

“Finding A New Normal:” Using Recreation Therapy to Improve the Well-Being of Women with Breast Cancer

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Abstract

Women with breast cancer face numerous physical and psychosocial challenges during and post cancer treatment that may decrease functioning and reduce overall well-being. Interventions that afford opportunities to transcend negative life experiences are needed but frequently not provided due to lack of post-treatment services provided by healthcare systems. HeartMath® and other forms of biofeedback offer efficacious interventions that recreation therapists can easily be trained to provide. These tools provide a promising way to increase coping skills, decrease stress, and improve immune functioning by increasing heart rate coherence (HRC). This article will review the literature and illustrate the outcomes of a case series conducted with female breast cancer survivors. A paired samples *t*-test revealed a significant increase in high HRC from baseline to posttest. This significant increase was established after the first HeartMath® session and sustained over the 6-week intervention. Discussion and implications of these findings are presented.

Women who are surviving with breast cancer know that they must develop the inner strength to cope with issues that arise during cancer treatment. This often manifests itself as a need to rearrange life priorities and develop the skills needed to lead a “new normal” life after diagnosis. By developing the psychological and physical strength needed to combat the debilitating side effects of cancer treatment, individuals may increase their tolerance of therapy and enhance their chances for treatment success. Utilizing an integrative approach toward managing the physical and psychosocial needs of

women with breast cancer is a vital, yet poorly executed aspect of breast cancer care (Institute of Medicine, 2007).

Limited research precludes our ability to fully understand how traditional and complementary approaches may enhance the skills women need to manage the side effects of cancer and cancer treatment. Studies that have explored interventions aimed at improving quality of life and symptom management report that integrative therapies such as exercise, guided imagery, relaxation, and cognitive behavioral support

groups, reduce the amount of psychosocial distress experienced during treatment and improve the quality of life of women with breast cancer (Courneya et al., 2003; Dimeo, Stieglitz, Fischer-Novelli, Fetscher, & Keul, 1999; Gordon et al., 2005; Hewitt, Herdman, & Holland, 2004; Von Ah, Kang, & Carpenter, 2007). The National Center for Complementary and Alternative Medicine (2004) identified a host of other complementary therapies that are not fully validated interventions, but have potential to improve the way breast cancer is treated. These include the use of several interventions commonly used during recreational therapy such as expressive arts, music, stress management, recreation activities, reflective journaling, and biofeedback. One stress management technique that holds particular promise is the application of HeartMath® and other biofeedback programs.

HeartMath® is a personal stress relief technique that trains individuals to be aware of and regulate their Heart Rate Coherence (HRC) and Heart Rate Variability (HRV) during various emotional states. Research has demonstrated that individuals who are able to sustain a positive emotional response to various stressful situations benefit from improved physiological, psychological, and social functioning (McCraty, 2003; McCraty, Atkinson, Tomasino, & Bradley, 2006; McCraty & Childre, 2003; McCraty & Tomasino, 2006). This increased psychophysiological performance is identified through distinct patterns of heart rate activity called HRC. There is a correlation between HRC and a high degree of order, harmony, and stability in mental and emotional processes (McCraty et al., 2006).

The purpose of this article is to review the literature regarding the physical and psychosocial needs of breast cancer patients and explore how HeartMath® and other biofeedback programs can help clients cope with those needs. A case series is used to illustrate the effects of a six-week intervention using HeartMath® in conjunction with other biofeedback programs, on the HRC of six participants in the "Get REAL & HEEL" (Get Recreation, Get Exercise, Get Active, Get Living) breast cancer program. Finally, a discussion of the implications of this research for practitioners and researchers is provided.

The Needs of Women with Breast Cancer

The American Cancer Society (ACS) reported that there are approximately 10.8 million Americans living with a cancer history and the incidence is increasing (ACS, 2009). Approximately 2.4 million of these

survivors have had breast cancer (National Cancer Institute, 2007). Estimates project that 182,500 new cases of breast cancer will be diagnosed in 2008. Breast cancer is the most common form of cancer experienced by women, with one in eight American females developing breast cancer during their lifetimes (ACS, 2009). Breast cancer remains the second most common cause of cancer death in women. Projections estimated that in 2007, approximately 40,460 women died of this disease.

