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Updated Review of Complementary and Alternative Medicine Treatments for Systemic Lupus Erythematosus

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Abstract

It is estimated that over 50 % of patients with systemic lupus erythematosus (SLE) have utilized complementary and alternative medicine (CAM) treatments to reduce symptoms and manage their health. However, there are relatively few randomized controlled trials of CAM for SLE. This review describes recent studies of vitamins and supplements, acupuncture, and mind-body interventions in SLE patients. The recent trials of CAM treatments for SLE indicate that supplements such as vitamin D, omega 3 fatty acids, N-acetyl cysteine and turmeric show some promise for reducing SLE disease activity. In addition, mind-body methods such as cognitive-behavioral therapy and other counseling interventions may improve mood and quality of life in SLE.

Keywords

Systemic lupus erythematosus; Complementary medicine; Alternative medicine; Integrative medicine; Supplements; Acupuncture; Vitamins; Mind–body treatments; Cognitive behavioral therapy; Meditation; Interpersonal therapy; N-acetyl cysteine; turmeric; DHEA; Vitamin D; Vitamin C; Vitamin E; Vitamin B6; Omega 3 fatty acids; Fish oil; Oxidative stress; Anti-oxidants

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Compliance with Ethics Guidelines

Conflict of Interest

Susan Manzi serves on the board for the Lupus Foundation of America, serves as a consultant for Exagen Diagnostics, and has been the co-holder of several patents.

Carol M. Greco and Claire Nakajima declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent

This article does not contain any studies with animal subjects performed by any of the authors. With regard to the authors' research cited in this paper, all procedures were followed in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000 and 2008.

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Introduction

Systemic Lupus Erythematosus (SLE) is a chronic autoimmune disease characterized by systemic inflammation. SLE patients intermittently and unpredictably experience disease flares in which the immune system may attack any body system. SLE is associated with higher than usual rates of cardiovascular disease [1], which is one of the most common causes of death [2]. On a day-to-day basis, most persons with SLE experience significant fatigue and pain, and many are unable to work because of SLE. Depression and anxiety are common, affecting up to 65 % of patients [3]. There currently is no cure for SLE, and some medical treatments such as long term corticosteroids many contribute to further health risks. Therefore, it is important to identify safe adjunctive practices and products that may reduce inflammation and symptoms.

What is CAM?

Complementary and Alternative Medicine (CAM) is a set of health systems, practices, and products that are not generally considered to be part of conventional medicine. CAM consists of natural products (vitamins, herbs, and supplements), mind and body medicine, and manipulation and other body-based practices, as well as alternative medical systems such as traditional Chinese medicine, ayurvedic medicine, and homeopathy (http://nccam.nih.gov/health/whatiscam). The field of CAM is broad and rapidly changing, and some CAM practices are becoming more widely accepted. For example, the use of supplements such as omega 3 fatty acids and vitamin D is becoming widespread in the general population and in people with SLE. A 2011 review of CAM in SLE by Haija and Schulz [4] describes the potential role of CAM for SLE, the need for rheumatologists and patients to be informed about CAM, and the challenge of limited research in this area. In this paper, we will review recent research studies of CAM for SLE identified via PubMed and Medline searches (English language, Human studies), including studies of natural products, mind and body medicine, and acupuncture.

Prevalence of CAM use in the general population and in persons with SLE

According to the National Health Interview Survey (NHIS), nearly 40 % of adults in the United States are actively using some form of CAM, and over 70 % will use CAM at some time during their life [5]. The most frequently used CAM therapies were natural products, followed by deep breathing and meditation, and chiropractic treatment. Approximately 50 % of adults in the National Health and Nutrition Examination Survey (NHANES) reported using dietary supplements such as multivitamins, omega-3 or fish oil supplements, and calcium, and the most common reasons for using supplements was to improve or maintain general health[6]. Interestingly, less than one-quarter of those taking supplements said they were doing so based on their health care provider's recommendation.

