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Psychological Interventions and Lifestyle Modifications for Arthritis Pain Management

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Abstract

This article provides an overview of self-management interventions used to manage pain in patients with arthritis. The article is divided in two major sections. In the first section, we review psychological interventions used to manage arthritis pain including pain coping skills training/cognitive behavioral therapy for pain management, emotional disclosure interventions, and partner-assisted interventions. In the second section, we address lifestyle behavioral weight loss interventions used to reduce arthritis pain. In each section we briefly describe the rationale and nature of the interventions, present data on their efficacy, and highlight potential future research directions.

Over the past three decades there have been significant advances in medical and surgical approaches to treating patients suffering pain due to rheumatic diseases. For example, early and more aggressive use of disease-modifying antirheumatic drugs (DMARDs) has led to reductions in pain and pain-related disability for many patients suffering from rheumatoid arthritis (RA) [1]. Pain medication protocols developed, refined, and tested in other persistent disease-related pain conditions (e.g. cancer pain) are now increasingly being applied to patients suffering from pain due to osteoarthritis (OA) and RA [2]. Finally, surgical options once held out as a last resort in the management of arthritis pain (e.g. joint replacement surgery) are now being offered to arthritis patients earlier in their disease course [3].

Given these recent developments in the biomedical management of arthritis pain, one might expect that there is a diminishing emphasis in current practice on the role of patient self-management efforts in controlling arthritis pain. Yet, recent clinical guidelines for the management of arthritis [4–6] clearly recommend patient self-management interventions as part of a comprehensive approach to pain control. Among the recommendations offered by

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these guidelines are the increased use of protocols designed to enhance patients pain coping skills and greater involvement of significant others in pain management efforts.

Arthritis is a particularly appropriate target for interventions designed to enhance pain self-management. First, pain is one of the most common symptoms of arthritis patients and is a significant concern of both patients and the health care providers who treat them [7]. Second, there is growing evidence that the use of pain coping strategies and patient's confidence (self-efficacy) that they can use pain coping skills to control pain not only influences the experience of pain but also the impact of pain on psychological distress and physical disability [2]. Third, recent randomized clinical trials have shown that psychosocial interventions for arthritis pain can produce significant improvements in pain and other outcomes (e.g. pain coping, anxiety, joint swelling, and physical disability) [7]. Finally, training in self-management strategies for controlling pain may be especially important for those patients who have difficulty tolerating or have failed to respond to more traditional biomedical approaches to pain.

This article provides an overview of self-management interventions currently being used to manage arthritis pain. The article is divided in two major sections. In the first section, we review psychological interventions used to manage arthritis pain including pain coping skills training/cognitive behavioral therapy for pain management, emotional disclosure interventions, and partner-assisted interventions. In the second section, we address lifestyle behavioral weight management interventions used to reduce arthritis pain. In each section we briefly describe the rationale and nature of the interventions, present data on their efficacy, and highlight potential future research directions.

Psychological Interventions

Pain Coping Skills Training/Cognitive Behavioral Therapy (CBT) for Pain Management

The notion that training in cognitive and behavioral pain coping skills could alter disease-related pain grew out of developments in pain theory dating back to Melzack and Wall's gate control theory [8]. The gate control theory maintains that pain is not a simple sensory event (e.g. a simple warning sign of tissue damage), but rather a complex experience that influences and can be influenced by brain processes related to sensation, cognition, emotion, and behavior. The gate control theory has two main tenets: 1) that a gating mechanism in the dorsal horn of the spinal cord can control the transmission of nociceptive signals from a peripheral site (e.g. inflamed joint) to the brain and, 2) that the spinal gating of noxious signals is controlled not only by input from the periphery but also by input from higher brain centers responsible thoughts, feelings, and behaviors. The gate control theory provides an explanation for why some psychological factors (e.g. active coping, optimism, social support) can reduce pain while others (e.g. feelings of helplessness, depression) can increase pain. One important implication of the gate control theory is that systematic training in cognitive and behavioral coping skills for altering thoughts, feelings, and behaviors related to pain can reduce pain and help minimize the detrimental impact of pain on psychological and physical functioning.

