes in professional practice; and increased confidence and perceived patient and therapist satisfaction.
(Hadley & Novitch, 2021)	Collection of data from various sources to gain a deeper understanding of this topic.	NA	To provide a comprehensive update of recent advances in the use of both CFT and CBT for the management of chronic pain conditions.	CBT and CFT are exceptional therapeutic methods in improving chronic pain or the overall well-being of our patients. With most of the therapy being conversational or evaluative in nature and the therapies themselves being tailorable to the individual, the options for expanding and modified CBT and CFT are numerous.

Legend: Cognitive Functional Therapy (CFT); Cognitive Behavioral Therapy (CBT); Chronic Low Back Pain (CLBP); Not Accessed (NA);

Table 4 - Methodological data extracted from qualitative studies

STUDY	INTERVENTION			MAIN FINDINGS
	Settings	Population	CFT Modules	
(O'Sullivan, 2018)	2/3 sessions per wk - 1 session per 2/3 wks; 12-wk intervention. Booster sessions.	CLBP ≥ 2 years	1. Help them "make sense of their pain" from a multidimensional perspective and within the context of their own story. 2. Develop effective pain control strategies by challenging negative cognitions and emotional responses to pain and modifying how they physically perform tasks (via body relaxation and extinction of safety behaviors) to achieve valued goals. 3. Adopt healthy lifestyle behaviors.	CFT takes individuals CLBP on a clinical journey that provides a multidimensional understanding of their pain within the context of their own story. In addition, pain and behavioral control strategies are used to allow individuals to return to valued functional activities and healthful lifestyle behaviors. The aim of this process is to build self-efficacy to break the cycle of pain-related distress and disability.
(O'Sullivan et al., 2019)	5.3 (mean) sessions over 3 mo	CLBP ≥ 4 months	Cognitive component: making sense of pain using individual's own story with reflective questioning to deepen the awareness of the factors involved in LBP; Exposure with 'control': where responses and behaviors that manifest during valued tasks, which are painful, feared, or avoided are explicitly targeted in a controlled manner; Lifestyle change: addressing lifestyle factors. Healthy	For many adolescents, LBP is less of a local structural spinal issue and more of an indication of their general health. Supervised exercise and education framed within a biopsychosocial framework are the cornerstones of treatment.

Legend: Cognitive Functional Therapy (CFT); Chronic Low Back Pain (CLBP); week (wk); month (mo)

Table 5 - Methodological data extracted from mixed-method studies

3.2. Study characteristics

Table 2 collects the general characteristics of the articles included in the current review; Tables 3, 4 and 5 list additional descriptive characteristics, the first author, year of publication, study design, intervention, session length, duration of follow-up, instruments and main findings.

They are divided in quantitative (64,3%; n=9), qualitative (21.4%; n=3) and mixed-method (14.3%; n=2) studies.

3.2.1. Sample characteristics

A total of 444 patients were enrolled in the 14 studies analyzed in this scoping review. Sample sizes in individual studies ranged from 1 (Cañeiro et al., 2013; Caneiro et al., 2017; Irfan, 2015; Meziat Filho, 2016; O'Sullivan et al., 2019) up to 206 participants (O'Keeffe et al., 2020). Cognitive Functional Therapy, as only studied intervention, presented a smaller sample size (n=6; 34 participants) than those addressing Cognitive Functional Therapy combined with other modalities: Cognitive Functional Therapy and Lumbar Stabilization Treatment (n=1; 52 participants); Cognitive Functional Therapy versus Manual Therapy and Exercise (n=1; 121 participants); Cognitive Functional Therapy versus Exercise and Education (n=1; 206 participants). Globally, 44,5% of the participants were men (n=198) and 55,4% were women (n=246), although the study assessing the Cognitive Functional Therapy and Lumbar Stabilization Treatment included only men (Khodadad et al., 2020). All participants had CLBP (ranged from ≥ 3 months up to ≥ 25 months) and one study did not specify the duration of CLBP of the participants(Khodadad et al., 2020). The subjects were mainly adults with a mean age of 42,6.