The prevalence of CAM use among persons with SLE is estimated to be at least as high as in the general population. The TRINATION study [7] surveyed 707 SLE patients in Britain, Canada, and the US, and found that CAM use was approximately 50 % in each of the three countries. In a sample of 192 SLE patients in China [8], 66.5 % had ever used CAM, and they reported using CAM to treat their disease symptoms or to promote health. In a cross-sectional survey of 192 SLE patients in Mexico [9], the prevalence of ever having used CAM was 53.6 %. Those who had used CAM treatments had greater cumulative organ damage due to SLE and higher pain. Eighty-one percent of the CAM users had used dietary or herbal supplements, and 13 % had used mind-body medicine. In a survey of vitamin and mineral supplement use among Canadian patients with SLE, 53 % used supplements in all, and 34 % used calcium and/or vitamin D, which are frequently used in the general population. Notably, those taking supplements did not differ from non-users in disease

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activity, but the SLICC/ACR damage index of supplement users was significantly higher [10]. The reasons for greater CAM and supplement use in those with greater cumulative damage are unknown. We might question whether certain CAM supplements or practices contribute to damage, but that cannot be inferred by these cross-sectional studies. It is also possible that those with greater organ damage due to SLE are unhappy with their conventional treatments and are searching for additional methods to support their health and reduce symptoms.

There are few studies that evaluate the safety, efficacy, or effectiveness of CAM treatments for SLE, perhaps due to difficulty of obtaining funding for large-scale, rigorous trials of natural products and other CAM interventions. However, the limited number of effective pharmaceutical agents for treating symptoms and reducing risk for SLE-related co-morbidities and the potential toxicity of these agents make exploration of CAM for SLE compelling.

Review of CAM treatments for SLE

Vitamins and Supplements

Some of the most promising new developments in CAM treatments for SLE are supplements and vitamins. According to epidemiologic studies, low intake of vitamins D, C, and other antioxidants in adolescence is not a causative factor in later development of RA or SLE [11, 12]. However, there is some evidence that these and other supplements may improve SLE symptoms and reduce risk for common SLE co-morbidities.

Vitamin D

Vitamin D is a steroid hormone that effects bone health, cardiovascular health, and the immune system [13]. Deficiency in vitamin D is widespread in the general population and even more prevalent in SLE patients [14, 15]. In a cohort of 177 SLE patients in Hungary, low vitamin D was found in 82 %, and was associated with SLE disease activity index, and severity of serologic markers such as anti-dsDNA [16]. Among a primarily African-American group of women with SLE, having a low level of vitamin D was associated with carotid artery plaque [17]. In a group of 38 premenopausal Asian women with SLE receiving steroids, all but 1 patient had deficient [25(OH)D < 20ng/ml] or insufficient [25(OH)D between 20 and 30 ng/ml] vitamin D levels, and lower vitamin D was associated with higher SLEDAI (disease activity) score [18]. Although low vitamin D may be influenced by sun avoidance or medications in SLE patients, it is evident that vitamin D may play a role in perpetuating the manifestations of SLE. Therefore, supplementing with vitamin D may have a positive effect on SLE symptoms, cardiovascular or bone comorbidity, or disease activity. One trial of vitamin D supplementation for improving SLE outcomes has been published [19], and an additional multi-site trial is underway in the United States (http://clinicaltrials.gov/ct2/show/NT00710021).

The multi-site US placebo-controlled study is investigating the effects of vitamin D supplementation on interferon (IFN) signature in SLE patients with vitamin D deficiency (defined as < 20 ng/ml). Interferon alpha is a key molecule in immune regulation. Preliminary findings indicate that vitamin D doses of up to 4,000 IU per day are safe and well tolerated, and that the percent of patients with an IFN signature response after 12 weeks of placebo, supplementation with 2,000 or 4,000 IU did not differ significantly. The authors note that sustaining higher levels of 25(OH)D for a longer duration may be necessary for immune outcomes to be improved [20].

