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Cognitive-behavioral therapy for management of mental health and stress-related disorders: Recent advances in techniques and technologies

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Abstract

Cognitive-behavioral therapy (CBT) helps individuals to eliminate avoidant and safety-seeking behaviors that prevent self-correction of faulty beliefs, thereby facilitating stress management to reduce stress-related disorders and enhance mental health. The present review evaluated the effectiveness of CBT in stressful conditions among clinical and general populations, and identified recent advances in CBT-related techniques. A search of the literature for studies conducted during 1987–2021 identified 345 articles relating to biopsychosocial medicine; 154 (45%) were review articles, including 14 systemic reviews, and 53 (15%) were clinical trials including 45 randomized controlled trials. The results of several randomized controlled trials indicated that CBT was effective for a variety of mental problems (e.g., anxiety disorder, attention deficit hypersensitivity disorder, bulimia nervosa, depression, hypochondriasis), physical conditions (e.g., chronic fatigue syndrome, fibromyalgia, irritable bowel syndrome, breast cancer), and behavioral problems (e.g., anti-social behaviors, drug abuse, gambling, overweight, smoking), at least in the short term; more follow-up observations are needed to assess the long-term effects of CBT. Mental and physical problems can likely be managed effectively with online CBT or self-help CBT using a mobile app, but these should be applied with care, considering their cost-effectiveness and applicability to a given population.

Keywords: Biopsychosocial approach, Cognitive-behavioral therapy, Stress management

History of cognitive-behavioral therapy (CBT)



CBT is a type of psychotherapeutic treatment that helps people to identify and change destructive or disturbing thought patterns that have a negative influence on their behavior and emotions [1]. Under stressful conditions, some individuals tend to feel pessimistic and unable to solve problems. CBT promotes more balanced thinking to improve the ability to cope with stress. The origins of CBT can be traced to the application of learning theory principles, such as classical and operant conditioning, to clinical problems. So-called “first-wave” behavioral therapy was developed in the 1950s [2]. In the US, Albert Ellis founded rational emotive therapy to help clients modify their irrational thoughts when encountering problematic events, and Aaron Beck employed cognitive therapy for depressed clients using Ellison’s model [3]. Behavioral therapy and cognitive therapy were later integrated in terms of theory and practice, leading to the emergence of “second-wave” CBT in the 1960s. The first- and second-wave forms of CBT arose via attempts to develop well-specified and rigorous techniques based on empirically validated basic principles [4]. From the 1960s onward, the dominant psychotherapies worldwide have been second-wave forms of CBT. Recently, however, a third-wave form of CBT has attracted increasing attention, leading to new treatment approaches such as acceptance and commitment therapy, dialectical behavior therapy, mindfulness-based cognitive therapy, functional analytic psychotherapy, and extended behavioral activation; other forms may also exist, although this is subject to conjecture [4]. In a field of psychosomatic medicine, it has been reported that cognitive restructuring is effective in improving psychosomatic symptoms [5], exposure therapy is suitable for a variety of anxious disease conditions like panic disorder and agoraphobia [6], and mindfulness reduces stress-related pain in fibromyalgia [7]. Several online and personal computer-based CBT programs have also been developed, with or without the support of clinicians; these can also be accessed by tablets or smartphones [8]. Against this background, this review focused on the effectiveness of CBT with a biopsychosocial approach, and proposed strategies to promote CBT application to both patient and non-patient populations.

Research on CBT

Using “CBT” and “biopsychosocial” as PubMed search terms, 345 studies published between January 1987 and May 2021 were identified (Fig. 1); 14 of 154 review articles were systemic reviews, and 45 of 53 clinical trials were randomized controlled trials. Most clinical trials recruited the samples from patient populations in order to assess specific diseases, but some targeted at those from non-patient populations like a working population in order to assessing mind-body conditions relating to sick leave [9]. The use of biopsychosocial approaches to treat chronic pain is shown to be clinically and economically efficacious [10]; for example, CBT is effective for chronic low-back pain [11]. The prevalence of chronic low-back pain, defined as pain lasting for more than 3 months, was reported to be 9% in primary-care settings and 7–29% in community settings [12]. Chronic low-back pain is not only prevalent, but is a source of significant physical disability, role impairment, and diminished psychological well-being and quality of life [11]. Interestingly, according to the results of our own study [13], CBT was effective among hypochondriacal patients without chronic low-back pain, but not in hypochondriacal patients with chronic low-back pain. These group differences did not seem to be due to differences in the baseline levels of hypochondriasis. Although evidence has suggested that both hypochondriasis and chronic low-back pain can be treated effectively with CBT [10, 11, 14], this has not yet been validated. Chronic low-back pain

may be associated with a variety of conditions, including anxiety, depression, and somatic disorders such as illness conviction, disease phobia, and bodily preoccupation. The core psychopathology of hypochondriacal chronic low-back pain should be clarified to promote adequate symptom management [13].

