

# Cognitive behavioral therapy for fibromyalgia

Robert Bennett\* and David Nelson

## SUMMARY

Cognitive behavioral therapy (CBT) techniques offer short-term, goal-oriented psychotherapy. In this respect, it differs from classical psychoanalysis in emphasizing changes in thought patterns and behaviors rather than providing 'deep insight'. Importantly, the beneficial effects of CBT can be achieved in 10–20 sessions, compared with the many years required for classical psychoanalysis. Although CBT is often done on a one-to-one basis, it also lends itself to a group therapeutic setting. CBT was initially used in the treatment of mood disorders, but its use has subsequently been expanded to include various other medical conditions, including chronic pain states. Over the past 18 years, several chronic pain treatment programs have used CBT techniques in the management of fibromyalgia. In this review, the results from 13 programs using CBT, alone or in combination with other treatment modalities, are analyzed. In most studies, CBT provided worthwhile improvements in pain-related behavior, self-efficacy, coping strategies and overall physical function. Sustained improvements in pain were most evident when individualized CBT was used to treat patients with juvenile fibromyalgia. The current data indicate that CBT, as a single treatment modality, does not offer any distinct advantage over well-planned group programs of education or exercise, or both. Its role in the management of fibromyalgia patients needs further research.

**KEYWORDS** cognitive behavioral therapy, fibromyalgia, pain, treatment, management

## REVIEW CRITERIA

Data for this review were obtained by searching the MEDLINE database from 1950 to August 2005. The search terms used were "cognitive", separately or in combination with "behavioral", "fibromyalgia" and "chronic pain". The full text of articles that were deemed relevant was obtained and reviewed. Cited references to these relevant articles were also included.

*R Bennett is Professor of Medicine at Oregon Health & Science University, Portland, OR, USA, where D Nelson is an Adjunct Associate Professor in the Department of Anesthesiology and Perioperative Medicine, as well as Associate Professor of Psychology and Associate Director of Clinical Training in the Department of Psychology & Philosophy, Sam Houston State University, Huntsville, TX, USA.*

## Correspondence

\*Oregon Health & Science University (SN ORD), Portland, OR 97239, USA  
bennetrob1@comcast.net

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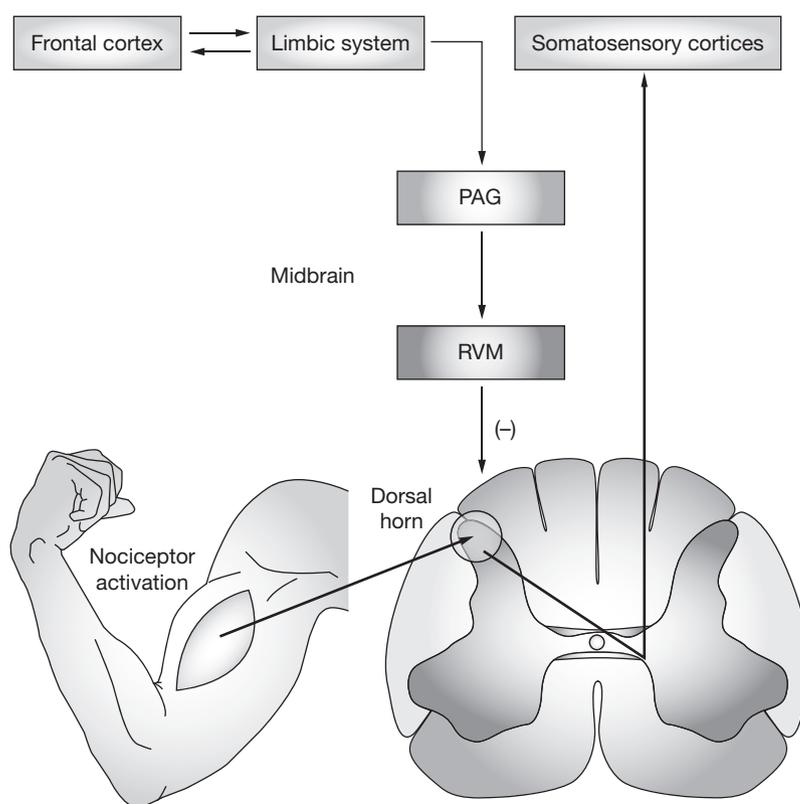
## INTRODUCTION