In a double-blind, placebo-controlled trial in Egypt, 267 SLE patients with low levels of vitamin D [25(OH)D < 30 ng/ml] were assigned on a 2:1 schedule to receive oral vitamin D

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(cholecalciferol) 2,000 IU/day or placebo for 12 months [19]. Of the 178 patients randomized to receive vitamin D, 88 % completed the study. A reference group of 175 healthy controls matched by age, sex, and body mass index was included in order to provide comparison baseline values for vitamin D status, inflammatory, hemostatic, and immunologic measures. Proinflammatory, hemostatic, and immune markers were elevated in patients relative to healthy controls, and vitamin D status was lower (19.8 ng/ml in SLE and 28.7 ng/ml in controls). SLEDAI score was inversely associated with vitamin D levels. After 12 months of vitamin D supplementation, the overall prevalence of suboptimal 25(OH) D fell from 69 to 33 %. IL-1, IL-6, IL-18, TNF-alpha, ESR, anti-dsDNA, anti-Smith, fibrinogen, and von Willebrand factor, but not anticardiolipin values, were significantly reduced in the vitamin D group compared to the placebo group at 12 months. SLEDAI scores in the supplementation group were reduced from 4.9 (SD = 3.6) to 3.2 (2.8) in those with baseline vitamin D insufficiency (10–30 ng/ml) ($p = 0.01$) and from 4.9 (3.5) to 3.0 (2.5) in those originally deficient (< 10 ng/ml) in vitamin D ($p = 0.05$), while SLEDAI did not improve in those receiving placebo. No serious adverse events were reported. This study demonstrates that the addition of vitamin D supplementation to standard SLE therapy may improve disease activity and modulate proinflammatory and hemostatic markers.

Other Vitamins

A prospective observational study in Japan followed 241 women with inactive SLE over 4 years and found that vitamin C intake via food was inversely associated with risk for developing active disease when adjusted for possible confounders such as SLE duration and damage [21]. Dietary vitamins were not associated with risk for vascular events during the follow-up period. The same research group also found dietary vitamin B6 to be inversely associated with risk for active disease but not atherosclerotic events in a cohort of women with inactive disease at baseline [22]. These studies highlight the importance of lifestyle factors such as a diet rich in antioxidants for SLE patients.

An intervention study that aimed to address cardiovascular disease risk in SLE focused on reducing oxidative stress and enhancing endothelial function through vitamin C and E supplementation [23]. In this 12-week study, 39 women with SLE in Hong Kong received a vitamin combination of 500 mg vitamin C and 800 IU of vitamin E, or placebo. The overall compliance was 95 % via pill counts, all 39 patients completed the study, and there were no adverse events. At 12 weeks, oxidative stress and lipid peroxidation, as measured by malondialdehyde (MDA), was significantly reduced in the vitamin group ($p < 0.05$) but not in those taking placebo. However, there were no significant effects on endothelial function as measured by flow mediated dilatation (FMD).

Omega 3 Fatty Acids / Fish Oil

Cardiovascular disease is a leading cause of death in SLE [24], and subclinical vascular disease is more prevalent in SLE than in the general population [1]. Therefore, supplements such as omega 3 polyunsaturated fatty acids that have cardioprotective and vascular effects in the general population [25], as well as anti-inflammatory effects [26], may also be useful for patients with SLE.

Duffy et al. [27] conducted a randomized double-blind placebo controlled trial of omega 3 fish oil (3 g/day) and copper supplementation for patients with SLE. Sixty-five patients were given the supplements daily for 24 weeks and disease activity was assessed at 6, 12, and 24 weeks. In the 52 participants who completed all 24 weeks of the intervention, those taking fish oil had a significant reduction in Systemic Lupus Activity Measure-Revised (SLAM-R) score by week 24, from 6.12 to 4.69 ($p > 0.05$). SLAM-R scores for those receiving copper

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did not decline. There was no significant reduction in dsDNA or other specific laboratory indicators with fish oil or copper.