In the last few years, significant medical advances in early detection and types of treatment have resulted in reduced mortality and increased survival rates of cancer patients (Berry et al., 2006). This growing population faces unique healthcare needs because of their disease and treatment. Surgery, radiation therapy, and systemic therapy can contribute to loss of functionality and psychological decline experienced by some patients and may result in decreased quality of life (Bloom, Petersen, & Kang, 2007; Carver, Smith, Petronis, & Antoni, 2006; Ganz et al., 2002).

Physiological side-effects of breast cancer treatment. Most cancer treatments result in a host of physiological symptoms such as extreme fatigue, muscular weakness, decreased lean muscle mass in concurrence with increased adiposity, abnormal hematological profiles, and a reduction in total body flexibility and agility (Battaglini, Dennehy, Groff, Kirk, & Anton, 2006; Courneya et al., 2003; Dimeo et al., 1999; Talvensaaari, 1995). The fatigue experienced by cancer patients is often described as excessive and chronic, visible in peripheral and total body weakness, lack of energy, exhaustion, lethargy, depression, and the inability to mentally focus. These symptoms, along with more acute side effects like nausea, diarrhea, and body aches, promote inactivity both during and following treatment and may contribute to poor treatment outcomes and decreased quality of life (Courneya & Friedenreich, 1999).

Psychosocial side-effects of breast cancer treatment. Some of the common psychosocial concerns breast cancer survivors experience include fear of recurrence, body image disruption, sexual dysfunction, treatment-related anxieties, intrusive thoughts about illness and persistent anxiety, marital or partner communication issues, feelings of vulnerability, and existential concerns regarding mortality (Hewitt et al., 2004). The psychosocial impacts of having cancer can result in significant distress that often goes untreated

by the healthcare system (Institute of Medicine, 2007). If ignored, the impacts of this distress can interfere with quality of life, family dynamics, the ability to make appropriate treatment decisions, and treatment adherence (Irvine, Brown, Crooks, Roberts, & Browne, 1991; Woolery & Salovey, 2004).

Meeting the physical and psychosocial needs of women who are undergoing, or have recently completed treatment for breast cancer, is an essential component of quality cancer care (Giese-Davis et al., 2004; Hewitt et al., 2004). Unfortunately, the complexity of breast cancer treatment has resulted in a number of issues that limit access to well-integrated comprehensive programs designed to meet the physical and psychosocial needs of women with breast cancer. Issues such as an increased reliance upon outpatient services, increased out-of-pocket cost for services, limited coordination of care and clinical practice guidelines, lack of known treatment outcomes, and lack of a designated point person responsible for overseeing the delivery of integrated services have resulted in less than 10 to 15 percent of survivors receiving the psychosocial services deemed as essential components of quality cancer care (Hewitt et al., 2004). The medical community must respond to this well documented gap by evaluating the effects of various complementary therapies that have the ability to mitigate or help individuals cope with the physical and psychosocial impacts of this disease.

Coping with Negative Life Experiences

Individuals in the midst of negotiating negative life experience; whether it be cancer, a family crisis, or financial hardships, must make decisions regarding how to cope with the situation. The coping strategies that individuals choose to adopt will likely depend upon several factors including the skills they have developed in their life and their general disposition. Studies show that people who react to stressors with approach-coping strategies fare better than individuals who use avoidance-coping strategies (Bellizzi & Blank, 2006). Individuals with strong social support networks including family, friends, community providers, and health care providers, may also be advantaged because social networks buffer the effects of stress and facilitates positive coping styles. Individuals who use positive, benefit-finding coping strategies experience enhanced relationships with family and friends, enhanced competence, increased purpose in life, a shift in priorities, enhanced spirituality, an increased appreciation for life and a desire to live life

to its fullest (Bellizzi & Blank; Lechner, Carver, Antoni, Weaver, & Phillips, 2006).

A growing body of literature points to the importance of one's psychological outlook when examining individuals' health and quality of life (Seligman, 2006). More specifically, hope, optimism, and social support are thought to play a vital role in determining immune functioning and are related to quality of life (Bellizzi & Blank, 2006; Seligman; Von Ah et al., 2007). Current research suggests that optimism and social support moderate the way that stress affects one's immune functioning. Individuals who are more optimistic are better able to offset the negative impact of stress and thus have improved immune functioning during negative life events (Seligman; Von-Ah et al.).