Cognitive behavioral therapy (CBT) is a form of psychotherapy that was developed in the mid to late 20<sup>th</sup> century. In this period there was a renaissance of interest in cognitive factors in psychology and behavior modification in particular, which occurred simultaneously with the pioneering work of psychotherapists who emphasized the role of dysfunctional thought patterns in coping and emotional disorders. For example, in the mid-1950s, Albert Ellis began to develop rational emotive therapy<sup>1</sup> as an efficient alternative to Freudian psychoanalysis.<sup>2</sup> Aaron Beck, beginning in the 1960s, developed a similar approach for treating depression, that was called cognitive therapy.<sup>3</sup> In the 1970s, Michael Mahoney formally applied behavior modification principles to cognitive processes,<sup>4</sup> and Donald Meichenbaum presented a new approach for coping and stress management that he termed cognitive behavior modification.<sup>5</sup>

Contemporary CBT is based on the cognitive theory of emotional responses. This model is based on the concept that pathological negative emotions are the result of dysfunctional thinking, which in turn is shaped by the patient's belief system. Cognitive therapists strive to educate their clients to understand that distorted beliefs adversely influence symptoms, and can be improved by educational and behavioral interventions. The main therapeutic techniques employed in CBT are twofold: first, the identification and modification of dysfunctional thought patterns that are interfering with therapeutic progress; and second, the engagement of the patient in behavioral interventions aimed at breaking the vicious circle between symptoms and patterns of dysfunctional performance. CBT was originally used in the treatment of cognitive distortions associated with mood disorders.<sup>1</sup> The rationale for its subsequent use in chronic pain states is based on the gate-control theory of pain<sup>6</sup> and on lessons from operant behavioral conditioning.<sup>7</sup> The cognitive behavioral model endorses the view that affective, behavioral,

cognitive, and sensory or physical aspects are all important for understanding a patient's experience of pain, and emphasizes the influence of the individual's beliefs on the pain experience. CBT involves attempts to downregulate the neural circuitry involved in inappropriate emotional responses to pain and other symptoms, by means of cognitive restructuring techniques and altered behaviors.<sup>8–10</sup> Primary goals of CBT typically include increasing a patient's sense of personal control over their pain and decreasing dysfunctional thought patterns, such as those involved in 'catastrophizing' (i.e. exaggerating the significance of a negative event) about the pain and its effects, and associated behavioral improvements in function.

There is now persuasive evidence that the pain component of fibromyalgia is caused by an abnormal processing of sensory impulses, usually referred to as central sensitization.<sup>11,12</sup> This phenomenon is characterized by a persistent hyperexcitability in dorsal-horn neurons, which continues long after the original sensitizing input has waned.<sup>13</sup> The ascending pain pathway from the spinal cord to the brain is modulated by a descending pain pathway originating in the brainstem.<sup>14</sup> Activation of the nuclei in the midbrain (the periaqueductal gray and the rostral ventromedial medulla regions) occurs in response to endorphins, opioids, emotions and the placebo response, and modulates dorsal-horn hyperexcitability via activation of monoaminergic pathways (mainly mediated by serotonin and norepinephrine) (Figure 1). Under normal circumstances, the descending pathway is predominantly inhibitory and suppresses normal (i.e. nonthreatening) visceral and musculoskeletal sensory impulses from reaching consciousness.<sup>15,16</sup> Fibromyalgia pain is improved in many patients (reduced by about 30%) by drugs that inhibit the reuptake of both serotonin and norepinephrine,<sup>17,18</sup> and it is thought that one mechanism of their action is the stimulation of the descending inhibitory pain pathway. These drugs are all antidepressants, and their effectiveness in chronic pain states underlines the increasing realization that pain and depressive illness, while not causally linked, have similar neurobiologic underpinnings.<sup>19</sup> Modification of the neural pathways involved in both the somatosensory and emotional components of the pain experience is hypothesized to underlie, in part, the physiologic rationale for using CBT in chronic pain states.<sup>20</sup> The



