REVIEW ARTICLE

Cognitive Behavioural Therapy for Chronic Pain Management: A Narrative Review

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ABSTRACT

Chronic pain is disabling and impacts an individual's psychosocial and functioning in multiple areas. Cognitive Behavioural Therapy (CBT) appears to be one of the psychotherapies that has good potential of prominent efficacy in managing chronic pain. This narrative review aims to provide the necessary information and latest development on the delivery, results efficacy and barriers of CBT in chronic pain management. A search was conducted at Pubmed and Web of Science in April 2021 yielding a total of 251 articles. After careful screening and filtration, a total of 21 articles was selected for this review. Of these 21 articles, CBT was observed to be commonly delivered through online, which helped to preserving cost, promoting adherence, having good efficacy and also safer during the time of the Covid-19 pandemic. Most of the articles showed significant efficacy of CBT in chronic pain management. In order to improve CBT for better efficacy, understanding and consideration towards mediators that affect pain outcome and barriers in implementation are crucial in developing modules in CBT for chronic pain management. As such, CBT can be improved by integrating customised components in the modules to target mediators specifically, and training can be provided for psychotherapist to combat the barrier of online communication and time management. For future research, direction can be focused on development of CBT modules that are specific to chronic pain management.

Keywords
CBT, psychotherapy, chronic pain, pain management, narrative review

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INTRODUCTION

Human experiences are unique to every individual, and they can be subjective. Among all the human experiences, chronic pain is one of the experiences that psychologists try to understand and manage in order to improve one's quality of life, including the quality of life of caregivers caring for patients with chronic pain.[1] Chronic pain is a significant issue that attracted attention worldwide, where chronic pain impacts an individual's psychosocial and functioning in several areas, such as mood quality of sleep, physical functioning and daily activities[2]. In Asia, the prevalence of chronic pain ranges from 7.1% (Malaysia) to 61% (Cambodia and Northern Iraq) where the rate of chronic pain is higher among the older adult population[3]. Chronic pain that affects people worldwide seems to be a universal issue.

Nonetheless, there are different types of chronic pain that require standardised classification to understand thoroughly. As classified in the International Classification of Diseases (ICD-11), there are seven most common types of chronic pain; chronic primary pain, chronic cancer pain, chronic posttraumatic and postsurgical pain, chronic neuropathic pain, chronic headache and orofacial pain, chronic visceral pain and chronic musculoskeletal pain[4]. Although there are various types of chronic pain and different measuring components of chronic pain such as objective assessment or subjective assessment, there is a unified definition of chronic pain, which is needed to facilitate and guide chronic pain management and treatment. In particular, chronic pain is defined precisely in such that only pain perseveres over normal healing time and recurring for three to six months is considered as "chronic pain"[5]. Correspondingly, patients with chronic pain are people who endure long-term suffering which will affect their quality of life. Thus, treatment and management of chronic pain are necessary and essential.

Traditionally, pain was viewed as an old medical issue that existed among human beings for a long time ago. Fundamentally, the view of the pain issue affected the treatment approach selected to treat this condition. In the past, European physicians used to treat chronic pain with opium[6]. Following that until today, medical treatment is still available to manage pain. Nevertheless, it seems that the view of chronic pain as merely a medical issue has been very limiting and ineffective to manage this condition as challenges in managing chronic pain are great and complex. Thus, following the demand for chronic pain management, there are several treatment approaches developed from the biopsychosocial model, which broaden the view and management of chronic pain[7]. Compared to single medical treatment that primarily focuses only on physical therapy or medication prescription, current chronic pain management actively that applies a multidisciplinary approach has been shown to be more effective and also reduce the reliance on opium[8]. This multidisciplinary approach is aligned with the model and concept of pain proposed by Engel (1977), in which the nature of pain is complex and is often presented in an interactive psychophysiological behavior pattern[9].