3.2.2. Methods

According to their methodologic design, on behalf of quantitative studies, most publications included in this review are Case-reports (28,6%; n=4). The remaining quantitative studies were Randomized Controlled Trials (RCT) (14,3%; n=2), a Single Case Experimental Design study (SCEDs), a Quasi-experimental Design study (pretest-posttest intervention) and a Cohort study. Regarding the qualitative studies, there are two noninterventional Cross-sectional (66.7%, n=2) and a Descriptive comprehensive review (33.3%; n=1). Among the Mixed-method studies, there is a Case report and a Case series.

3.2.3. Intervention characteristics

The 11 interventional studies in this scoping review analyzed four types of interventions: CFT alone (Cañeiro et al., 2013; Caneiro et al., 2017, 2019; Irfan, 2015; Meziat Filho, 2016; O'Sullivan et al., 2019; O'Sullivan, 2018; Sullivan et al., 2015); CFT and Lumbar Stabilization Treatment (Khodadad et al., 2020); Cognitive Functional Therapy versus Manual Therapy and Exercise (Vibe Fersum et al., 2013); Cognitive Functional Therapy versus Exercise and Education (O'Keeffe et al., 2020).

From the interventional articles included in this review, it is possible to note different parameters of intervention in CFT, such as the number of sessions, duration, weekly frequency, intervention period, follow-up and tailoring of intervention. It was found that the studies ranged from 5 to 24 sessions, with a predominance of 12 sessions (n=4; 36,4%). Only five stated the duration of the sessions, which varied between 30 minutes to 1 hour and 30 minutes, with a predominance of 60 minutes for the initial session and 30-45 min for the follow ups (n=3; 27,3%). The frequency of the sessions progressed from 2/3 sessions per week to 1 session every 2/3 weeks. The period of intervention varied between 6 to 12 weeks, being 12 weeks the most used period (n=7; 63,6%), and the last follow-up carried out, counting from the baseline, varied between 3 weeks and 18 months. All the participants were assessed with the primary purpose to evaluate the likelihood of any serious or specific pathology explaining the presence of LBP symptoms and, in such cases, referred to appropriate medical management. The remainder were categorized as having nonspecific LBP.

Regarding the tailoring of intervention, all studies performed an intervention adapted to the needs of each participant, focusing on three main domains: Component 1, "cognitive training", education regarding the pain mechanism and discussing the multidimensional nature of persistent pain to help the patients "making sense of their pain" from a multidimensional perspective and within the context of a person's own narrative and experience, to disconfirm unhelpful beliefs and responses to pain; Component 2, "functional movement training," and component 3, "functional integration," further combined and renamed "exposure with control," where responses and behaviors that manifest during valued tasks, which are painful, feared, or avoided, are explicitly targeted in a controlled manner; and finally, component 4, "physical activity and lifestyle training," is now simplified to "lifestyle change" to address lifestyle factors.

In the studies included in this systematic review, CFT was facilitated by therapists with at least practice on the management of low back pain (Irfan, 2015; Khodadad et al., 2020; Meziat Filho, 2016), therapists with prior experience in CFT who received training from an experienced CFT therapist (including workshops, patient examinations, pilot study and clinical manual) (O'Keeffe et al., 2020; Vibe Fersum et al., 2013)and by therapists whom are educators and researchers who worked to develop the 'Cognitive

Functional Therapy (CFT) intervention (Cañeiro et al., 2013; Caneiro et al., 2017, 2019; O'Sullivan et al., 2019; O'Sullivan, 2018; Sullivan et al., 2015).