**Figure 1** Cartoon showing the major neural pathways in pain processing. Central sensitization can occur in response to persistent nociceptor activation with resultant temporal summation of impulses in dorsal-horn neurons. This process can be modulated by the descending inhibitory pain pathway, which originates in the rostral ventromedial medulla and the periaqueductal gray nuclei of the brainstem and projects to dorsal-horn neurons in the spinal cord. This descending pathway is activated by opioids, endorphins, the placebo response and in the response to acute danger. This pathway is also influenced by higher cortical centers and the nuclei of the limbic system (i.e. insula, amygdala and cingulate). The major neurotransmitters that serve this pathway at the level of the dorsal horn are serotonin and norepinephrine. Abbreviations: –, inhibition; PAG, periaqueductal gray; RVM, rostral ventromedial medulla.

key elements commonly employed in a CBT program are shown in Box 1.

### COGNITIVE BEHAVIORAL STUDIES IN FIBROMYALGIA PATIENTS

On the basis of principles originally discussed by Turk *et al.*,<sup>21</sup> CBT has been used in the management of chronic pain for over 20 years.<sup>22–25</sup> It is widely recognized that the effective management of fibromyalgia involves both pharmacologic and nonpharmacologic strategies.<sup>26,27</sup> The two major nonpharmacologic techniques that are used in fibromyalgia treatment are exercise<sup>28,29</sup> and CBT. This review discusses the major studies that used CBT techniques in the management of fibromyalgia patients (Table 1).

**Box 1** Key elements of cognitive behavioral therapy for fibromyalgia.

- Education about the nature of fibromyalgia (e.g. central sensitization and other central pain processes, interaction between emotions, behavior and cognition in coping and functioning)
- Realistic goal setting for work or work-like activities, social activities, and involvement with family and friends
- Relaxation training (e.g. progressive muscle relaxation training, controlled diaphragmatic breathing)
- Appropriate behavioral pacing of activities to not overdo or underdo activity levels
- Identification of dysfunctional thought patterns and techniques to counter negative automatic thoughts, and the underlying maladaptive attitudes or beliefs fueling these thoughts
- Communication skills training, to enhance appropriate assertiveness and allow a corresponding release of tension from controlling and bottling up negative thoughts and feelings, and enhance interactions with health-care providers and others
- Strategies for acquisition, maintenance, and generalization of skills
- Strategies for relapse prevention and for managing painful flare-ups

**Results from noncontrolled and quasi-controlled studies**

An early, quasi-controlled study of a CBT program was reported by Nielson *et al.*<sup>30</sup> This study employed a 3-week inpatient treatment program. Patients acted as their own control, during the waiting period for admission into the program. Significant improvements were seen in patients receiving CBT with respect to pain severity, life interference, control over pain, emotional distress, pain experience (worry and emotional response to pain), depression, anxiety and the number of pain-related behaviors. No significant improvements were seen during the waiting list period. White *et al.*<sup>31</sup> subsequently followed 25 of these patients for a mean of 30 months. They continued to show improvements in all target variables during this long-term follow-up, but the improvement was only significant for pain behavior, worry and control over pain. In summary, this 3-week inpatient

CBT program achieved worthwhile short-term improvement in fibromyalgia symptoms with continued improvement after 30 months in pain behavior, worry and pain control.

The use of CBT techniques in a noncontrolled study of girls with juvenile primary fibromyalgia ( $n=7$ , mean age 13 years) was reported by Walco and Ilowite.<sup>32</sup> These patients were treated individually by a clinical psychologist over the course of 4–9 sessions. The therapist followed a CBT program that had been used successfully in children with juvenile rheumatoid arthritis. The average pain intensity on the pediatric pain questionnaire visual analog scale (VAS)<sup>33</sup> was in the severe range at the beginning of the program and reported as absent or negligible at the end. On the basis of reports from both parents and patients, there was a return to premorbid levels of functioning in school attendance, activities of daily living, participation in family activities and interaction with peers. During telephone follow-up after 4–24 months (mean 10.8 months), four patients reported no subsequent pain. This short, individualized CBT program resulted in a dramatic improvement in pain and functioning of juvenile fibromyalgia patients.