Among different psychological treatment approaches, Cognitive Behavioural Therapy (CBT) stands out to be a popular and promising psychological treatment approach that offers better efficacy in managing chronic pain[10]. *CBT has the advantage of being a structured, theoretical-based and evidence-based psychotherapy*. In theory, CBT adopts Gate Control Theory proposed by Melzack and Wall (1965) where pain transmission is influenced by thoughts, emotions and regulatory processes[11]. The Gate Control Theory emphasised the subjective experiences of pain was not only a biological product, but also a product of perception and emotions, which will involve regulations in the mind. Thus, CBT applied cognitive-behavioural theory that works on both cognitive and behavioural approach to affect and manage chronic pain[12]. Until today, CBT has been recognised as the psychological treatment approach that is most extensively supported by empirical evidence[13]. However, it is important to take note that the application of CBT in chronic pain management is not standardised and there is no standard protocol in administering CBT for chronic pain patients[14]. Although there is no standard protocol on the administering of CBT to manage chronic pain, there are various common techniques that are often applied in CBT. For instance, the cognitive behavioural techniques that are applied include, cognitive restructuring, relaxation techniques, biofeedback, time- or quota-based activity pacing, setting behavioural goals, behavioural activation, problem-solving training and sleep hygiene[15].

Despite the lack of standardised protocol in administering CBT for chronic pain management, CBT appeared to be a highly structured psychotherapy that require clear goal setting. CBT is considered a short-term psychotherapy, ranging from 5 weeks to 15 weeks for chronic pain management[16] This wide range of the timeline showed that although there are common techniques applied in CBT of chronic pain management, the planning and structure of CBT can be highly flexible. In spite of that, CBT that was specifically designed for pain management has three fundamental components, which are psychoeducation, coping skills training and the last component is application and maintenance of the learned coping skills[17]. Previous reviews have focused on the efficacy, innovations and gaps in CBT to manage chronic pain[10,14,18]. A review published in Cochrane Library suggests that efficacy of CBT in reducing pain has been small when compared to active control[10]. It is thus necessary to review the recent application of CBT in chronic pain management in order to inform practice of CBT to increase efficacy of CBT in chronic pain management. This narrative review aims to provide the necessary information and latest development on the delivery, results efficacy and barriers of CBT in chronic pain management which can assist current practitioners, clinicians or policy makers to deliver CBT of quality in order to maximise and increase the efficacy of CBT in chronic pain management.

METHODS

Literature search was conducted through two major journal platform of Pubmed and Web of Science databases. The selected range was targeted at the articles that were published in the last five years, which dated

from 1 January 2016 to 25 September 2021. Only articles published in English were included. This narrative review adopted the PICO strategy in identifying scientific research, which is population, intervention, comparison and outcomes.

The inclusion criteria for this narrative review are listed below:

- Study population: 18 years old and above.
- Study design: Clinical trial and randomised controlled trial.
- Exposure: Receiving Cognitive Behavioural Therapy with related cognitive-behavioural techniques and the types of chronic pain as listed in ICD-11which are:
- Chronic primary pain
- Chronic cancer-related pain
- Chronic postsurgical or posttraumatic pain
- Chronic secondary musculoskeletal pain
- Chronic neuropathic pain
- Chronic secondary headache or orofacial pain
- Other specified chronic pain
- Chronic pain, unspecified
- Outcome: Pain intensity, cost-effectiveness, interference of pain with activities and quality of life.
- Publication type: Articles published in scientific journals.

The exclusion criteria are as following:

- Study design: Review, systematic review, meta-analyses, cross-sectional studies, longitudinal studies with follow-up case, case-control studies and case reports.
- Exposure: Other types of therapy such as mindfulness therapy, acceptance and commitment therapy that does not include specific cognitive behavioural therapy components, group-based programme and physical discomfort that otherwise does not meet the definition and criteria of chronic pain under ICD-11.
- Outcome: Cognitive function.
- Publication types: Conference press, letters, discussion, editorials news articles, abstract and book chapters.

As such, the search term of "cognitive behavioural therapy" was combined with "chronic pain" in the two scientific databases. In the process, if the research studies did not meet the inclusion criteria and possessed exclusion criteria, the studies were not be included in the final selection.

RESULTS

The results of the search strategies were compiled and shown in a flow diagram of Figure 1 as adapted from PRISMA flow diagram with final analysis involving narrative review[19]. In the total, 119 (Pudmed)+132 (Web of Science)=251 articles were identified and listed to evaluate if these research studies met the inclusion criteria.

Research articles on CBT was reasonably abundant, and some of the research designs actively combined CBT with other techniques such as physical or physiotherapy interventions and mindfulness. Other than that, some articles that adopted self-management interventions based on cognitive-behavioural principles were excluded from the selection. The summary of the final selected 21 articles is summarised in Table 1 as below.