3.2.4. Outcome measures

In the 9 quantitative selected studies, it was possible to verify a total of 32 different scales and instruments which were used to assess the results of the implemented interventions. They were divided into 3 categories: Reported pain and disability, Physical and Psychosocial measures. Table 6 (below) shows the categorization of each instrument regarding the dimensions it encompasses. This categorization was performed by two independent researchers, and a third researcher in situations of disagreement.

Of these instruments, the Oswestry Disability Index (ODI) (77,8%; n=7) and the 11-point Numerical Rating Scale (NRS) (66,7%; n=6) were the most used instruments for reporting pain and disability. All qualitative studies referred a pain and disability outcome measure. Patients' self-reported tolerance for bending, sitting and walking were the most used measures for reporting functionality (44,4%; n=4), although only 6 of the 9 qualitative articles described physical outcomes. Finally, when it comes to psychosocial measures, the Fear-Avoidance Beliefs Questionnaire (FABQ) was the most used instrument (44,4%; n=4), although only four articles described an outcome related to psychosocial component. Two studies (Caneiro et al., 2019; Khodadad et al., 2020) outlined the importance of Behavioral Risk Factors related to the risk of developing chronic pain, addressing some measures but not including them as an outcome. Specifically: Weight (Body Mass Index), smoking (self-reported use during the year), physical activity (frequency per week), alcohol consumption (frequency per week) and sleep (hours per night).

Two basic types of measures, clinician-based outcome measures and patient-reported outcome questionnaires, are in common use. Clinician-based outcome measures can be affected by observer bias and may not reflect patient priorities, hence the importance of patient-reported outcome questionnaires. The debate over patient-reported versus clinician-based measures has largely been resolved, in that these measures provide different perspectives and are both needed. Patient-reported measures provide a patient-centered perspective and tend to be predictive of participation outcomes such as return to work. Clinicians are increasingly using such measures to contribute to clinical decision making. The validity of the measures and their subscales, as well as their ability to detect clinical change, are important considerations when choosing between available outcome measures (Vincent et al., 2013).

The instruments used by the authors approach the different dimensions of the International Classification of Functioning Disability and Health (ICF) (World Health Organization., 2001), with a predominance of the component "body structures and functions", followed by the domain "activity and participation" and "environmental factors".

Reported pain and disability measures
11-point Numerical Rating Scale (NRS)
Back Pain Attitudes Questionnaire (BackPAQ)
Brief Illness Perception Questionnaire (B-IPQ)
Fear-Avoidance Beliefs Questionnaire (FABQ)
Fremantle Back Awareness Questionnaire (FreeBAQ)
Nordic Musculoskeletal Questionnaire
Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ) and Short Form (OMPSQ-SF)
Oswestry Disability Index (ODI)
Pain Anxiety Symptoms Scale (PASS-20)
Pain intensity: 11-point Numerical Rating Scale (NRS)
Pain Catastrophizing Scale (PCS)
Pain Self-Efficacy Questionnaire (PSEQ)
Patient-Specific Functional Scale (PSFS)
Roland-Morris Disability Questionnaire (RMDQ)
STarT Back screening tool
Tampa Scale of Kinesiophobia (TSK) (pain-related fear)
Visual Analogue Scale (VAS)
Physical measures
Back muscle endurance (Biering-Sørensen Test)
Bending/Sitting/Walking: patient's self-reported tolerance
Hip, pelvic and trunk kinematics (15-min ergometer row)
Lower-limb muscle endurance (Isometric squat and hip flexor muscle test)
Lumbar movement control (LMC)
Sit-and-Reach test
Sitting posture
Total lumbar spine range of motion (ROM)
Psychosocial measures
Back Beliefs Questionnaire (BBQ)
Coping Strategies Questionnaire
Depression, Anxiety and Stress scale
Distress (depression, anxiety and pain bothersomeness)
Fear-Avoidance Beliefs Questionnaire (FABQ)
Hopkins Symptoms Checklist (anxiety and depression)
Subjective Health Complaints Inventory (single item questions)

Table 6 – Categorization of outcome measures

3.2.5. Barriers and facilitators

Studies reported collecting data on barriers and/or facilitators mostly using interviews but also as part of surveys, questionnaires, and field notes. Barriers and facilitators were reported in 42,9% (6/14) of studies in total. More specifically, 6 studies focused solely on barriers, 3 studies focused solely on facilitators, and a combination of hindering and enabling factors was reported in 3 studies. The dominant

factor was communicational, highlighted in 88,8% of studies on barriers and facilitators (8/9). Therapeutic alliance, communication skills and effective motivational interview were common themes in this category.

