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UNIVERSITY OF CALGARY

Reducing Stress in Breast Cancer Patients:

The Effects of a Mindfulness-Based Stress Reduction Program

On Measures of Stress and Mood

In Post-Treatment Early Stage Breast Cancer Outpatients

by

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A THESIS

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The undersigned certify they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Reducing Stress in Breast Cancer Patients: The Effects of a Mindfulness-Based Stress Reduction Program on Measures of Stress and Mood in Post-Treatment Early Stage Breast Cancer Outpatients" submitted by Michael Mackenzie in partial fulfilment of the requirements for the degree of Master of Science.

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Abstract

The objective of the current project was to determine whether a Mindfulness-Based Stress Reduction program had beneficial effects on symptoms of stress and mood in early-stage breast cancer patients who were at least 3 months post-treatment. A convenience sample of 33 early-stage breast cancer patients completed the Symptoms of Stress Inventory (SOSI) and Profile of Mood States (POMS) pre and post intervention. The intervention consisted of a weekly meditation group lasting 1.5 hours for 8 weeks plus home practice, and a 3-hour weekend retreat between weeks 6 and 7. The mean SOSI total score showed a significant 22% (t=3.40, p<0.01) decrease in stress symptoms over the course of the intervention. The mean POMS scores showed no significant reductions. Interestingly, those who attended more sessions reported increased symptoms of stress, as indicated by elevated scores on the SOSI. Similarly, those who reported practising more yoga at home reported increased symptoms of stress. These results indicate an 8-week MBSR program can decrease symptoms of stress in early stage breast cancer patients.

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Dedication

In loving memory of my dear, sweet friend John Branton, who remains my sustenance and solace in this work. You are a constant source of inspiration in my life. May God bless and keep you my Brother. I know in my heart you have returned home.

This work is also dedicated to my Grandmother, Jean Todd, who, throughout my life, has been a master teacher in the art of being there for others. You have given me so much over the years and never asked for anything in return. With your love, support and guidance I have become who I am today.

Lord, make me an instrument of Your peace. Where there is hatred, let me sow love; Where there is injury, pardon; Where there is doubt, faith; Where there is despair, hope; Where there is darkness, light; And where there is sadness, joy.

O Divine Master, Grant that I may not seek to be consoled as to console; To be understood as to understand; To be loved as to love. For it is in giving that we receive, It is pardoning that we are pardoned, And it is in dying that we are born to eternal life.

St. Francis of Assisi, The Prayer of St. Francis

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Chapter One: Introduction

The diagnosis and subsequent treatment of breast cancer is an emotionally debilitating experience for many women and their families (Brown, Stewart, & McWilliam, 1999). Almost half of breast cancer patients suffer from moderate to severe psychological distress, and face substantial difficulties in coping with their illness, even though they have early stage breast cancer with a relatively good prognosis (Bleiker, Pouwar, van der Ploeg, Leer, & Ader, 2000; Spiegel, 1996).

Within the population of cancer patients, there is a growing interest in complementary therapies that stem from a desire to be proactive and take initiative in personal care (Balneaves, Kristjanson, & Tataryn, 1999; Hilsden & Verheof, 1999). For women who use complementary therapies, decision making regarding the use of these therapies provides meaningful opportunities to assume control over their disease, treatment and well-being during cancer treatment and recovery (Balneaves et al., 1999; Truant, 1999; Verhoef, Hilsden, & O'Beirne, 1999). Of the complementary therapies, methods of promoting relaxation to regulate arousal and reduce distress, including Mindfulness-Based Stress Reduction (MBSR) have demonstrated some utility (Carlson, Ursuliak, Goodey, Angen, & Speca, 2001; Speca, Carlson, Goodey, & Angen, 2000).

Recently, there has been a growth of clinical treatment and wellness programs based on mindfulness meditation and yoga modelled after the MBSR program of Kabat-Zinn and colleagues at the Stress Reduction Clinic of the University of Massachusetts Medical Centre (Kabat-Zinn, 1990). Kabat-Zinn describes the 8-week MBSR program as, "A well-defined and systematic patient-centred educational approach which uses relatively intensive training in mindfulness meditation as the core of a program to teach people how to take better care of themselves and live healthier, more adaptive lives." (Kabat-Zinn, 1996, p. 163). The health promotion effects of MBSR appear to complement conventional biomedical treatment in a comprehensive, patient-centred approach to healing and alleviation of human suffering (Reibel, Greeson, Brainard, & Rosenzweig, 2001).

The body of research investigating MBSR's efficacy for the treatment of health problems is growing. These programs have shown some effectiveness as adjunct treatment in trials involving patients suffering from many medical conditions. Miller, Fletcher, & Kabat-Zinn (1995) report that training in the practice of mindfulness meditation is related to positive psychological and physical well-being outcomes in clinical populations. The MBSR model, in many cases modified to be specific to each illness, has been used in the treatment of a variety of disorders including chronic pain, fibromyalgia, anxiety and panic disorders, psoriasis, and depression (Bishop, 2002). In each instance, mindfulness meditation has been conceptualised as a form of stress management (Moore, 1998).

Considering the high degree of emotional distress following a cancer diagnosis, and the efficacy of MBSR in other medical populations, it seemed logical to offer the MBSR program to cancer patients. Initial work with MBSR and cancer patients showed substantial improvements in symptoms of stress and mood disturbance in a randomised controlled trial of a mixed group of cancer patients (Speca et al., 2000). The beneficial effects of the treatment were sustained six months post program completion (Carlson et al., 2001). The MBSR program provided not only an efficacious treatment for distress, but fit within patients' own framework of positive health behaviour (Kabat-Zinn, 1990). The two previous studies conducted at the Tom Baker Cancer Centre on the effects of a MBSR program on symptoms of stress and mood focused on a heterogeneous cancer population, with a wide variety of diagnoses and stages of illness (Carlson et al., 2001; Speca, et. al., 2000). The current project focused on whether an 8-week MBSR group psychosocial intervention had similar beneficial effects on symptoms of stress and mood in early-stage breast cancer patients, who were at least 3 months post treatment. Study sample homogeneity allowed for some control of disease and treatment-related variables and reflected an increased focus within the research design (Gotay & Stern, 1995). By recruiting patients who were 3 months post-treatment the researcher hoped to respond to previous research indicating that support from the health care team diminishes post-treatment, as women are expected to return to normal activities (Edgar, Remmer, Rosberger, & Fournier, 2000). The researcher hypothesised the use of MBSR, as a psychosocial resource, might be especially helpful to women during this time of transition.

This chapter introduces breast cancer, its' associated stresses, and the psychosocial treatment of the disease in preparation for detailed discussion of how Mindfulness-Based Stress Reduction (MBSR) interventions are used in the treatment of breast cancer. The following topics are covered: Breast cancer, stress and breast cancer, psychosocial factors influence on cancer progression, stress and the stress response, reducing stress, complementary therapy, and group therapy.

Breast Cancer

Breast cancer is the most common cancer diagnosis for women in North America (Bleiker & van der Ploeg, 1999). The lifetime risk of developing breast cancer for North American women is one in eight. The incidence of breast cancer increases with age, although the rate of increase slows after menopause (Hortobagyi, 1998). At the time of diagnosis, more than 90% of patients have only localised disease (Abraham & Zujewski, 2001). Breast cancer is most treatable when detected in these early stages (Dollinger, Rosenbaum, Benz, Goodson, Friedman, & Sickles et al., 1997).

Once breast cancer has been found, more tests are done to find out if the cancer has spread from the breast to other parts of the body. This is called staging, which is directly related to prognosis and determines the type of treatment offered. The clinical stages range from stage I to stage IV. In stage I the tumour is 2cm or less in size, without any evidence of spread to nearby lymph nodes or distant sites. The 5-year survival rate for stage I breast cancer is 85% (Dollinger et al., 1997). In stage II breast cancer the primary tumour is more than 2cm but not more than 5cm in greatest dimension. The 5year survival rate for stage II breast cancer is 66% (Dollinger et al., 1997). Stage III breast cancer includes tumours larger than 5cm, tumours with invasion of the skin of the breast or chest wall and any tumours with involvement in the axillary lymph node on the same side as the cancer. The 5-year survival rate for stage III breast cancer is 41% (Dollinger et al., 1997). Stage IV, or metastatic breast cancer, features distant metastases and chest wall involvement beyond the breast area. The 5-year survival rate for stage IV breast cancer is 10% (Dollinger et al., 1997). In the current study, the sample consisted exclusively of individuals with stage I and II breast cancer, which can be optimally

treated with breast-conserving surgery, and the addition of radiotherapy, chemotherapy and/or hormone therapy (Hortobagyi, 1998).

Stress and Breast Cancer

Almost half of breast cancer patients suffer from moderate to severe psychological distress, and face substantial difficulties in coping with their illness, even though they have early stage breast cancer with a relatively good prognosis (Bleiker et al., 2000; Edgar et al., 2000; Packard, Haberman, Woods, & Yates, 1991). There are many potential sources of distress for people diagnosed with cancer, including the anticipation of suffering, undergoing taxing treatment regimens, difficulty coping with life changes, and adjusting to the inherent uncertainty and uncontrollability of the illness (Carlson et al., 2001). Compounding these difficulties, popular lore and scientific findings lead many patients to conclude that stress, including the very stress caused by their cancer, may contribute to recurrence or progression of their disease (Maunsell, Brisson, Mondor, Verreault, & Deschenes, 2001).

Cancer diagnosis may challenge the integrity of one's ideas about oneself, and long-held concepts about one's life trajectory and relationships. A stable personal world can be disrupted as the person is plunged into the role of patient in a universe of doctors, tests, hospitals and uncertain but critically important treatment choices. Patients often confront existential issues, such as trying to make sense of the illness in their lives and confronting issues around death and dying (Speca et al., 2000). Many patients' experience enduring problems, including increased anxiety and depression near the time of diagnosis and throughout treatment and recovery (Nezu, Nezu, Friedman, Houts, DelliCarpini, & Bildner et al., 1999; Epping-Jordan, Compas, Osowieki, Oppedisano, & Gerhardt et al., 1999). Overall mood disturbance of breast cancer patients is persistent and declines slowly over time (Spiegel, Morrow, Classen, Raubertas, Stott, & Mudaliar et al., 1999).

Psychosocial Factors of Cancer Progression

There is currently a belief in the oncology field that psychosocial factors, especially stress, may somehow interact with biological and environmental factors. This includes the influence of stress on the immune response and therefore the susceptibility of the immune system to infectious, allergic, auto-immune diseases and to cancer (Spiegel, 2000; Thomas, Groer, Davis, Droppleman, Mzingo, & Pierce, 2000; Greer, 1999; Spiegel, 1999; Jerry, 1996; Kabat-Zinn, 1990). Adaptation to a cancer diagnosis is significantly influenced by the pre-existing psychosocial factors patients bring to their cancer experience (Zabora, Brintzenhofeszoc, Curbow, Hooker, & Piantadosi, 2001). As treatment ends, patterns of coping used throughout treatment may continue to influence outcomes related to adjustment (Edgar et al., 2000). Poor health behaviours may increase the effects of stress, and exacerbate physiological and psychological symptoms (Meaney, 2001; Anderson, Kiecolt-Glaser, & Glaser, 1994).

These findings are related to the field of psychoneuroimmunology, or PNI. PNI is the study of links between the central nervous, immune and endocrine systems (Jerry, 1999). According to this model, the experience of negative stress is often situational and dependent on the individual's perceptions of their world and the PNI system is set in accordance to these perceptions. Whether a particular situation is viewed as an exciting challenge, a neutral event, or a threat can be a matter of individual perception and interpretation, and our stress-response systems respond in kind (Jerry, 1996). Therefore, interventions which reduce stress or which alter beliefs and values are expected to produce changes in the patient's resistance to stress and are reflected by corresponding modifications in PNI function (Greer, 1999; Jerry, 1999).

The pathways by which changes in immune function may translate into disease progression are currently being debated in the literature. The subsequent contests that exist between our scientific knowledge base and popular beliefs about cancer are problematic for individuals with cancer and their health care providers. Most oncologists and surgeons believe tumour type and stage, along with other biological tumour markers, general health, and medical treatment are the only factors that account for variance in outcome. The extent to which psychosocial factors may play a role in cancer and the exact mechanisms are still poorly understood because of the complexities involved in studying cancer (Levenson & Bemis, 1991). The development of any kind of cancer is a multistage, complex occurrence involving our genes, cellular processes, environment, and our individual behaviour and actions (Kabat-Zinn, 1990). Compared to other known risk factors, psychosocial factors may by themselves make a small contribution to cancer onset. Regardless, many professionals and lay people believe psychological factors play a major role in cancer onset and progression. Theories of psychosocial influence provide understandable and accessible hypotheses for the general public about the etiology and course of personal illness (Levenson & Bemis, 1991). People take hope in the implication one can change their physical health by changing some aspects of one's personality or behaviour (McKenna, Zevon, Corn, & Rounds, 1999).