The neuromatrix theory of pain builds upon and extends the gate control theory [9] by highlighting the key role that stress and stress regulation systems play in persistent pain conditions. According to the neuromatrix theory, pain is a major stressor that, when it persists, can profoundly alter homeostatic mechanisms. Alterations in homeostasis that are caused by persistent pain can activate stress regulation processes to reinstate homeostasis (e.g. release of cortisol, cytokines) that, in turn, can heighten pain. The neuromatrix theory's highlighting of the importance of stress dysregulation has led to an increased emphasis on teaching patients how to use pain coping skills to manage stress.

Pain coping skills training/CBT for pain management typically consists of three components [7]. The first component involves providing an educational rationale (e.g. the gate control theory) that helps patients better understand how their thoughts, feelings, and behaviors can influence pain and how in turn their own efforts to manage pain can influence the pain experience. The second component involves therapist-guided training in cognitive and behavioral coping strategies such as progressive relaxation training, brief relaxation methods, goal setting, activity pacing, imagery, and strategies for altering overly negative thoughts related to pain (e.g. cognitive restructuring). The third component involves extensive home practice with coping skills and learning how to apply those skills to challenging pain-related situations (e.g. managing pain flares).

Bradley and colleagues [10] were among the first to conduct a methodologically rigorous trial to test the efficacy of a pain coping skills training/CBT intervention for patients having RA. A sample of 53 RA patients was randomly assigned to receive either a 15 session protocol that provided extensive training in relaxation, biofeedback, goal setting, and self-rewards or to a control group that received 15 sessions of structured social support. When compared to the control condition, the pain coping skills training/CBT protocol produced significant reductions in pain behavior, disease activity, and trait anxiety.

An important focus of recent studies of pain coping skills training/CBT studies in RA patients has been on the effects of providing training early in the course of the disease. In a randomized clinical trial of 53 patients having a less than 2 year history of RA, Sharpe and colleagues [11] found that, when compared to a routine medical care control condition, a protocol that combined routine medical care with a comprehensive pain coping skills training/CBT regimen led to significant improvements in joint stiffness, C-reactive protein levels, and depression. An 18 month follow-up study [12] reported that patients who received the pain coping skills training/CBT regimen not only maintained their improvements in joint function and depression but also showed additional benefits in terms of reductions in anxiety and disability. Taken together, these findings suggest that a pain coping skills training/CBT protocol may be a useful adjunct to routine care typically given to RA patients early in the course of their disease.

Our research group has conducted a number of clinical trials testing the efficacy of pain coping skills training/CBT protocols in patients having osteoarthritic knee pain. In our first study [13], we randomly assigned 99 patients having OA of the knees to one of three conditions: pain coping skills training, arthritis education, and standard care control. Patients in the pain coping skills training attended 10 weekly group sessions training them in cognitive and behavioral pain coping strategies, while those in the arthritis education condition attended 10 weekly group sessions providing educational information and lectures on arthritis. Data analyses showed that patients in the pain coping skills training group had significant improvements in pain, psychological disability, and physical disability when compared to those in the arthritis education and standard care control conditions. A six month follow-up study [14] revealed that patients in the pain coping skills group maintained their gains in psychological disability and showed a strong trend ($p=.051$) to show improvements in physical disability compared to the arthritis education condition. In addition those patients who reported the greatest increases in their perceived efficacy of pain coping skills over the course of initial training had significantly lower levels of pain, physical disability, and pain behavior at six months follow-up. These findings suggest that pain coping skills training can benefit OA patients suffering from persistent knee pain and that changes in pain coping achieved with this training are related in meaningful ways to a number of long-term outcomes.

Pain coping skills training/CBT is one of the most widely used psychological interventions for the control of arthritis pain. A recent meta-analysis of randomized psychosocial interventions found that pain coping skills training/CBT, in fact, was the most frequently tested intervention

(tested in 18 of 26 studies) [7]. As discussed above, controlled studies have shown that pain coping skills training/CBT can produce beneficial outcomes in patients suffering from either OA or RA pain. What makes the effects of this training impressive is that they are not restricted solely to pain, but also evident for other important indices of adjustment to persistent arthritis pain including anxiety, depression, physical disability, and joint function. An important direction for future research on pain coping skills training/CBT interventions is to determine whether these interventions can be successfully disseminated into clinical practice. In a dual-site (SUNY-Stony Brook, Duke Medical Center) NIH-supported study we are currently testing the efficacy of nurse-practitioner delivered pain coping skills training protocol for patients with OA pain seen in a primary care practice. We are also working with investigators at Mt. Sinai to develop a web-based platform for delivering pain coping skills training to OA patients being treated in primary care settings.