Wright et al. [28] conducted a 24-week double-blind RCT of 3 g of omega 3 fatty acids on 60 patients with SLE. Patients in the omega 3 group took four capsules per day, each containing 1.8 g eicosapentanoic acid (EPA) and 1.2 g docosahexanoic acid (DHA). Placebo capsules contained olive oil. Endothelial function as measured by FMD of the brachial artery was the primary outcome measure, and SLAM-R and BILAG were secondary outcomes. FMD improved from baseline to 12 weeks, and to 24 weeks in the omega 3 fatty acid group ($p = 0.002$ and $p < 0.001$, respectively), and there were no significant improvements in FMD in the placebo group. SLAM-R and BILAG scores improved significantly from baseline to 12 weeks, and from baseline to 24 weeks in the omega 3 fatty acid group but not the placebo group. Notably, individual component scores of the BILAG all improved significantly ($p < 0.05$) except for renal, which was 0 throughout the study, and neurological, which was low (approximately 1) at baseline. Although earlier studies of fish oil for SLE found doses of 15–20 g/day to be helpful for cholesterol [29–31], what is very important about the Duffy and Wright studies is that doses were low enough to be tolerable and palatable to the patients.

N-acetyl cysteine (NAC)

Based upon data indicating that the natural antioxidant glutathione (GSH), a tripeptide composed of cysteine, glutamic acid, and glycine, is depleted in the peripheral blood lymphocytes (PBLs) of SLE patients [32, 33], and that N-acetyl cysteine (NAC) is a precursor of GSH and an antioxidant, several safety and dose-finding trials have been initiated. Following a case study of a lupus nephritis patient for whom adding 1.8 g of NAC per day to SLE therapy led to improved proteinuria and reduced fatigue and disease activity [34]. Tewthanom et al. [35] randomized 40 women with mild SLE to usual care alone or to usual care plus 600 mg of NAC administered three times a day (1.8 g/day) for 6 months. Plasma GSH was not significantly elevated by 6 months, but malondialdehyde (MDA), a marker of oxidative stress, was significantly reduced in those receiving NAC but not the comparison group. SLEDAI scores, which were low to begin with (2.65 in controls and 2.15 in those randomized to NAC), improved in both groups. No serious adverse events were found.

Lai et al. [36] conducted a double-blind placebo-controlled trial of NAC. Thirty-six SLE patients received either placebo or one of 3 doses of NAC (600, 1,200, or 2,400 mg twice daily for 3 months). Blood samples from 42 age, sex and ethnic background-matched healthy subjects were included for immunologic studies. The main aim of the study was to determine whether the doses of NAC increased GSH in peripheral blood lymphocytes, with SLE disease activity as a secondary outcome. In the combined group of patients who received NAC dosed at 2.4 and 4.8 g per day, SLEDAI scores improved from 5.78 at baseline to 3.6 at 1 month of treatment ($p < 0.001$), 4.0 after 2 months ($p < 0.001$), 4.9 at 3 months ($p = 0.003$) and remained at 4.4 1 month after discontinuing the NAC supplementation ($p = 0.005$). AntidsDNA level was reduced in the combined NAC group from 78.9 IU/ml at baseline to 19.5 IU/ml after 1 month ($p = 0.049$). Similarly, BILAG score reductions were greater for those treated with NAC than those who received placebo ($z = -2.19$, $p = 0.029$.) Of note, 33 % of those taking the largest NAC dose reported nausea, which was reversed after stopping NAC. NAC at 2.4 g/day was tolerated by all of the patients.