Turk and colleagues reported the results from a noncontrolled, multidisciplinary group study involving 67 fibromyalgia patients who completed 6 half-days of treatment over 4 weeks.<sup>34</sup> In addition to medical management, physical and occupational therapy, patients received CBT that focused on strategies for self-management of pain and stress, relaxation training, and recognition of maladaptive thought patterns with appropriate substitutions and problem solving. Significant improvements were obtained for pain severity, life interference, sense of control, affective distress, depression, perceived physical impairment, fatigue, and anxiety. Improvement in pain severity was predicted by pretreatment levels of depression, activity, perceived disability, solicitous responses of significant others, and idiopathic onset. At 6-month follow-up, the improvements in pain, life interference, sense of control, affective distress, and depression were sustained. When patients were grouped by profile according to the West Haven–Yale Multidimensional Pain Inventory (WHYMPI) scheme<sup>35</sup> (Box 2), subgroup differences were revealed: ‘dysfunctional’ patients improved more than ‘adaptive copers’. The ‘interpersonally distressed’ patients did not benefit from the program.

**Table 1** A summary of fibromyalgia studies that have employed cognitive behavioral techniques.

Trial	Number of patients	Number of sessions	Control group	Outcome and comment
<b>Noncontrolled and quasi-controlled studies</b>				
Nielson <i>et al.</i> (1992) <sup>30</sup>	25	25	Waiting list as own control	Initial improvement in fibromyalgia symptoms Sustained improvement at 30 months only in pain, pain coping and behavior CBT was one of several concurrent therapeutic modalities
Walco and Ilowite (1992) <sup>32</sup>	7 <sup>a</sup>	4–9	None	Individualized CBT program 5 patients who completed the program had an almost complete “cure” and showed continued improvement over 4–24 months
Turk <i>et al.</i> (1998) <sup>34</sup>	67	6	None	Significant improvements in pain, sense of control, affective distress, depression, and life interference that were sustained at 6 months post-treatment
Creamer <i>et al.</i> (2000) <sup>36</sup>	28	8	None	Program involving CBT, relaxation training and exercise Improvements in total FIQ, pain levels, tender points, pain threshold and physical function
Degotardi <i>et al.</i> (2005) <sup>42</sup>	67 <sup>a</sup>	8	None	8-week individualized CBT program Significant improvements in pain and other fibromyalgia-related symptoms
Lemstra and Olszynski (2005) <sup>43</sup>	71	1 CBT 18 exercise 2 massage 1 dietitian 1 rheumatologist	Routine medical care with family physician	Improvements in pain intensity, pain disability, depression, and overall health status at 6 weeks post-treatment Improvement sustained at 15 month follow-up except for general health status Ongoing improvement strongly related to continuation of exercise
<b>Controlled studies</b>				
Burckhardt <i>et al.</i> (1994) <sup>44</sup>	56	6	Waiting list and exercise	CBT and exercise groups both showed modest improvement in self efficacy, but not in total FIQ or pain level CBT not superior to exercise
Vlaeyen <i>et al.</i> (1996) <sup>47</sup>	112	12	Waiting list and education	Initial improvement in pain coping and pain control, but not pain level Improvements not sustained at 6 and 12 months
Bennett <i>et al.</i> (1996) <sup>48</sup>	104	24	Waiting list	Improvement in total FIQ, pain level, and all other variables Improvements were sustained in 33 patients followed for 2 years CBT was one of several concurrent therapeutic modalities
Nicassio <i>et al.</i> (1997) <sup>49</sup>	71	10	Education	Both CBT and control groups showed significant improvements in pain behavior and depression, but not pain level CBT was not superior to education alone
Williams <i>et al.</i> (2002) <sup>50</sup>	122	6	Exercise	25% of the CBT group versus 12% of the exercise group showed improvement in physical functioning at 1 year post-treatment ( $P < 0.05$ ) Pain level was not improved
Redondo <i>et al.</i> (2004) <sup>53</sup>	50	8	Exercise group	Total FIQ, but not pain, improved in both CBT and exercise groups Improvement was not sustained at 6 and 12 month follow-up CBT was not superior to exercise
Kashikar-Zuck <i>et al.</i> (2005) <sup>54</sup>	30 <sup>a</sup>	6	Crossover design	Improvement in coping strategies and functional disability, but not pain Symptom monitoring followed by CBT was more effective than CBT followed by symptom monitoring