Emotional Disclosure—Over the past 25 years, research by Pennebaker and other investigators has demonstrated that individuals who engage in the disclosure of emotionally difficult and stressful events (emotional disclosure) may experience significant benefits in their health status [15–19]. Typically, these studies require that participants write or talk privately in detail about their thoughts and feelings about a major life event they have not fully disclosed to others. Disclosure sessions are typically carried out for 20 to 30 minutes daily for four days in a row. The effects of disclosure are usually compared to a control condition in which participants talk or write about a neutral topic. In these studies, all participants are followed up to examine long-term health benefits of the intervention. Studies have been carried out in college students as well as a variety of other typically healthy populations. Although results vary, in general emotional disclosure has led to short term increases in negative mood followed by longer term improvements in outcomes. Beneficial effects of emotional disclosure have included reductions in symptoms and health problems [16,17,19,20], decreases in the frequency of health care visits [19–21], and improvements in immune functioning [19].

There has been growing interest in testing the efficacy of emotional disclosure in patients suffering from pain due to RA. RA is a good model in which to test emotional disclosure interventions for several reasons. First, there is evidence that RA patients experience high levels of stress [22,23] and are quite reactive to interpersonal stress [24–26]. Second, patients having RA experience often have high levels negative emotions which are linked to increased pain [27]. Third, there is a body of literature that suggests that some patients with RA are particularly prone to inhibit their negative emotions and experience problems identifying and reporting their emotions [28].

Kelley and colleagues [29] were the first to systematically test the effects of emotional disclosure in persons with RA. In this study, 72 patients having RA were randomly assigned to either an emotional disclosure condition (talking privately into a tape recorder about stressful life events for 4 consecutive days) or to a control condition (talking about neutral pictures for 4 consecutive days.) Results revealed that, while the emotional disclosure intervention produced significant immediate increases in negative mood, at three months follow-up patients receiving this intervention reported significantly lower levels of affective disturbance and enhanced physical functioning. Interestingly, patients who experienced the largest initial increases in negative mood had the best outcomes at follow up in terms of improvements in joint functioning. The results of this study attracted considerable attention since they indicated that a brief emotional disclosure protocol can have lasting benefits for RA patients. Subsequent studies of emotional disclosure in RA patients, however, have produced inconsistent results. In a study that involved both RA patients and asthma patients, Smyth and colleagues [30] reported that RA patients who engaged in a written disclosure task for three days had significant improvements in physician ratings of their disease activity four months later. Broderick and colleagues [31] tested the effects of a standard three day home-based written emotional

disclosure protocol in patients with RA. They found the disclosure intervention produced no significant effects on outcomes. Wetherell and colleagues [32] conducted a clinical trial comparing the effects of an emotional disclosure protocol to a control intervention in RA patients and found that, when compared to the control condition, emotional disclosure was associated with reductions in disease activity and improvements in mood. Conclusions regarding the benefits of emotional disclosure, though, were tempered by the fact that the differences in outcome obtained mainly reflected the effects of the control getting worse.

Finally, we recently conducted a study to test whether the benefits of emotional disclosure in RA patients could be enhanced by having a trained nurse assist the patient in the disclosure process [33]. In this study, 98 patients having RA were randomly assigned to one of four conditions: a) private verbal emotional disclosure; b) clinician-assisted verbal emotional disclosure; c) arthritis information control or d) no-treatment, standard care only control group. Outcome measures of pain, disability, affect, and stressed were collected at evaluation sessions conducted prior to treatment at 1-month, 3-month, and 12-month follow-ups. Data analyses revealed that there were no consistent benefits of either the clinician-assisted or private emotional disclosure protocols.

The application of emotional disclosure protocols to samples of RA patients is a relatively recent development. Prior studies have mainly been conducted in samples of healthy individuals. Meta analyses of the effects of emotional disclosure in health samples have shown this intervention produces moderate effect sizes [34,35]. Interestingly, the mixed findings obtained in emotional disclosure in RA patients are similar to those reported in other clinical populations. Indeed, meta-analyses of emotional disclosure in clinical populations [35,36] have shown that this intervention has a small effect size on average.

