A Review of the Literature on Mindfulness-Based Treatments for Patients with Cancer

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Abstract
Over the course of the past two decades mindfulness-based approaches have gained popularity in the world of clinical psychology. A particularly popular mindfulness-based approach referred to as mindfulness-based stress reduction has been utilized as a treatment for a broad range of issues including both mental and physical health problems. One area that has demonstrated the utility of mindfulness-based stress reduction is in the treatment of cancer patients. A significant amount of mental and physical stress is associated with receiving a diagnosis of cancer. It is due in part to this stress and the chronic nature of the disease that mindfulness-based stress reduction has generated a great deal of interest in cancer treatment. The current literature review serves to provide some background on mindfulness, discuss how it has been used therapeutically, and review the literature on the use of mindfulness-based stress reduction in the treatment of cancer patients.

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ABSTRACT

Over the course of the past two decades mindfulness-based approaches have gained popularity in the world of clinical psychology. A particularly popular mindfulness-based approach referred to as mindfulness-based stress reduction has been utilized as a treatment for a broad range of issues including both mental and physical health problems. One area that has demonstrated the utility of mindfulness-based stress reduction is in the treatment of cancer patients. A significant amount of mental and physical stress is associated with receiving a diagnosis of cancer. It is due in part to this stress and the chronic nature of the disease that mindfulness-based stress reduction has generated a great deal of interest in cancer treatment. The current literature review serves to provide some background on mindfulness, discuss how it has been used therapeutically, and review the literature on the use of mindfulness-based stress reduction in the treatment of cancer patients.

Keywords: cancer; mindfulness; mindfulness-based stress reduction (MBSR)
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Introduction

The current psychological literature has seen an increase in the popularity of mindfulness-based treatments (Baer, 2003). Mindfulness-based treatments have been used in the treatment of a variety of both mental and physical health problems. Over the course of the last two decades a particular mindfulness-based treatment referred to as mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1990) has been increasingly investigated for its utility in treating physical illnesses (Grossman, Niemann, Schmidt, & Walach, 2004). Individuals with chronic illness provide a special challenge for the current health care system (Grossman et al., 2004). These individuals experience a significant amount of stress in their daily lives and often require a great deal of healthcare resources (Grossman et al., 2004). Due to the unique challenges presented by this population, programs which can provide symptom relief and be applied to a broad range of illnesses, like MBSR, are of great interest to those in the healthcare field (Grossman et al., 2004).

A specific area of research that has demonstrated the utility of MBSR in individuals with chronic illness is in the treatment of patients diagnosed with cancer (Carlson, Speca, Patel, & Goodey, 2003). This research has revealed that MBSR may provide a means to reduce symptoms of stress and depression, and improve quality of life for these individuals (Speca, Carlson, Goodey, & Angen, 2000). The following literature review serves to provide a background on mindfulness, discuss ways in which mindfulness-based treatments have been used therapeutically, and provide a discussion of the research investigating the use of MBSR in the treatment of patients diagnosed with
Mindfulness

Mindfulness Defined in Western Psychology

The psychological literature contains many different definitions from various authors. Kabat-Zinn (2003) defined mindfulness as "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (p. 145). Bishop et al. (2004) described mindfulness as “an approach for increasing awareness and responding skillfully to mental processes that contribute to emotional distress and maladaptive behavior” (p. 230). Additionally, Germer (2005) stated that “To be mindful is to wake up, to recognize what is happening in the present moment” (p. 24).

While mindfulness has been defined in many different ways from various perspectives, definitions of mindfulness contain the same basic core concepts. One core concept of mindfulness is the idea of awareness in the present moment. This core concept is best captured by the simple mindfulness definition of "moment by moment awareness" (Germer, 2005, p. 26). In this type of awareness one strives to become more aware of what is happening in the present moment and less distracted by thoughts of the past or the future. Kabat-Zinn (1994) emphasizes another core concept, non-judgment with a more specific definition of mindfulness stating that "Mindfulness means paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (p. 4). By emphasizing non-judgment, mindfulness becomes a way to be aware without expending the energy that it typically takes to evaluate our experiences. Here we are less interested in evaluating and more interested in simply noticing what our experience is. Kabat-Zinn
(1994) states that another important core concept in the practice of mindfulness is intent. The basic idea behind intent is that the individual who is seeking a mindful state is doing this consciously and intentionally. This emphasis upon intent also highlights the important idea that becoming more mindful requires effort.