A sizeable portion of women with breast cancer believe stress can cause or contribute to causing the disease (Maunsell et al., 2001; McKenna et al., 1999). If women think stress might cause the disease, some also fear stress could cause it to progress (Maunsell et al., 2001). The sense of personal failure some women experience when cancer recurs can lead to self-blame and the attribution of cancer progression to personal fault. (Stewart, Cheung, Duff, Wong, & McQuestion et al., 2001). This controversy results in an exciting field of discovery, where any new information may be a valuable addition to our understanding of a very complex puzzle.

Stress and the Stress Response

Stress is a natural part of life and cannot be avoided. "At root, stress is a natural part of living from which there is no more escape than from the human condition itself" (Kabat-Zinn, 1990, p. 2). In moderation and the right context, stress can be a positive, constructive force in our lives. However, too little, too much, the wrong kind or not being able to handle a stressful event can lead to negative effects. Stress acts on several levels, including our physiology, behaviour, thinking, emotions and relationships. This interaction influences the state of the mind and body and our resilience for coping with stressful events.

The word stress has become an umbrella term for the various pressures we experience in life. Stress is a response to a stressor, which is the stimulus that produces a stress response (Selye, 1974). A stressor is anything that provokes a stress response in our bodies and can be an internal or external occurrence or event. The way each individual experiences stress is subjective based on their personal perception of events. The same events can have very different meaning and significance to different people, and thus elicit very different reactions (Meaney, 2001). The stress response is contingent upon the degree to which we perceive the stressor as posing a demand, and the appreciation of our resources to deal with that demand. The intensity of the stress response is a function of the degree of imbalance between the demand and resources for coping coupled with the perceived severity of the consequences of poor coping (Malec, Hiebert, Young, Rose, & Blackshaw et al., 2000). The amount of control one believes they have over their environment and the circumstances one encounters influences the amount of stress they experience.

Selye (1974) identified three universal stages in our coping with stressful events, which he termed the "fight or flight response". The first is the alarm stage, in which we become aware of the stressor. The second is the resistance stage, in which we react to the stressor either by fighting or running away. The third is the exhaustion stage, in which we recuperate from fighting or avoiding the stressor. The fight or flight response is triggered when, real or imagined, we view our immediate environment as dangerous. This response increases our chances of survival by allowing us to react quickly in the moment.

During periods of trauma, such as cancer diagnosis and treatment, our awareness of potential threats in the environment is heightened (Meaney, 2001). The more an incident is perceived as being threatening, the greater the chances of activating a stress response (Epping-Jordan et al., 1999). A high number of stress symptoms is an indication of chronic activation of the stress response. The fight-or-flight response becomes harmful when it is triggered frequently and we begin to lose our ability to recuperate from stressors. The accumulated effects of stress reactivity, compounded by inadequate ways of coping with stressors, can lead to breakdown in one form or another. This can be maladaptive and damaging until the individual learns how to respond to the stresses of life in a healthy way.

Reducing Stress

Adaptation to the changing stressors of cancer is shaped in large part by the effectiveness of the patient's coping strategies (Edgar et al., 2000). The more efficient the individual's ability to control adverse conditions associated with a potential stressor, the less likely the stressor is to produce ongoing physiological effects (Meaney, 2001). By controlling thoughts, emotions, behaviours and environmental factors, individuals may exercise control over their experience of stress. What is critical in the successful adjustment to perceived stressful events is that individuals see themselves as having resources to deal with a problem (Meaney, 2001). We have the ability to affect the balance point between our internal resources for coping with stress and the stressors that are an unavoidable part of living. By exercising this capacity consciously and intelligently, we can control the amount of stress we experience (Kabat-Zinn, 1990).

Changing our own interpretation of events is something over which we can exert control but this takes time, effort, and self-examination. Handling stress involves two steps. The first step is stressor management, which involves examining ways to reduce or alter demands so they fall within one's coping ability. The second step is stress management, consciously changing the way one personally responds to stress.

Stressor management helps control stress by restoring balance between stressors, the demands people face, and the resources they have for coping with those demands (Malec et al., 2000). A person diagnosed with breast cancer may not be able to avoid becoming stressed, but they are still able to reduce the impact of the stressor. However, some demands are so powerful they overtax virtually everyone's coping ability. The amount of resources required to change a demanding situation may be so extensive it is not sensible to try to change the demand (Malec et al., 2000).

If stressor management is not possible, stress management offers an alternative path to reducing stress, by influencing the physiological, cognitive, and/or behavioural components of the stress response (Malec et al., 2000). When there is no viable course of external action an individual can take to reduce stress, it is still possible to employ psychological resources that give a sense of being engaged and in control to some degree (Kabat-Zinn, 1990). By changing the way we see ourselves in relationship to our stressors, we can change our experience and therefore modify the extent to which stress taxes our resources or endangers our wellbeing. We can also become more resistant to stress if we build up our coping resources and enhance our physical and psychological wellbeing during times where we are not overwhelmed.

Complementary Therapy

Standard cancer treatments, which include surgery, radiotherapy, chemotherapy, and hormone therapy, are designed to remove or kill tumour cells. Oncologists and other healthcare providers may also recommend other types of treatment aimed at overall improvement of general health and well-being. These interventions are often referred to as complementary or adjunctive treatments, as they are used along with standard therapies (Hilsden & Verhoef, 1999; Verhoef et al., 1999). The use of complementary therapies by people living with breast cancer is widespread and of clinical significance to health professionals (Balneaves et al., 1999; Hilsden & Verheof, 1999). It has been well documented in the literature that a variety of psychosocial interventions have been established that effectively reduce psychological and physiological symptoms of stress in cancer patients and improve overall quality of life (Cassileth, 1997; Fawzy, Fawzy, Arndt, & Pasnau, 1995). This assistance in helping cancer patients and their families adjust optimally to their illness is an integral component of good overall medical care (Spiegel, Bloom, & Yalom, 1981).

Complementary therapies that support lifestyle change have achieved an aura of respectability and are often accompanied by scientific proof, or the blessing of mainstream medicine (Verhoef et al., 1999). Most complementary therapies have a common philosophy that includes a focus on health and improving wellbeing, rather than on controlling disease. Complementary therapies present patients with the opportunity to do something for themselves as a complement to more traditional medical approaches. Generally, active patient participation in illness management is encouraged over passive adherence to prescribed treatments. A common theme in complementary therapies is that people learn to face their life problems and develop personalised strategies for working with them. By involving people in an expanded definition of medicine and health care in a participatory way, complementary therapies help people shift the balance of responsibility away from an exclusive dependency on physicians and closer to their own personal efforts, over which they have more direct control (Kabat-Zinn, 1990). These collaborative elements give rise to a highly individualised and participatory healing

process, which makes complementary therapies attractive to cancer patients (Verhoef et al., 1999).

The desire to regain control after diagnosis with a chronic life-threatening illness such as breast cancer has been demonstrated to facilitate adaptation to illness. Many women with breast cancer want responsibility for their treatment decisions, including use of complementary therapies, which helps to develop feelings of empowerment (Balneaves, et al., 1999; Gray, Greenburg, Fitch, Parry, Douglas, & Labrecque, 1997). Using complementary therapies provides opportunities to make meaningful decisions to assume control over the disease process, treatment and recovery (Balneaves et al., 1999; Truant, 1999; Verhoef et al., 1999). When patients feel some degree of control in their lives they interpret their situation as less threatening and consequently less stressful (Truant & Bottorff, 1999).

Regardless of the efficacy of complementary therapies, the motivations of cancer patients in seeking them are, fundamentally, self-healing motivations which, when engaged appropriately, can contribute to patients' psychological and physical well-being (Ritvo, Irvine, Katz, Mathew, Sacamano, & Shaw, 1999; Gray et al., 1997). Consequently, these therapies may play an integral role in helping women with breast cancer cope with their disease and medical treatment (Balneaves et al., 1999). This despite the fact women with breast cancer are cognisant of the limited scientific evidence supporting the ability of complementary therapies to "cure" cancer. Patients are realistic in their use of complementary therapies as adjunctives, rather than as replacements to conventional care (Balneaves et al., 1999).

Group Therapy

Group therapy is considered the psychological treatment of choice for most cancer patients (Spira, 1998). There is increasing evidence that people with chronic illnesses who come together to gain knowledge about their illness, to learn coping skills and/or share their common experiences show improvements in both psychological and physical symptoms (Reibel et al., 2001). Quality of life benefits, such as reduced emotional distress, enhanced social adjustment, adaptive behavioural coping, symptom improvement, accrue from psychosocial interventions offered to patients (Anderson et al., 1994). The literature on the psychotherapeutic treatment of cancer patients provides evidence for a positive systematic improvement in mood, coping, adjustment and overall quality of life (Fawzy, Fawzy, Arndt, & Pasnau, 1995).

The traditional role of cancer support groups is to provide basic information about cancer and its treatment, to teach coping mechanisms and to offer emotional / social support for participants (Coward, 1998). Group therapy often incorporates cognitive, behavioural, and supportive-expressive components (Carlson et al., 2001). Many group psychotherapies that have shown promise in improving adjustment encourage open expression of emotion and assertiveness in assuming control over the course of treatment, life decisions, and relationships (Spiegel, 1999). Goals include helping members learn about themselves in relation to cancer and buffering their stress by offering a safe atmosphere in which they can discuss difficult decisions and talk with others experiencing similar life changes (Fobair, 1997B; Iacovino & Reesor, 1997).

Interventions centred around coping skills help patients gain information about their illness and accompanying stressful reactions to treatment while learning how to maintain health-related habits (Iacovino & Reesor, 1997). Methods of promoting relaxation to regulate arousal and reduce distress, including various forms of meditation, are of demonstrated utility across a spectrum of healthcare concerns (Speca et al., 2000). There is considerable evidence that regular use of some form of deep relaxation lowers general levels of body tension (Malec et al., 2000). A result of regular relaxation practice is a lower baseline tension level and subsequently a reduction in the intensity of ones stress reactions (Meaney, 2001; Malec et al., 2000).

Patients who participate in psychosocial interventions receive a great deal of social support from their participation in groups (Spiegel, 1999; Fawzy et al., 1993; Spiegel et. al., 1981). Social relationships buffer individual perceptions of stressors, provide resources to modify the environmental demand, and help manage individual affective responses (Roberts, Cox, Shannon, & Wells, 1994). Sharing a similar diagnosis creates a sense of community that alleviates the deep sense of isolation so commonly experienced by patients with cancer (Spiegel et al., 1981). These group settings empower patients by providing a sense of connection and shared meaning (Lang & Patt, 1994). By listening to and observing one another, patients share in the discovery of solutions to common dilemmas and thus increase their repertoire of effective coping skills (Spiegel et al., 1981).

Practical and emotional support are found to be positively related with good adjustment outcome in coping with breast cancer (Bleiker et al., 2000). For some women, involvement in a support group is a mechanism for learning how to receive care and attention from others. Care giving has been the primary life role for many women; accepting their own need for help and concern can be stressful. As women share their experiences with others in a group, they learn a mutuality of accepting and providing support that will help them better manage the impact of illness in their lives (Coward, 1998).

The most effective group strategies involve accepting cancer as a diagnosis and facing the problems related to cancer directly (Nezu et al., 1999). Sympathetic and direct confrontations with issues are seen as necessary, as is finding meaning in the midst of distressing situations. Patients establish meaningful social support, confront fears, express their emotions, seek control over what can be improved, and let go of what cannot be controlled (Spira, 1998). Handled well, such confrontation enhances patients' abilities to cope, manage symptoms better, and reorder priorities in life (Spiegel, 2001).

This chapter has discussed the stresses associated with cancer, the ways in which patients can reduce stress, cultivate better illness knowledge, better sense of meaning of life, and fewer problems with medical treatment. Chapter Two: Mindfulness-Based Stress Reduction

This chapter will explore the relationship between meditation and stress reduction in the psycho-oncology field. The following topics will be covered: what meditation is, the relationship between meditation and stress reduction, how meditation differs from relaxation, cognitive and behavioural therapies and an overview of how the MBSR program is implemented for patients with cancer diagnoses.

The concept of mindfulness has its roots in Buddhist spiritual traditions, where the experience of conscious awareness is actively cultivated. Mindfulness meditation is historically derived from the Theravada Buddhist tradition, commonly practised in Sri Lanka, Thailand, Myanmar, Laos and Cambodia as well as parts of India, Southern China, Vietnam, Malaysia and Indonesia. Meditation in the Theravada Buddhist tradition can be subdivided into two groups: samatha meditation, or concentration meditation; and vipassana, or mindfulness meditation. In concentration meditation an object is focused on to the exclusion of all else. This object can be either a physical object or a syllable or phrase chanted aloud or silently. In mindfulness meditation there is also a type of concentration present, in that the meditator stays focused on the breath. In addition, the meditator also attends to other thoughts, feelings and sensations as they arise. It is felt by some (Kabat-Zinn, 1990) that mindfulness meditation includes concentration and as such is a more complete meditation path.