Nonmodifiable and modifiable factors were also identified as patients' barriers to recovery. Pain management, (including pharmacology); medical management (in the presence of health comorbidities); psychiatric and/or psychological management (major depressive disorders, posttraumatic stress disorder, or high levels of social stress); and dietary and psychological support (when morbid obesity is present). Other identified patients' barriers were behavioral (levels of acceptance and readiness to engage in behavioral change), physical limitations (deficits in muscle strength and endurance that act as barriers to achieve personally relevant functional and lifestyle goals) and resident-specific (poor health status).

Some pointed physiotherapists' work-related barriers as particularly challenging and modifying them was regarded as extending beyond their professional remit. Organizational factors were also identified and included time constraints, increased workload, leadership and supervisory support. Financial factors such as lack of funding or financial constraints were also reported.

Professional factors were identified and included lack of physiotherapists' specific skills across several domains as well as a contextual understanding of foundational behavioral psychology and neuroscience. Physiotherapists' personality characteristics, engagement, resistance to change, and other individual factors were reported, especially clinicians trained to primarily consider physical and pathoanatomical factors and provide passive treatments for the management of disabling LBP. Physiotherapists who have been trained to broaden their skill set toward a multidimensional approach to pain reported positive changes to their clinical practice and greater confidence to deal with psychosocial factors and complex cases.

3.3. Results of individual studies

3.3.1. Interventional quantitative studies

In 2016, a case report by Muhammad Irfan enrolled 1 male patient aged 57 with CLBP for 4 months, with an initial ODI score of 68%, an initial self-reported tolerance for standing of 10 min and 200m of self-reported tolerance for walking. The patient received 12 CFT treatment sessions in 3 months. Results showed that ODI score dropped to 19% and the self-reported tolerance for standing and walking improved 60 min and three kilometers, accordingly (Irfan, 2015).

J.P. Cañeiro et al. in 2013 demonstrated through the use of a case report the effectiveness of applying CFT in active adolescents. The case study is of a 17-year-old adolescent male rower with a 4-month history of LBP. It was a CFT 8-week intervention of 5 sessions consisting of a CFT approach that

targeted optimization of movement behavior, providing the rower with alternative movement strategies to minimize sustained flexion loading. Measurements were made pre-therapy and post-therapy. The results showed that following 5 sessions of CFT, there were clear improvements in reduced temporal summation of pain and reduced functional disability preintervention compared to 12 weeks postintervention: Rolland-Morris Disability Questionnaire (RMDQ) score (12/24 to 1/24) and the patient-Specific Functional Scale (4/30 to 26/30) (Cañeiro et al., 2013).

N. Meziat Filho conducted a case report study in 2016 to assess the effectiveness of CFT in a 32-year-old female patient with 4-months of LBP. After 12 consultations over a period of 40 days, the results showed a reduction in pain by changes in 11-NRS (4/10 to 1-2/10), disability in ODI (42% to 14%) and the physical activity dimension in FABQ (19 to 3 points), demonstrated meaningful response to CFT.

Later in 2017, J.P. Cañeiro et al. published another case report, this time to provide clinicians insights into the process of change in a 57-year-old male person with a 25-year history of CLBP, who received an individualized behavioral approach of CFT over 6 sessions in a 3-month period. The patient demonstrated improvements in bending-related fear, pain expectancy, and pain experience, and substantial changes in pain-related fear (Tampa Scale of Kinesiophobia (TSK): 47/68 to 33/68; change) and risk profile (Örebro Musculoskeletal Pain Questionnaire: 61/100 to 36/100). Clinical interviews at 6 and 18 months revealed positive changes in mindset, understanding of pain, perceived pain control, and behavioral responses to pain (Caneiro et al., 2017).