At this point it seems fair to conclude that emotional disclosure may be more effective in some RA patients than others. Future research is needed to identify those patients who are most likely to respond to emotional disclosure. For example, it could be that RA patients who are most likely to have difficulty identifying their emotions or who hold back on expressing negative emotions would benefit the most. Future research also needs to examine strategies for enhancing the effects of emotional disclosure in RA patients. It is possible that having patients engage in an emotional disclosure task prior to training in pain coping skills/CBT for pain management could produce synergist effects that are stronger than what might be obtained with either intervention alone. With increased disclosure of life events and major stressors patients may be more readily able to use learned coping skills to manage stressors that contribute to their pain.

Partner-Assisted Psychological Interventions—For many of the millions of adults who live with arthritis pain, the spouse or partner plays an important role in psychological adjustment and illness management [37,38]. Therefore, patients may derive greater benefit from psychological interventions for pain (e.g., arthritis education, peer support, or cognitive-behavioral techniques) that incorporate their partner than from interventions that are solely patient-oriented [39]. In addition, because of the negative social impact of patient distress and pain expression [e.g., 40], this treatment approach may benefit the partner as well. Specifically, partners' emotional well-being, sense of mastery in providing support and assistance, and critical attitudes may improve as the result of being included in patients' psychological pain treatment [39].

Partner-assisted psychological interventions for chronic illnesses such as arthritis vary in terms of whether they focus on interpersonal issues between patient and spouse. Some interventions provide education to both partners regarding etiology and treatment of the illness and may enlist the spouse or partner's help in changing patient health behaviors. In contrast, other

interventions more directly address issues such as the impact of such a painful illness on the spouse, communication between partners about pain and other symptoms and need for support, or ways in which the spouse might be helpful or unhelpful [41]. Although the first approach may be beneficial to patients and partners, illness-related interactions between the patient and partner are more likely to improve with the latter, more interpersonally-focused approach [39].

Several randomized, controlled studies have compared a couple-based intervention for OA that included such an interpersonal focus to a patient-based intervention using the same type of content (i.e., cognitive-behavioral skills training, education and support). In the first study, patients and their spouses were taught pain coping skills (e.g., cognitive coping strategies) and couples skills (e.g., communication, spouse reinforcement) [42,43]. In comparison to patients receiving pain coping skills training without spouse involvement for 10 weeks, patients in the 10-week couple-oriented intervention tended to experience better outcomes such as decreased pain severity and pain behaviors.

More recent research tested an intervention that provided education and support to OA patient and spouse and also addressed issues such as supportive and unsupportive communications and effective strategies for requesting and providing spousal assistance. Patients who received the 6-week couple-oriented intervention did not experience change in pain and physical function, but their spouses reported greater reductions in stress and tended to have less critical attitudes than spouses of patients who received the 6-week patient-oriented intervention [44]. Moderators of patient treatment outcomes also were identified. Wives who received the couples intervention reported decreased stress whereas husbands who received the couples intervention became more stressed, consistent with the finding that female family caregivers benefit more from psychosocial treatment than male caregivers [e.g., 45]. In addition, only spouses who were highly satisfied in their marriage experienced decreased depressive symptoms and increased caregiver mastery from the couples intervention, suggesting that future partner-assisted interventions addressing problematic relationship issues may enhance the effects of these interventions for spouses who are in unhappy marriages.

An analysis of secondary outcomes from the same study showed that patients in the couple-oriented intervention experienced greater improvements in spousal support and punishing responses to pain than those who received education and support without spouse involvement [46]. Specifically, patients in the couple-oriented intervention reported a greater decrease in their spouses' punishing responses to pain (e.g., anger, irritation) than patients in the patient-oriented intervention. A trend effect was observed in regard to the advantage of couple-oriented intervention for increasing spouses' attempts to distract patients from their pain. In addition, patients in the couple-oriented intervention reported greater increased spouse support than those in the patient-oriented intervention.

There are several possible explanations for the seemingly discrepant findings regarding enhanced quality of pain-related interactions with the spouse on the one hand [46] but no effects on patients' pain or physical function on the other hand [44]. One explanation is that changes in pain-related interactions may have been too small to affect patients' pain and function. Findings from post-hoc analyses focused on patients in the dyadic intervention were consistent with this explanation, in that changes in spousal support, distracting responses, or punishing responses were not significantly associated with changes in patient pain or physical function. A second explanation is that the largest effects observed in this study were for positive spouse behaviors and these factors may have less impact on patient pain and function than negative spouse behaviors.