The same group of investigators [37] evaluated the effects of NAC supplementation on cognitive complaints of SLE patients as assessed by the ADHD Self-Report Checklist (ASRS) [38]. Twenty-four patients from the NAC trial, 25 SLE patients who were not

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enrolled in the NAC trial and 42 healthy subjects were compared. This study found increased cognitive/inattention symptoms and impulsivity/hyperactivity symptoms in SLE compared with healthy subjects. Patients who received NAC of 4.8 g per day had significant reductions in ASRS scores after 2 and 3 months of the supplement, and patients who received 2.4 g/day had reduced ASRS scores at 3 months. The reduction in ASRS scores was greater in the combined NAC groups than in the placebo group, and NAC influenced the cognitive/inattention aspects of ADHD but not impulsivity. At the end of 3 months of treatment, the standardized mean difference in effect size for NAC at 4.8 g/day was 0.72 (Cohen's *d*) for ASRS total score, 0.71 for inattention symptom score, indicative of moderate effect size, and 0.44 for impulsivity score. In combination, these reports on NAC effects on SLE disease activity and self-reported cognitive symptoms are very promising, although replication in larger groups is needed.

Turmeric

Curcumin is the most active component in the spice turmeric. Turmeric can inhibit tumor growth, inflammatory cytokine production, and inflammatory bowel disease, and curcumin can lower cholesterol and enhance wound healing [39]. Khajehdehi et al. [40] conducted a 3-month RCT of turmeric supplements in 24 patients with relapsing or refractory lupus nephritis in Iran. Those randomized to the active supplement received 3 capsules per day containing 500 mg turmeric and the control group received color- and size-matched capsules. At baseline, the 2 groups did not differ on nephritis parameters or other therapies (all were receiving prednisone and 11/12 in each group received cyclophosphamide). No adverse events were observed, and significant decreases in proteinuria, systolic blood pressure, and hematuria were found post-turmeric supplementation ($p < 0.05$). No significant changes were observed in the control group. However, the sample size was very small in this study and the results may not be replicated in larger populations.

DHEA supplement

DHEA is an adrenal steroid hormone that tends to be reduced in SLE. There has been longstanding interest in dehyroepiandrosterone (DHEA) supplementation for improving SLE disease activity and protecting against the negative effects of steroids. The results of studies are mixed, indicating mild benefits or none, depending on the outcomes assessed. A randomized double-blind placebo-controlled trial of 200 mg/day DHEA for 6 months or placebo in 120 Chinese women with SLE did not reduce disease activity as assessed by SLAM-R, but flares were reduced as were patients' assessment of disease activity in the DHEA group compared to placebo [41], and synthesis of the proinflammatory cytokine IL-10 was reduced [42]. In another RCT that included 137 women with active SLE on corticosteroids, systematic reductions in steroid dose were possible in a greater percentage of those taking DHEA than those receiving placebo [43]. In a multi-site RCT with 381 women with SLE who received 200 mg DHEA or placebo for 12 months, among those who had clinically active disease at baseline, 58.5 % who were on DHEA and 44.5 % of the placebo group were classified as responders ($p = 0.017$). There was a trend for those receiving DHEA to have an increased time to flare ($p = 0.097$), but SLEDAI score was not reduced significantly. Over 30 % of the DHEA group discontinued their medication due to side effects and other reasons [44]. DHEA has been found to have protective effects on bone mineral density (BMD) in SLE patients taking glucocorticoids [45, 46]. A recent study of DHEA versus placebo for fatigue and well-being in 60 women with quiescent SLE found no effect of DHEA over placebo [47]. Patients' beliefs that they received DHEA, rather than their actual use of DHEA, was associated with reduced fatigue. Although DHEA supplementation shows some promise, there are also reports of frequent but mild side effects such as acne (in up to 54 % of patients) [48] and hirsuitism, as well as reports of reduction in HDL cholesterol [49].