<sup>a</sup>Patients with juvenile fibromyalgia. Abbreviations: CBT, cognitive behavioral therapy; FIQ, Fibromyalgia Impact Questionnaire.

The results from another noncontrolled study that involved 28 female fibromyalgia patients, were reported by Creamer *et al.*<sup>36</sup> These patients had 8 weekly sessions of 2.5 h each. Interventions included education, relaxation or meditation training and Chinese movement therapy (qi gong). An intent-to-treat analysis revealed

significant post-treatment improvements in the 20 patients who completed the study, in terms of total Fibromyalgia Impact Questionnaire (FIQ) score (including pain VAS ratings),<sup>37</sup> Beck Depression Inventory,<sup>38</sup> Health Assessment Questionnaire function,<sup>39</sup> catastrophizing,<sup>40</sup> tender point score,<sup>41</sup> myalgic score<sup>41</sup> and

**Box 2** West Haven–Yale Multidimensional Pain Inventory (WHYMPI).

The West Haven–Yale Multidimensional Pain Inventory<sup>35</sup> is a self-reported measure of psychosocial variables that are relevant to the chronic pain experience, and are theoretically linked to the cognitive behavioral model. The assessed variables are pain severity, life interference, affective distress, perceived life control, social support, significant other's responses (solicitous, punitive, distracting) to pain, and activity levels.

Subgroup	Abbreviation	Profile
Dysfunctional	DYS	High pain severity, life interference, and affective distress; low perceived life control; low activity
Interpersonally distressed	ID	Low support from significant others
Minimizer or adaptive copier	AC	Low pain severity, life interference, and affective distress; high perceived life control; higher activity

pain threshold (dolorimetry).<sup>41</sup> At 4-month follow-up, the improvements were sustained in all these outcomes with the exception of depression scores. This study showed impressive results, albeit tempered by the absence of a control group and the combination of three nonpharmacologic treatment modalities.

Degotardi *et al.* reported the results of an 8-week CBT program in 67 children with juvenile primary fibromyalgia syndrome (JPFS). The patients were aged 8–20 years (mean  $13.9 \pm 2.8$  years) and were predominantly female (88.1%).<sup>42</sup> The diagnosis of JPFS was based on the Yunus criteria of 1985, rather than the 1990 American College of Rheumatology criteria (the Yunus criteria specify widespread pain with  $\geq 5$  out of 11 designated tender points). A standardized JPFS treatment manual, developed in two previous pilot studies, was used throughout the CBT study. This study used only CBT interventions, which consisted of: psychoeducation (week 1), sleep improvement (weeks 2–3), pain management (weeks 4–6) and activities of daily living (weeks 7–8). Treatment was on an individual basis, with parents in attendance. There was a family history of psychiatric problems in 32% of cases (mothers most commonly reported obsessive-compulsive symptoms, anxiety, and paranoid ideation). In all, 45 (66%) children completed the entire 8-week protocol. Comparison of preintervention and post-intervention scores revealed significant improvements in pain (24% reported no pain at the end of the study), somatic symptoms, anxiety,

fatigue, sleep quality, and improved function with fewer school absences. There was no attentional control group (i.e. patients who received the same amount of therapist contact time) because the authors had previously found that a program of therapist attention and relaxation therapy was ineffective; they therefore considered that it was 'unethical' to offer this as part of their treatment program. This 8-week individualized CBT program reported impressive results in pain and other fibromyalgia-related symptoms.