**Eastern/Buddhist Perspective**

In addition to Western psychological definitions, it is important to consider the root of the term in the Eastern tradition of Buddhism. The Western term mindfulness found its origin in Pali, the language of Buddhist psychology 2,500 years ago (Germer, 2005). In Pali the word for mindfulness is *sati*. The basic components of *sati* include awareness, attention, and remembering (Germer, 2005). These basic components serve as a parallel to the core concepts from the Western perspective discussed above. Here, the *sati* components of awareness and attention correspond to the Western idea of present moment awareness. Brown and Ryan (2003) discuss awareness and attention further as being aspects of consciousness. They suggest that a mindful state of consciousness involves "attention to and awareness of current experience or present reality" (Brown & Ryan, 2003, p. 822). The additional *sati* component of remembering serves to emphasize that in the Eastern traditions mindfulness involves remembering to bring one’s attention to the present moment. This concept of remembering parallels the Western idea of intent in that one has to remember or make an intent to become more mindful.

**Cultivating Mindfulness**

It is important to remember that mindfulness is not a simple process that one can
learn in a brief training course (Kabat-Zinn, 2003). It takes great discipline to cultivate and practice mindfulness. Kabat-Zinn (1994) points out that a state of mindfulness opposes our natural tendency to exist habitually in our thinking minds. This thinking mind is typically in the past or the future and is controlled by thoughts of what should have been done and what needs to be done. Kabat-Zinn (1994) states that in order to "capture our moments in awareness and sustain mindfulness" (p. 8) one must put forth a great deal of effort. While it takes special work and commitment to practice mindfulness, it is important to remember that it is inherently gratifying to exist in the present moment. It is in the present moment that one is free from the past and future (Germer, 2005). In the present moment one is able to see their own true potential without expectations and fears (Kabat-Zinn, 2003). Additionally, one is able to see more deeply areas of life that may have been neglected. These potentially neglected areas of our life often include grief, fear, anger, and sadness. Through the practice of mindfulness one can be more aware of these areas of life and begin to better understand them and deal with them (Germer, 2005). Not only can mindfulness help us to look at areas of ourselves we may have neglected or that we may have difficulty looking at; mindfulness can also help us to better appreciate feelings such as happiness, joy, and peace (Germer, 2005). It is through the practice of mindfulness that one may be more able to lead a more complete and whole existence and be more aware of both the sadness and the joy of life.

Many different approaches exist for the purpose of cultivating a state of mindfulness, and although these approaches have differences, they all share several basic processes and goals (Bishop et al., 2004). The most commonly discussed approach in the psychological literature is meditation (Kabat-Zinn, 2003). The basic foundation of
meditation can be defined as “the intentional self-regulation of attention from moment to moment” (Kabat-Zinn, 1982). It should be noted that the specific branch of meditation being discussed here is aptly referred to as mindfulness meditation. In mindfulness meditation the goal is to focus on one's present experience as it changes from moment to moment. Mindfulness meditation contrasts with another branch of meditation referred to as transcendental meditation (Benson & Klipper, 2000). Transcendental meditation falls under the category of concentration-based meditation approaches. In transcendental meditation the goal is not to be aware of the present moment so much as it is to maintain the focus of attention upon a specific stimuli, most commonly a word referred to as a mantra (Baer, 2003).

To illustrate the general process in mindfulness meditation, Bishop et al. (2004) described a basic sitting meditation:

The client maintains an upright sitting posture, either in a chair or cross-legged on the floor and attempts to maintain attention on a particular focus, most commonly the somatic sensations of his or her own breathing. Whenever attention wanders from the breath to inevitable thoughts and feelings that arise, the client will simply take notice of them and then let them go as attention is returned to the breath. This process is repeated each time that attention wanders away from the breath. As sitting meditation is practiced, there is an emphasis on simply taking notice of whatever the mind happens to wander to and accepting each object without making judgments about it or elaborating on its implications, additional meanings, or need for action (Kabat-Zinn, 1990; Segal, Williams, & Teasdale, 2002). The client is further encouraged to use the same general approach outside
of his or her formal meditation practice as much as possible by bringing awareness back to the here-and-now during the course of the day, using the breath as an anchor, whenever he or she notices a general lack of awareness or that attention has become focused on streams of thoughts, worries, or ruminations. (p. 232)

The basic process of mindfulness meditation described here illustrates the importance of applying what one has learned in meditation practice to everyday life.