Partner-assisted psychological interventions also have been developed and tested for individuals with RA. In a study by Radojevic and colleagues, RA patients who received 6 weeks of behavior therapy alone showed greater decreased joint swelling than those who received a 6-week educational intervention with a family member [47]. A study by Riemsma and colleagues on RA patients and their partners (88% spouses) found that, contrary to prediction, a 5-week educational program attended by both partners resulted in decreased self-efficacy and increased fatigue whereas patients who attended a 5-week patient-oriented educational program experienced increased self-efficacy and decreased fatigue [48]. A third study of RA patients incorporated the spouse in a 4-week educational intervention that also used cognitive-behavioral techniques (i.e., rational emotive therapy to restructure disease-related cognitions and teach effective coping) and resulted in patients' improved disease-related communication with the spouse. However, there was no advantage of the partner-assisted intervention over a similar patient-oriented intervention [49]. Of these three studies focused on RA, only the study conducted by van Lankveld and colleagues [49] examined effects of intervention on the spouse, reporting no differences in these outcomes.

Several tentative conclusions can be drawn regarding the efficacy of partner-assisted psychological interventions for arthritis pain. First, the advantage of patient-oriented pain coping skills/cognitive-behavioral intervention over partner-assisted educational intervention [42,43,47] may reflect that patients with pain conditions typically respond best to psychosocial treatments that use a cognitive-behavioral approach, regardless of whether a spouse/partner is involved or not. Second, the efficacy of educational interventions that focus on providing information is not clear, especially in interventions that may not fully address the partner's concerns or interpersonal issues between patient and partner [e.g., 48]. Third, future interventions may have greater impact if they are more intensive (i.e., more weeks/sessions) and also target spousal social control strategies that have been linked to health behaviors [50, 51]. For example, given the importance of physical activity for promoting long-term function in many arthritis conditions, it may be useful to enhance positive social control strategies that encourage physical activity (e.g., encouragement to stay active, modeling an active lifestyle) and reduce negative social control strategies that may evoke resentment and lead to less activity (e.g., nagging the patient to exercise more often). Finally, in future research testing partner-assisted treatment approaches it will be especially important to include outcome measures that enable researchers to evaluate the benefits of interventions for both patients and partners.

Lifestyle Behavioral Weight Management for Arthritis Pain Management

Lifestyle behavioral weight management programs are designed to help overweight and obese individuals with arthritis minimize the impact of pain on their day-to-day life. Lifestyle behavioral weight management programs encourage arthritis patients to gradually lose weight through permanent lifestyle changes. Small weight losses (5% to 10% of initial body weight) can improve obesity-related complications [52–59] and maintenance of small weight losses through changes in diet and exercise/activity patterns can sustain improvements in health [60–61]. Lifestyle behavioral weight management programs typically focus on altering one or more behavioral factors (e.g., eating habits, dietary patterns, activity/exercise) and one or more psychosocial factors (e.g., cognitions, feelings, attitudes, relationships) known to impact weight management. Meta-analysis and systematic reviews of the obesity literature have shown that lifestyle behavioral weight management programs can reduce weight in obese persons [62,63] There is evidence that lifestyle behavioral weight management programs not only reduce weight in OA patients, but also decrease pain levels, improve body mechanics, and positively impact adjustment to OA [64–68]. There is also increasing interest in the possibility that some of the strategies offered by lifestyle behavioral weight management may be beneficial in reducing pain and disability in patients having RA.

Osteoarthritis

Obesity and OA commonly co-occur [69] making lifestyle behavioral weight management programs particularly relevant for many individuals with OA. Research has shown that increased weight contributes to the development and progression of OA and negatively impacts adjustment to OA pain and disability [70]. A recent meta-analysis concluded that weight-loss is a significant predictor of reductions in disability in persons with OA [71]. Messier and colleagues [72] found that for each pound of weight loss in obese OA patients there is a 4-fold reduction in the load exerted on the knee per step during daily activities which has significant clinical implications. Research has shown that increased weight contributes to the development and progression of OA and negatively impact adjustment to OA pain and disability [70].

