



Published in final edited form as:

Curr Oncol Rep. 2014 December ; 16(12): 417. doi:10.1007/s11912-014-0417-x.

Mind-Body Practices in Cancer Care

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Abstract

Being diagnosed with a life threatening disease such as cancer and undergoing treatment can cause unwanted distress and interferes with quality of life. Uncontrolled stress can have a negative effect on a number of biological systems and processes leading to negative health outcomes. While some distress is normal, it is not benign and must be addressed, as failure to do so may compromise health and QOL outcomes. We present the evidence for the role of stress in cancer biology and mechanisms demonstrating how distress is associated with worse clinical outcomes. The National Comprehensive Cancer Network states that all patients be screened with the single-item Distress Thermometer and to also indicate the source of distress and to get appropriate referral. In addition to the many conventional approaches for managing distress from the fields of psychology and psychiatry, many patients are seeking strategies to manage their distress that are outside conventional medicine such as mind-body techniques. Mind-body techniques such as meditation, yoga, tai chi, and qigong have been found to lower distress and lead to improvements in different aspects of quality of life. It is essential that the standard of care in oncology include distress screening and the delivery of different techniques to help patients manage the psychosocial challenges of diagnosis and treatment of cancer.

Keywords

distress; screening; cancer; mind-body; quality of life

Introduction

A cancer diagnosis and treatment can be profoundly stressful events, affecting all aspects of life. As patients attempt to cope with the broad ramifications of a cancer diagnosis and treatment, their experience of distress often remains unaddressed. This unmet need may be deleterious not only to patient quality of life (QOL) and well-being, but may also lead to

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worse clinical outcomes when compared to patients who manage stress. This report will focus on addressing patient distress, recommendations for screening, and the role of mind-body practices for managing distress and improving QOL.

Stress

Although there is research showing that stress and depression are associated with worse survival in cancer [1], controversy still exists around the interpretation that psychosocial and biological factors can indeed contribute interdependently to disease processes [2]. However, extensive research exists showing that psychosocial factors are associated with important cancer-related biological systems.

The health damaging effects of chronic stress are well documented in the medical literature. Research shows that chronic stress affects almost every biological system in our bodies [3]. Unmanaged chronic stress can speed the aging process through telomere shortening, [4] increasing the risk for heart disease [5], sleeping difficulties [6], digestive problems [7], and even depression [8]. Moreover, it can also cause patients to forego healthy eating and exercise habits that help prevent cancer and other disease.

With regard to cancer, there is little convincing evidence that chronic stress affects cancer initiation; however, there is extensive evidence that chronic stress can promote cancer growth and progression [9-11]. The underlying mechanisms for such effects are complex and involve chronic activation of the sympathetic nervous system (SNS) and the HPA axis [12-14]. Sustained elevations from these pathways (e.g., norepinephrine, cortisol) can result in diverse effects including stimulation of cancer invasion, angiogenesis, inflammation and immune dysregulation, reduced anoikis, and even reduced efficacy of chemotherapy drugs [15-17]. The underlying signaling pathways [18] offer opportunities for designing new therapeutic approaches for disrupting the effects of stress biology on cancer biology and include both biobehavioral and pharmacological (e.g., beta-blockers) approaches. Ensuring that patients are managing stress effectively may be important to improving outcomes. However, identifying and treating chronic stress has not yet become part of the standard of care, but a case could be made for routine evaluation in all patients.

Screening and Treating Chronic Stress (Distress)

According to the National Comprehensive Cancer Network (NCCN), distress is:

“A multifactorial unpleasant emotional experience of a psychological (cognitive, behavioral, emotional), social, and/or spiritual nature that may interfere with the ability to cope effectively with cancer, its physical symptoms and its treatment. Distress extends along a continuum, ranging from common normal feelings of vulnerability, sadness, and fears to problems that can become disabling, such as depression, anxiety, panic, social isolation, and existential and spiritual crisis [19].”