Mindfulness is the systematic development of the basic human capacity to attend intentionally to events in the field of consciousness. It is an innate trait that can be developed and is applicable within a wide range of perceptual, cognitive and behavioural contexts (Kabat-Zinn, Lipworth, & Burney, 1985). The practitioner of mindfulness meditation develops awareness in the present moment of all that is happening, without judging or evaluating the experience (Speca et al., 2000). The practice itself grounds the practitioner in alternative ways of seeing and responding, moment by moment (Kabat-Zinn, 1990). As individuals continue to practice they find mindfulness meditation to be an inner resource they can draw on in all aspects of their lives.

The Relationship between Meditation and Stress Reduction

Awareness is the critical element in learning how to free ourselves from stress reactions (Kabat-Zinn, 1990). The most important step in breaking free from stress reactivity is to be mindful of what is actually happening while it is happening. This allows us to see our life situation more clearly and to influence the level of stress associated with our habitual reactions in difficult situations. By becoming conscious of our options in stressful situations and by being mindful of the relevance and effectiveness of our responses to those situations, we may be able to exert considerable control over our experiences of stress (Kabat-Zinn, 1990). Awareness may also temper the intensity of the arousal, either reducing arousal at the time or helping us to recover more quickly afterwards (Kabat-Zinn, 1990). Greater resilience in the face of stressors and reduced stress reactivity are characteristic of people who practice meditation regularly (Kabat-Zinn, 1990).

Responding to stress requires moment to moment awareness, taking each moment as it comes. Only through regular practise is the individual's awareness reliable enough to assist in responding to stressors. The capacity to respond mindfully develops during meditation practice (Kabat-Zinn, 1990). Through the repeated experience of recognising the patterns of one's mental processes, the patient realises their role as writer-director of inner dramas and discovers an element of choice in the perception of reality. Subsequently, the patient is less at the mercy of mental responses and is therefore less stereotyped in reactions and behaviour (Kutz, Borysenko, & Benson, 1985). Within this scope of practice patients begin to hold their unique constellations of thoughts and experiences in new ways, leading their minds back from theories and abstractions to actual experiences in the here-and-now (Epstein, 1999).

How Meditation Differs from Relaxation, Cognitive and Behavioural Therapies

The meditative approach shares some attributes with relaxation, cognitive and behavioural therapeutic approaches, but differs structurally and theoretically from them in a number of noteworthy respects (Kabat-Zinn, Massion, Kristeller, Peterson, Fletcher, & Pbert et. al., 1992). Meditative and cognitive behavioural approaches share an emphasis on noting sensations and thoughts without viewing them as catastrophic and the use of stress-inducing situations as cues to engage in new behaviours. Mindfulness shares with cognitive therapy the perspective that perception and thought drive emotion and behaviour, that if one changes their relationship to thought they can change deeply ingrained maladaptive patterns of behaviour (Miller, Fletcher, & Kabat-Zinn, 1995).

In mindfulness training there is no attempt at systematic desensitisation. When negative experiences arise, clients are encouraged to see them as opportunities to engage in mindful coping strategies (Kabat-Zinn et al., 1992). The emphasis is on developing "generic" strategies for coping with stress, rather than techniques for coping with specific problems (Kabat-Zinn et al., 1992). The mindfulness approach also does not try to substitute one thought pattern for another. Rather than focus on the irrationality or maladaptive nature of a given cognition, as in cognitive therapy, the client is encouraged to become aware of how realities are created and the potential consequences of these constructions. The emphasis is on identifying thoughts as 'just' thoughts and acknowledging the potential inaccuracy and limits of all thought (Kabat-Zinn et al., 1992). The mindfulness approach emphasises meditation as an alternative way of relating to moment-to-moment experience and thus more as a "way of being" rather than as a "technique" in the narrow and usual therapeutic sense of coping (Miller et al., 1995).

Meditation is commonly but erroneously thought of as a technique that aims at achieving a specific, highly pleasant "meditative state". However, there exists no single "meditative state" the meditator is trying to achieve: pleasant, unpleasant and neutral feeling states all arise during meditation. In mindfulness meditation, there is no attempt to achieve any objective other than moment-to-moment attention. "Meditation involves facing and accepting the totality of one's experience as it is, rather than forced or mechanical attempts to achieve particular ends, even relaxation, insight, or greater wellbeing" (Kabat-Zinn, Massion, Hebert, & Rosenbaum, 1998, p. 771). The only goal is the cognitive process of observation itself. All other effects, including beneficial ones like symptom reduction, are considered by products not central to the process of selfobservation (Kutz et al., 1985).

Mindfulness-Based Stress Reduction (MBSR)

Much of the current work using mindfulness meditation as a therapeutic intervention comes from or is inspired by the Stress Reduction Clinic at the University of

Massachusetts Medical Centre and the work of Kabat-Zinn (1990). Trained as a Biochemist and a long-time meditation and yoga practitioner, Kabat-Zinn felt there must be other ways to treat patients with chronic illness other than traditional medical interventions. Kabat-Zinn integrated mindfulness meditation and gentle hatha yoga into a secular program that could be taught to people with no previous meditation experience facing severe and long lasting health issues (Kabat-Zinn, 1990). The MBSR program has spread since it's initial inception at the University of Massachusetts in 1979 and there are currently over 240 such programs throughout North America (Moore, 1998).

MBSR Structure

The MBSR program is an 8-week program offered in a skill-based psychoeducational format with mixed groups of up to 20 people. Patients are educated about the psychophysiology of stress and provided with ways of approaching life's challenges using mindfulness skills. Kabat-Zinn describes MBSR as, "A well-defined and systematic patient-centred educational approach which uses relatively intensive training in mindfulness meditation as the core of a program to teach people how to take better care of themselves and live healthier, more adaptive lives." (Kabat-Zinn, 1996, p. 163). Formal practices consist of sitting meditation, body scan, mindful hatha yoga and walking meditation. Informal practice consists of mindfulness in everyday life, including awareness of pleasant and unpleasant events and deliberate awareness of routine activities such as eating, bathing and interpersonal communication (Kabat-Zinn & Santorelli, 1999). Group processes focus on practical day-to-day applications of mindfulness, problem solving related to impediments to effective practice, and supportive interaction between group members (Speca et al., 2000).

MBSR Goals

Implicit in many approaches to the enhancement of psychological wellbeing is the importance of becoming aware of one's cognitive, emotional, interpersonal, and social circumstances. Through the practice of mindfulness MBSR programs provide a means by which clients monitor and regulate their own arousal and hence face and evaluate their problems with greater emotional equilibrium (Speca et al., 2000). The MBSR program seeks to facilitate patients' increased awareness of their propensity to analyse, evaluate and project into the future. The program's goal is to shift attention back to direct and immediate perception of ongoing experience (Carlson et al., 2001). Patients strive to develop skills to focus on the task at hand and, as a result, become less confused, less anxious, and more effective (Kabat-Zinn, 1990).

Meditation provides a powerful psychological framework and specific methods for coming to terms with one's personal situation in ways that provide comfort, meaning, and direction in times of high stress and uncertainty. Patients are introduced to the idea it is possible to have pleasant moments in spite of being in crisis or in pain (Kabat-Zinn, 1990). The MBSR program suggests responding mindfully to change and loss will make a difference in the perception of stressful events, having cancer become an event rather than the defining characteristic of the patient (Coker, 1999). In the process, meditation can help individuals mobilise the full range of inner and outer resources available to them. MBSR programs can evoke a greater commitment and sense of partnership in patients undergoing medical procedures and treatments, and foster a greater sense of engagement in life (Kabat-Zinn et al., 1998).

MBSR Underlying Assumptions

The psychological factor most frequently reported to affect disease outcome in cancer patients is coping style (Greer, 1999; Fawzy, Fawzy, Hyun, Guthrie, Fahey, & Morton, 1993). Being diagnosed with cancer and the accompanying implicit life threat undermine strategies that rely excessively on future-oriented, goal-directed behaviours as a source of purposefulness and meaning in life. "Avoidance and distraction in the face of serious life threat is draining: it isolates one from others, makes it harder to manage the inevitable painful emotions that accompany serious disease and arduous treatment, and makes it difficult to plan additional means of coping" (Spiegel, 2001, p. 287). As there is evidence positive emotional factors can enhance healing, a diagnosis of cancer can be a time for mobilising an optimistic, engaged perspective and for working at being less susceptible to the pull of pessimistic, helpless, and ambivalent mind states (Kabat-Zinn et al., 1998).

The mindfulness-based approach to therapy is based on the belief everyone has an innate level of awareness that can be expanded upon. The practice of mindfulness encourages a willingness to look deeply into all emotional states and life circumstances that arise, even highly aversive and frightening ones, simply because they are already present and a part of one's experience. "From the meditative perspective, any situation, even cancer, can become one's teacher. In illness, a willingness to look and listen to the actuality of one's lived experience can significantly transform its meaning" (Kabat-Zinn et al., 1998, p. 770). Patients, in their capacity to bear witness to events that constitute their lives, have a large say in determining what life's potential outcomes may be.

The emphasis on self-observation and self-responsibility can enhance realisations of self-worth and help people to perceive conditioned patterns of behaviour more clearly (Kabat-Zinn et al., 1985). It is in this context that MBSR can assume an especially meaningful role for cancer patients. "An inward orientation toward one's experience can be extremely valuable in charting a course of action. Meditation practice can be extremely useful as a complement to medical care, psychotherapy, and social support from family and friends" (Kabat-Zinn et al., 1998, p. 767). This ability to deal with real-life issues enhances patients' coping strategies and reduces their sense of isolation and helplessness (Spiegel, 1999).

MBSR Patient Selection and Contraindications

Meditation practice is a rigorous and demanding discipline, calling on the practitioner to devote time on a daily basis to its formal practice, as well as to the equally challenging task of bringing the practice into everyday life. Learning meditation under crisis conditions may be difficult and is not always advisable. The timing and the context in which meditation is offered are extremely important to maximise the receptivity of people in crisis who might benefit from its practice. The provider and patient need to explore together the appropriateness of such a suggestion, the degree of involvement it might require, and the potential benefits and costs associated with such an approach. Meditation may be most helpful when treatments have ended and the person is attempting to return to normal activities as a "survivor" and to change lifestyle to promote health and reduce the risk of recurrence (Kabat-Zinn et al., 1998).

Developing a screening protocol for potential program participants is of extreme importance in MBSR, as participation can significantly increase stress levels for some individuals (Miller, 1993). Kabat-Zinn elaborates further, stating, "Things may seem like they are getting worse rather than better at first as one begins to pay a higher degree of attention to unpleasant and potentially anxiety-filled experiences and moments. This requires a commitment to face and "be with" one's problems rather than to deny them or emotionally distance oneself from them." (Kabat-Zinn, 1996, p. 168). Prospective participants in MBSR programs should be informed of these risks, and a formal risk/benefit discussion should be part of any screening interview for MBSR programs (Miller, 1993). Populations of individuals at risk during MBSR interventions include those with a history of psychosis, severe personality disorders, significant recent loss, severe depression, or a history of physical or sexual abuse (Miller, 1993).

Role of MBSR Facilitator

The efficacy of MBSR instruction is based around the therapist's personal practice. Effective teaching of meditation can be done only by people deeply committed to their own personal meditation practice, so that patients are not asked to do something the instructor does not actually do and understand through direct personal experience (Kabat-Zinn et al., 1998). Roth and Creaser relate, "It is only through weaving a meditation practice into the fabric of one's life and experiencing how it informs both the joys and sorrows of life that a health care professional is able to teach meditation to patients in a truly authentic way." (Roth & Creaser, 1997, p. 171).

In designing a MBSR program for a given population, course content and structure are altered to reflect the life trajectories of the participants (Roth & Creaser, 1997). The adjustment requires a degree of sensitivity to the lived experience of each participant, "its relevance to treatment and outcome, and its value in mobilising the inner resources of the patient for healing and coping" (Salmon et al., 1998, p. 264). The acceptability of an MBSR program depends on the instructor's familiarity with the patient population, and the skill with which the instructor presents mindfulness and its applicability to the lives of participants (Roth & Creaser, 1997). Providing an MBSR intervention in a psychosocial oncology setting also requires familiarity with the special issues involved in psychotherapy with cancer patients including types of neoplasms, stages of disease, and treatments available for each type of cancer (Sourkes, Massie, & Holland, 1998).

Within a coping skills format the therapist serves as a guide. The best facilitator is usually one who can gently introduce new ideas within the context of the patient's relevant experience (Spira, 1998). The attention and skill of the facilitator are directed towards listening to the insights and examples provided by patients and then using these experiences as a starting point for "weaving" more didactic material into the structure and fabric of each class (Kabat-Zinn, 1996). Facilitators provide encouragement as group members re-examine their values and personal goals and establish priorities congruent with their immediate situation (Fobair, 1997).

Within the context of MBSR primary emphasis is placed on equity in the counselling relationship. As such, "Classes are instructed in such a way that energy, expertise, and

creativity are identified as residing in all individuals, and are not the exclusive domain of the instructor." (Salmon et al., 1998, p. 264). Each client's own private strategies are examined and cultivated, rather than imposing the therapist's choice of method (Kabat-Zinn et al., 1985). Community within the group unfolds out of practice, discussion and silence. The facilitator highlights mind-body connections, patterns, and what participants observe and learn about themselves. Emphasis is placed on living more fully in each moment, and garnering supportive experiences from others regarding ways to handle the stresses faced in coping with life as a cancer patient (Spira, 1998).