Kieran O'Sullivan et al., in 2015 conducted a multiple case-cohort study with 26 participants (14 female, 12 male) with a mean age of 44.3 and a duration of LBP over 6 months. Two participants did not complete the program. The study consisted of 3 phases: A1 was a baseline phase during which measurements of pain and functional disability were collected on 3 occasions over 3 months for all participants. During phase B, participants entered a CFT intervention program involving approximately 8 treatments over an average of 12 weeks. Finally, phase A2 was a 12-month, no-treatment follow-up period. The baseline mean number of pain values with NRS was 4.3 (SD=1.9). Based on ODI values at baseline, the level of disability varied from low (ODI value =20%; n=2) to moderate (ODI value 21%– 40%; n=11) to high (ODI value =41%; n=13). Compared with median ODI values across the 3 baseline measurements, median ODI values were 22 points lower after treatment, 23 points lower after 3 and 6 months, and 24 points lower 12 months later. Fifteen of the 24 participants who completed the intervention reported a reduction in functional disability greater than 30% at the 12-month follow-up. Compared with mean NRS values across the 3 baseline measurements, NRS values were 1.6 points lower immediately after treatment, 1.5 points lower 3 months later, 1.5 points lower 6 months later, and 1.7 points lower 12 months later. Thirteen of the 24 participants who completed the intervention reported at least a 30% reduction in pain 12 months after the intervention had ended, demonstrated meaningful response to CBT (Sullivan et al., 2015).

In a replicated single-case experimental design study, J.P. Cañeiro et al. in 2019 aimed to understand the process of change at an individual level. A total of 4 participants (1 male, 3 female) with a mean age of 56.2 and a duration of CLBP over 6 months enrolled the CFT program. One participant had a break from treatment for 2 weeks because of illness. It consisted in three-phases: Phase A: 8-wk baseline period with no intervention; Phase B: 12-wk period of CFT (range 7-12 sessions); Phase A': 12-wk follow-up; Phase B': 5 CFT 'booster' sessions. The scores at the end of follow up are representative of low disability levels, with changes beyond the minimal clinically important change of 2.5 points in the RMDQ for all four participants. Three participants had changes that were more than double the minimal clinically important change of 8 points for pain-related fear (TSK) and had scores below cut off (14) for pain catastrophizing (PCS), indicating clinically meaningful changes (Caneiro et al., 2019).

In 2019, a pretest-posttest intervention was conducted by Behrouz Khodadad et al. to investigate the effectiveness of CFT treatment in addition to education in Lumbar Movement Control (LMC). After screening, 52 male participants (mean age, 44.3) with CLBP (time not specified) were allocated into CFT (n = 17), Lumbar Stabilization Treatment (LST) (n = 17), or control (n = 18) groups. One patient in the CFT and 1 patient in the LST group dropped out for personal reasons. Each exercise session for the CFT and LST groups lasted at least 60 minutes and was performed 3 days per week, for 8 weeks. Pain and LMC were evaluated before and after 8 weeks of intervention with VAS and Luomajoki LMC battery tests, respectively. Compared with baseline, pain and LMC were reduced and improved significantly in both groups after 8 weeks. However, the changes in both variables were not significantly different between groups. Percent change for pain between pretest and posttest values in the LST group was a decrease of 45%, compared with a decrease of 40% in the CFT group. Change in LMC in the LST group was a decrease of 100%, compared with a decrease of 200% in the CFT group. There was no change for both variables in the control group(Khodadad et al., 2020).