Results of a multidisciplinary rehabilitation treatment program for fibromyalgia patients, which included a small CBT component, were reported by Lemstra and Olszynski.<sup>43</sup> In this study, 35 individuals completed a 6-week outpatient program that consisted of 18 aerobic exercise classes plus light weight training, a 3 h educational class with a rheumatologist, a 3 h educational class with a dietitian, and two 20 min individual sessions with a massage therapist. The CBT component was provided by a PhD-qualified psychologist, and involved a 3 h group lecture on relaxation training and another 3 h group lecture on behavioral modification, including pain and stress management. A control group of 36 individuals continued their usual medical care provided by their family physician (i.e. they received no special attention). After 6 weeks of treatment, the active-intervention group showed significant improvements compared with the control group, in the following outcome measures: general health status, average pain intensity, Pain Disability Index, Beck Depression Inventory, days in pain during the last month, and the number of hours in pain over the preceding month. Patients who were followed-up at 15 months reported sustained, significant improvements in all health measures, apart from the general health status. There was no significant change in prescription drug use or work status, either immediately post-intervention or 15 months later. A logistic regression analysis found that long-term changes in the Pain Disability Index were contingent upon exercise adherence after completion of the initial intervention. This 6-week rehabilitation program reported worthwhile improvements in many measures, including pain, that were maintained over 15 months in patients who continued to exercise. The relative importance of the CBT component (two 3 h group lectures) in bringing

about these improvements cannot be determined; adherence to exercise was the major reported determinant of long-term improvement.

### Results from controlled studies

The results from a controlled study that compared the efficacy of a program of education to that of a physical training program in 86 women with fibromyalgia were reported by Burckhardt *et al.*<sup>44</sup> Three groups were studied: a delayed-treatment group (controls), a group who received education only, and a group who received education plus physical training. All patients in the two treatment groups ( $n=56$ ) participated in 6 weekly education classes of 90 min each. These classes included information on fibromyalgia, the role of stress in the development and maintenance of symptoms, coping strategies, problem-solving techniques, assertiveness training, relaxation strategies and the importance of physical conditioning. At the end of the educational component, 28 patients (the education plus physical training group) were given an additional hour of physical training. Evaluation after 6 weeks revealed significant within-group changes in both treatment groups, in terms of the fibromyalgia attitudes index,<sup>45</sup> myalgic score, self-efficacy ('other symptoms' subscale)<sup>46</sup> and FIQ ('days feeling bad' subscale). The control group did not improve significantly for any of these variables. The only significant between-group difference was that the control group saw their physicians significantly more often than the treatment groups. This CBT program, either with or without an exercise component, failed to result in any significant improvement in pain or total FIQ score; however, self-efficacy and adherence to regular exercise and relaxation strategies improved in both CBT groups.

Vlaeyen *et al.* reported the results from a controlled study that involved 112 patients with fibromyalgia, 43 of whom remained on the waiting list as controls. Patients who received intervention attended a 6-week outpatient program comprising 12 treatment sessions:<sup>47</sup> 49 patients were randomly assigned to receive educational cognitive treatment and 39 to participate in an educational discussion group. A within-group analysis showed improvements at the end of the program in both the educational cognitive group and educational discussion group, but not the control group. Improvement was only significant, however, for the variables of coping with pain and pain

control. At 6-month and 12-month follow-up there were no significant differences between the educational cognitive and educational discussion groups, except for an increase in pain intensity in the educational cognitive group at 12 months. This CBT group program, therefore, achieved some short term success but was no more effective than education alone.