MBSR Process Issues

MBSR utilises sound educational principles, presenting program information within the context of patient's lives (Spira, 1998). This provides clients with a process of selfexamination stemming from their own expertise, without having to appeal to an ideological or cultural shift in perspective (Kabat-Zinn & Santorelli, 1999). The teaching of a variety of different meditation-based techniques also increases the probability patients will find at least one technique congruent with their needs. Participants are encouraged to adapt techniques to their own specific life circumstances, in collaboration with program staff (Kabat-Zinn & Chapman-Waldrop, 1998).

In MBSR one works with the body, breath, and mind and their accompanying physiological, psychological, affective, and spiritual states. This leads to a participatory learning environment, in which the fundamental constituents of what it is to be human are cultivated directly by the patient according to her or his own innate capacities. "Breathing and just sitting quietly are within the capabilities of virtually all persons, despite the fact that internal associative mind states vary widely from one individual to the next" (Salmon et al., 1998, p. 264). Within this context of practice clients are free to access their own inner resources for learning, growing and healing (Kabat-Zinn, 1996).

The MBSR model provides a process in which each individual's specific constellation of characteristics is valued and utilised by the client in their entirety and worked with in a participatory therapeutic environment (Kabat-Zinn et al., 1985). This is an, "Ongoing, dynamic process in which the patient's self-monitoring, self-exploration, and deepening self-knowledge, interact with treatment directives, structure, and methods to facilitate potential positive changes in health and overall adaptation." (Salmon et al., 1998, p. 264). This enhances patients' sense of control during the struggle with illness and helps bring a better resolution to the practical problems being faced (Sourkes et al., 1998).

MBSR Outcomes

Through engaging in MBSR programs, patients, "acquire and practice a set of interrelated skills with mindfulness meditation at its core, which effectively alleviates their distress within a practical clinical setting." (Speca et al., 2000, p. 620). Meditation in this framework is practised as a 'way of being' rather than as a technique. It emphasises bringing mindfulness to all aspects of life experience, including physical illness, emotional turbulence, and the activities of everyday living (Kabat-Zinn et al., 1998). Patients in MBSR programs have had great success in preventing psychological deterioration, promoting affective improvement and a greater ability to centre and clarify their thoughts, feelings, and behaviours. MBSR programs allow patients to harness their experiences of unpleasant events, enabling them to develop a sense of greater control in
the face of life's difficulties (Kabat-Zinn, 1990). As part of the MBSR group, individuals have an opportunity to express personal feelings about their illness and share experiences regarding meditation practice. This discussion helps patients focus on the issues and feelings they face in the moment. These moments of clarity, identification, and connection are part of the healing process MBSR offers cancer patients.

The use of meditation in conjunction with medical interventions is increasingly embraced by both recipients of healthcare and its' providers (Brennan & Stevens, 1998). Patients with chronic medical conditions who participate in MBSR are able to effect positive changes in their physical and mental health status, presumably the result of an increased ability to cope with stress, pain, and illness (Reibel et al., 2001). These findings concur with research findings that suggest psychosocial interventions help foster improved health habits and enhance coping (Petersson, Berglund, Brodin, Glimelius, & Sjoden, 2000; Spiegel, 1999; Coward, 1998; Levenson & Bernis, 1991). The health promotion effects of MBSR appear to complement conventional biomedical treatment in a comprehensive, patient-centred approach to healing and alleviation of human suffering (Reibel et al., 2001). The growing presence of MBSR programs in clinical settings attests to the practical benefits of meditation training and is an increasingly practical referral option for health providers (Kabat-Zinn et al., 1998).

This chapter provides one of the first attempts to outline how MBSR can successfully be utilised to reduce stress within a cancer population. Emphasis is placed on merging current psychosocial theories of cancer treatment with existing MBSR process literature.

Chapter Three: Literature on the Efficacy of MBSR

This chapter explores clinical research over the past 20 years using the MBSR model. The following clinical populations have been studied: chronic pain, fibromyalgia, anxiety and panic disorders, psoriasis, depression, heterogeneous patient populations and symptoms of stress and mood in cancer patients.

MBSR Research with Clinical Populations

Some of the strongest evidence for the effects of stress reduction emerge from studies with meditation (Meaney, 2001). There has been a growth of clinical treatment and wellness programs based on meditation and yoga modelled after the MBSR program of Kabat-Zinn and colleagues at the Stress Reduction Clinic of the University of Massachusetts Medical Centre (Kabat-Zinn, 1990). The body of research investigating MBSR's efficacy for the treatment of health problems is growing. These mindfulnessbased programs have shown some effectiveness as adjunct treatment in trials involving patients suffering from many medical conditions. Miller, Fletcher, and Kabat-Zinn (1995) report training in the practice of mindful awareness is related to positive psychological and physical well-being outcomes in clinical populations.

The MBSR model, in many cases modified to be specific to each illness, has been used in the treatment of a variety of disorders including chronic pain (Kabat-Zinn, Lipworth, Burney, & Sellers, 1987; Kabat-Zinn, Lipworth & Burney, 1985; Kabat-Zinn, 1982), fibromyalgia (Kaplan, Goldenberg, & Galvin-Nadeau, 1993), anxiety and panic disorders (Kabat-Zinn, Chapman, & Salmon, 1997; Miller, Fletcher, & Kabat-Zinn, 1995; Kabat-Zinn, Massion, Kristeller, Peterson, Fletcher, & Pbert et al., 1992), psoriasis (Kabat-Zinn, Wheeler, Light, Skillings, Scharf, & Cropley et al., 1998; Bernhard, Kristeller, & Kabat-Zinn, 1988), depression (Teasdale, Segal, Williams, Ridgeway, Soulsby, & Lau, 2000; Williams, Teasdale, Segal & Soulsby, 2000), heterogeneous patient populations (Reibel, Greeson, Brainard, & Rosenzweig, 2001; Kabat-Zinn & Chapman-Waldrop, 1988) and mood and symptoms of stress in cancer outpatients (Carlson et al., 2001; Speca et al., 2000). In each instance, mindfulness meditation has been conceptualised as a form of stress management (Moore, 1998).

Bishop's 2002 literature review characterises MBSR as a clinical program, developed to facilitate adaptation to medical illness through the provision of systematic training in mindfulness meditation as a self-regulatory approach to stress reduction. There has been widespread and growing use of this approach within medical settings and many claims have been made regarding its efficacy. Bishop cautions that published research in this area has been largely uncontrolled with methodological problems, including inappropriate or inadequate use of statistics, failure to control for concurrent treatments that might effect outcome variables, and arbitrary determination of clinical response. Although there is evidence suggesting a MBSR program is an effective approach, there is still a great deal we do not know about this treatment modality. More serious investigation is warranted and strongly recommended (Bishop, 2002).

Chronic Pain

Kabat-Zinn's initial 1982 study examined the practice of mindfulness meditation in a 10-week MBSR program to treat chronic pain patients. Patients were expected to meet once a week for 2 hours and to engage in a minimum of 45 minutes a day, 6 days a week

of meditation practice outside of class. Mindfulness meditation was hypothesised to facilitate detached observation, which appeared to cause an "uncoupling" of the physical experience of pain from patient's subjective reactions to pain and reduced the experience of suffering through addressing patients cognitions (Kabat-Zinn, 1982). Data were presented on 51 chronic pain patients who had not improved with traditional medical care. At 10 weeks patients showed statistically significant reductions in pain experience and intensity, as measured by the McGill-Melzak Pain Rating Index (PRI). Patients reported a greater ability to engage in ordinary life activities while in pain, as measured by the Table of Levels of Interference (TLI), prior to their participation in the program. Patients showed significant reductions in total mood disturbance, psychological symptomatology, and medical symptoms, as measured by the Profile of Mood States (POMS), Symptoms Checklist 90 Revised (SCL-90-R) and Medical Symptom Checklist (MSCL) respectively. These changes were relatively stable on follow-up at 2.5 and 7 months. This study lacked a matched comparison control group, making a rigorous interpretation of the role of meditation in treating chronic pain difficult. Based on these initial results, Kabat-Zinn posed this form of meditation as the basis for an effective behavioural program for chronic pain patients (Kabat-Zinn, 1982).

Kabat-Zinn, Lipworth, and Burney's follow-up 1985 study introduced a control group. 90 chronic pain patients were trained in mindfulness meditation in a 10-week MBSR program. At 10-weeks patients had reduced present-moment pain (PRI), inhibition of activity by pain (TLI), total mood disturbance (POMS), psychological symptomatology (SCL-R-90) and medical symptoms (MCSL). Pain-related drug utilisation decreased and activity levels and feelings of self-esteem increased. Improvement appeared to be independent of gender, source of referral and type of pain. A comparison group of pain patients did not show significant improvement on these measures. The improvements observed during the meditation training were maintained up to 15 months post-meditation training for all measures except present moment pain (PRI). The majority of subjects reported continued high compliance with the meditation practice as part of their daily lives. While this study did make comparisons with a control group, this control group was not randomised (Kabat-Zinn et al., 1985).

In Kabat-Zinn, Lipworth, Burney, and Sellers' 1987 study, 225 chronic pain patients were studied following mindfulness meditation training in a 10-week MBSR program. Large and significant overall improvements were recorded post-intervention in physical and psychological status. These gains were maintained at follow-up in the majority of subjects. Follow-up times ranged from 2.5-48 months. However, present moment pain (PRI) tended to revert to pre-intervention levels. Most subjects reported a high degree of adherence with meditation techniques, maintenance of improved status over time, and a high degree of importance attributed to the training program. Limitations of the study included lack of a non-treatment control group and reliance on self-report measures. The researchers concluded meditation training could have long-term benefit for chronic pain patients (Kabat-Zinn et al., 1987).

Fibromyalgia

Kaplan, Goldenberg and Galvin-Nadeau's 1993 study evaluated the effectiveness of a MBSR program on fibromyalgia, a chronic disease characterised by widespread pain, fatigue, sleep disturbance, and resistance to treatment. 77 patients meeting the 1990 criteria of the American College of Rheumatology for fibromyalgia took part in the 10week MBSR program. At 10 weeks statistically significant improvements in global wellbeing were reported, as measured by the Visual Analog Scales (VAS). Patients also improved on psychological and medical symptoms, as measured by the SCL-90-R and MSCL respectively. Additionally, patients achieved improvement in their perceived ability to control and decrease pain, as measured by the Coping Strategies Questionnaire (CSQ). Patients also improved in health status and functional disability, as measured by the Fibromyalgia Impact Questionnaire (FIQ). Limitations of this study included the lack of a control group for comparison purposes, the lack of follow-up data on patients completing the program and arbitrary determination of clinical response. Nevertheless, these preliminary findings suggested a MBSR program is effective for patients with fibromyalgia (Kaplan et al., 1993).

Anxiety and Panic Disorders

Kabat-Zinn, Massion, Kristeller, Peterson, Fletcher, Pbert, Lenderking, and Santorelli's 1992 study was designed to determine the effectiveness of an 8-week MBSR program for patients with anxiety disorders. The 22 study participants were screened with a structured clinical interview and found to meet the DSM III-R criteria for generalised anxiety disorder or panic disorder with or without agoraphobia. Patients improved pre- to post-intervention on measures of anxiety, as measured by the Hamilton Anxiety Scale (HAI) and Beck Anxiety Inventory (BAI), and depression, as measured by the Hamilton Depression Scale (HDI) and Beck Depression Inventory (BDI). These changes were maintained at the 3-month follow-up. The number of subjects experiencing panic symptoms was also substantially reduced. Limitations of this study included the small sample size and convenience sampling of the treatment group. It was concluded a group MBSR program could effectively reduce symptoms of anxiety and panic and help maintain these reductions in patients with generalised anxiety disorder or panic disorder, with or without agoraphobia. (Kabat-Zinn et al., 1992).

Miller, Fletcher and Kabat-Zinn (1995) conducted a follow-up study on the previous study of 22 medical patients with DSM III-R defined anxiety disorders. In this study, 3-year follow-up data were obtained and analysed on 18 of the original 22 subjects to probe long-term effects. Analysis showed maintenance on the gains obtained in the original study. Ongoing compliance with the meditation practice was also demonstrated in the majority of subjects at 3 years. Limitations of this study included a lack of a randomised control group, a control for concomitant treatment and a small sample size. The researchers concluded an intensive but time-limited group MBSR program could have long-term beneficial effects in the treatment of people diagnosed with anxiety disorders (Miller et al., 1995).