It is expected that the incidence of both obesity and obesity related-OA will increase in the coming years [73,74]. Given this, the application of lifestyle behavioral weight management programs to overweight and obese OA patients will become increasingly important. To date, there have been a number of clinical trials testing the effects of lifestyle behavioral weight management protocols in overweight and obese OA patients. Although the content of these protocols varies somewhat across studies, the results obtained generally support the notion that lifestyle behavioral weight management can have beneficial effects in OA patients.

Studies examining the impact of lifestyle behavioral weight management programs have largely focused on older adults with knee OA (≥ 60 years; $\text{BMI} \geq 28$). In an early study, Messier and colleagues [64] randomly assigned 24 overweight and obese knee OA patients to either a weight management program that included diet therapy and exercise training or to an exercise only control group. The exercise component consisted of aerobic and strength training exercises for 1 hour, 3 days a week, for 6 months. In addition to exercise, participants in dietary therapy received 1 hour of nutrition class that included instruction on how to modify caloric intake and cognitive-behavioral strategies to promote behavioral change. Both groups showed improvements in pain and physical disability at 6 months follow-up. However, participants in the combined group (e.g., exercise and diet) lost significantly more weight ($M = 18.8$ lb [8.5kg] vs. $M = 4.0$ lb [1.8 kg]) and demonstrated greater loading weight rate and maximum breaking force with biomechanical testing than patients in the exercise only group.

Based on preliminary evidence from their early work, Messier and colleagues [65] conducted a second, larger and more rigorous clinical trial that incorporated a longer follow-up. This trial compared the separate and combined effects of exercise and dietary weight loss in improving pain, physical function, and mobility in older overweight and obese OA patients ($N = 252$). Participants were randomized to exercise intervention, diet intervention, exercise and diet intervention, or a control group (e.g., attention, social interaction, health education). Consistent with their earlier findings, Messier and colleagues [65] found that the exercise plus diet intervention produced the greatest benefit in knee pain and physical function (e.g., self-reported physical function, 6-minute walk distance, and stair climb time). All three treatment groups maintained treatment gains for at least 18 months, while the control group (e.g., healthy lifestyle training) regressed toward baseline values.

Encouraging substantial weight loss in older populations has been controversial because of the potentially harmful effects of weight loss in accelerating loss of lean tissue. To examine how intense weight loss impacts outcomes older adults with OA, Miller and colleagues [66] tested a lifestyle behavioral weight loss program in older OA patients that incorporated severe calorie restriction (daily energy deficit of 1000 kcal). Study outcomes included self-report and performance task measures of physical function and body composition. The weight loss intervention (e.g., partial meal replacements, nutrition education, lifestyle behavioral modifications, three weekly exercise sessions) was compared to a weight stable intervention (e.g., newsletters and bimonthly session health sessions). The weight loss intervention group

obtained a mean weight loss of 8.5% compared to no change in the weight stable group and reported less pain, stiffness, and higher physical functioning than the weight stable condition. Importantly, despite loss of lean body mass, the weight-loss intervention group reported less pain, stiffness, and higher physical function and did significantly better on performance tasks (e.g. 6-minute walk, stair climb time) than the weight stable group. This study demonstrated important benefits and no detrimental effect of weight loss for older OA patients.

Although diet and exercise are the two most common components of lifestyle behavioral weight management programs, additional components have also been investigated. One study compared the impact of a weight loss program that included diet, exercise, and acupuncture to electrotherapy for pain in obese OA patients [e.g., 75]. Patients who received the weight loss program reported significantly greater pain reduction, better ambulation, and decreases in disability compared to patients treated with only electrotherapy. This study demonstrated that a lifestyle behavioral weight loss program may have greater benefits than traditional medical approaches.

Lifestyle behavioral weight management programs for OA patients not only impact OA pain and disability, but have been shown to have other positive benefits for overweight and obese patients with OA. Rejeski and colleagues [67] reported that a lifestyle behavioral weight management program applied to overweight and obese OA patients had positive effects on self-report measures of physical role functioning, general health, social functioning, satisfaction with physical functioning, and satisfaction with physical appearance when compared to a control group. Another study found that a lifestyle behavioral weight management program had a positive impact on mobility related self-efficacy in older, obese OA patients [68]. This is particularly important as self-efficacy has emerged as an important psychological predictor of adjustment to OA pain [76,77].