The NCCN Practice Guidelines in Oncology state that all patients be screened with the single-item Distress Thermometer [19]. The Distress Thermometer asks patients to rate their distress using a scale ranging from 0 (“no distress”) to 10 (“extreme distress”). Patients also indicate their source of distress by checking off issues listed on a 34-item problem list. The

list includes practical problems, family problems, emotional problems, spiritual/religious concerns, and physical problems. While some distress is normal, it is not benign and must be addressed, as failure to do so may compromise health and QOL outcomes. The NCCN recommends those scoring 4 be referred to a mental health care professional for further evaluation.

The majority of patients are not routinely screened for distress, even though there are numerous evidence-based techniques to treat different mood disorders [20,21]. In addition to the many conventional approaches for managing distress from the fields of psychology and psychiatry, many patients are seeking strategies to manage their distress that are outside psychiatry and clinical psychology. Mind-body techniques include a variety of practices to help decrease distress, maintain a healthy balance between sympathetic and parasympathetic arousal, and foster an environment where patients can find meaning in their lives.

Mind-body Practices

A key ingredient to reduce the damaging effects of chronic stress, reducing distress, and improving QOL is to have patients engage in behaviors that decrease sympathetic and increase parasympathetic arousal; in other words, having them learn how to relax in stressful situations. Many people may turn to mind-body techniques as a way to manage stress and improve QOL.

Mind-body practices can be defined as techniques to help modify biological, physiological, or psychosocial processes as well as improve QOL outcomes. The belief that what we think and feel can influence our health and healing dates back thousands of years [22]. The importance of the role of the mind, emotions, and behaviors in health and well-being is central to traditional Chinese, Tibetan, Greek, and Ayurvedic medicine and other medical traditions of the world. The National Center of Complementary and Alternative Medicine (NCCAM) combines *Mind and Body Therapies* in one category, with the primarily *mind* therapies including techniques such as meditation, relaxation, tai chi and qigong, and yoga. These are typically seated or movement-based techniques that can be helpful in managing stress and enhancing QOL. The expressive arts such as music therapy, art therapy, dance therapy, and journaling also fall into this aspect of the Mind and Body category.

Other techniques in the NCCAM Mind and Body category are considered *body* techniques such as acupuncture, massage therapy, Feldenkrais, Alexander technique, Pilates, and spinal manipulation. This report will focus on the mind-body techniques for which there are no external manipulation of the body. Some of these other techniques will be addressed in other reviews (e.g., acupuncture and massage). Although a number of evidence-based conventional psychological, behavioral, and pharmacological interventions exist for managing distress in cancer patients, this report will also not focus on these more accepted psychological therapies such as support groups or cognitive behavioral therapy.

Of note, research shows that mind-body practices have a positive effect on many systems in our body, improving QOL, reversing the harmful effects of stress, and creating fundamental changes in the way the brain functions [23-31]. These practices can affect neurotransmitters (i.e. glutamate, GABA) and neuromodulators (i.e. dopamine, serotonin, epinephrine), which

are essential in maintaining a healthy balance between sympathetic and parasympathetic arousal, therefore, helping to manage the stress response [32]. Mind-body practices have an excellent safety profile, with some practices requiring more physical activity than others. The research to date indicates that there is good evidence that mind-body practices can be utilized as useful complementary therapies in people with cancer.