Kabat-Zinn, Chapman, and Salmon (1997) began investigating the impact of psychological characteristics in evaluating the relationship between cognitive/somatic response pattern for anxiety and preference for different relaxation techniques. This was an exploratory study of 135 medical patients referred for an 8-week MBSR program. Following intervention, patients rated how much they liked each of three techniques: sitting meditation, body scan meditation, and hatha yoga, which differed in primary cognitive/somatic orientation but shared the unifying attentional stance characteristic of mindfulness meditation (Kabat-Zinn et al., 1997). The high cognitive/low somatic anxiety subgroup showed a significant preference for the most somatic technique (hatha yoga) and least liked the most cognitive technique (sitting meditation). The high somatic/low cognitive anxiety subgroup showed the inverse response. The body scan, with both cognitive and somatic qualities, was preferred to an intermediate degree by both groups. Each subgroup, taken as a whole, most liked the technique that focused primarily on objects of attention that differed most from their dominant mode of anxiety expression. Irrespective of an individual's mode of anxiety expression or technique preference, patients reduced both their cognitive and somatic anxiety, as measured by the SCL-90-R. The apparent beneficial effects of this program for the majority of patients may have been attributable to a generalised rather than a technique specific effect of mindfulness practice, emphasising cultivation of relaxed attentiveness. Limitations of this study included small subgroup sample size and lack of strong operational definitions for cognitive and somatic groups (Kabat-Zinn et al., 1997).

Psoriasis

Bernhard, Kristeller and Kabat-Zinn conducted a pilot study in 1988 to determine whether psoriasis patients actively engaged in practising stress reduction techniques during ultraviolet treatment would achieve more rapid clearing of lesions than patients receiving the same treatment without practising these techniques. In a randomised study patients about to commence conventional phototherapy (UVB) or photochemotherapy (PUVA) treatment were assigned to either of two treatment conditions: tape or no-tape. Clinic nurses recorded a "turning point" when improvement in psoriasis could first be detected, a "halfway point" when patients had only about half the amount of psoriasis they started with, and a "clearing point" when less than about 5% of the patient's original amount of psoriasis remained (Bernhard et al., 1988). 12 patients entered the study and completed the protocol. 8 patients were randomised to receive the tape intervention and four underwent conventional treatment without the tape. Comparison of the two treatment groups showed that the turning point for the group who practised the relaxation/visualisation techniques in conjunction with their UVB or PUVA treatments occurred significantly earlier than it did for the group who did not receive the tape. Clearing was achieved earlier as well. Limitations of this study include the small sample size and the disproportionate sampling method (Bernhard et al., 1988).

Kabat-Zinn, Wheeler, Light, Skillings, Scharf, Cropley, Hosmer and Bernhard's 1998 study further tested the hypothesis that stress reduction methods based on mindfulness meditation can positively influence the rate at which psoriasis clears in patients undergoing UVB or PUVA treatment. 37 patients with psoriasis about to undergo UVB or PUVA treatment were randomly assigned to one of two conditions: a MBSR intervention guided by audiotaped instructions during light treatments, or a control condition consisting of the light treatment alone with no taped instructions. Psoriasis status was assessed in three ways: direct inspection by unblinded clinical nurses; direct inspection by physicians blinded to the patient's study condition (tape or no-tape); and blinded physician evaluation of photographs of psoriasis lesions. Four sequential indicators of skin status were monitored during the study: a "first response point", a "turning point", a "halfway point", and a "clearing point". Subjects in the tape groups reached the halfway point and the clearing point significantly more rapidly than those in the no-tape condition, for both UVB and PUVA treatments. The results suggest the rate of skin clearing in patients with moderate to severe psoriasis can be accelerated when subjects engage in an audiotape-guided, meditative stress reduction exercise during their UVB or PUVA treatment sessions (Kabat-Zinn, 1998).

Depression

Teadale, Williams, Soulsby, Segal, Ridgeway and Lau (2000) evaluated a mindfulness-based group intervention designed to train recurrently depressed patients to disengage from thinking that might mediate relapse/recurrence. 145 recurrently depressed patients were randomised to continue treatment as usual under the care of a family doctor or, in addition, to receive an 8-week mindfulness-based program. Relapse/recurrence of major depression was assessed over a 60-week study period. For patients with three or more previous episodes of depression (77% of the sample), the program significantly reduced relapse/recurrence, as measured by the Hamilton Rating Scale for Depression (HRSD) and the BDI. For patients with only two previous episodes, the program did not reduce relapse/recurrence. The researchers concluded mindfulness-based programs offer a promising cost-efficient psychological approach to preventing relapse/recurrence in recovered, recurrently depressed patients (Teasdale et al., 2000).

Williams, Segal, Teasdale and Soulsby's (2000) second study investigated whether autobiographical memory could be affected by an MBSR intervention. Previous research on depressed and suicidal patients and those with post-traumatic stress disorder has shown that patient's memory for the past is overgeneral (i.e., patients retrieve generic summaries of past events rather than specific events). Recovered depressed patients were randomly selected to receive either treatment as usual under the care of family doctor or an eight-week MBSR program designed to reduce risk of relapse. Whereas control patients showed no change in specificity in memories in response to cue words, the MBSR treatment group showed a significantly reduced number of generic memories, as measured by the HRSD and Autobiographical Memory Test (AMT). The researchers concluded that when recovered depressed patients undergo training that includes instructions to focus carefully on everyday events and allow cognitions to occur without trying to suppress them, the tendency to retrieve events in categoric style is reduced. (Williams et al., 2000).

Heterogeneous Patient Populations

Kabat-Zinn and Chapman-Waldrop's 1988 study measured compliance rates for medical patients with a variety of diagnoses physician-referred to an 8-week MBSR program. 784 consecutive referred patients who enrolled in the program over a 2-year period were studied. Of these, 598 (76%) completed the program and 186 (24%) did not. Among chronic pain patients, only sex discriminated between completers and noncompleters, with females more than twice as likely to complete the program as males. Limitations of this study included lack of patient referral criteria (Kabat-Zinn & Chapman-Waldrop, 1988).

Reibel, Greeson, Brainard and Rosenzwig's 2001 study examined the effects of an MBSR program on health-related quality of life and physical and psychological symptomology in a heterogeneous patient population. 136 patients participated in an 8week MBSR program and were required to practice 20 minutes of meditation daily. Health related quality of life was enhanced as demonstrated by improvement in vitality, bodily pain, and role limitations caused by physical health and social functioning, as measured by the Short-Form Health Survey (SF-36). Alleviation of psychological and physical symptoms was also reported, as measured by the SCL-R-90 and MSCL respectively. One-year follow-up revealed maintenance of initial improvements on several outcome parameters. Limits of this study included the lack of a control group and non-randomised patient selection. The researchers concluded a group mindfulness meditation training program could enhance functional status and well-being and reduce psychological distress and physical symptoms in a heterogeneous patient population with various chronic health problems (Reibel et al., 2001).

Symptoms of Stress and Mood in Cancer Outpatients

The objective of Speca, Carlson, Goodey, and Angen's 2000 study was to assess the effects of participation in a MBSR program on symptoms of stress and mood disturbance in cancer outpatients. A convenience sample of eligible cancer patients were randomly assigned to either an immediate treatment condition or a waitlist control condition. All patients completed the Symptoms of Stress Inventory (SOSI) and POMS both before and after the intervention. The intervention consisted of a weekly meditation group lasting 1.5 hours for 7 weeks plus home meditation practice. 90 patients (mean age, 51 years) completed the study. The group was heterogeneous in type and stage of cancer. Patient's mean pre-intervention scores on dependent measures were equivalent between groups.

After the intervention, patients in the treatment group had fewer overall symptoms of stress; fewer cardiopulmonary and gastrointestinal symptoms, less emotional

irritability, depression and cognitive disorganisation; and fewer habitual patterns of stress, as measured by the SOSI. The treatment group also had significantly lower scores on total mood disturbance and subscales of depression, anxiety, anger, and confusion and more vigour than control subjects, as measured by the POMS. Overall reduction in symptoms of stress was 31% with a 65% reduction in total mood disturbance, as measured by the SOSI and POMS respectively. These results provide evidence that a relatively brief MBSR program can effectively reduce stress symptoms and mood disturbance in both male and female patients with a wide variety of cancer diagnoses, stages of illness, and ages (Speca et al., 2000).

The goal of Carlson, Ursuliak, Goodey, Angen and Speca's (2001) follow-up study was to assess the effects of participation in a MBSR program on symptoms of stress and mood disturbance in cancer outpatients both immediately and 6 months after program completion. A convenience sample of eligible cancer patients was enrolled after they had given informed consent. All patients completed the SOSI and POMS both before and after the intervention and six months later. A total of 89 patients (mean age 51 years) provided pre-intervention data. 80 patients provided post-intervention data, and 54 completed the 6-month follow-up. Patients' scores decreased significantly from pre to post intervention on SOSI (22%) and POMS (47%) total scores and most subscales, indicating fewer symptoms of stress and less mood disturbance. These improvements were maintained at the six-month follow-up. Female gender and more education were associated with higher initial SOSI scores. More education and greater initial mood disturbance predicted improvements on the SOSI. More advanced stages of cancer were associated with less initial mood disturbance, while more home practice and higher initial POMS scores predicted improvements on the POMS between the pre-and postintervention scores. This program was effective in decreasing stress symptoms and mood disturbance for up to 6 months in both male and female patients with a wide variety of cancer diagnoses, stages of illness, educational backgrounds, and disparate ages (Carlson et al., 2001).

This chapter confirms Bishop's (2002) concern regarding the lack of scientific rigour in previous MBSR studies. However, it also demonstrates the wide-ranging utility of this intervention with a host of clinical patient populations.

Chapter Four: Current Study

The Tom Baker Cancer Centre Department of Psychosocial Resources' two previous studies on the effects of a MBSR program on mood and symptoms of stress focused on a heterogeneous cancer population, with a wide variety of diagnoses and stages of illness (Carlson et al., 2001; Speca et al., 2000). The overall objective of the current project was to determine whether a MBSR group psychosocial intervention had similar beneficial effects on mood and symptoms of stress in stage I and II breast cancer patients, who were three months post-treatment.

This project was part of a larger study, funded by the Canadian Breast Cancer Research Institute (CBCRI), examining the effects of a mindfulness meditation intervention on psychological parameters, quality of life and autonomic, endocrine and immune functioning in breast and prostate cancer patients. The project researcher initially became involved in the larger study as a Research Assistant for the Principle Investigator. He was also a participant-observer in the fourth and final cohort of the intervention. The researcher was responsible for data entry of all psychological outcome measures for both the early-stage breast and prostate cancer study subjects and conducted his own data analysis for the early-stage breast cancer sub-group.

The selection of breast cancer patients from the sample allowed for project sample homogeneity, some control of disease and treatment-related variables and reflected an increased focus within the research design (Gotay & Stern, 1995). By recruiting patients who were three months post-treatment the researcher hoped to respond to previous research indicating that support from the health care team diminishes post-treatment, as women are expected to return to normal activities (Edgar et al., 2000). The researcher hypothesised the use of MBSR, as a psychosocial resource, might be especially helpful to women during this time of transition.

The researcher was specifically interested four questions:

- 1. What types of patients chose to participate in this program (i.e., age, marital status, years of education, and cancer stage)?
- 2. What was the rate of completion of the program and compliance with data collection pre- and post-intervention?
- 3. Do scores on the Symptoms of Stress Inventory (SOSI) (Thompson, 1989), or Profile of Mood States (POMS) (McNair, Lorr, & Droppleman, 1992) change over the course of the program?
- 4. Is the amount of home practice of yoga / meditation / both or class attendance related to score changes in symptoms of stress (SOSI), or mood states (POMS) over the course of the program?

Methods

Participants

The research team's initial proposal included a Randomised Control Group. However, we were informed by the CBCRI the cost of autonomic, endocrine and immune functioning outcome measures precluded us from this larger sample, due to the expense involved. Subsequently, a convenience sample was used to enrol subjects in the study. Any patient having received a confirmed diagnosis of stage I or II breast cancer who was at least three months post-treatment was eligible to participate. There were 59 participants in the larger study: 10 prostate cancer patients and 49 breast cancer participants. Of the 49 breast cancer patients, one person did not complete the time 1 measures. 15 people did not complete the time 2 measures, and of these, six did not complete the intervention itself: four due to work demands and two due to scheduling difficulties. Of the other nine subjects who participated in the intervention but did not complete time two measures, six had problems with scheduling, as the assessments took place early in the morning. One had to work early mornings, and two had difficulties finding a drive to the centre at that time. As such, data from 33 individuals were available for pre-post analysis.

Instruments

The primary outcomes of symptoms of stress and mood were measured using the SOSI (Thompson, 1989) and POMS (McNair et al., 1992), which have been commonly used in MBSR research. Instruments created for this study included a form for recording the duration of each participant's daily meditation practice and a demographic data collection form.

Symptoms of stress inventory. The SOSI (Leckie &Thompson, 1979) was designed to measure physical, psychological, and behavioural responses to stressful situations. It is a 94-item inventory. The instrument provides a total stress score as well as 10 subscale scores including peripheral manifestations, cardiopulmonary symptoms, central-neurological symptoms, gastrointestinal symptoms, muscle tension, habitual patterns, depression, anxiety/fear, emotional irritability, and cognitive disorganisation. Higher scores indicate higher reported levels of stress symptoms.

Scores on subscales relating to emotional responses during stress are highly intercorrelated (r= .64 - .78). The indicators of physical symptoms tend to have lower

intercorrelations (r= .38 - .58). Evidence of concurrent validity exists in that the SOSI correlates highly with the Symptoms Checklist 90 (SCL-90), a measure of psychological distress(r= .82). The internal consistency for the total SOSI is .97 (Cronbach's Alpha). The total SOSI test-retest correlation is high (r= .83). Overall, there tends to be a consistency of client responses over time within most of the subscales (Thompson, 1989).