As mentioned above, a variety of other approaches and methods exist as a means to cultivate mindfulness (Germer, 2005). Baer (2003) points out that the current psychological literature discusses numerous approaches and specific exercises designed to help individuals become more mindful. Most what has been referred to within mindfulness-based practices involves focusing one's attention upon some phenomena that enters the individual's awareness (Baer, 2003). These phenomena can vary widely from one mindfulness exercise to another and can include anything from cognitions or thoughts to physical sensations, emotions, or perceptions (Baer, 2003). Broadly speaking, these various approaches all share the same goal of bringing a non-judgmental awareness to whatever experience one is having in the present moment (Baer, 2003).

Kabat-Zinn (2003) points out an important idea that mindfulness lies on a continuum and that we are all mindful to one extent or another at all times. He states that we all have the capacity to be mindful and that it is simply an aspect of human nature. This is an important idea, because it illustrates the point that the practice of mindfulness is done as a means to increase an individual's capacity to exist in the present moment, not just while practicing, but throughout their daily life.
Mindfulness-Based Interventions

As mindfulness has become more popular in the world of clinical psychology a variety of different mindfulness-based interventions have emerged. These treatments include (but are not limited to) mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1982, 1990), mindfulness-based cognitive therapy (MBCT; Segal, Williams, & Teasdale, 2002), dialectical behavior therapy (DBT; Linehan, 1993), and acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999). As the interest in mindfulness has increased in recent years, these therapeutic approaches have continued to gain respect as valid treatments for a variety of mental and physical health problems (Carmody & Baer, 2007). A more detailed review of each of these treatments is provided below.

MBSR (Kabat-Zinn, 1982, 1990) is the most widely investigated mindfulness-based intervention in the psychological literature. The MBSR program was originally designed in 1979 by Dr. Jon Kabat-Zinn at the University of Massachusetts Medical Center. MBSR was originally designed as a behavioral health program for individuals with issues ranging from chronic pain to stress-related disorders (Baer, 2003). The MBSR program is a manualized eight to ten week program intended for groups of up to thirty participants. The groups meet on a weekly basis for two hours each session and conclude the program with an intensive day long seminar lasting roughly eight hours. Participants are instructed in practicing a variety of different mindfulness exercises. For example, a sitting meditation is taught where participants are instructed to sit in a comfortable posture and focus their awareness on their breath. Participants are also taught how to
complete a body scan meditation. In the body scan meditation they are instructed to lie down with their eyes closed and bring their attention to various parts of the body. The main idea behind the body scan meditation is for participants to experience the sensations in their body in an open and non-judgmental manner.

In addition to the sitting and body scan meditations, participants are taught a variety of other ways to incorporate mindfulness into their lives. For example, participants are instructed to practice mindfulness within basic activities like walking, standing, and eating (Baer, 2003). In conjunction with the mindfulness exercises taught during the weekly sessions, participants are instructed to practice mindfulness exercises six days a week for 45 minutes each time (Baer, 2003). Broadly speaking, participants are encouraged to become aware of their thoughts and feelings, and are given special instruction to not become absorbed by them. Additionally, participants are instructed to dismiss maladaptive thoughts when they encounter them and return to the present moment as best they can.

MBCT is another mindfulness-based therapeutic intervention (Segal, Williams, & Teasdale 2002). MBCT was originally developed by Zindel Segal, Mark Williams and John Teasdale as a treatment for individuals suffering from recurrent major depressive disorder. MBCT is based upon the MBSR program designed by Dr. Jon Kabat-Zinn and is also manualized treatment program designed for groups. The primary differences between the two treatments are that MBCT incorporates of aspects of cognitive therapy and the focuses exclusively on the reduction of depressive relapse. The incorporation of aspects of cognitive therapy is intended as a means to help individuals develop an awareness of their maladaptive thought patterns. Through teaching individuals to take a
more detached or decentered approach to their thoughts it serves the purpose of helping them to prevent identification with negative thinking and instead embrace a more realistic or accurate reflection of their experience.

DBT (Linehan, 1993) represents a unique approach to the integration of mindfulness into behavioral therapy. DBT was originally developed by Marsha Linehan at the University of Washington and has been utilized primarily as a treatment for borderline personality disorder. The emphasis upon the dialectic in DBT is emphasized as a means to help clients see the balance between acceptance and change. Here the main idea is supporting clients to accept who they are and the situations that they may be in and work to change problematic behaviors in order to improve the quality of their lives. Clients participating in DBT spend one year in a weekly skills building group in addition to meeting with their individual therapist. DBT incorporates mindfulness into treatment differently than MBSR and MBCT. Mindfulness is taught as parts of what Linehan refers to as "what" and "how" skills (Linehan, 1993). "What" skills consist of observing, describing, and participating, and "how" skills consist of non-judgmentally, one-mindfully, and effectively. These skills are taught to clients in a way that allows them the flexibility to use whatever mindfulness skills they find helpful.