RA

Patients with RA suffer from pain, restricted mobility, reduced muscle strength, and low endurance [78]. There is emerging evidence that increased exercise and modified diet, both components of lifestyle behavioral weight management, may have positive benefits for RA patients. Traditionally, it has been thought that exercise would worsen RA symptoms and cause additional joint damage. However, newer work has led to the realization that exercise and general physical activity plays an essential role in managing disability [79] and can increase aerobic capacity and muscle strength in RA [80]. Physical inactivity in RA has been associated with increased pain, obesity, comorbid health problems, low functional capacity, and higher levels of disease activity and fatigue [81]. A recent study found that RA patients who self-initiated long-term regular exercise (e.g., ≥ 20 minutes, ≥ 3 times a week) reported less fatigue and disability than RA patients who do not exercise [82]. Another study found that RA patients assigned to aerobic exercise had less pain, fatigue, and depression and improved grip strength and walk time than a control group [83].

There is epidemiological evidence to suggest that a lifelong diet of certain foods (e.g., fish, olive oil, cooked vegetables) may decrease the incidence and severity of RA [84,85]. There is some data suggesting that implementing a modified diet may lead to decreases in RA symptoms. In a randomized controlled trial of RA patients, Skoldstam and colleagues [86] found that diet modification decreased physiological markers of RA activity, improved physical functioning, and improved self-report quality of life. Other research has found that RA patients who modified their diet through a 6 week cooking course intervention with an emphasis on a Mediterranean-type diet reported decreased pain, stiffness, and increased quality of life at a 6 month follow-up compared to a control group [87].

Although patients with RA who are obese are more likely to experience impaired physical and mental quality of life than normal weight RA patients [88], evidence supporting weight loss per se in this population is not available. However, there is evidence that important components of lifestyle behavioral weight loss interventions (e.g., exercise and diet modification) may have significant physical benefits and other quality of life benefits for patients with RA. To date, there are no studies examining the application of a comprehensive lifestyle behavior modification (e.g., exercise and diet) in patients with RA, but emerging lines of evidence suggest that this is an important area to explore and better understand. Further, although obesity appears to be associated with negative outcomes in RA, there is limited empirical evidence to that support weight loss in obese RA patients. This is a critical empirical question that needs to be answered.

Comment

Lifestyle behavioral weight management interventions confer clear benefits for overweight and obese patients with OA. Evidence also suggests that the exercise and diet modification components of lifestyle behavioral weight management programs may have important benefits for patients with RA. Although exercise and diet alone provide some benefit compared to control groups in both OA and RA studies, it appears that combining these two elements of lifestyle behavioral weight management provide the greatest effect.

The majority of patients with OA are older [89], however, OA is not limited to older populations. Reasons that individuals may have symptoms of OA at earlier ages include joint injury and overweight or obesity [90]. Obesity has been rising across all age groups during the past two decades [91] and it is expected that obesity related OA will also increase [73,74]. It will be important that future work in this area is not limited to only older adults, but also includes younger individuals. We are currently conducting an NIH-supported clinical trial that is examining lifestyle behavioral weight loss in radiographically confirmed OA patients. Over 50% of our sample is under the age of 60; this study will yield data for us to examine the benefits of lifestyle behavioral weight loss among younger overweight and obese OA samples. As mentioned above, future research is also need to determine how much patients with RA might benefit from combined components of lifestyle behavioral. To date, studies of RA patients have been tested separate components of lifestyle behavioral modification strategies – usually exercise or diet. The results of OA trials strongly suggest that combining such strategies may be most beneficial.

Most approaches to arthritis pain are based on a traditional biomedical model that emphasizes pharmacological or surgical interventions (e.g., joint replacement, knee replacement). However, there is evidence that these approaches do not eliminate pain and disability faced by patients with OA and RA. Lifestyle behavioral weight management programs are not often prescribed to OA and RA patients and are not widely available in clinical settings. It is important that healthcare professionals understand the benefits of lifestyle behavioral weight management programs for OA and RA and insist on the availability of such programs for their patients. It will be important that training in lifestyle behavioral change strategies be available to healthcare professionals and that there are appropriate facilities available to support these interventions.

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