Profile of mood states. The POMS (McNair et al., 1992) is a widely used instrument in the study of psychological aspects of cancer. It is a 65-item five point Likert scale designed to assess fluctuating affective states over a one-week period. The instrument provides a total mood disturbance score as well as six factor-based subscale scores including tension-anxiety, depression-dejection, anger-hostility, vigour-activity, fatigue-inertia, and confusion-bewilderment. Higher scores indicate more mood disturbance, except on the vigour-activity subscale, where higher scores indicate more vigour.

The internal consistencies of the POMS are highly satisfactory, near .90 or above. The POMS also has acceptable test-retest reliability, (r= .65 - .74). The POMS has high levels of concurrent validity with related scales (Gotay & Stern, 1995; McNair et al., 1992). In addition normative data is available for cancer populations, including breast cancer (Gotay & Stern, 1995; McNair, et. al., 1992).

Procedure

In total, four different cohorts of 15 participants were run sequentially over the study duration. All participants were interviewed individually one week before the start of the intervention. Informed consent was obtained at that time and the baseline

psychometric assessment was completed (time 1). Demographic and disease data were collected and participants completed the SOSI and POMS. Throughout the duration of the intervention participants were required to complete a homework log that included what meditation techniques and how long they practised each day. All participants were reassessed after completing the program eight weeks later (time 2).

Intervention

Details of the intervention, including objectives, structure, components and content, for the Tom Baker Cancer Centre's existing two studies have previously been described (Speca et al., 2000). Briefly, The Tom Baker Cancer Centre's eight-week MBSR program was modelled on the MBSR program at the Stress Reduction Clinic at the Massachusetts Medical Centre as described by Kabat-Zinn (1990), and is offered in a structured educational group-based setting. Currently there are no local treatment protocols for the MBSR program developed at the Tom Baker Cancer Centre. Rather, program facilitators refer to Kabat-Zinn's *Full Catstrophe Living* (1990) and the *Mindfulness-Based Stress Reduction Professional Training Resource Manual* developed by Kabat-Zinn and Santorelli (1999).

The MBSR program at the Tom Baker Cancer Centre consisted of three components:

- 1. Theoretical material related to mindfulness, relaxation, meditation, yoga and mindbody connection.
- Experiential practice of meditation and yoga during group meetings and home-based
 practice.

3. Group processes focused on problem solving related to impediments to effective practice, practical day-to-day applications of mindfulness, and supportive interaction between group members (Speca, et. al., 2000).

A booklet was provided to patients containing information pertinent to each week's instruction, including a bibliography for those wishing to pursue relevant themes in greater depth, and an audio tape with a body-scan meditation on one side and a guided sitting meditation on the other (Carlson, et. al., 2001; Speca, et. al., 2000). The MBSR teaching staff consisted of two psychologists, a registered nurse, a clinical social worker and a M.Sc. student in Applied Psychology for the final cohort. All staff had training in the MBSR program model.

A week-by-week description of the program content follows:

Week 1. Introduction – Introductions and reasons for participation were shared. A rationale and overview of the intervention was presented. Participants were led through an exercise on relaxed breathing and guided awareness of bodily sensations while lying on the floor. Home practice and record keeping were explained (Speca et al., 2000)

Week 2. Mindfulness – Attitudes that serve as the bedrock of mindfulness meditation practice were introduced. These included, non-judging, patience, beginner's mind, trust, non-striving, acceptance, and letting go. Benefits of mindfulness meditation practice were also discussed. Patients were introduced to sitting mindfulness meditation practice and gentle yoga exercises (Speca et al., 2000).

Week 3. Mind-Body Connection – Group discussion and problem solving about home practice took place. Patients were asked to examine a list of symptoms of stress and check those that applied. The stress response was reviewed including the activation of the sympathetic and parasympathetic nervous system. This led to a discussion of psychoneuroimmunology (PNI) and the linkages between the central nervous system, immune system, and endocrine system. The process of mindfulness meditation was outlined and illustrated through a guided meditation exercise using breath awareness to anchor participants' attention. Mindful practice of gentle yoga continued in this and the remainder of the sessions (Speca et al., 2000).

Week 4. Balance in the Autonomic Nervous System – The reciprocal relationship between patterns of breathing and emotional responses were explored through breathing techniques derived from yogic practices. Participants also explored "mini" relaxation exercises they could use throughout the day. Participants were given a sleep exercise that varied the number of breaths while moving from a supine position, to sleeping on their left, then right side. Patients were encouraged to vary their home practice among the learned techniques (Speca et al., 2000).

Week 5. Attitudes and Coping – The relationship between cognition and emotion was explored. Mindfulness of thought processes was taught to allow interruption and modification of habitual stress-induced patterns of cognitive appraisal. The nature of cognitive distortions and irrational assumptions and beliefs were also explained (Burns, 1999). The tendency of the self to become identified with the contents of thought was highlighted and challenged. Homework included self-monitoring of cognitive appraisal associated with stressful experiences and to practice challenging limiting beliefs (Speca et al., 2000)

Week 6. Imagery – The self-monitoring assignment was reviewed, and problems encountered in application were addressed. Principles of visualisation and imagery as

adjuncts to meditative practices were taught. Focusing awareness on a chosen image (Mountain Meditation) during guided meditation was used as a means to strengthen concentration (Speca et al., 2000).

Weekend Silent Retreat – A rationale for the three-hour weekend silent retreat was provided. Participants engaged in a blend of sitting meditation, gentle hatha yoga, body scan, walking meditation, loving kindness meditation, discussion of the days events and a closing circle (Speca et al., 2000).

Week 7. Deepening and Expanding – The weekend silent retreat was discussed. Concepts around mindfulness of ongoing experience were introduced. A guided meditation was practised, which included shifting mindful awareness through modalities of hearing, touch, feeling and thinking. Yoga sun salutations were also introduced (Speca et al., 2000).

Week 8. Summary and Follow-up – Previously presented materials were reviewed and integrated, highlighting meditation as a means to access wellness in multiple domains of experience. Participants were charged with the task of developing their own plans for continued well being, using insights derived from the program. The nature of the intervention as a starting point rather than as a conclusion was reinforced. Resources in the community were discussed, and self-directed practice of mindfulness meditation and yoga were encouraged to be continued (Speca et al., 2000).

Data Analysis

All data analyses were conducted using the Statistical Package for the Social Sciences (SPSS), version 10.1, for the PC in Windows NT.

Demographic and medical history variables were described for the complete sample using frequency and descriptive statistics. The 15 patients with incomplete data were compared with the rest of the sample on all demographic, medical and psychological variables collected at baseline. Independent-samples *t* tests were performed on age, years of education, and the SOSI and POMS total and subscale scores, and chisquares were performed on marital-status and stage to determine whether there were differences between those who completed the time 2 assessment versus those who did not.

Total and subscale scores on the SOSI and POMS were analysed using pairedsamples *t* tests to compare scores of the 33 participants who completed both the pre- and post-intervention assessments. Change scores were calculated on the POMS and SOSI total and subscale scores by subtracting the pre-intervention score from the postintervention score. Thus, negative change scores indicated a decrease in symptoms, whereas positive scores were associated with increases in symptomatology. Pearson product-moment correlations were performed to investigate the relationships between change scores on the SOSI Total scale and POMS Total Mood Disturbance scale and Attendance, Home Yoga Practice, Home Meditation Practice and Total Home Practice (total home practice of meditation and yoga).

Secondary analysis was performed on Attendance, Home Yoga Practice, Home Meditation Practice, Total Home Practice, the SOSI Total scale and the POMS Total Mood Disturbance scale using independent samples *t*-tests to examine the impact of Stage (1 or 2), Marital Status (single/divorced or married/cohabiting), Age Median Split (under 52 of age or over 52 years of age), Education Median Split (under 14 years of education or over 14 years of education), Duration With Illness Median Split (under 1.05 years with illness or over 1.05 years with illness) and Total Home Practice Median Split (under 1560 minutes of practice or over 1560 minutes of practice) on scores at time 1, time 2 and change scores.

Results

Primary Analysis

Participants. Demographics for the participants at time one are presented in Table 1. The age of participants ranged from 32 to 87 years (mean age, 53 years). Of the 47 participants with complete demographic data 14 (29%) were single or divorced and 33 (67%) were married or cohabiting. In general participants were well educated, with a mean of 14 years of formal education. They had been diagnosed with cancer a median of 1.05 years previously. Of the 47 participants, 17 (35%) had stage I breast cancer and 30 (61%) had stage II breast cancer. 43 of 49 (88%) participants completed the intervention. This completion rate was similar to the Tom Baker Cancer Centre's two previous studies, in which 83% (Speca et al., 2000) and 90% (Carlson et al., 2001) of participants completed the MBSR intervention respectively.

The 15 breast cancer patients with incomplete data were compared on all demographic, medical, and psychological variables collected at baseline. Participants with complete data were more likely to be married or co-habitating rather than single, divorced or widowed (X^2 =3.90, p<0.05). This finding is consistent with research indicating that breast cancer patients who are not in a marital relationship, and consequently have less social support, are more vulnerable to psychological distress

(Kornblith, Herndon, Zuckerman, Viscoli, Horwitz, & Cooper et al., 2001; Gluhoski, Siegel, & Gorey, 1997). No other differences on demographic variables were found. Noncompleters also had higher scores than completers on the POMS depression-dejection subscale (t=2.71, p<0.01). Such differences are consistent with other research, which found cancer patients experiencing emotional distress appear less likely to comply with medical treatment regimens and to participate in research (Spiegel, 1996). No baseline differences on the SOSI were found.

Stress scores. Scores on the SOSI are presented in Table 2. Scores are only presented for the 33 patients who completed both the pre- and post-intervention questionnaires, upon which the paired samples t-tests were conducted. The mean SOSI Total score showed a statistically significant 22% reduction (t=3.40, p<0.01) in stress symptoms over the course of the intervention. Statistically significant reductions in pre- to post-intervention scores were observed in the following SOSI subscales; 23% reduction in Peripheral Manifestations (t=2.96, p<0.01), 18% reduction in Muscle Tension (t=3.07, p<0.01), 21% reduction in Habitual Patterns (t=3.26, p<0.01), 24% reduction in Depression (t=2.57, p<0.05), 25% reduction in Anxiety/Fear (t=3.09, p<0.01), 28% reduction in Cognitive Disorganisation (t=3.30, p<0.01). These reductions in symptoms of stress experienced by participants specific to each of these subscales.

Mood scores. Scores on the POMS are presented in Table 3. Scores are only presented for the 33 patients who completed both the pre- and post-intervention questionnaires, upon which the paired samples t-tests were conducted. There were no significant changes in any of the POMS scores over the course of the intervention. The

Total Mood Disturbance score at Time 1 was 20.00, which is already quite low, indicating minimal mood disturbance. These scores are consistent with mood scores reported by others for patients with cancer (Cassileth, Lusk, Brown, & Cross, 1985) but were dissimilar to two previous studies that utilised the MBSR intervention with a heterogeneous cancer population (Carlson et al., 2001; Speca et al., 2000).

Correlations. Upon analysis of the range of data on the questionnaires, it was found that several outliers existed for each variable, such that their scores were greater than two standard deviations from the mean score. Because outliers can have an extreme effect on the magnitude of correlations (Krathwohl, 1998), the researcher chose to eliminate those scores for each variable that were greater than two standard deviations from the mean in either direction. Correlations were then performed on the remaining data. This process involved removal of data for one individual on the SOSI, three individuals on the POMS, two individuals in Home Yoga Practice, one individual in Home Meditation Practice, and two individuals in Total Home Practice. For Attendance scores, applying the same principle, with a mean attendance of just over seven sessions and a standard deviation of two sessions, this resulted in elimination of individuals who attended three or fewer sessions. Therefore, attendance data was excluded for six participants, however, only two of these six provided time two data and had change score data available.

Correlations for the SOSI Total change score, POMS Total Mood Disturbance change score, Attendance, Home Yoga Practice, Home Meditation Practice and Total Home Practice are presented in Table 4. Attendance and Total Home Practice were positively correlated (r=.41, p<.01), suggesting those who attended more classes also practised more at home. Interestingly, Attendance and the SOSI Total change score were positively correlated (r=.43, p<.05), suggesting those who reported increased attendance also reported increased symptoms of stress. Total Home Practice and the SOSI Total Change score were positively correlated (r=.45, p<.05), suggesting those who reported increased total home practice also reported increased symptoms of stress. Home Yoga Practice and the SOSI Total change score were also positively correlated (r=.46, p<.01), suggesting those who reported increased home yoga practice reported increased symptoms of stress.

Secondary Analysis

The positive correlations between increased symptoms of stress and attendance, total home practice and home yoga practice were unexpected. Secondary analyses were performed using independent samples *t*-tests to examine the impact of stage, marital status, age, education, duration with illness and total home practice on SOSI Total and POMS Total Mood Disturbance scores at time 1, time 2 and change scores. No significant findings were found accounting for the impact of stage, marital status, age, or education on SOSI Total and POMS Total Mood Disturbance scores at time 1, time 2 and change scores.