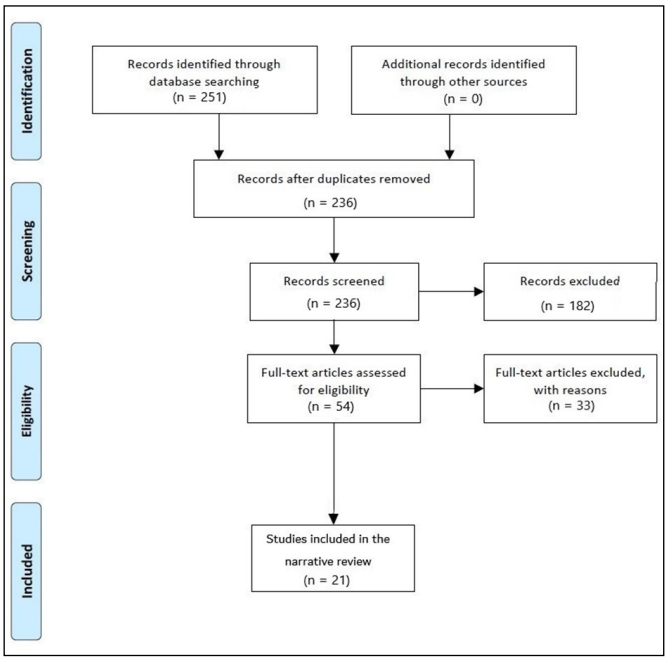

Figure 1. Flow diagram of search process and search results.

Table 1. Summary of selected articles

No.	Author Year Country	Target condition	Treatment arms (n) Delivery period	Assessment tools	Clinical outcome
1.	Barry et al. 2019[20] United States	Chronic lower back pain and opioid dependence	CBT (21) MDC (18) 12-week	Brief Pain Inventory (BPI)	Pain interference and pain intensity did not differ significantly between the two groups.
2	Billington et al. 2017[21] United Kingdom	Chronic pain symptoms	CBT & SR (3) SR (7) 22-week	Short Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS); Work and Social Adjustment Scale (WAS); Beck Depression Inventory (BDI); General Health Questionnaire (GHQ); Medical Outcomes Study Questionnaire (MOS); Ryff Scale; Dalgard Mastery Scale (DMS); Pain severity; Positive and Negative Affect Scale (PANAS)	There is no consistent pattern of change in all areas (mood, well-being, work, function). Correlation between high pain and negative emotions was highly significant. Qualitatively, CBT affected pain and emotion beyond the duration of the group.
3.	Burke et al. 2019[22] Ireland	Spinal cord injury chronic pain.	iCBT (35) Control (34) 6-week	The World Health Organization Quality of Life Bref (WHOQOL-BREF); The international spinal cord injury quality of life basic data set; The International Spinal Cord Injury Pain Basic Data Set (ISCIPBDS) (Version 1); The Douleur Neuropathique en 4 Questions (DN4) interview; The Chronic Pain Acceptance Questionnaire-8 (CPAQ-8); The Brief Pain Inventory (BPI) Interference sub-scale; The Hospital Anxiety and Depression Scale (HADS); The Pittsburgh Sleep Quality Index (PSQI)	No difference in quality of life, moderate to large effect size found on pain metrics, and 48% of the CBT group improved.
4.	Dura-Ferrandis et al. 2017[23] Spain	Temporomandibular disorders with chronic pain.	CBT (41) Standard therapy control group (31) 10-week	Self-reported grading chronic pain scale; Self-reported number of days in the last 2 months in which the patients voluntarily took medication to manage their pain symptoms; Multidimensional Pain Inventory (MPI) Interference scale; Number of localized sites upon applied pressure according to RDC/TMD criteria examination; Brief Symptoms Inventory-18; Pain Catastrophizing Scale (PCS); Survey of Pain Attitudes (SOPA-35); Coping Pain Questionnaire (CAD)	Effect of treatment on pain intensity was partially mediated by distress, catastrophising, perceived control, distraction, and mental self-control. Pain interference was partially mediated by distress, distraction, and mental self-control.
5.	Fraser at al. 2019[24] United Kingdom	Chronic widespread pain.	tCBT (32)	Qualitative interview.	Majority of participants described positive changes in subjective pain level or pain-management.
6.	Gandy et al. 2016[25] Australia	Chronic pain.	iCBT with SMS prompts (56) iCBT without prompts (139) 8-week	Patient Health Questionnaire 9-Item (PHQ-9); Generalized Anxiety Disorder 7-Item (GAD-7); Roland Morris Disability Questionnaire (RMDQ); Wisconsin Brief Pain Questionnaire (WBPQ)	85% of participants reported SMS to be helpful. There is no significant difference between the two groups for clinical improvements.
7.	García-Dasí et al. 2021[26] Spain	Haemophilia with chronic pain.	CBT with physiotherapy (10) Control (9) 16-week	Self-efficacy (Chronic Pain Self-Efficacy Scale); QoL (A36 Hemophilia-QoL); Emotional status (Hospital Anxiety and Depression Scale and Rosenberg's Self-esteem Scale); Pain (Visual Analogue Scale); Pinesiophobia (Tampa Scale for Kinesiophobia)	There are significant improvements in control of symptoms and pain management scores in intervention group and the effect remain overtime for pain management, quality of life, pain and kinesiophobia.
8.	Gilliam et al. 2021[27] United States	Chronic pain.	Interdisciplinary CBT (463)	Pain Catastrophizing Scale (PCS); West Haven-Yale Multidimensional Pain Inventory (WHYMPI); Patient Health Questionnaire-9 (PHQ-9); Short Form Health Survey (SF-36)	Patients with improved reduction in pain catastrophising had significantly greater improvements in pain interference, depression, and physical and mental functioning.