Consistent with the general behavioral intervention literature in cancer, efficacy for the benefits of mind-body interventions is mixed although generally positive. Early intervention studies are generally susceptible to common methodological flaws (e.g., small sample size, lack of control groups and follow-up periods as well as heterogeneous and primarily self-reported outcomes) and prudence is warranted when drawing conclusions. However, a recent meta-analysis of 13 randomized control trials, primarily for women with breast cancer, revealed large effects for psychological health and medium effects for fatigue, general QOL, and psychosocial wellbeing [33]. Although the authors reported only small effects for sleep disturbances and physical function, it is important to note that the reviewed trials were based on a prevention rather than treatment model, as they did not select for elevated symptom burden. Consequently, similar to the behavioral intervention literature at large, studies tended to use an “all-comers” approach to patient recruitment, which may have resulted in small treatment gains [34]. Over the last couple of years, methodologically rigorous RCT’s addressing some of these limitations have been conducted and published in top tier journals in clinical oncology. Although there is some data to support the use of expressive art therapies such as music therapy [35], art therapy [36], and expressive writing [37] and journaling to improve QOL, the number of trials is limited and they typically have small sample sizes and often no control groups. There are many different mind-body programs that can be useful and this paper will review recent findings for meditation and the movement-based practices of yoga, tai chi, and qigong.

Meditation

Meditation is an ancient practice that is part of many spiritual traditions. It has been described as “a wakeful hypometabolic physiologic state” [38] in which the practitioner is extremely relaxed, yet alert and focused. Although meditation methods can vary, most types of meditation share common features including focused attention, controlled regulation of breathing, and control over thoughts and feelings that come to mind; whether the goal is to inhibit and/or acknowledge and release them. Given the continuous attention-based processes involved in initiating and maintaining a meditative state, meditation has been proposed to be an attentional training exercise. Meditation, among other things, helps bring awareness to the relation between the mind and body; acknowledging the constant dialogue and bidirectional effect that the mind and body have on each other.

The meditation practice that has been researched the most is Mindfulness-Based Stress Reduction (MBSR) and variants of this practice. However, other meditative methods have also been studied as interventions in health and in particular in people with cancer. MBSR is typically taught in 2-hour weekly sessions for 8 weeks and also a full day retreat. The program includes mindfulness meditation, a body-scan, yoga-like movements, and mindful walking meditation. The majority of the studies reviewed, both of MBSR and other

meditation types, were conducted in women with breast cancer. However other studies were done in populations including lung cancer, gynecologic cancer, or open to all cancers. Very few studies were conducted in patients with pediatric cancer.

The larger RCTs of meditation published in the past few years have used some form of MBSR for women with breast cancer. A Danish study of 336 women with breast cancer (Stage I-III) comparing MBSR versus usual care found significant reduction in self-reported levels of anxiety and depression and improvement in sleep quality associated with MBSR [39]. A British study of 229 breast cancer survivors comparing MBSR versus usual care found that MBSR reduced the long-term emotional and physical adverse effects of medical treatments, including endocrine treatment [40]. A recent Canadian single-arm study of 268 individuals with cancer found a significant reduction in mood disturbance and symptoms of stress after an 8-week MBSR program compared to baseline [41].

Carlson and colleagues modified the standard MBSR program for people with cancer called Mindfulness Based Cancer Recovery (MBCR) [24]. In a recent RCT, 271 breast cancer survivors scoring 4 or greater in the distress thermometer were randomized to MBCR, Supportive Expressive Therapy (SET), or a control group that attended a 1-day stress management session. MBCR resulted in lower symptoms of stress compared to SET and the control group, and improved QOL compared to the control group. Contrary to their hypothesis, MBCR also resulted in higher levels of social support compared to SET. In addition, both MBCR and SET resulted in more normative diurnal cortisol profiles than the control group [24,42].

Carlson's laboratory has also recently explored the efficacy of delivering the MBCR program online in a synchronous manner [43]. In a small RCT with 62 distressed, heterogeneous cancer survivors (mainly breast and prostate), they found it was feasible to deliver the intervention online and there was initial indication of efficacy. Patients in the online MBCR program, relative to a waitlist control group, reported significant improvements in mood disturbance, stress symptoms, spirituality, and mindfully acting with awareness.