Total home practice. Taking into account the amount people practised was found to be significant in accounting for differences in attendance and scores on the SOSI Total for time 1, time 2 and change scores and are presented in Table 5. The mean attendance score suggested those who practised less came to less classes (t=-2.95, p<0.01) than those who practised more (t=-2.94, p<0.01). The mean SOSI Total score at time 1 showed a non-significant trend that those that practised less, had less stress symptoms (t=-1.77, p<0.1) than those who practised more (t=-1.78, p<0.1). The mean SOSI Total score at Time 2 showed a significant difference that those who practised less, had less stress symptoms (t=-3.84, p<0.01) than those who practised more (t=-3.84, p<0.01). Although the entire group experienced significant reduction in stress symptoms, as measured by the SOSI total score, the effect was more pronounced for those who practised less. Those that practised less experienced a statistically significant 38% decrease in stress symptoms (p<0.05) than those who practised more, who achieved a statistically significant 4% decrease in stress symptoms (p<0.05) over the course of the intervention.

Duration with illness. Taking into account how long participants had been ill was found to be significant in accounting for differences in Home Yoga Practice and are presented in Table 6. The mean Home Yoga Practice score suggested those participants who had been ill longer, practised less yoga (t=2.27, p<0.05), than those participants who had not been ill as long (t=2.21, p<0.05). This finding may reflect that those who had been ill longer were unable to fully comply with the yoga component of the MBSR program.

This chapter has demonstrated some support for existing literature on the effects of a MBSR program on measures of stress and mood in cancer patients but startling differences between early-stage breast cancer patients versus a heterogeneous cancer population in relation to meditation practice and increased symptoms of stress.

Chapter Five: Discussion

The results of this study, though unexpected, focused attention on the subtle interactions at play in early-stage breast cancer prognosis. These results open the door to discussions concerning the complex nature of post-treatment psychosocial factors, the need for more intensive screening and individualised patient treatment within the larger context of group therapy. This chapter begins with a discussion of the methodological limitations of the study then moves to an examination of the influence of marital status and depression in the psychosocial treatment of early-stage cancer patients. This leads to an exploration of the relatively low decrease in scores on measures of stress and mood. Implications of this study highlight a need for disassembly of the MBSR program to determine which features of the intervention are most effective. Further qualitative research is also needed to determine the relationship between existing empirical data suggesting MBSR is an effective approach for working with cancer patients and the selfperceived effects of meditation by cancer patients themselves.

Methodological Limitations

The major methodological limitations of this study were the use of a convenience sample, the lack of a control group, and the small sample size of 33 who completed preand post-intervention questionnaires. It could be argued observed changes occurred spontaneously as part of the cancer recovery trajectory. Additionally, the reliance on *t*-tests in the present study could have led to Type I error. Without a formal randomised control group for comparison, the influence of outside factors on the outcome measures cannot be precluded, and no definitive cause-effect relationships established between participation in the MBSR program and concurrent changes in psychological scores observed. This possibility cannot be ruled out within this study design, and the results reported must necessarily be considered preliminary and interpreted cautiously.

To strengthen subsequent research design a randomised control group would prove valuable. It will also be important in subsequent studies to incorporate a more comprehensive subject screening protocol, to determine program suitability. Additionally, a MBSR cancer treatment protocol for MBSR program facilitators would strengthen program adherence and fidelity. One could also compare study cohorts to examine potential differences in treatment response. Additionally more sophisticated statistical methods could be utilised, including ANOVA's and comparisons between the current study sample and breast cancer patients who were subjects in the Tom Baker Cancer Centre's previous two studies. Data collection methods could also be strengthened to increase the subject response rate, particularly for time 2 measures. More time could also be spent examining participants' home practice via their practice journals. It would also be important to examine subjects' program evaluation forms, as a determinant of client satisfaction with the program.

MBSR Program Completion

Marital Status

Participants with complete data were more likely to be married or co-habitating rather than single, divorced or widowed. This finding is consistent with research indicating breast cancer patients who are not in a marital relationship, and consequently have less social support, are more vulnerable to psychological distress (Kornblith et al., 2001; Gluhoski et al., 1997). Without an intimate relationship or confidant, patients may have been less able to obtain tangible help and advice (Kornblith et al., 2001). Studies have found social support buffers individual perceptions of stressors, provides resources to modify the environmental demand, and helps manage affective response during times of psychological distress in medical populations (Kornblith et al., 2001; Roberts et al., 1994). Future empirical work should examine marital status as a primary predictor of adjustment and examine the problems of adaptation among single women with breast cancer in greater detail (Gluhoski et al., 1997).

Depression

Non-completers had higher scores than completers on the POMS depressiondejection subscale. Such differences are consistent with other research, which found cancer patients experiencing emotional distress appeared less likely to comply with medical treatment regimens and to participate in research (Spiegel, 1996). Symptoms of depression impact not only the quality of life of the individual, but impact on their care and ability to persist with and tolerate treatment and, thereby indirectly, on the course of their illness (Sellick & Crooks, 1999; Spiegel, 1996). In all probability, patients enter their initial experience with cancer with pre-existing levels of distress. Without intervention, their level of distress remains elevated, whereas patients with a lower level of distress gradually adapt to cancer diagnosis and treatment (Zabora, Blanchard, Smith, Roberts, Glajchen, & Sharp et al., 1997).

Depression is a common problem among cancer patients, but is often unrecognised and therefore undertreated as depressive symptoms are misattributed to cancer or its treatment (Spiegel, 1996). The identification of depression is imperative if a cancer care system is to address the needs of cancer patients and provide the comprehensive treatments necessary (Sellick & Crooks, 1999). Through psychosocial screening early identification of risk with targeted interventions are feasible (Zabora et al., 2001; Sellick & Crooks, 1999). Knowledge about levels of affective state and coping at baseline are essential for identifying and tailoring interventions to meet specific needs (Sellick & Crooks, 1999; Liang, Dunn, Gorman, & Stuart-Harris, 1990; Fawzy et al., 1993). Clinical attention to depression in cancer patients results in better patient adjustment, reduced symptoms and may influence disease course (Spiegel, 1996).

Measures of Stress and Mood

Symptoms of Stress

Results from the pre-post analysis suggest an 8-week MBSR program can decrease symptoms of stress in early-stage breast cancer patients, including peripheral manifestations, muscle tension, habitual patterns, depression, anxiety/fear, and cognitive disorganisation. Interestingly, those who attended more sessions reported increased symptoms of stress. Similarly, those who reported practising more reported increased symptoms of stress. This data was not consistent with other published results (Carlson et al., 2001; Speca et al., 2000) and may reflect those in greater psychosocial distress attended more classes and practised more as a coping mechanism, while those in less distress coped better on their own. Secondary analysis of the data, accounting for differences in practice time, and a study (Burnstein, Gelber, Guadagnoli, & Weeks, 1999) indicating women with early-stage breast cancer may use complementary therapies in response to symptoms of stress, support this hypothesis. As such, vulnerable patients identified by the use of complementary therapies should alert health professionals to inquire about anxiety, depression, or physical symptoms (Burstein et al., 1999).

Mood Disturbance

The lack of significant reductions in mood scores on the POMS is inconsistent with previous research using the MBSR program with a heterogeneous cancer population (Carlson et al., 2001; Speca et al., 2000). These results may have more to do with the relatively low initial mood disturbance in participants at time one than the efficacy of the intervention. In fact, initial time 1 scores of these participants were similar to post-scores of participants in reported in previous studies (Carlson et al., 2001; Speca et al., 2000), further emphasising the overall well-being of these participants prior to starting the program. With such low initial levels of mood disturbance in the current sample creating a floor effect with significant variance in scores, it would be difficult to attain statistically significant decreases in scores.

This low level of mood disturbance is likely explainable by the study selection criteria – patients in early stage disease at least 3–months post treatment. A recent study (Edgar et al., 2000) supports the perspective that individuals who are post-cancer treatment are likely to have lower levels of distress than those still undergoing active treatment regimes. Further, Hanson Frost and colleagues (2000) suggested women whose cancer has stabilised coped better with their illness than women newly diagnosed, undergoing adjunctive treatments, or whose cancer has recurred. Since the previous group was heterogeneous with respect to both type and stage of cancer, and treatment regimen, it is reasonable to see these differences.

Consistent with the lower scores on the POMS, initial scores on the SOSI were lower in this group of patients compared to the previous study group (Carlson et al., 2001; Speca et al., 2000). Post-intervention scores on the SOSI and POMS were quite similar in both the previous studies and the current undertaking. This suggests the end result for both groups was similar in terms of both stress symptoms and mood, but that the current group began with less stress. The floor effects evident in this study suggest screening patients for more distressed individuals might be more effective in selecting patients that stand to benefit from this program. Psychosocial interventions must be rigorously tested in high-risk populations so their efficacy can be established. Application of an intervention in a general population of cancer patients may produce artificially positive results (Zabora et al., 2001).

However, the POMS scores found in the present study are consistent with mood scores reported by others for patients with cancer and with results documenting the similarity of mental in cancer patients and the general public (Cassileth et al., 1986). The implication is that researchers should carefully consider whether a scale is appropriate for their population of cancer patients. The use of inappropriate measures may confer conclusions and interpretations incongruent with the clinical reality for cancer patients (Gotay & Stern, 1995). This kind of information is extremely important to distinguish between statistically and clinically significant information and to provide a basis for using the scales in the care of individual patients (Gotay & Stern, 1995). The psychological differences between the heterogeneous cancer population in the previous two studies and the homogeneous early-stage breast cancer sample in the present study test-score results underscore the need to evaluate the psychosocial status of cancer patients within a relevant, appropriate context (Cassileth et al., 1985). To simply perceive cancer patients as a homogeneous group is an erroneous assumption. Priorities of need may change dramatically in patients no longer under active treatment (Liang et al., 1990). Health care professionals need to recognise the diverse needs of patients at different phases of their disease process to better meet the needs of patients with a breast cancer diagnosis (Zabora et al., 2001; Hanson Frost et al., 2000).

Duration with Illness

Taking into account how long participants had been ill was found to be significant in accounting for differences in home yoga practice. Those participants who had been ill longer practised less yoga than those participants who had not been ill as long. It is possible the yoga component of the present program was too difficult for those who had been ill longer. Program initiation and maintenance are difficult to achieve, even among young and healthy persons, and so it may be more difficult for cancer patients, who as a group are older, symptomatic from the disease and distressed. These illness-related factors make it difficult to mobilise oneself to engage in positive health behaviours (Anderson, et. al., 1994). A recent study (Petersson et al., 2000) suggests it is important to develop exercise routines for cancer patients appropriate to their illness.

Although attempts were made to allow patients to participate in the yoga component of the program at their own pace, adapted yoga practises for those with

special illness-related needs might be better integrated into the MBSR framework. Increased knowledge of psychosocial needs and coping difficulties would allow the precise targeting of psychosocial interventions to improve the quality of life of patients with cancer (Liang et al., 1990). At present, no information is available in North America that would allow a physician to match specific patients characteristics to a specific treatment program. However, therapeutic yoga and meditation practices have been tailored for the individual in places such as the Krishnamacharya Yoga Mandiram in Chennai, India (Desikachar, Desikachar, & Moors, 2001). This more individualised approach has proven effective for many suffering from a variety of medical diagnoses and provides a sound alternative to more group-based programs.

Efficacy of Intervention

There are important questions concerning who might benefit from a MBSR program. Pre-existing personality traits may influence recruitment, compliance and the ability to use meditation to ease stress and mood symptoms (Bishop, 2002). It is possible the efficacy of this approach has more to do with the kinds of people who gravitate to the program than the approach itself. These questions have important implications for the identification of potential patients who would be expected to benefit from this approach.

Inconsistent findings on the efficacy of psychosocial interventions may also be due to the all-encompassing nature of the intervention (Liang et al., 1990). In a multi-faceted intervention, it is difficult to isolate the mechanisms of action or specific techniques that may account for improvements. Even if beneficial effects were due to the intervention and not natural history or recovery, the relative importance of the different components of
the program cannot yet be ascertained. Whether the most effective components of the MBSR program are meditation, yoga, social support, group processes, professional attention, or other factors will have to await further dismantling studies of MBSR. Future research may be beneficially applied to pinpointing the most effective aspects of the intervention and helping to distinguish its effects from other programs utilising similar techniques.

The effectiveness of the MBSR program is likely to depend, at least in part, on how useful patients find the particular techniques within the program structure. In all likelihood, the most useful aspects will vary from person to person depending on individual needs, background and personality (Kabat-Zinn et al., 1997). Relatively little is known about psychological factors that may predispose an individual to prefer one type of relaxation technique over others. Kabat-Zinn and colleagues (1997) study concerning cognitive/somatic orientation in patients with anxiety disorders and their preference for different meditation techniques provides a beginning process of analysis in determining which components of the program may be most useful within any given subgroup. Knowledge of these factors may help optimise MBSR program adherence.