ACT (Hayes, Strosahl, & Wilson, 1999) represents another unique application of mindfulness to behavioral therapy. ACT was developed by Steven Hayes in the mid 1990's and does not utilize mindfulness in the same way that the other mindfulness-based interventions discussed above do. Instead, ACT incorporates mindfulness-based principles as strategies. Generally, ACT is a method to teach individuals to simply notice the events in their lives and embrace them whether positive or negative. A primary goal
in ACT is to treat experiential avoidance and help individuals remain in contact with their experience. They are supported to transcend the self and view themselves as observers. Additionally, they are supported to focus on accepting unwanted events from the past and bring more clarity to their personal values. One key principle within ACT is cognitive diffusion. The basic idea behind cognitive diffusion is to change the relationship that one has with their thoughts such that their potential for creating distress is diminished (Hayes et al., 1999).

Despite the differences in the way that various mindfulness-based treatments incorporate mindfulness, they all utilize similar core concepts. These include the ideas of present moment awareness, non-judgment, and acceptance. These basic concepts serve as a means to aid individuals in finding a way to cope with whatever problems they are dealing with and live life more fully and more healthfully (Baer, 2003).

Mindfulness and Health

Health can be defined as "the condition of being sound in body, mind, or spirit; esp: freedom from physical disease or pain" (Webster's Ninth New collegiate dictionary, 1987, p. 558). As has been discussed throughout much of the psychological literature mindfulness serves to aid in healthy mental functioning. The definition stated here serves to emphasize this through the concept of being sound in mind. Another aspect to this definition however is being sound in body and free from physical disease.

It should be noted that individuals suffering from chronic disease exert a great deal of pressure upon the healthcare system (Grossman, et al., 2004). This pressure comes in many different forms. One area of emphasis here is that there are a limited
number of professionals who have time or appropriate training to treat patients suffering from chronic disease (Grossman, et al., 2004). Additionally, programs that do exist for treating patients with chronic disease are often directed at a specific illness and group of symptoms. It is due at least in part to these pressures that a cost effective treatment approach that could potentially target a broad range of physical illnesses should be highly sought after (Grossman et al. 2004).

Broadly speaking, there has been a great deal of research utilizing mindfulness-based interventions in the treatment of physical disease (Grossman, et al., 2004; Shigaki, Glass, & Schopp, 2006). Several research studies have begun to show empirical evidence for the use of mindfulness-based approaches in the treatment of the physical diseases, including chronic pain (Kabat-Zinn, Lipworth, & Burney, 1985; Randolph, Caldera, Tacon, & Greak, 1999), fibromyalgia (Grossman, Tiefenthaler-Gilmer, Raisz, & Kesper, 2007; Singh, Berman, Hadhazy, & Creamer, 1998), gastrointestinal disorders, (Whitehead, 1992), heart disease (Barnes, Treiber, & Davis, 2001; Tacon, McComb, Caldera, & Randolph, 2003), and cancer (Ott, Norris, & Bauer-Wu, 2006; Shigaki, et al., 2006). The majority of these studies utilized MBSR as the treatment intervention.

The MBSR program was originally developed at the University of Massachusetts Medical Center by Dr. Jon Kabat-Zinn as a means to treat patients who were not responsive to conventional medical treatment (Shigaki et al., 2006). The majority of these patients suffered from chronic pain and had exhausted their medical treatment options without success. Kabat-Zinn (1982, 1990) suggested that patients were able to find relief from their pain through a number of different mechanisms. One primary mechanism he discussed was exposure. Through exposure he described that patients would be more able
to experience their pain without emotionally reacting to it. This process in turn would reduce the distress that patients associated with their pain (Kabat-Zinn, 1982, 1990).

Another mechanism discussed in this process is cognitive change. Kabat-Zinn (1982, 1990) discussed the idea that the practice of mindfulness led to changes in patients thinking patterns allowing them to realize that their thoughts are not necessarily reflections of the truth. This in turn aided patients in being with their pain rather than trying to escape from it (Kabat-Zinn, 1982, 1990). Self-management is another important mechanism described by Kabat-Zinn (1982, 1990). He discussed the idea that as patients were able to be aware of their pain without reacting to it that they gained the opportunity to engage in supportive or coping activities.