In a randomized controlled trial by K. Vibe Fersum et al., 2013, a total of 121 patients (58 male, 63 female) with a mean age of 40.2 and CLBP duration over 3 months were randomized to either CFT group (n = 62) or manual therapy and exercise group (MT-EX) (n = 59). Treatment occurred weekly for the first two to three sessions and then progressed to one session every 2–3 weeks during the 12-week intervention period. For perceived function, the CFT group improved by 13.7 points at ODI, and the MT-EX group by 5.5 points. For pain intensity, the CFT group improved by 3.2 points at NRS, and the MT-EX group by 1.5 points. The CFT produced superior outcomes for non-specific CLBP compared with traditional manual therapy and exercise (Vibe Fersum et al., 2013).

In 2020, another RCT by Mary O'Keeffee et al., investigated whether a physiotherapist-delivered individualized intervention (CFT) was more effective than physiotherapist-delivered group-based exercise and education (EX-Ed) for individuals with CLBP over 6 months. 206 adults were randomized to either CFT (n=106) or EX-Ed group (n=100). The length of the CFT intervention varied according to the

clinical progression of participants (mean=5 treatments). The group intervention consisted of up to 6 classes (mean=4 classes) over 6–8 weeks. Primary outcomes were disability (ODI) and pain intensity (NRS) in the past week at 6 months and 12months post randomization. CFT reduced disability more than the EX-Ed group at 6 months (mean difference, 8.65 to 13.64), and at 12 months (mean difference, 7.02 to 11.80). There were no between-group differences observed in pain intensity at 6 or 12 months. CFT reduced disability, but not pain, at 6 and 12 months compared with the group-based exercise and education intervention. (O'Keeffe et al., 2020)

3.3.2. Interventional mixed-method studies

Peter B. O'Sullivan et al., in 2018 published a descriptive case series enrolling 3 participants (2 male, 1 female) with a mean age of 39.3 and a mean duration of CLBP over 2 years. Patients were seen at a weekly basis for the first 2-3 sessions and then progressed to one session every 2–3 weeks during the 12-week intervention period. The authors concluded that CFT takes individuals CLBP on a clinical journey that provides a multidimensional understanding of their pain within the context of their own story. In addition, pain and behavioral control strategies are used to allow individuals to return to valued functional activities and healthful lifestyle behaviors. The aim of this process is to build self-efficacy to break the cycle of pain-related distress and disability (O'Sullivan, 2018).

Finally, in 2019, a descriptive case report conducted by Kieran O'Sullivan et al. aimed to answer the question: "Are the needs of adolescents with LBP entirely similar, or entirely different, to those of adults with LBP?". A 16-year-old footballer who reported LBP with 4-month duration enrolled a CFT program for a 12-week period, initially seen for 2 or 3 sessions, which were extended to every 2 or 3 weeks to build confidence to self-manage over. In the end, the authors confirmed that for many adolescents, LBP is less of a local structural spinal issue and more of an indication of their general health and that supervised exercise and education framed within a biopsychosocial framework are the cornerstones of treatment (O'Sullivan et al., 2019).

3.3.3. Noninterventional qualitative studies

Samantha Bunzli et al. conducted a cross-sectional qualitative study with an interpretive description framework. The aim of this study was to compare the perspectives of participants who reported differing levels of improvement after CFT. 14 individuals (6 male, 8 female; mean age 42.4) who had participated in a CFT intervention integrated a one-on-one, face to face semi structured interview.

Analyzing the narratives of the participants, the codes that appeared important in achieving an optimal outcome were grouped into 2 themes: (1) changing pain beliefs and (2) achieving independence. Changing beliefs included the codes therapeutic alliance, body awareness and pain control. Achieving independence included the codes problem solving, self-efficacy, fear, stress coping, and normality (Bunzli et al., 2016).