A 6-month outpatient program involving female fibromyalgia patients (104 women who attended the program plus 29 control patients who did not attend) was reported by Bennett *et al.*<sup>48</sup> Groups of 15–25 patients met for 90 min sessions once a week for 6 months. The program consisted of formal lectures on fibromyalgia, group therapy that emphasized behavior modification and stress reduction techniques, treatment of sleep disturbances and depression with medications (mainly cyclobenzaprine and tricyclic antidepressants), injection of myofascial trigger points, aerobic conditioning and stretching exercises. Significant changes were seen in the total FIQ score, pain VAS, and in all other FIQ subscales. The number of tender points was significantly reduced, as was the total myalgic score. The 33 patients who were followed up for 2 years reported continuing improvement; their quality of life approached that of healthy individuals, and 42% reported periods completely without pain on 3 or 4 days of each week. This multidisciplinary outpatient program achieved good results in pain and most other symptoms. The multidimensional design of the program, however, means that it is not possible to isolate the role of CBT in achieving these results.

Nicassio *et al.* compared the efficacy of CBT ( $n=36$ ) with that of education ( $n=35$ ) in a 10-week, controlled study.<sup>49</sup> The CBT component involved education about fibromyalgia, in terms of the gate-control theory of pain, activity pacing, and behavioral goal setting. This program was unique as it included a support person who assisted individuals with implementation of the behavioral interventions. The education (control) group received informative lectures and videotapes, group discussion, and contact with a support group. At immediate post-treatment and 6-month follow-up, improvements were found in both groups' pain behaviors, depression, and myalgic scores; pain was not significantly improved. There were no significant differences between the two groups. Multiple regression analysis indicated

that changes in helplessness and passive coping were associated with improvements in pain levels and depression in the CBT group; however, improvements in helplessness were associated only with pain improvements in the control group. This program reported improvements in depression, pain behaviors and myalgic scores, but did not improve pain. CBT was no more effective than education.

Williams *et al.* randomly allocated 122 fibromyalgia patients (90% female, average age  $47.7 \pm 11.4$  years) to receive either standard medical management, including medications and suggestions for aerobic fitness (control group;  $n=69$ ) or the same standard medical management plus six sessions of CBT ( $n=76$ ).<sup>50</sup> Patients in both groups took stable doses of pharmacotherapy. The predetermined primary outcome measure was a 6.5-unit improvement in the physical component summary score (PCS) of the SF-36<sup>®</sup> Medical Outcomes Study 36-item general health survey questionnaire,<sup>51</sup> at 12-month follow-up. The primary outcome goal was attained by 25% of the CBT group, compared with 11.6% of the control group ( $P<0.05$ ). Odds ratio analysis showed that patients in the CBT group were nearly three times more likely to achieve a 6.5-unit improvement in the PCS. There was no difference between the two groups in terms of pain, as assessed by the McGill sensory and affective pain scales.<sup>52</sup> Success in improving physical function was associated with neither the level of adherence to therapy, nor whether the subjects chose their own CBT goals versus therapist-established goals. The authors concluded that “this study supports the notion that physical functional status can be improved in a sustainable manner in a subset of persons with this disease, perhaps in combination with instruction in aerobic fitness and symptom-based pharmacological management”. This CBT program, added to standard medical care, provided a modest but sustained improvement in physical functioning.

Redondo *et al.*<sup>53</sup> conducted a long-term, prospective, randomized, parallel-group clinical trial that included 50 female fibromyalgia patients, which compared the efficacy of a group-based CBT approach with that of a physical exercise-based strategy. Both groups were followed up immediately post-treatment, and at 6 and 12 months after finishing the program. The total FIQ score improved significantly

in both the CBT and exercise groups. Improvement was not sustained, however, at 6-month and 12-month follow-up. There were no differences in depression, anxiety and self-efficacy measurements in either group at any of the follow-up periods. The use of analgesic drugs at 12-month follow-up did not increase in the exercise group, but did increase significantly in the CBT group. Contrary to expectations, there was no significant association between measures of self-efficacy and clinical improvement in the CBT group. This 2-month group CBT program reported short-term improvements in fibromyalgia symptoms in both the CBT and exercise groups, but these improvements were not sustained at 6 and 12 months follow-up. CBT and PE were equally effective in the short term.