**MBSR and Treatment of Various Physical Illnesses**

Grossman et al. (2004) conducted a meta-analysis investigating the application of MBSR in the treatment of a broad range of illnesses. The illnesses incorporated in the meta-analysis included the following conditions: fibromyalgia, mixed cancer diagnoses, coronary artery disease, chronic pain, depression, and anxiety. While 64 empirical studies were originally considered for the meta-analysis, only 20 studies met criteria to be included in the study. Grossman and colleagues included studies which utilized the MBSR program or an applied mindfulness procedure as the primary means of improving health. Further inclusion criteria for the studies which were used in the meta-analysis included that mindfulness programs had to last 6-12 weeks, outcome measures had to be based upon standardized and validated scales, and available data had to allow for effect size calculations. Outcomes included measures of physical and mental well-being.
including anxiety, depression, mood, and medical symptoms.

Grossman et al. (2004) found similar effect sizes for both controlled and uncontrolled studies – the overall effect sizes (Cohen's $d$) were approximately 0.5 ($P<.0001$) with homogeneity of distribution. These findings suggest that MBSR programs may prove to be useful in helping to reduce symptoms associated with a broad range of chronic illnesses and disorders. Furthermore, these findings suggest that MBSR may be an effective technique in enhancing general coping with distress both in the case of serious illness and in everyday life (Grossman et al.).

Shigaki et al. (2006) conducted a review of the literature investigating the use of MBSR in medical populations. In their literature review they included individuals with chronic pain, cancer, and heart disease. Based on their review, they stated generally that MBSR is likely an effective intervention for a variety of health problems (Shigaki et al., 2006). More specifically, they emphasized that individuals from the studies they reviewed reported reductions in pain, reductions in symptoms of anxiety and depression, increased quality of life, and improved emotional factors (Shigaki et al., 2006). Despite these promising findings, Shigaki et al. (2006) stated that most experts agree that more research is required in this area in the form of rigorous controlled design research studies.

A broader investigation was conducted by Carmody and Baer (2007) among individuals suffering from physical illness, chronic pain, stress related problems, and anxiety. In this study the researchers investigated the relationship between mindfulness practice and medical and psychological symptoms. Participants completed measures of mood, stress, and various psychological and medical symptoms, both before and after participating in an 8-session MBSR group. The researchers found that mindfulness
practice was related to improvements in both medical and psychological symptoms, as well as improvements in well-being (Carmody & Baer, 2007).

While the application of mindfulness-based interventions in the treatment of physical illness is quite broad, the current review serves to focus solely on the use of MBSR in the treatment of patients suffering from cancer.

Mindfulness and Cancer Treatment

The experience of receiving a diagnosis of cancer is an intensely stressful experience for most people (Matchim & Armer, 2007). The majority of people experience a significant degree of fear after having received a cancer diagnosis, including concerns about the future, fears about treatment side effects, changes in physical capacities, and changes in social roles (Speca et al., 2000). Cancer diagnosis and treatment is associated with a significant potential for psychological impact, so much in fact that some individuals will meet criteria for anxiety, depression, or another mental health disorder (Ott et al., 2006). Additionally, the challenges presented by the physical symptoms of the disease serve as a major contributor to patient distress. These physical symptoms include nausea, diarrhea, vomiting, mouth sores, fatigue, and pain (Ott et al., 2006). The number of people affected by the disease is very significant. For example, it was estimated that around 1.4 million Americans were newly diagnosed with cancer in 2008 (American Cancer Society, 2008). Additionally, The National Center for Health Statistics reported cancer to be the second-leading cause of death in the United States (National Center for Health Statistics, 2006).

As has been suggested, the recent psychological literature has posed that
mindfulness-based treatments may be helpful in treating individuals suffering from cancer (Matchim & Armer, 2007). Mindfulness-based treatments have been utilized as a means to help increase an individual’s awareness of emotional distress and maladaptive behavior (Baer, 2003). A goal of this awareness is decreased reactivity, which may lead to a decrease in symptoms and an opportunity to become more involved in activities that may help an individual to feel better (Shigaki et al., 2006). As discussed above, individuals with cancer often suffer a great deal of physical and emotional distress related to their illness. Therefore, an approach like MBSR that could serve to help these individuals cope with this distress is warranted. Topics that have been emphasized in the research literature as areas of special need in the cancer patient population include compromised immune function (Carlson et al., 2003), stress and anxiety (Tacon, 2006), depression (Lengacher et al., 2009), fatigue (Carlson & Garland, 2005), and sleep issues (Shapiro, Bootzin, Figueredo, Lopez, & Schwartz, 2003).