Another cross-sectional qualitative study, piloted by Aoife Synnott et al., aimed to explore physiotherapists' perceptions of their identification and treatment of CLBP after intensive CFT training. Thirteen Physiotherapists who had received specific CFT training (9 male, 4 female) enrolled semi-structured telephone and Skype interviews to answer the question: "What are physiotherapists' perspectives on managing the cognitive, psychological and social dimensions of CLBP after intensive biopsychosocial training?". Four main themes were identified in the data: self-reported changes in understanding and attitudes; self-reported changes in professional practice; increased confidence and perceived patient and therapist satisfaction (Synnott et al., 2016).

Lastly, Graham Hadley and Matthew B. Novitch descriptive article had the purpose of providing a comprehensive update of recent advances in the use of both CFT and CBT for the management of chronic pain conditions. For that, the authors performed a collection of data from various sources to gain a deeper understanding of this topic. Main findings described that CBT and CFT are exceptional therapeutic methods in improving chronic pain or the overall well-being of chronic pain patients. With most of the therapy being conversational or evaluative in nature and the therapies themselves being tailorable to the individual, the options for expanding and modified CBT and CFT are numerous (Hadley & Novitch, 2021).

4. Discussion

4.1. Summary of evidence

The aim of this study was to provide a comprehensive update of advances in the use of CFT and ascertain how it is operationalized for the management of chronic pain conditions. In this scoping review we identified 14 primary studies addressing CFT dissemination and implementation research published between 2013 and 2021. Our findings indicate a paucity of research focusing specifically on dissemination of knowledge and a limited number of studies on implementation in this area. To our knowledge, this is the first scoping review to map the evidence of CFT, identifying main concepts, theories, sources and knowledge gaps; and to examine the extent, range and nature of the intervention, as well as establishing how it is operationalized for the management of chronic pain in people with musculoskeletal conditions.

A growing movement in the world of pain is focused on increasing functionality and mental status rather than focusing on pain scores and numerical measures. Perception of pain has become a major target of our clinical focus which aids in potentially decreasing pharmacologic consumption, invasive procedures and unhealthy patient habits that may have led to chronic pain. Calls have been made for a paradigm shift, away from a biomedical 'injury' model, to viewing LBP as a multifactorial biopsychosocial disorder, and directing treatment at beliefs and behaviors that promote pain and disability rather than simply at the signs and symptoms associated with the disorder. Calls have also been made for the need for a multidimensional classification-based approach to direct management of NSCLBP in order to make treatment more person-centered (Borkan et al., 2002; O'Sullivan, 2011). This is supported by reports that disability levels in chronic pain are better predicted by cognitive and behavioral aspects of pain rather than sensory and biomedical ones (Campell and Edwards, 2009). CFT addresses all of these objectives.

The primary aim of CFT is for each subject to acquire self-management strategies for their disorder by developing positive back pain beliefs, pain control, developing adaptive strategies of movement that enhanced functional capacity and the ability to engage in regular physical activity. Individuals are initially seen weekly for 2 or 3 sessions, after which sessions are extended to every 2 or 3 weeks in order to build confidence to self-manage over a 12- week period. Booster sessions may be required beyond this time if pain again becomes uncontrollable, distressing and/or disabling.

The objectives of CFT are to enable the treating clinician to take individuals on an individualized journey to:

Making sense of pain. Help them "make sense of their pain" from a multidimensional perspective and within the context of their own story. The process of making sense of pain is reflective and uses individuals' own story, words, and metaphors combined with their experiences during the guided behavioral experiments to disconfirm their previously held beliefs and provide a new understanding of their pain. This process outlines how contextual factors, negative pain beliefs, and unhelpful emotional and

behavioral responses set up a vicious cycle of pain, distress and disability. This vicious cycle in turn acts as a barrier to achieve valued goals. This information is written down and discussed in a collaborative and reflective manner. During this process, different aspects of the schema are discussed while reinforcing the structural integrity of the spine and the meaning of radiological imaging.