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Acupuncture

A recent meta-analysis of acupuncture for pain [50] included 29 RCTs with a total of 17,922 patients. For osteoarthritis, acupuncture compared favorably to non-acupuncture comparison treatment, with pain outcomes 0.57 SDs lower than controls. Acupuncture also performed significantly but modestly better than sham acupuncture controls, with pain 0.16 SDs lower than sham. From this study, we can hypothesize that acupuncture may be helpful for musculoskeletal pain in SLE but also that there are factors not specific to acupuncture needling that contribute to therapeutic effects.

Although the evidence base for acupuncture's effects on pain in rheumatic conditions is growing, to date few studies have examined acupuncture's utility in SLE patients. Our research group conducted a pilot feasibility and safety trial of acupuncture that explored effect sizes for pain and fatigue in 24 SLE patients [51]. All participants continued their usual medical care during the study and were assigned randomly to 10 sessions of acupuncture, 10 sessions of minimal needling, in which needles are inserted just under the skin in regions that are not known to be active acupuncture points, or to a usual care control group. Safety was carefully examined at each session, and the investigators found transient minor events, such as pain upon needle insertion, dizziness, or local bruising, to be present in 23 % of acupuncture and minimal needling sessions. Generally, acupuncture and minimal needling performed better than usual care alone, with effect size differences compared to usual care in the small to moderate range. Approximately 40 % of the acupuncture and minimal needling patients reported ≥30 % reduction in pain. No usual care participants met this clinical pain improvement criterion. Additionally, 13 % of acupuncture and 25 % of minimal needling patients had a reduction in fatigue of ≥30 %, but no usual care patients met this fatigue improvement criterion. Although the study did not have enough subjects to reliably analyze outcomes, it suggests that acupuncture did not perform consistently better than minimal needling. This may be because any control condition in which needles are inserted can elicit a non-specific analgesic effect [52] or because treatment did not last long enough. This study suggests that acupuncture is feasible and safe for SLE patients and may have benefits in terms of pain and fatigue, but larger samples and perhaps a non-needling control group are needed.

The only other recent SLE acupuncture study involved the addition of acupuncture to antiemetic medication for chemotherapy-induced nausea and vomiting in 39 rheumatic disease patients (some of whom had SLE) receiving cyclophosphamide infusions [53]. Patients served as their own controls in this study, receiving anti-emetic medication alone during some infusions, and medication plus acupuncture during other phases of their treatment course. Acupuncture significantly reduced nausea severity 24 and 48 h after infusion ($p = 0.0001$). Bouts of vomiting after infusion averaged 3.33 without acupuncture, and 0.59 with acupuncture (p =v0035). Although this was not a RCT, these results are consistent with studies of acupuncture for chemotherapy-induced nausea in cancer patients and suggest that acupuncture may be considered when needed in rheumatic disease patients receiving cyclophosphamide.

Mind–body treatments for reducing SLE symptoms

Pain, fatigue, functional limitations and reduced quality of life are common in lupus patients. Mood disorders affect up to 65 % of SLE patients over their lifetimes [3] and the rate of psychiatric disorders are higher in SLE than in other chronic, inflammatory autoimmune diseases, such as RA and ankylosing spondylitis [54]. Addressing quality of life and mood disorders is important, as depression has been linked to nonadherence with medications [55], as well as cardiovascular disease risk in SLE patients [56].

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Although the number of RCT's is limited, a variety of mind–body interventions, such as cognitive behavioral therapy (CBT), interpersonal therapy, and other behavioral treatments for lupus patients have been tested and returned encouraging results [57]. Mind–body interventions for SLE may be focused on reducing pain, stress, anxiety, and fatigue, and consist of skills training in physiologic relaxation, meditation, problem-solving, and assertive communication skills and identifying and modifying distorted or unhelpful thinking styles. These interventions may be delivered individually, in groups, or to couples by a psychotherapist, counselor, or nurse. Although typically provided face-to-face, several studies have evaluated remote delivery of the intervention, such as via telephone or computer. A telephone-based counseling intervention that focused on self-care management and communication between lupus patients and their partners resulted in increased self-efficacy for managing SLE, better mental health, and reduced fatigue compared to an attention-only control group [58]. In an uncontrolled pilot study of 17 SLE patients with self-reported cognitive difficulties, an 8-week group psychoeducational course resulted in improved verbal learning ability, as well as self-reported memory functioning and reduced depression [59]. The Chronic Disease Self-Management Program, a group educational class modeled upon the widely known Arthritis Self-Management Program, showed encouraging results for low-income SLE patients, with around 60 % of 40 participants reporting significant physical and cognitive improvement post-intervention. However, this study lacked a control group [60].