As noted above, the majority of research looking at mindfulness-based approaches in the treatment of cancer has focused on MBSR (Grossman et al., 2004). Therefore, the review below focuses solely on MBSR in the treatment of cancer patients.

Meta-Analytic and Comprehensive Reviews of the Effects of MBSR on Cancer

Smith, Richardson, Hoffman, and Pilkington (2005) conducted a systematic review of the research literature looking at MBSR as a supportive care for patients with cancer. From the research literature they isolated three randomized controlled clinical trials and seven non-controlled clinical trials. The inclusion criteria for this study included: 1) studies that included outcome measures, 2) participants within the studies
that had a primary diagnosis of cancer (any type acceptable), and, 3) studies utilizing MBSR as a mental health treatment for cancer patients. Broadly speaking, the researchers reported positive results across studies. They stated that participation in MBSR was associated with reductions in stress, improvements in mood, and increased sleep quality. An interesting aspect of this review was the relationship found between increased practice of the mindfulness techniques and outcome. Based upon this, they emphasized the importance using measures to assess for daily practice compliance (Smith et al., 2005).

Another review conducted by Ott, Norris, and Bauer-Wu (2006) served both as a discussion of the recent literature on MBSR and cancer treatment, and as a critical evaluation of the emerging research on the topic. To begin, they discussed some of the background on the history of MBSR and how it was originally used as an intervention for patients that did not respond to conventional medical treatments. They went on to discuss that MBSR is being used for similar reasons today, in addition to a growing interest in alternative medicine (Ott et al., 2006). With regards to the evaluation of emerging research, the researchers isolated nine studies and five conference abstracts to be reviewed. The majority of patients from these studies were suffering from either breast or prostate cancer. In general, the findings revealed that MBSR provided consistent benefits for those suffering from cancer across all studies. These benefits included: improved psychological functioning, reduction of stress, better coping, and enhanced well-being. The researchers stated that more research is needed in this area utilizing randomized, controlled study designs as well as investigating different treatment settings and cancer diagnoses (Ott et al., 2006).
Matchim and Armer (2007) conducted an investigation looking solely at the review of instruments used to assess the psychological impact of MBSR on the health of cancer patients. They reviewed 13 psychological instruments in seven different studies. Most of the studies investigated utilized a simple one-group pre- and post-test design. Inclusion criteria in their study required that the studies be original research, as well as that the participants within the studies be suffering from some form of cancer. Some degree of variation existed amongst the post-MBSR outcomes lending in part towards expected variation between the different instruments tested. With regard to the relationship between MBSR and cancer patient treatment, the preliminary findings are positive. The authors suggested generally that MBSR has a positive impact on health and well-being in cancer patients.

Ledesma and Kumano (2009) conducted a meta-analysis to investigate the mental and physical health impact of MBSR on patients diagnosed with various types of cancer. Many types of cancer, including breast, ovarian, prostate, lung, ear, rectal, endometrial, and melanoma were included in the meta-analysis. It should be noted, however, that the majority of studies involved in the meta-analysis were conducted with patients suffering from breast and prostate cancer. A total of 10 studies were included in the meta-analysis. In order to be involved in the analysis, studies must have had a MBSR program that ran from 6 to 15 weeks, had cancer patients as participants, at least one quantitative outcome, an English-translation publication, and a publication date by 2007. Outcome measures for the meta-analysis fell into two subgroups: physical health factors and mental health factors. The physical health factors included immune function, hormonal indices, and dietary fat, while the mental health factors included anxiety, depression, and daily stress.
Overall affect sizes were calculated, revealing a Cohen's effect size of $d = 0.48$ for mental health factors and a Cohen's effect size of $d = 0.18$ for physical health factors. The authors suggested that these findings indicate that MBSR may be helpful in supporting cancer patients in the psychosocial adjustment associated with the disease (Ledesma & Kumano, 2009).

The Impact of MBSR on Immune Function

It is commonly understood in the research literature that cancer patients have compromised immune function (Andersen, Kiecolt-Glaser, & Glaser, 1994). Having a compromised immune system leaves one vulnerable to the progression of disease and further illness (Andersen et al., 1994). This highlights the importance of the need to find ways to help support cancer patients in strengthening their immune systems.