Kashikar-Zuck *et al.* revisited the effectiveness of CBT in a controlled, crossover study that enrolled patients with juvenile fibromyalgia ( $n=30$ ).<sup>54</sup> The CBT protocol consisted of 4 weeks of one-to-one therapy sessions, followed by two biweekly sessions that alternated with biweekly telephone check-ups with the therapist. The crossover design allowed patients to act as their own control: patients were initially randomly assigned to either CBT or to daily self-monitoring diary recording of average pain level, sleep quality and pain medications taken. After 8 weeks, the patients crossed over to the other treatment for a further 8 weeks. CBT content included education on behavioral techniques, muscle relaxation, distraction and activity pacing, problem-solving, sleep hygiene, and cognitive strategies for dealing with negative thoughts and mood difficulties. Parents were included in some sessions. After the first 8 weeks of treatment, depressive symptoms and functional disability, but not pain, were significantly improved in both groups; similar changes were sustained after 16 weeks of treatment. Patients who received self-monitoring followed by CBT, rather than CBT followed by self-monitoring, derived the most benefit. This CBT program achieved significant improvements in coping and functional disability without concomitant improvements in pain.

## CONCLUSIONS AND FUTURE PERSPECTIVES

It is evident from this analysis that no solid conclusions can be made as to the general

applicability of CBT in the treatment of fibromyalgia. A valid comparison of these individual studies is not possible, as the described programs varied greatly in terms of CBT techniques, patient selection, the use of controls, outcome measures and the use of adjunctive medical therapies. Furthermore, one cannot legitimately compare noncontrolled studies that employed within-group analyses with controlled studies that employed between-group analyses.

Effective CBT requires training and experience; furthermore, interpersonal relationships between therapists and patients have an important role in the success or failure of therapy. Descriptions of the training and skill levels of the CBT therapists in these programs were largely lacking. Some of the programs were essentially educational in nature, but included some CBT techniques. All CBT programs, with the exception of those in the three trials that enrolled patients with juvenile fibromyalgia, employed group therapy. In two of these studies there were impressive improvements in pain and other fibromyalgia-related symptoms.<sup>32,42</sup> It has been noted that juvenile patients with fibromyalgia have a generally better prognosis than adults with this condition<sup>55,56</sup> and, therefore, individualized CBT might be especially effective in juvenile fibromyalgia. Programs that included CBT in a multidisciplinary approach to fibromyalgia treatment were generally more successful than programs that used CBT in isolation.<sup>30,48</sup> Such synergy could be especially relevant in those studies employing concomitant exercise therapy, as it has been reported that the maintenance of an exercise program in fibromyalgia seems to be contingent on the patient being able to deal with stress, pain, barriers to exercise, and disability.<sup>57</sup> Somewhat surprisingly, several programs failed to show the expected correlation between improved fibromyalgia symptoms and improvements in self-efficacy, pain behaviors and coping.<sup>44,47,50,53</sup> Turk *et al.* have suggested that CBT might be most successful in a subgroup of fibromyalgia patients with prominent psychological distress and dysfunctional patterns of thinking and behavior;<sup>58</sup> future research should explore this notion further.

In conclusion, the current evidence provides modest support for the use of CBT in the management of fibromyalgia, especially when it is part of a more comprehensive program utilizing medications and exercise.<sup>26</sup>

### KEY POINTS

- Cognitive behavioral therapy (CBT) has a long track record in the treatment of mood disorders
- CBT also has a role in the treatment of a variety of chronic medical conditions, including chronic pain syndromes
- The rationale for use of CBT in the management of patients with fibromyalgia is based, in part, on the physiological links between chronic pain and depression
- In general, CBT does not seem to provide sustained pain relief in fibromyalgia patients
- The published literature indicates that the primary utility of CBT in the management of patients with fibromyalgia lies in improving aspects of the syndrome other than pain, including self-efficacy, dysfunctional thought patterns and physical function
- Current evidence suggests that CBT should be considered as an adjunctive therapy in the management of fibromyalgia patients, particularly those who present with an emotionally distressed and/or dysfunctional profile, although CBT could also be useful for other patient subgroups

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**Competing interests**

The authors declared they have no competing interests.

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