CBT is a psychological intervention with a strong evidence base for depression and anxiety and, in recent years, it has been evaluated in SLE. A 2010 RCT of 45 patients with systemic or cutaneous lupus with high levels of stress assigned participants to 10 weekly group sessions of CBT or to a usual medical care alone control group and followed them for 15 months. The investigators found that group CBT reduced stress perceptions ($p = 0.04$), vulnerability to stress ($p < 0.001$), depressive symptoms ($p = 0.002$), and anxiety ($p < 0.001$) and that changes were superior to those found in the control group (between group p's < 0.02 at 15-month follow-up). CBT was also associated with improvement in self-report of physical role function and mental health relative to the control group. However, the intervention did not lead to improved SLE disease activity outcomes or reduced flares [61]. Our research group conducted a RCT for reducing pain and stress in 92 SLE patients [62]. Participants were randomly assigned to 6 sessions of individual CBT+ biofeedback (a method for increasing body awareness and physiologic relaxation), supportive counseling (as a control for non-specific treatment effects such as attention from the therapist), or to usual medical care alone. Those in the CBT/BF group had significantly greater reductions in pain and improvements in psychological functioning than supportive counseling or usual medical care groups at the end of treatment, and maintained their psychological functioning benefits at a 9-month follow-up compared to usual care. All three groups improved in SLE disease activity. In contrast, an RCT that randomized 53 adolescent females with SLE to computerized CBT, computer delivery of education, or no-contact control, found that neither of the computer interventions significantly improved pain management, adjustment and adaptation, or quality of life [63]. However, the interventions were online modules supported by telephone contact with the therapists, and perhaps face-to-face contact would result in greater benefit.

Meditation is another mind–body treatment that has been tested in RCTs in patients with chronic pain [64] and chronic illness [65], and has been shown to enhance immune function in healthy controls [66]. Training in Mindfulness-Based Stressed Reduction (MBSR), an 8-session group psychoeducational program that focuses heavily on meditation, has proven effective in reducing psychological distress and pain intensity in patients with rheumatoid arthritis [67] and osteoarthritis [68]. Additionally, in a RCT for RA patients, MBSR was more effective than CBT in reducing distress in the patients who had comorbid depression

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[69]. Neither MBSR nor other meditation programs have been evaluated in SLE patients to date. Our research team is currently conducting a RCT of mind–body skills training, consisting of CBT plus mindfulness meditation versus supportive non-directive counseling for SLE patients with comorbid depression (NCT 01120652).

Conclusions

Several supplements or natural products are currently being studied for direct effects on disease activity, for their potential to reduce the need for corticosteroids, or to protect against cardiovascular disease and bone loss. Trials are few and sample sizes are often limited, but the use of supplements such as vitamin D and omega 3 fatty acids/fish oil have some support in SLE, as well as in the general population. Although more studies are needed, NAC and turmeric/curcumin may prove useful for reducing oxidative stress, improving endothelial function or proteinuria in SLE. Yoga, tai-chi, and chiropractic manipulation and massage have not been studied in SLE, and trials of acupuncture for SLE are limited. Mind–body CAM interventions have thus far been mainly in the area of psychological and psychoeducational treatments and the evidence is positive for their impact on psychosocial sequelae of living with a chronic, painful, and unpredictable illness such as SLE.

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