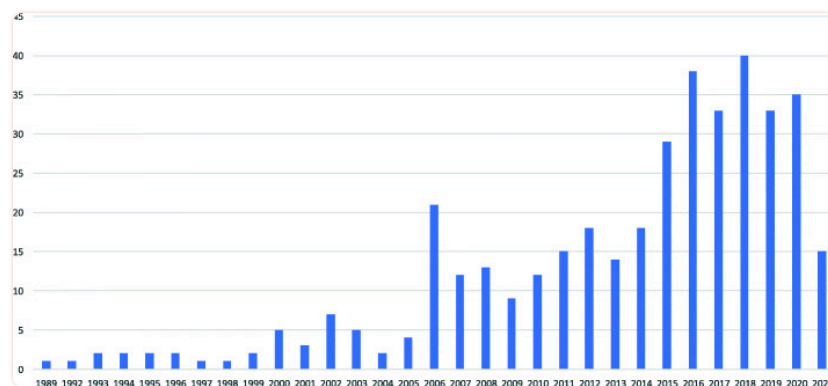


Fig. 1

Number of articles per year identified by a PubMed search from 1989 to the present

Since 2000, Cochrane reviews have evaluated the effectiveness of CBT for a variety of mental, physical, and behavioral problems. Through a search of the Cochrane Library database up to May 2021 [15], 124 disease conditions were assessed to clarify the effects of CBT in randomized controlled trials; the major conditions for which CBT showed efficacy are listed in Table 1. These include a broad range of medical problems such as psychosomatic illnesses (e.g., chronic fatigue syndrome, irritable bowel syndrome, and fibromyalgia), psychiatric disorders (e.g., anxiety, depression, and developmental disability), and socio-behavioral problems (drug abuse, smoking, and problem gambling). For most of these conditions, CBT proved effective in the short term after completion of the randomized controlled trial. Although the number of literature was still limited, some studies have reported significant and long-term treatment effects of CBT on some aspects of mental health like obsessive-compulsive disorder [16] 1 year after the completion of intervention. Future research should investigate the duration of CBT's effects and ascertain the optimal treatment intensity, including the number of sessions.

Table 1

Example diseases and problems for which CBT is expected to be effective (Cochrane reviews)

(PTSD)	following CBT	2012	▲
Social anxiety disorder	Reduced clinician-assessed PTSD symptoms in adults	December 2013	
	Reduced PTSD symptoms when used as couple and family therapies	December 2019	
	Reduced social phobia via brief CBT	September 2018	
Acute stress disorder	Reduced acute traumatic stress symptoms via brief trauma-focused CBT	March 2010	
Attention deficit-hyperactivity disorder	Beneficial for treating adults with this disorder in the short term	March 2018	
Bulimia nervosa	Efficacy of a specific manual-based form of CBT for bulimia nervosa	October 2009	
Hypochondriasis		October 2007	
Somatoform disorder	Reduced hypochondriacal symptoms and general functioning	November 2014	
	Reduced symptom severity in adults with somatoform disorders		
Physical diseases:	Improved survival at 12 months (metastatic)	June 2013	
Breast cancer	Favorable effects on anxiety, depression and mood disturbance (non-metastatic)	May 2015	
Chronic fatigue syndrome	Reduced fatigue symptoms	July 2008	
Fibromyalgia	Reduced pain, negative mood, and disability	September 2013	
Irritable bowel syndrome	Reduced symptoms of irritable bowel syndrome and improved quality of life	January 2009	
Recurrent abdominal pain		January 2017	
	Reduced pain in the short term in children and adolescents		▼

Future directions for CBT application in biopsychosocial domains

In Japan, CBT for mood disorders was first covered under the National Health Insurance (NHI) in 2010, and CBT for the following psychiatric disorders was subsequently added to the NHI scheme: obsessive-compulsive disorder, social anxiety disorder, panic disorder, post-traumatic stress disorder, and bulimia nervosa [17]. The treatment outcomes and health insurance costs for these six disorders should be analyzed as the first step, for appropriate allocation of medical resources according to disease severity and complexity [18]. In Japan, health insurance coverage is provided only when physicians apply for remuneration. A system promoting nurse involvement in CBT delivery [19], as well as shared responsibility between the CBT instructor and certified psychologists (or even a complete shift from physicians to psychologists), has yet to be established. Information and communication technology (ICT) devices may allow CBT delivery to be shared between medical staff and psychologists, in medical, community and self-help settings [8]. The journal BioPsychoSocial Medicine published 334 relevant articles up to the end of May 2021, 112 (33.5%) of which specifically addressed CBT [20]. CBT is a hot topic in biopsychosocial medicine, and more research is required to encourage its application to clinical and general populations.

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None.

Abbreviations

CBT	Cognitive-behavioral therapy
ICT	Information and communication technology
NHI	National Health Insurance
PTSD	Post-traumatic stress disorder

Authors' contributions

MN organized the project and wrote the entire manuscript. KS and NS conducted the literature search and were involved in the conceptualization of the review. All authors (MN, KS and NS) share final responsibility for the decision to submit the manuscript for publication. The authors read and approved the final manuscript.

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