Particularly relevant to this article, Seligman (2006) discussed the relationship between having an optimistic explanatory style and cancer. In collaboration with colleagues, Seligman explored the relationship between experiencing helpless states and the development of cancer tumors in rats. Rats who had each been implanted with sarcoma cells on their flank received one of three conditions: mild escapable shock (mastery/optimism), mild inescapable shock (learned helplessness), and no shock (no psychological change). The experiment revealed that as expected, 50% of the rats that had no psychological change rejected the tumor. Of the rats that were able to master eliminating the shock by pressing a bar, 70% rejected the tumor. However, only 27% of the rats that could do nothing to change the shock rejected the tumor. These authors concluded that feeling helpless produced more rapid growth of tumors in rats while feeling "optimistic" led to greater tumor rejection (Seligman & Visintainer, 1985; Visintainer, Volpicelli, & Seligman, 1982). Although the link between emotional state and immune system function is not well understood, nor has it been adequately explored in humans, this experiment is provocative.

Based on the research presented above as well as a growing body of literature that correlates explanatory style to immune functioning and quality of life, it seems instrumental that healthcare professionals use this information to help clients cope with issues they are facing because of their disability or illness (Karademas, Karvelis, & Argyropoulou, 2007; Lechner et al., 2006; Von Ah et al., 2007). Interventions specifically targeting one's explanatory style and coping mechanisms are essential. Seligman (2006) offers the ABCDE model as a way to transform pessimistic attitudes and increase

individuals' control over how they think about adversity. He contends that *adversity* rapidly results in us thinking about the situation and developing *beliefs* regarding an event. The beliefs we develop have a direct impact on what we feel and what we do next and therefore result in *consequences*. The first step in helping individuals cope with a negative event is to have them recognize the relationship between adversity, beliefs, and consequences and the control they have over accurately defining a situation so that it does not result in permanent and pervasive negative self-thoughts. As Seligman states, "learned optimism works not through an unjustifiable positivity about the world but through the power of 'non-negative' thinking" (p. 221). Therefore, individuals need to learn to dispute negative thoughts by presenting evidence, exploring alternatives, accurately portraying the implications of an event, or on certain occasions, distracting one's thoughts from dwelling on negative unchangeable events. By continually engaging in a process where the individual *disputes* negative thoughts s/he will result in an *energization* that is reflective of increased coping skills and a renewed optimistic outlook toward an event. In addition to using the ABCDE model to engage an optimistic coping style, professional therapists may also enhance this technique by using HeartMath® and other recreation therapy techniques.

In a qualitative study of women enrolled in the Get REAL & HEEL breast cancer program, Groff and colleagues found that RT interventions helped women transcend the cancer experience by enhancing their coping mechanisms (Groff, Battaglini, Sipe, O'Keefe, & Peppercorn, 2009). Although many of the women were naturally in the process of undergoing a life transition as the result of having cancer, biofeedback programs provided the women with a powerful outlet for engaging in a purposeful reflective process that facilitated their self-understanding and connection to the larger world. The researchers concluded that the creation of a group environment where individuals could learn from others who had similar experiences was instrumental in helping women get back some kind of normalcy and develop "a new normal."

There is a growing body of literature which suggests that leisure contexts may be particularly helpful in protecting individuals from stress and foster personal growth during negative life events (Carruthers & Hood, 2004, 2005; Csikszentmihalyi, 1993; Guo, Yang, & Malkin, 2007; Kleiber, 1999; Kleiber, Hutchinson, & Williams, 2002). It has been argued that during a

negative life event individuals experience considerable disruptions in personal expressiveness and socialization (Kleiber). Leisure, defined as freely chosen activities that individuals pursue during their free time that often result in a satisfying state of mind, is relevant to these experiences because it affords individuals opportunities to escape, experience enjoyment in the midst of stress and discomfort, be self-expressive despite feeling constraints, and/or restore some sense of continuity. Shannon and Shaw (2005) found that leisure became more of a priority for women who had completed breast cancer treatment because they had an increased appreciation for the fact that "life is short" and they had a keen desire to engage in meaningful leisure activities that had value and were enjoyable. The women realized that by using the experience of having cancer as a catalyst for change they were more focused on health-promoting leisure behaviors. Therefore, it seems reasonable to assume that prescriptive recreation therapy interventions can be powerful forms of treatment that can help reduce the stress associated with experiencing a negative life event and help individuals develop positive coping skills that facilitate overall well-being.