Con't

No.	Author Year Country	Target condition	Treatment arms (n) Delivery period	Assessment tools	Clinical outcome
9.	Goldthorpe et al. 2016[28] United Kingdom	Chronic orofacial pain.	Complex intervention based on CBT (17)	Qualitative interview.	Patients are able to accept CBT as an intervention, with the interview theme emerged on processes of engagement.
10.	Guarino et al. 2018[29] United States	Chronic pain with aberrant drug-related behaviour.	TAU (55) TAU with web-based CBT (55) 12-week	Multidimensional Pain Inventory (MPI); Current Opioid Misuse Measure (COMM); Pain Catastrophizing Scale (PCS)	The group assigned to TAU with web-based CBT has significantly lower aberrant drug-related behaviour, pain catastrophising and pain-related emergency department.
11.	Herman et al. 2017[30] United States	Chronic low-back pain.	MBSR (116) CBT (113) UC (113) 8-week	Cost was measured.	CBT and MBSR are significantly more cost-effective than UC.
12.	Marasha de Jong et al. 2018[31] United States	Unipolar depression with chronic pain.	MCBT (19) TAU (14) 8-week	Quick Inventory of Depressive Symptomatology – Clinician rated ($QIDS\text{-}C_{16}$); Hamilton Rating Scale for Depression ($HRSD_{17}$); Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials (IMMPACT); Brief Pain Inventory short form (BPI-sf); Visual Analogue Scale (VAS); Short-Form Health Survey (SF-36 version 1.0 RAND); Beck Anxiety Inventory (BAI); Patient Global Impression of Change Questionnaire (PGIC)	MCBT group has a significant decrease in $QIDS\text{-}C_{16}$ but not in $HRSD_{17}$.
13.	Monticone et al. 2018[32] Italy	Chronic neck pain.	CBT based on NeckPix(15) CBT based on Tampa Scale of Kinesiophobia (TSK) (15) 6-week	Neck Disability Index (NDI); NeckPix©; Tampa Scale of Kinesiophobia (TSK); Pain Catastrophizing Scale; Chronic Pain Coping Inventory (CPCI); EuroQol-Five Dimensions (EQ-VAS)	No significant change in NDI after CBT, but showed progressive decrease in kinesiophobia.
14.	Rutledge at al. 2018[33] United States	Chronic back pain.	CBT (33) SC (33) 8-week	Roland-Morris Disability Questionnaire (RMDQ); Numerical Rating Scale (NRS); Patient Clinical Global Impressions Scale (CGI)	There is no significant difference in clinical outcome between the two groups.
15.	Schemer et al. 2018[34] Germany	Chronic back pain.	CBT (24) Exposure (37) 14-week	Pain Disability Index (PDI); Quebec Back Pain Disability Scale (QBPDS); Numeric Rating Scale (NRS-P); German Pain Questionnaire Deutscher Schmerzfragebogen (DSF)	No evidence of unique treatment processes between CBT and Exposure group.
16.	Seng et al. 2019[35] United States	Episodic and chronic migraine.	Mindfulness-Based Cognitive Therapy (31) TAU (29) 8-week	Henry Ford Hospital Headache Disability Inventory (HDI); Migraine Disability Assessment (MIDAS); Headache Days/30 Days, Average Headache Attack Pain Intensity/30 Days; Migraine Disability Index (MIDI)	Disability reduction reported to be significantly higher for Mindfulness-Based Cognitive Therapy group compared to TAU group.
17.	Taguchi et al. 2020[36] Japan	Treatment-resistant chronic pain.	CBT (16) 16-week	Numerical Rating Scale (NRS); Pain Catastrophizing Scale (PCS); EuroQOL 5 dimensions 5-level (EQ-5D-5L); Patient Health Questionnaire-9 (PHQ-9); Generalized Anxiety Disorder scale (GAD-7)	There was reported reduction in depression, anxiety and disability.
18.	Tang et al. 2020[37] United Kingdom	Chronic pain with insomnia.	Hybrid CBT (14) Self-help control treatment (11) 12-week and 24-week	Severity Index (ISI); Brief Pain Inventory (BPI); Multidimensional Fatigue Inventory general fatigue score; Hospital Anxiety and Depression Scale; EuroQoL EQ-5D-5L; Qualitative interview	Patients received Hybrid CBT was more satisfied, while patients with self-help control treatment desired for more contact hours and guidance from therapist.
19.	Thomson et al. 2016[38] United Kingdom	Chronic neck pain.	PNEP (28) IBMT (29) 4-week	Northwick Park Questionnaire (NPQ); Numeric Pain Rating Scale (NPRS); Pain Catastrophising Scale; Tampa Scale for Kinesiophobia (TSK); Chronic Pain Self-Efficacy Scale (CPSS); Pain Vigilance and Awareness Questionnaire.	IBMT group reported more improvements in functional self-efficacy, pain intensity and disability.