Davidson et al. (2003) investigated the impact that participation in an MBSR program had on the immune responses of a sample of 49 healthy individuals. After participating in an 8-week MBSR program the researchers subjected half of the group to an influenza vaccination. They found that individuals who participated in the MBSR program had a stronger immune response to the vaccination when compared to those who did not participate in the program. The researchers emphasized that these findings suggest that participation in an MBSR program may help to improve immune function.

Carlson, Speca, Patel, and Goodey (2003) investigated the use of MBSR programs for patients diagnosed with breast and prostate cancer. The researchers in this study examined immune function, in addition to other variables, following completion of an MBSR program. While they reported no significant decrease in immune cell subsets,
they did report that immune profiles which were indicative of depression returned to normal levels. The authors noted that this was the first study to demonstrate improvements in cancer-related immune functioning. A major limitation noted by the authors was the lack of a control group. They emphasized that without a control group one cannot be sure whether the improvements were due to the MBSR program or other factors.

Carlson, Speca, Faris, and Patel (2007) investigated the long-term effects of participation in an MBSR program on immune function in a sample of patients with breast or prostate cancer. They assessed for various immune function indicators, including intracellular cytokine production and immune cell counts at pre- and post-intervention, at the beginning of the study and at both a 6- and 12-month follow-up. The researchers found that immune patterns revealed a decrease in inflammatory cytokines over the course of the 12-month follow-up. Thus, they concluded that participation in the MBSR program was associated with improvements in immune function.

An interesting application of MBSR was described for the treatment of prostate cancer in conjunction with dietary intervention (Saxe et al., 2001). The researchers described participation in an MBSR program along with the use of a specific low-fat vegetarian diet for patients with prostate cancer. The participants had recently undergone prostatectomies (removal of the prostate), but were found to have rising prostate specific antigen (PSA) levels (an indicator of prostate cancer). Patients who participated in the intervention were found to display PSA levels indicating that the rate of increase of prostate disease was greatly inhibited. Of note within this process is the fact that stress reduction as is typically experienced in MBSR training is associated the modulation of
immune function (Saxe, et al., 2001). The researchers in this study suggested that the MBSR program may play a role in gaining compliance with dietary intervention, which has previously been shown to be effective in the treatment of prostate cancer.

Witek-Janusek et al. (2008) investigated the effects of participation in an MBSR program on immune function in women who were newly diagnosed with early stage breast cancer. The format of the study was a non-randomized controlled design. The researchers assessed for various immune function indicators at pre- and post-intervention, and again at 4-week post-intervention. They found that participation in the MBSR program was associated with beneficial changes in immune function indicators.

The Impact of MBSR on Sleep and Fatigue Symptoms

Cancer related fatigue (CRF) is experienced by the vast majority of patients with cancer (Mustian et al., 2007). Many different factors can contribute to CRF including biological factors related to immune dysfunction and psychological factors including causal attributions and expectancy (Mustian et al., 2007). Sleep disturbance is also quite common amongst cancer patients as commonly related to stress and anxiety (Shapiro et al., 2003).

Carlson and Garland (2005) investigated the impact of MBSR on fatigue in 63 cancer outpatients. No restrictions were placed upon stage or type of cancer. Participants in the study took part in a standard 8 week MBSR program and completed a variety of outcome measures including fatigue, sleep, mood, and stress. The researchers found there to be a significant reduction in fatigue amongst participants in the MBSR program. Other studies have demonstrated similar findings regarding reductions in fatigue amongst
cancer patients following MBSR programs (Speca et al., 2000; Shapiro et al., 2003).

Shapiro et al. (2003) examined the efficacy of MBSR in treating sleep disturbance among women with breast cancer. The researchers found that sleep efficiency did not improve, however stated that those who reported greater time engaging in mindfulness practice had significantly greater improvements on measures of sleep quality. Other research studies have shown similar findings regarding the improvement in sleep quality for cancer patients participating in MBSR programs (Carlson, Speca, Patel, & Goodey, 2004; Carlson & Garland, 2005; Shapiro, 2002).

The Impact of MBSR on Psychological Factors

As noted above, receiving a diagnosis of cancer is an intensely stressful experience for most people (Matchim & Armer, 2007). This can have a significant psychological impact and create a tremendous amount of fear regarding the process of cancer treatment, thoughts about the future, and changes in social roles (Speca et al., 2000). A number of different psychological factors have been investigated in the research on MBSR and cancer treatment. These psychological factors include mood, depression, state anxiety, stress symptoms, mental adjustment, locus of control, and quality of life.