Efficacy of Recreation Therapy for Women with Breast Cancer

The case series presented below will demonstrate the efficacy of a six-week recreation therapy intervention provided during the Get REAL & HEEL breast cancer program. The Leisure and Well-Being Model served as the theoretical framework for service delivery because it draws its support from the positive psychology literature (Carruthers & Hood, 2007; Hood & Carruthers, 2002, 2007). This model considers the individual's problems, deficits, and negative experiences, as well as their strengths, capacities, and positive experiences. When each of these factors is considered simultaneously, they provide a picture of the client's resilience, well-being, and quality of life.

The Leisure and Well-Being model is founded on the premise that recreation therapy positively affects one's psychological well-being by enhancing an individual's leisure experiences and developing his or her resources and capacity to engage in life activities. The five guiding principles that enhance leisure and life experiences are: savoring leisure, authentic leisure, leisure gratification, mindful leisure, and virtuous leisure. Resource development is also focused on five areas including: psychological resources, social

resources, cognitive resources, physical resources, and environmental resources. When applied to practice, this model supports the application of a host of interventions targeting improved psychosocial well-being (Carruthers & Hood, 2007; Groff et al., 2009; Hood & Curruthers, 2007).

Biofeedback and HeartMath®. In an attempt to develop the capacity to engage in mindful leisure and experience leisure appreciation, the participants in the Get REAL & HEEL program received biofeedback and HeartMath® training. Biofeedback is a training technique that allows individuals to become aware of and to regulate personal health using signals from their bodies. The body signals typically used during biofeedback include: brain activity, blood pressure, muscle tension, heart rate, and skin conductance levels (Association for Applied Psychophysiology and Biofeedback, 2007). Therapists use sensors placed on the muscles, head, or hand to provide visual and/or audible "feedback" about what is occurring in the client's body. Through continued practice, individuals use this training to regulate what many consider involuntary responses and to ultimately lead healthier lives.

HeartMath® is a personal stress relief technique that trains individuals to be aware of and regulate their Heart Rate Coherence (HRC) during various emotional states. Research has demonstrated that individuals who are able to sustain a positive emotional response to various stressful situations benefit from improved physiological, psychological, and social functioning (McCraty, 2003; McCraty et al., 2006; McCraty & Childre, 2002; McCraty & Tomasino, 2006). This increased psychophysiological performance can be measured through distinct patterns of heart rate activity called HRC. Heart rate coherence represents a high degree of order, harmony, and stability in mental and emotional processes (McCraty et al.). One physiological outcome associated with the presence of sustained levels of coherence is improved dehydroepiandrosterone (DHEA)/cortisol ratio. Sustaining high HRC, while feeling positive emotions, is associated with increased DHEA and decreased cortisol. Improved DHEA/cortisol ratios are linked to improved physiological functioning (reduced stress reactivity and improved homeostasis) which is a key factor in the maintenance of good health (McCraty; McCraty et al.; McCraty & Childre).

During the course of this case series, the RT intervention utilized HeartMath® (HM) and Journey to the Wild Divine (JWD) products. HeartMath® focused

on teaching individuals:

- (a) how to use the Quick Coherence technique to induce HRC and focus on positive emotions,
- (b) how to use the Heart Lock-in Technique to sustain HRC, and
- (c) how to use the emWave PSR to practice using the HeartMath® techniques and to identify how daily activities impact HRC.

Additionally, the interventions utilized Wild Divine products including:

- (a) The Journey to the Wild Divine software, and
- (b) Healing Rhythms.

Each of these procedures is described in more detail below.

The basic HeartMath® technique called "Quick Coherence" technique is a three-step action designed to induce HRC. To induce HRC individuals are instructed to focus on the area of the heart, breathe in and out rhythmically to a count of five, and then shift focus to a feeling of love and appreciation. The Heart Lock-in Technique teaches individuals to shift focus to the area of the heart and breathe slowly and deeply, sustain a genuine feeling of appreciation and care, and then radiate those feelings of care toward others. The emWave is a product produced by the HeartMath Institute and uses the same scientific principles to provide individuals feedback regarding their HRC level.