Con't

No.	Author Year Country	Target condition	Treatment arms (n) Delivery period	Assessment tools	Clinical outcome
20.	Van der Vaart et al. 2016[39] Netherlands	Chronic pain with fatigue.	iCBT (18) 6-modules	Qualitative interview guided by Consolidated Framework for Implementation Research (CFIR)	Facilitators and barriers are identified in five domains of implementation intervention, users individual characteristics, inner setting, outer setting and implementation process.
21.	Zgierska et al. 2016[40] United States	Opioid-treated chronic low back pain.	Mindfulness Meditation CBT (21) Control (14) 8-wwek	Brief Pain Inventory (BPI); Numerical Rating Scale (NRS); Oswestry Disability Index (ODI); Chronic Pain Acceptance Questionnaire (CPAQ); Mindful Attention Awareness Scale (MAAS); Perceived Stress Scale (PSS)	Mindfulness Meditation CBT significantly reduced pain severity and sensitivity to experimental thermal pain stimuli as compared with control group.

Note. CBT = Cognitive Behavioural Therapy, MDC = Methadone Drug Counselling, SR = Shared Reading, tCBT=telephone-Cognitive Behavioural Therapy, CBT = internet=Cognitive Behavioural Therapy, TAU = Treatment as usual, MBSR = Mindfulness-Based Stress Reduction, UC=Usual Care, MBCT=Mindfulness-Based Cognitive Therapy, SC = Supportive Care, PNEP = Progressive Neck Exercise Programme, IBMT = Interactive Behavioural Modification Therapy

DISCUSSION

Efficacy: Delivery, Instruments Used and Results

In summary, the selected studies in this narrative review, there are a variety of modes of delivery. For instance, there are group-based and individual-based CBT and the medium of CBT delivery can be physically face-to-face, online, or delivery through telephone. Although there is a variety of delivery medium, it was observed that there are more CBT delivered through the internet medium, or the involvement of creative technology application such as inclusion of SMS reminder to the patients with chronic pain in practicing CBT.[25] The implementation of CBT for managing chronic pain on web-based or internet-based strategically increase adherence and reduce drop-out rate as patients with chronic pain have lower activities of daily living, and were restricted to do other activities due to the pain they experience, including mobility.[41] Ideally, CBT that was delivered through online will also reduce the perceived cost from the patients to engage in the CBT treatment, and thus promoting the adoption of the treatment process. The effort of travelling to the physical premises is not as demanding in the online treatment. Additionally, the psychotherapists will also save cost related to the premises rental and preparation of the physical space to deliver CBT. In the nut shell, CBT appeared to be beneficial in terms of tangible factors such as cost of delivery and thus is promoting adherence compared to traditional CBT that delivered face-to-face.