A small RCT of Tibetan Sound Meditation (TSM) for women with breast cancer reporting chemotherapy-induced cognitive impairment was recently published [29]. Forty-seven women with breast cancer (stage I-III) were randomized to TSM or a wait list usual care control group. Women in the TSM group showed improvements in objective measures of short-term memory and processing speed (executive function), and reported better cognitive function, cognitive abilities, mental health, and spirituality at the end of treatment compared to the control group.

A few studies have examined the benefits of meditation by conducting qualitative research. Qualitative analyses examine the *experience* of the participants, capturing the psychological dynamics as they participate in the mind-body interventions. One such study explored the 'lived experience' of eight women with breast cancer in an MBSR trial [44]. Some reported that MBSR was particularly helpful in keeping their focus on the present and decreasing fear of their future as cancer survivors, as well as helping them redefine their perspectives about

themselves, their values, and their future. Another study qualitatively examined the experience of 28 people with lymphoma participating in a Tibetan Yoga RCT during or up to 12 months post treatment. The patients reported ‘living in a paradox’, where their experience was neither linear nor singular, as they went through contradicting physical and psychosocial experiences. Those who were in the Tibetan Yoga group had a greater sense of acceptance and found a greater sense of meaning in their illness [45].

Yoga, Tai Chi, and Qigong

Movement-based mind-body practices (e.g., Indian-based yoga, Tibetan yoga, and Chinese tai chi/qigong) typically combine physical postures or movements, breathing techniques, and meditation with the goal to enhance health and wellbeing. Indian-based Yoga (“yoga” is Sanskrit for “to yoke” or “join”), one of the most widely practiced Eastern traditions in Western cultures, focuses on the union of mind and body or the harmonic synchronization of body, breath, and mind. This ancient practice has been used in India to treat health imbalances for centuries [46]; and over the last few decades, a growing body of scientific investigations has documented the potential benefits of practicing yoga for healthy and clinical populations [47]. Yoga has also increasingly gained popularity in the cancer setting. In fact the literature now includes several systematic reviews and meta-analyses evaluating QOL benefits associated with practicing yoga in cancer patients and survivors [33,48-50].

A large, multi-center RCT involving 410 cancer survivors with moderate to great sleep disturbances demonstrated that an 8-session yoga intervention improves sleep outcomes [25]. Relative to a standard care control group, yoga participants reported improved sleep quality as measured by self-report and actigraphy, as well as reduced sleep medications. In a relatively small trial, Bower et al. [51] showed that yoga is an effective treatment to manage treatment-related fatigue in breast cancer survivors who presented with persistent fatigue relative to their counterparts in a psycho-education control group. Moreover, potentially shedding light on underlying mechanisms, the intervention reduced inflammatory signaling [52], which plays a distinct role in behavioral symptoms such as fatigue after breast cancer treatment [53,54]. Thus yoga may actually impact biological pathways beyond patients’ perceptions of QOL and symptoms. Kiecolt-Glaser and colleagues further supported this finding with a large RCT involving 200 breast cancer survivors [55]. Women in the yoga group had lower levels of inflammatory markers compared to those in the control group. Importantly, more frequent practice produced larger reductions in inflammations as well as fatigue.

Mind-body intervention research has been criticized for lacking an attention control group to rule out attention confounds in treatment effects. Addressing this frequent limitation, a recent publication compared QOL and stress hormone regulation (i.e., cortisol slope) in women with breast cancer undergoing radiotherapy who were assigned to either a yoga, stretching, or waitlist control group [27]. This 3-arm trial revealed that women in the yoga group reported greater increases in physical function and general health relative to those in the stretching and control group. Although both active groups reported reductions in fatigue relative to the waitlist control group, women in the yoga group demonstrated improved cortisol regulation as an indicator of a more adaptive stress response. These findings have