In addition to the use of HM, two biofeedback programs written by the Wild Divine Project were used during this 6 week RT intervention. The JWD software teaches individuals to use a breathing technique called the "heart breath" to reduce stress and manage emotions. The heart breath is virtually the same technique as the Quick Coherence Technique developed by HM. The software measures and uses significant changes in heart rate and skin conductance to trigger the completion of a series of biofeedback events that are woven into a personal journey of self-awareness and healing. Each biofeedback event requires individuals to induce a state of high energy (measured via increased heart rate and skin conductance level) or relaxation (measured via decreased heart rate).

The Healing Rhythms (HR) software is a 15-step interactive software program that teaches individuals to control the stress in their lives by monitoring their physiological state through biofeedback. The Wild

Divine Project, who produces Healing Rhythms and the Journey to the Wild Divine, teach many of the same principles through the two software programs. Healing Rhythms uses heart rate variability and skin conductance levels as measures to allow individuals to accomplish various biofeedback events. The beat-to-beat changes in one's heart rate determine heart rate variability. The goal is to achieve greater HRV and develop skills individuals can use to lead healthier lives. Skin conductance levels are a measurement of sweat gland activity. Perspiration is sensed as a signal the autonomic nervous system is activated. Sensors placed on the pads of the three middle fingers measure the two-biofeedback events. The 15-step program consists of three parts: Self Discovery, Creating Happiness, and Developing Life Skills. Each of the three parts includes steps designed to help individuals achieve a sense of a healthy body and calm mind. There are mind/body practices that individuals do prior to each biofeedback exercise. To be successful during the biofeedback events an individual concentrates on his or her breathing and total body relaxation. The Healing Rhythms program teaches individuals how to be mindful of their physiological states and how to control various physiological responses by creating a positive mental and physical state.

Purpose of the Study

The purpose of this case series research study was to determine how HeartMath®, in conjunction with other biofeedback programs, impacted the HRC of breast cancer survivors. The research questions were:

- (1) Does participation in a 6 week Heartmath intervention, used in conjunction with other biofeedback programs, improve the heart rate coherence of women with breast cancer?, and
- (2) Do breast cancer survivors perceive any benefit from participation in recreation therapy using HeartMath in conjunction with other biofeedback programs post breast cancer treatment?

Methods

Case series methodology was used to determine if a 6-week intervention using HeartMath®, Healing Rhythms, and the Journey to the Wild Divine affected the HRC ratios of women who had recently completed breast cancer treatment. In addition to the HRC ratios recorded on emWave PC, the women's perceptions of how the biofeedback interventions affected their lives is also presented.

Sample

Six women who had completed breast cancer treatment within the past six months and had voluntarily enrolled in Get REAL & HEEL participated in the study. They range in age from 42-66 years old. Five of the women were married and one woman was single. Five of the woman also had children. Their stage at diagnosis and treatment varied. Three participants had stage I breast cancer, one had stage II disease, one stage III, and one had bi-lateral disease. All of the diagnoses occurred between December of 2005 and August of 2006. Finally,

Table 1

DEMOGRAPHIC BACKGROUND OF THE SAMPLE

	Age	Marital Status	Children	Education	Occupation	Stage of Cancer
(1)	49	Married	Yes	College	Homemaker	I & IIA Bilateral
(2)	50	Married	No	College	Full Time	II Ductal
(3)	52	Divorced	Yes	College	Part Time	I Invasive
(4)	53	Married	Yes	College	Inemployed	I
(5)	42	Married	Yes	High School	Homemaker	III
(6)	66	Married	Yes	College	Retired	I Invasive

all but one of the participants had some amount of postsecondary education. Their occupations varied with two participants being homemakers, one employed part time, one employed full time, one self-employed, one currently un-employed, and one retired.

Data Collection Procedures

The data collection period lasted approximately 6 weeks with the number of RT sessions women received ranging from 17 to 23 sessions. The protocol and data collection procedures were approved by the Institutional Review Board of Lineberger Comprehensive Cancer Center and the University of North Carolina at Chapel Hill. All of the women completed the following protocol. During the first recreational therapy intervention individuals provided three baseline measures:

- (a) 10 minute HeartMath (HM) reading with no intervention ("just be"),
- (b) 5 minute HM measure of the individual "practicing a technique they typically use to manage a stressful situation" ("manage stress"), and
- (c) 5 minute measure where individuals were introduced to HM techniques.