Exposure with control. Exposure with control is a process of behavioral change through experiential learning, in which sympathetic responses and safety behaviors that manifest during painful, feared, or avoided functional tasks are explicitly targeted and controlled. This approach enables individuals to gradually return to their valued functional activities without pain escalation and associated distress. These new functional strategies are immediately integrated into activities of daily living in order to generalize the learning and build self-efficacy during these tasks. These are gradually progressed on the basis of the individual's personally relevant goals, level of conditioning, and perceived control over pain.

Lifestyle change. Adopt healthy lifestyle behaviors. Unhelpful lifestyle factors, discussed as part of making sense of pain, form a central part of CFT when relevant. Individually designing of the exercise program is implemented. When the person is highly sensitized and has difficulties in self-regulation, this approach may be directed in a graduated, time- contingent manner. If safety behaviors are present during these activities (e.g., muscle guarding and/or movement avoidance) a focus is placed on relaxed "normalization" of movement. When an activity is still associated with a distressing escalation of pain, a less provocative activity may first be selected and gradually progressed toward the activity of preference. For those with high levels of sedentary behaviors, activity scheduling is explored.

This clinical journey is adapted to the individual's multidimensional profile. The results suggest that improvement after a CFT intervention depends on: (1) the degree to which patients adopt bio-psychosocial beliefs and (2) their ability to independently self-manage their condition. Changing beliefs is associated with a strong therapeutic alliance, development of body awareness, and the experience of pain control. Achieving independence is associated with the development of problem-solving skills and self-efficacy, reducing fear, improving stress coping, and a return to normality.

Analysis of outcome measures provides some insight into the possible mechanisms of effectiveness. Most of the cognitive and psychosocial outcome measures demonstrated significant improvement after the CFT intervention. The results verified great reductions in pain, disability and psychological mediators (stress, anxiety, fear, depression, distress, back beliefs and coping mechanisms). This was supported by standard outcome assessments at baseline and follow up periods of included interventional studies. These findings are supported by previous reports of benefits with different targeted behavioral approaches to managing NSCLBP. Moseley et al. (2004) reported reduced pain and enhanced function associated with pain education. Asenlof et al. (2009) reported superior long-term outcomes for treating NSCLBP with an individually tailored behavioral intervention targeting cognitions,

motor behavior and activity, compared with physical therapy. Vlaeyen et al. (2002) reported benefits with a graded exposure approach to management in a series of NSCLBP patients with high levels of fear.

Barriers for clinicians adopting this approach relate to their sense of competence and confidence to deal with psychosocial factors, time constraints within their clinical setting, privacy for sensitive conversations, and a shift away from providing passive therapies to treat pain, although it is common that clinicians feel that people with disabling LBP expect passive therapies. The barriers for clinicians are similar to those for people with disabling LBP, highlighting that a mindset shift is also needed in public attitudes and understanding of disabling LBP outside the clinic. Physical therapists who have been trained to broaden their skill set toward a multidimensional approach to pain report positive changes to their clinical practice and greater confidence to deal with psychosocial factors and complex cases.

4.2. Limitations

As is the case for most studies investigating behavioral interventions, data were collected via self-report which can be vulnerable to self-preservation bias. Although it was decided to limit the scope of this review to people with chronic musculoskeletal pain, there were only included articles describing chronic low back pain conditions due to our eligibility criteria. Further scoping research should investigate other regions, such as cervical, thoracic and/or upper/lower limbs.

4.3. Conclusions

CFT is a flexible integrated behavioral approach for individualizing care for people with disabling LBP. It is based on a multidimensional clinical reasoning framework designed to identify and target modifiable factors that drive pain, pain-related distress, and disability. CFT takes individuals with disabling LBP on a clinical journey that provides a multidimensional understanding of their pain within the context of their own story. In addition, pain and behavioral control strategies are used to allow individuals to return to valued functional activities and healthful lifestyle behaviors. The aim of this process is to build self-efficacy to break the cycle of pain-related distress and disability.

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6. References

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