significantly advanced the field in that they suggest that the effectiveness of a yoga intervention is not confounded by mere attention and stretching exercises. This trial also highlights that combining physical postures (i.e., *asanas*) with breath work (*pranayama*) and meditation produce treatment effects beyond mere attention and stretching. Nevertheless, at the current state, our knowledge is restricted to women with non-metastatic breast cancer. We do not know if these findings generalize to other cancer populations and particularly male patient and survivors. Currently, efforts are made to extend these findings to women with advanced breast cancer [56] as well as survivors of lung cancer [57],[58]. Although these programs are in a pilot phase, findings regarding feasibility and potential benefits are promising. Additionally, as practitioners in supportive care increasingly recognize the importance of including caregivers in QOL management, yoga may also be beneficial for caregivers of cancer patients [59]. To that end, a Tibetan-based yoga practice was developed and pilot-tested as a couple-based yoga program for lung cancer patients undergoing radiotherapy and their family caregivers, and found large treatment effects for both patients and caregivers [60].

Although the effectiveness of yoga in men is largely unknown to date, *tai chi/qigong* has been examined in various cancer populations including non-gender specific and male cancers [22,61-69]. Part of Traditional Chinese Medicine, *tai chi/qigong* ("*qi*" energy flow; "*gong*" skill or achievement) [70] originated as martial arts form is increasingly gaining popularity particularly among older adults in Western cultures. Relative to yoga, *tai chi* and *qigong* have been less frequently studied in cancer but have increasingly received attention after a landmark study published in the *New England Journal of Medicine* suggested therapeutic benefits in patients with fibromyalgia with a single-blinded RCT design [71]. Yet, findings in the cancer literature are believed to be mixed at this stage as two recent meta-analyses (one involving 5 RCT's of 407 women with breast cancer [72] and one including 13 RCT's with 592 patients with mixed cancer types [63]) suggested. Both independent reviews concluded that, although treatment gains are evident, caution is warranted due to methodological constraints and the small sample of included trials. Nevertheless, encouraging advances are evident. To highlight a recent study, Campo et al. [73] assigned senior survivors of prostate cancer who experienced fatigue either to a 12-week *qigong* or stretching group. Results indicated that men in the *qigong* group reported less fatigue and distress than those in the stretching group, again pointing to the notion that movement-based mind-body interventions are not to be reduced to mere physical activity. It is also worth noting that several investigators of *tai chi/qigong* programs have incorporated objective performance status measures as well as biomarkers of inflammation to establish a role of *tai chi/qigong* in cancer rehabilitation. For instance, one trial measured peripheral circulatory status and functional aerobic capacity in survivors of nasopharyngeal cancer resulting in favorable outcomes [74]. Lastly, Wang et al. [65] examined the effect of a *tai chi* practice on immune function recovery of postsurgical lung cancer patients. Findings suggested that participants in the *tai chi* group revealed less humoral and cellular immunity dysregulation compared to those in the control group.

Summary

Overall, mind-body research is finding that these practices have an effect on most systems in the body (e.g., immune, endocrine, neurotransmitters (neuromodulators), and even gene expression to name a few), improving aspects of QOL, and creating fundamental beneficial changes in participant's lives. Neuroscience studies of mind-body practices show beneficial changes in the brain [75,76]. The neurological effect of mind-body practices demonstrates the brain's profound ability to change itself through experience. This new frontier of medicine is revealing how important it is to manage chronic stress and how influential our behaviors are on how our brain works and our overall health and well-being. Mind-body practices are one such healthy behavior to manage stress, improve quality of life, and achieve better balance in life. Clinicians should use the distress thermometer per NCCN guidelines as a simple way to measure distress and the sources of distress. Mind-body practices may be a good way to help patients manage the distress inherent with their cancer experience. Of note, practicing a mind-body technique 10-20 minutes per day is a feasible recommendation and will be beneficial, and logging their time and experience will help support this difficult lifestyle change. Besides encouraging patients to attend local classes, clinicians can recommend websites where patients can download or listen to recorded mind-body practices that are usually free. Patients often ask which mind-body program is the best for reducing stress and improving QOL. The answer is the one they will do *every day* and make a part of their life.

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