Alternative Research Approaches

Psychoneuroimmunology Research

The practice of meditation has been associated with immunological effects (Kabat-Zinn, 1990). In the Tom Baker Cancer Centre MBSR program manual (2000) Speca, Goodey, Angen and Carlson list several benefits to mindfulness meditation, including: decreased levels of stress and mood disturbance, decreased pain levels and experience of pain, balance of the autonomic nervous system, slowed heart rate and decreased bloodpressure, strengthened immune system and decreased levels of stress hormones.Interestingly, the benefits of meditation continued for some time after formal practice.

These findings are very much related to the field of psychoneuroimmunology (PNI). Interventions which reduce stress or which alter beliefs and values for the better are expected to produce changes in the patient's resistance to stress and are reflected by characteristic and corresponding modifications in PNI function (Greer, 1999; Jerry, 1999). The pathways by which changes in immune function may translate into disease progression are currently being debated in the literature. In this respect the Tom Baker Cancer Centre has recently completed three papers on the MBSR program's effect on immune function, hormone levels, and blood pressure in early stage breast and prostate cancer patients, using the data from the larger CBCRI study (Carlson, Speca, Patel, & Goodey, in press A; Carlson, Speca, Patel, Goodey, in press B; Carlson, Speca, Goodey, in press). Future research should focus on further assessing the physical, biochemical, and physiological parameters that may be improved through use of this intervention.

Mindfulness Construct Validation

Although there is evidence suggesting an MBSR program is an effective approach with applications in psychosocial oncology, there is still a great deal we do not know about this treatment modality. To date, the defining criteria for mindfulness have not been elaborated substantially beyond general descriptions of the construct and there is no evidence that can currently be cited in support of the validity of the construct of mindfulness (Bishop, 2002). In this capacity, questions concerning the operational definition and validation of the construct of mindfulness are highly relevant to identifying the mechanism of action of this approach (Bishop, 2002). In this respect, recent meetings have been held to establish a consensus on mindfulness, including a testable operational definition of mindfulness and a valid and reliable measure of mindfulness. This process will help to answer fundamental questions concerning the mediating role and mechanisms of action of mindfulness (Bishop, Lau, Shapiro, Carlson, Anderson, & Carmody et al., in press).

Qualitative Research

Although we have positive empirical results concerning the MBSR program we have little actual understanding of the mechanisms at work. Despite several studies we are still unable to determine the linkages between the existing empirical data that suggests MBSR is an effective approach for working with cancer patients and the self-perceived effects of meditation by cancer patients. What would seem needed now is an exploration of patients' experience of meditation and its' impact on measures of well-being to understand how meditation practice impacts on patients' lives and mediates their ability to work with their illness. Increased knowledge of patients' beliefs would inform our understanding of how to encourage positive lifestyle changes and reframe disease management in meaningful ways that give a greater sense of personal control (Stewart et al., 2001).

Social scientists and patient interest groups are now encouraging funding bodies involved in oncology research to give greater consideration to qualitative research, in part so that patients' opinions and experiences can be heard (Waxler-Morrison, Doll, &

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Hislop, 1995). Qualitative methods of data collection are useful when a researcher wants to understand how individuals understand their world, explore how individuals' perceptions in situations of stress colour their behaviour, and in providing everyday illustrations of phenomena (Krathwohl, 1998). Moreover, taking a qualitative approach is valuable in describing complex interpersonal interactions (Berg, 1989; Krathwohl, 1998).

To take the opportunity to explore patients' lived experience of meditation and how they have integrated it into their lives would provide useful information that could dictate potential future directions for research (Brennan & Stevens, 1998). Some areas of study may include a patient-centred definition of mindfulness, patient identification of mechanisms of change, an intervention break down in terms of efficacy, and insight into how patients successfully integrate the practice of meditation into the fabric of their lives. The richness of this data would provide a source from which questions and theories can emerge concerning the self-perceived experiences of those who practice meditation in conjunction with mainstream cancer treatments (Brennan & Stevens, 1998).

While the Tom Baker Cancer Centre's previous two studies (Carlson et. al., 2001; Speca et. al., 2000) have begun to provide data from an empirically analytical model, they have not given voice to the recipients of treatment (Brennan & Stevens, 1998). One proposed project now being developed by the researcher, in collaboration with the Tom Baker Cancer Centre, is to explore the use and self-perceived effects of an ongoing MBSR drop-in class by cancer patients using a grounded theory approach, similar in scope to the 1998 Brennan and Stevens study. Grounded theory provides a general methodology for developing theory that is grounded in data systemically gathered and analysed (Strauss & Corbin, 1990). Through the intended research proposal this type of personalised information would come from a more interpretative research paradigm (Brennan & Stevens, 1998). The self-perceptions and experiences of the patients would also contribute to the discourse on meditation in health care and the generation of theory (Brennan & Stevens, 1998).

Conclusion

A growing body of research suggests MBSR programs provide substantial benefits to cancer patients (Carlson et al., 2001; Speca et al., 2000). Two previous studies on the effects of a MBSR program on symptoms of stress and mood focused on a heterogeneous cancer population, with a wide variety of diagnoses and stages of illness (Carlson et al., 2001; Speca et al., 2000). Both studies found MBSR programs had beneficial effects on symptoms of stress and mood disturbance. The overall objective of the current project was to determine whether a MBSR group psychosocial intervention had similar beneficial effects on symptoms of stress and mood in early-stage breast cancer patients who were at least three months post-treatment.

MBSR participation was associated with decreased symptoms of stress in breast cancer patients. Additionally, stress symptoms improved on six of the ten symptoms of stress subscales, emphasising the breadth of stress-related symptoms significantly alleviated over the course of this intervention. Interestingly, those who attended more sessions and reported practising more at home reported increased symptoms of stress. This data was not consistent with other published results (Carlson et al., 2001; Speca et al., 2000). These findings may reflect those in greater psychosocial distress attended more classes and practised more as a coping mechanism, while those in less distress coped better on their own and were less inclined to fully participate in the program. No significant improvements were seen in mood disturbance.

Overall changes seen in these patients were moderate. This may be due to the high levels of patient psychological functioning at the start of the study. This could also indicate that this type of program is only moderately effective for early stage breast cancer patients who are three months post treatment. Future studies of this nature would benefit from a randomised control group and from screening for more distressed individuals at the start of the program.

Enthusiasm for group psychosocial interventions, like the MBSR program, should be tempered by the recognition that scientific evidence supporting a relationship between psychological factors and cancer is in the developing stages. Although group psychosocial interventions can enhance coping and reduce distress, they are effective only as adjuncts to standard medical care (Kabat-Zinn et al., 1998). This type of intervention is not an alternative or independent treatment for cancer or any other illness or disease (Fawzy et al., 1993). Nonetheless, these programs have shown some effectiveness as adjunct treatment in trials involving patients suffering from many medical conditions and these results suggest further fruitful avenues for possible future research.

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Ν	Age (Years)		Education		Cancer Stage		Marital Status	
	Mean	SD	Mean	SD	I	II	Single/divorced	Married/cohabiting
49	52.7	10.7	14.4	2.4	17	30	14	33

Table 1: Demographic Characteristics

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Table 2: SOSI Time One and Two Scores

	Time One		Time Two	
Scale	Mean	Standard Deviation	Mean	Standard Deviation
1. SOSI Peripheral Manifestations	7.70**	4.78	5.94	4.42
2. SOSI Cardiopulmonary	8.52	6.81	6.64	6.30
a. SOSI Symptoms of Arousal	2.94	2.88	2.39	2.63
b. SOSI Upper Respiratory	5.58	4.79	4.24	4.48
3. SOSI Central Neurological	3.36	2.89	2.70	2.84
4. SOSI Gastrointestinal	6.00	5.22	4.88	4.51
5. SOSI Muscle Tension	12.21**	7.23	9.97	7.35
6. SOSI Habitual Patterns	19.18**	10.31	15.15	7.99
7. SOSI Depression	8.70*	6.08	6.58	4.79
8. SOSI Anxiety/Fear	13.06**	7.33	9.76	7.55
9. SOSI Emotional Irritability	6.03	5.05	5.18	6.07
10. SOSI Cognitive Disorganisation	6.03**	3.54	4.36	3.52
SOSI Total Score	90.79 **	44.94	71.15	41.04

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* p<0.05, ** p<0.01

	Time One		Time Two	
Scale	Mean	Standard Deviation	Mean	Standard Deviation
1. POMS Tension-Anxiety	5.94	6.03	5.27	6.53
2. POMS Depression-Dejection	8.55	10.40	7.42	8.69
3. POMS Anger-Hostility	7.91	6.83	6.76	7.37
4. POMS Vigour-Activity	15.79	5.93	.14.91	5.40
5. POMS Faugue-mertia	3.73	5.76	9.55	7.08
POMS Total Mood Disturbance	20.00	31.98	16.76	34.26

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Table 3: POMS Time One and Two Scores

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* p<0.05, ** p<0.01

Table 4: Attendance, Home Yoga/Meditation/Total Practice and SOSI Total Score	,
POMS Total Mood Disturbance Correlations.	

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	Attendance	Home	Home	Total	SOSI	POMS
		Yoga	Meditation	Home	Total	Total Mood
		Practice	Practice	Practice	Score	Disturbance
Attendance	1.00					
Home	.47**	1.00			,	
Yoga					• *	
Practice						
Home	.33*	.38*	1.00			
Meditation						
Practice						
Total	.40**	.72**	.90**	1.00		
Home						
Practice						
SOSI	.43*	.46**	.33	.45*	1.00	
Total Score						
POMS	.15	.05	.08	.08	.39*	1.00
Total Mood						
Disturbance						

*

Pearson correlation is significant at the 0.05 level (2-tailed). Pearson correlation is significant at the 0.01 level (2-tailed). **

Table 5: Total Home Meditation Practice Median Split (under 1560 minutes of practice or over 1560 minutes of practice) - Attendance, Home Yoga Practice, Home Meditation Practice, Total Home Practice, SOSI Total, POMS Total Mood Disturbance Time One/Two and Change Scores.

Scale	Mean	Standard Deviation
Attendance		
Under 1560 Minutes of Practice	7.53**	1.02
Over 1560 Minutes of Practice	8.40**	.82
Home Yoga Total		
Under 1560 Minutes of Practice	314.80**	216.96
Over 1560 Minutes of Practice	766.55**	358.88
Home Meditation Total		
Under 1560 Minutes of Practice	838.30**	294.32
Over 1560 Minutes of Practice	1457.05**	387.23
Total Home Practice		
Under 1560 Minutes of Practice	1153.10**	348.07
Over 1560 Minutes of Practice	2247.00**	513.51
SOSI Total (Time 1)		
Under 1560 Minutes of Practice	78.11	43.13
Over 1560 Minutes of Practice	106.95	57.25
SOSI Total (Time 2)		
Under 1560 Minutes of Practice	46.44**	20.49
Over 1560 Minutes of Practice	92.44**	43.29
SOSI Total (Change)		
Under 1560 Minutes of Practice	-29.40*	28.31
Over 1560 Minutes of Practice	-4.19*	26.33
POMS TMD (Time 1)		
Under 1560 Minutes of Practice	15.95	30.61
Over 1560 Minutes of Practice	31.80	40.05
	51.00	
POMS TMD (Time 2)		
Under 1560 Minutes of Practice	6.88	22.94
Over 1560 Minutes of Practice	26.38	42.23
	_0.00	
POMS TMD (Change)		
Under 1560 Minutes of Practice	-7.67	17.29
Over 1560 Minutes of Practice	-10.23	16.19

* p<0.05, ** p<0.01

Table 6: Duration of Illness Median Split (Under 1.05 Years or Over 1.05 Years) -Attendance, Home Yoga Practice, Home Meditation Practice, Total Home Practice, SOSI Total, POMS Total Mood Disturbance Time One/Two and Change Scores.

Scale	Mean	Standard Deviation
Attendance		
Under 1.05 Years	8.09	1.12
Over 1.05 Years	7.65	1.09
Home Yoga Total		
Under 1.05 Years	649.91*	397.20
Over 1.05 Years	406.05*	287.92
Home Meditation Total		
Under 1.05 Years	1247.55	447.36
Over 1.05 Years	1034.00	450.75
Total Home Practice		
Under 1.05 Years	1884.09	707.30
Over 1.05 Years	1479.58	629.08
SOSI Total (Time 1)		
Under 1.05 Years	102.88	56.23
Over 1.05 Years	85.83	44.02
SOSI Total (Time 2)		
Under 1.05 Years	79.22	39.73
Over 1.05 Years	60.88	40.46
SOSI Total (Change)		
Under 1.05 Years	-12.69	33.53
Over 1.05 Years	-20.88	24.89
POMS TMD (Time 1)		
Under 1.05 Years	29.04	42.80
Over 1.05 Years	22.63	23.28
POMS TMD (Time 2)		
Under 1.05 Years	23.83	41.30
Over 1.05 Years	8.06	20.98
POMS TMD (Change)		
Under 1.05 Years	-7.79	16.65
Over 1.05 Years	-12.13	18.19

* p<0.05, ** p<0.01