Nevertheless, there were concerns as to whether the efficacy of CBT in managing chronic pain will be compromised although there appeared to be more significant adherence when the mode of delivery in CBT changes from physical to online. This challenges psychotherapists to use pain management creatively and to be technology savvy to competently deliver CBT online without compromising the quality of the CBT delivered. For the efficacy of online CBT on chronic pain management, the changes of pain scale of 0-100 ranged from 3.67 to 31 for individuals who received the intervention.[42] Compared to traditional CBT in managing chronic pain, the efficacy shown by online CBT is similar[14]. Thus, the recent changing trend of delivering CBT online was considered to be a good move. However, online CBT is not applicable for individuals who have limitation in mobility and ICT literacy as these studies only included participants who are able to utilise technology or having social support that assist them in utilising technology[43].Thus, online delivery is not suitable for those who are not able to utilise technology due to their literacy and inadequate social support. Nevertheless, there is by no means to replace traditional CBT with online CBT to fully benefits every CBT patient regardless of whether they are literate in technology.

Other than the mode of delivery, factors such as techniques of psychotherapy use and also measurement of clinical outcome are slightly different across selected studies. As a whole, a total of 16 studies, more than half of the selected studies showed that treatment processes that involved either cognitive-behavioural techniques, or both showed significant clinical improvements in the management of chronic pain, or related well-being qualities such as quality of life or disability. Nevertheless, quite a considerable number of studies, which are 5 out of the 21 selected studies showed no significant differences in the clinical outcome in the pain intensity between the intervention group and control.

The pain intensity is the common clinical outcome almost across the selected studies, as it has been seen as the primary concern for both clinicians and patients to manage chronic pain. In terms of pain intensity, there are observed to be a variety of instruments used to measure this clinical outcome Although there are differences in the instruments used, it is unlikely that the efficacy that was not detected in some of the studies is due to this reason. To point out, some of the common instruments frequently used are Brief Pain Inventory (BPI), Pain Catastrophising Scale (PCS) and Numerical Rating Scale (NRS) which are all validated in its psychometric properties to be used as a reliable instrument [44-46](Ferreira -Valente et al. 2011; Keller et al. 2004; Osman et al. 1997). Other areas that are affected by chronic pain were also measured and included in the outcome of the selected studies to further understand the impact of CBT towards patients with chronic pain, such as quality of life, disability, sleep, anxiety and depression. In all, the majority of the studies showed that CBT has significant outcome in other affected areas such as disability and quality of life, which might be a more important indicator of outcome for CBT as optimisation in functioning and quality of life can be enhanced even with the same pain intensity with the help of CBT.

Mediators of CBT in Chronic Pain Management

In the treatment process of CBT in chronic pain management, there are specific mediators identified such as distress, catastrophising thoughts, perceived control, distraction and mental self-control.[24] According to the Theory of Planned Behaviour introduced by Ajzen (1985), humans are reasonable beings who will consider logically their health decision based on their attitudes towards the behaviour, social norms and perceived control[47]. However, this can only partly explain the mediators found in previous research studies. This is because mediators such as distress, distraction and catastrophising thoughts interfere with chronic pain management, which indicates that humans are not as rational as assumed. With this in mind, the planning of CBT treatment should take into consideration these mediators in order to develop more efficient interventions for chronic pain management. Given that some of the modules in CBT are already handling some of the mediators, such as cognitive restructuring can tackle the issue of catastrophising thoughts and perceived control, these can be further emphasised in the CBT treatment. In particular, mindfulness and managing stress can modules that can be incorporated into CBT in chronic pain management, as this factor can mediate the relationship between CBT and pain outcomes by tackling distraction and distress.[48] Thus, specific modules in CBT can be proposed to tackle mediators that can be combined with other common modules of pain management, allowing CBT to be more customised to the issue of chronic pain due to the mediators discovered. Nevertheless, this does not indicate that every module of CBT must include all the mediators found in previous study. Instead, customisation is possible with further assessment in the wake of awareness of these mediators, which contribute to CBT efficacy. In particular, previous study had conducted customised intervention combining pain management and emotional distress in CBT for adolescents, and this intervention has great potential to be generalised to other age groups that suffers from chronic pain[49]. However, identifying only mediators might not be sufficient as a guideline for practitioners to improve the quality of the CBT delivered for chronic pain management.