For sessions 2-22, individuals engaged in approximately 30 minutes of recreational therapy using HM and other biofeedback software including the Journey to the Wild Divine and Healing Rhythms. For the follow up session, individuals provided two measures:

- (a) 10 minute HM reading with no intervention ("just be"), and
- (b) 5 minute baseline HM measure of the individual "practicing a technique they typically use to manage a stressful situation" ("manage stress").

All measurements and interventions were conducted by the same certified and licensed recreation therapist.

At the completion of each recreation therapy session, the therapist documented on the services provided and treatment outcomes. The objective measurements of treatment outcomes, along with the subjective expressions of these women provided additional data used to address the second research question.

Data Analysis

The analysis of data included visual depictions of the percentage of low, medium, and high heart rate coherence individuals had during each of the five sessions. Paired samples *t*-tests were used to compare the baseline and follow-up test scores for each of the two measures (e.g. "just be" and "manage stress"). Paired samples *t*-test were also used to determine if the high HRC for the first HeartMath® session was significantly different from each of the other four conditions: baseline "just be," baseline "manage stress," follow up "just be," and follow-up "manage stress."

The authors used content analysis of the recreation therapy documentation to capture the participants' perceptions of the effectiveness of the RT intervention. Content analysis is used to capture the content and context of documents (Miles & Huberman, 1994; Ritchie & Lewis, 2003; Robson, 2002). The primary focus of a content analysis is on capturing and interpreting the "common sense, substantive meaning in the data" (Ritchie & Lewis, p. 202). Two licensed recreation therapists served as the primary investigators who completed analysis of the RT documentation. The lead author had been extensively trained in qualitative methodology while the secondary investigator received preliminary education in this methodology and was mentored by the primary researcher throughout the project. To improve the validity of the findings, the data analysis process included several reliability checks between investigators. Data analysis was considered to be complete when each quote that was pulled from the RT documentation for each of the participants was either discarded or identified as being supportive of one of themes that emerged from the data.

Results

The results are presented in relation to the primary research questions. Quantitative results were used to address the question of whether participation in a 6 week HeartMath® intervention improved the heart rate coherence of women with breast cancer; and qualitative results were used to address breast cancer survivors perceptions of whether they derived benefits from participation in recreation therapy post breast cancer treatment.

Quantitative results

Visual inspection of the pre and posttest percentage of low, medium, and high HRC for each individual clearly indicate that the amount of low HRC decreased and the amount of high HRC increased in each of the treatment conditions (Figure 1). Paired samples *t*-tests

were calculated to compare the mean baseline high HRC scores to the mean follow up high HRC scores for both the “just be” and the “manage stress” conditions. A significant increase in high HRC from baseline to follow up was found for both conditions (Table 2). A paired samples *t*-test was also used to compare the mean