Speca et al. (2000) investigated the effects of an MBSR program on mood and stress symptoms in breast cancer outpatients. In this study the researchers randomly assigned cancer patients to either the MBSR condition or the wait-list control condition. The researchers found that the participants who were assigned to the MBSR treatment condition scored significantly lower on measures of mood disturbance, depression, anxiety, anger, and confusion. Another study looking at MBSR and immune function
(Carlson et al., 2003) found that individuals who participated in MBSR had improved quality of life and decreased stress symptoms. An additional study by Carlson et al. (2007) investigated the use of MBSR with a mixed breast and prostate cancer sample. In this study the researchers looked at the same variables of quality of life as well as various indicators of immune function. They found similarly that participation in the MBSR program was associated with enhanced quality of life, decreased stress symptoms, and lower mood disturbance (Carlson et al., 2007).

Tacon (2006) investigated both psychological and physical symptoms in women with breast cancer, and found that women who had gone through the MBSR program had reductions in state anxiety, depression, pain, and symptoms of distress. Tacon, Caldera, and Ronaghan (2004) also investigated those same variables with the addition mental adjustment and locus of control. They found that after completing the MBSR program women with breast cancer had decreased levels of state anxiety and beneficial changes in both mental adjustment and locus of control. The researchers suggested that these findings may provide initial support for utilizing mindfulness-based approaches for individuals dealing with the stress and threat that accompanies cancer diagnosis.

Mackenzie, Carlson, Munoz, and Speca (2007) qualitatively investigated the experiences of nine participants who had gone through an 8-week MBSR program. The researchers in this study were interested in the experiences that these individuals had and the perceived effects that they attributed to their attendance in the MBSR group. Through a thematic analysis the researchers isolated five common themes: (1) opening to change, (2) self-control, (3) shared experience, (4) personal growth, and (5) spirituality. The previously discussed psychological factors of mental adjustment and locus of control
correspond well respectively to the themes of opening to change and self control.

Overall, the researchers in these studies have demonstrated that participation in MBSR is related to beneficial changes in a number of different psychological factors. The beneficial changes discussed within these studies reflect much of the basic foundations within mindfulness practice (Ledesma & Kumano, 2009).

Summary and Directions for Future Research

Over the past two decades there has been a growing interest in mindfulness-based approaches in the world of clinical psychology (Baer, 2003). MBSR has gained the most popularity in this area as a treatment intervention being utilized for a broad range of issues (Kabat-Zinn, 1990). The current literature review serves to illuminate the application of this treatment in the domain of physical disease, more specifically in the treatment of cancer patients.

Cancer patients provide a special need as they often suffer a great deal of physical and emotional distress (Matchim & Armer, 2007). Currently, much of the literature in this area has supported the use of MBSR for this population. There exist a number of different ways in which MBSR has begun to show its value as a treatment approach for these individuals. One such area is immune function. Studies of immune function have shown that participation in an MBSR program may lead to improvements in various immune function indicators (Carlson et al., 2003). Another area of distress for this population is sleep disturbance and fatigue. Participation in an MBSR program has been associated with patient reports of improvements in sleep quality and reductions in fatigue (Shapiro, 2002; Speca et al., 2000). Psychological factors are yet another area within the
research on MBSR that have yielded promising results. The range of findings in this area is quite broad including improvements in mood (Speca et al., 2000), quality of life, locus of control, and mental adjustment (Tacon et al., 2004), as well as reductions in depression (Lengacher et al., 2009), state anxiety, and symptoms of stress (Tacon, 2006).

The current literature review serves in part to emphasize the value of MBSR as a treatment for cancer patients. Although the researchers discussed in these studies demonstrated different applications of MBSR, as well as differences in outcome measures, they all lend toward the value of using MBSR for this population. It should noted that recommendations for the use of MBSR are dependent on the patient receiving professional medical treatment as the first priority. MBSR is an adjunctive treatment and should be treated as such.

While these studies have demonstrated the benefits associated with mindfulness based approaches in the treatment of cancer patients, more research needs to be done in order to clarify how these changes take place and what other groups of people may benefit. In the future, researchers should focus on the incorporation of individuals diagnosed with a broader range of types of cancer, including Hodgkins lymphoma, melanoma, colon, lung, and cervical cancers. Additionally, future research should focus on large scale research projects in this area. This is an important and necessary step in the process of gaining a deeper understanding of the ways in which mindfulness can be utilized to benefit those suffering from cancer.
References