Barriers to Implementation and Future Directions

Another important element that can increase the efficacy and quality of CBT delivered is to tackle and manage the barriers in the process of implementation. Specifically,

there are barriers identified in the implementation of CBT in chronic pain management through qualitative interviews. In spite of the convenience and reliability of the quantitative outcome measurement, qualitative interview provides valuable information on the barriers to implementation. There are five main areas that were derived from qualitative interviews, the implemented intervention, individual characteristics of users, inner setting, outer setting and the process of implementation.[40] The prominent and common barriers in CBT for chronic pain management are affected by both the psychotherapists and the characteristics of patients. Unfortunately, characteristics of patients such as comorbidity are a common barrier and an element that is harder to change among patients, which requires more attention from the psychotherapists. That is to say, a more integrated treatment will be required to deal with comorbidities, including targeting depression and anxiety[32]. Despite the characteristics of patients, factors from psychotherapists are easier to target as a whole in order to enhance the efficacy of CBT in chronic pain management. For instance, barriers experienced by psychotherapists in communication through online therapy and time management can be overcome by providing more training targeting these challenges and difficulties in order to acquire the relevant online communication skills and time management skills. Another possible solution to the challenges is to accumulate experience to reduce the requirement to acquire new skills in the implementation of CBT. Additionally, there are facilitators in CBT implementation on chronic pain management that the practitioners can work on and enhance the efficacy of CBT in chronic pain management[40]. Hence, in the future, the delivery of the content and attitude of the psychotherapist towards the confidence in CBT can be built on in order to further increase the quality of the CBT implemented in chronic pain management.

In regards to the enhancement of CBT delivery, the delivery of CBT in recent years had been actively modified with additional components with the hope that it will enhance the efficacy to specifically help patients with chronic pain. These additional modules are not specifically part of traditional CBT, but as development of CBT progress and there is a rise of second-wave and third wave of CBT, adding modules to target problem according to evidence-based is favourable.[50] For instance, the combination of CBT with mindfulness, physiotherapy, sleep interventions and dietetic intervention makes the CBT more specialise to the cater to chronic pain management so as to customise to the needs of patients with chronic pain. However, this initial effort of combining CBT with other components makes standardisation of CBT for chronic pain management difficult at this stage of CBT development. As such, there are various common CBT components that were applied in the selected studies such as behaviour activation, behaviour pacing, relaxation, mindfulness, identifying maladaptive cognitive coping thoughts and cognitive restructuring. The challenge to produce an informed guideline for CBT in chronic pain management will mean that therapists will have to rely on their experience, clinical judgement and knowledge to plan the CBT modules in chronic pain management. In the future, it is suggested that psychologists can come out with a guideline recommending the CBT modules in chronic pain management, which can be combined with multidisciplinary components.

CONCLUSION

In conclusion, CBT showed mostly positive outcome for chronic pain management in this narrative review. Nevertheless, there were significant numbers of studies that did not find clinical outcome differences between CBT intervention group and control group among the selected studies. The trend of CBT in chronic pain management involves conducting treatment online, and the treatment planning of CBT involves combination of multidisciplinary interventions such as physiotherapy, nutrition, mindfulness, or even SMS reminders. This trend had led the development of CBT to be more customised to chronic pain management. Nevertheless, the variety of CBT modules also causes less standardisation of guided protocol in the process of implementation, which may affect the efficacy and quality of the CBT delivered for chronic pain management. Future directions of research can focus-on the development of CBT modules specific to chronic pain management, which can involve common

modules such as relaxation, behavioural activation, behavioural pacing, cognitive restructuring, and also additional modules that enhance the efficacy of CBT in chronic pain management.

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