Figure 1

BASELINE AND FOLLOW UP HEART RATE COHERENCE RATIOS BY PARTICIPANT

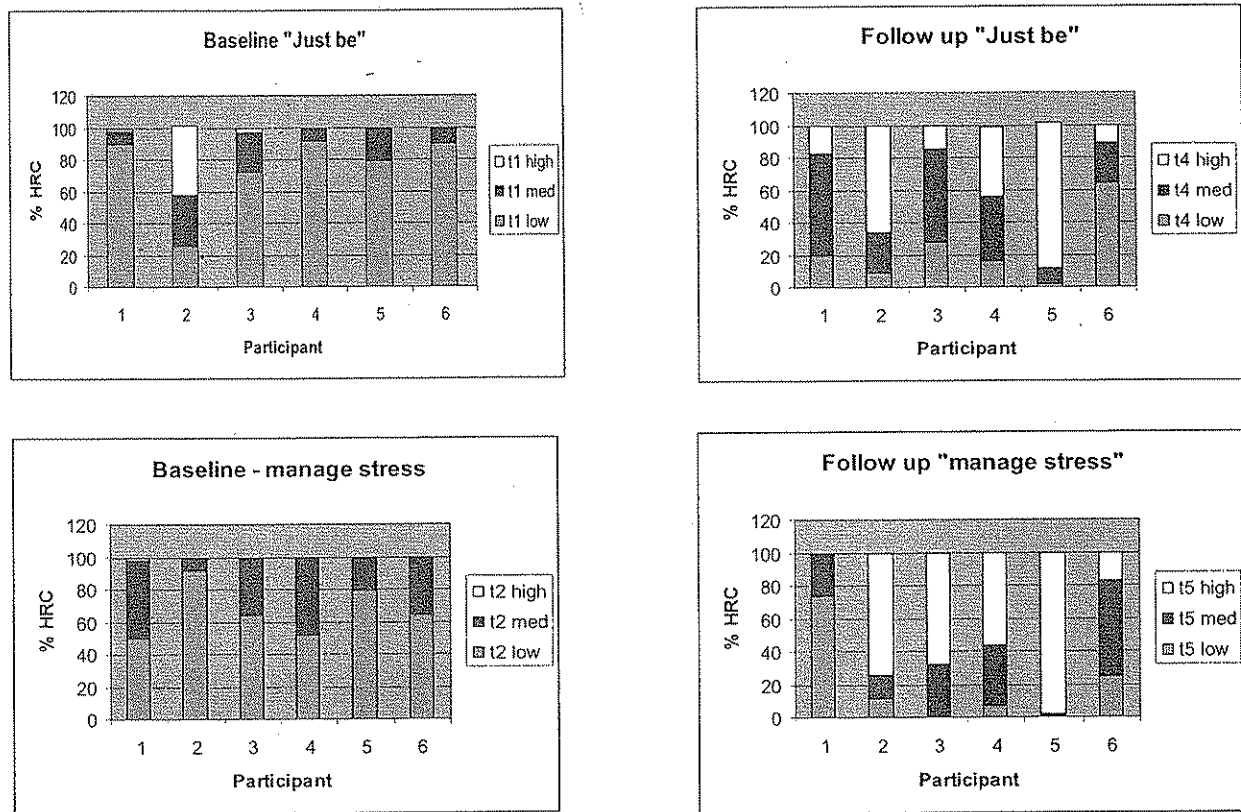


Table 2

PAIRED SAMPLE T-TESTS OF HIGH HRC FOR BASELINE AND FOLLOW UP CONDITIONS

Condition	Pre <i>M</i>	<i>SD</i>	Post <i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
“Just Be”	8.2	17.1	40.2	31.9	-2.6	5	.047*
“Manage Stress”	.3	.8	52.2	36.8	-3.4	5	.019*

* Significant at the .05 level

Table 3

**PAIRED SAMPLE T-TESTS OF HIGH HRC FOR HEARTMATH®
FOR BASELINE AND FOLLOW UP CONDITIONS**

Comparison Groups	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
1st HeartMath® - Pre "Just Be"	-38.3	24.5	-3.8	5	.012*
1st HeartMath® - Pre "Manage Stress"	-46.2	25.9	-4.4	5	.007*
1st HeartMath® - Post "Just Be"	6.3	25.3	.6	5	.566
1st HeartMath® - Post "Manage Stress"	-5.7	25.6	-.5	5	.611

* Significant at the .05 level

differences between the high HRC ratio achieved by the six participants during the first HeartMath® session and each of the other four conditions. The mean percentage of high HRC for each of the conditions were as follows: 1st HM session ($M=46.5$), Pre "Just Be" ($M=8.2$), Pre "Manage Stress" ($M=.33$), Post "Just Be" ($M=40.2$), Post "Manage Stress" ($M=52.2$). A significant increase in high HRC from the Pre "Just Be" and Pre "Manage Stress" conditions to the 1st HeartMath® session was revealed (Table 3). There were non-significant differences in high HRC and each of the post session conditions (Table 3). The objective changes reported here are further supported through the subjective comments captured in the therapists' documentation of the recreation therapy services received.

Qualitative Results

Content analysis of the RT documentation performed after each of the sessions revealed several themes including: feeling in control, integrating processes into everyday life, and emotional transformations.

Feeling in control. The biofeedback sessions helped all six of the women realize that they had control over certain physiological responses. As one woman stated, "It is really good to be able to see on the monitor what you can do to control your physiology." Being able to see your heart rhythms on the computer monitor helped the women understand that they could control their physiological response, in particular their heart rate coherence, and that these techniques could help them manage many situations. One woman used the quick coherence technique as a way to take control of her health

and develop stress management skills. In response to a session where she sought to find an inner balance she stated, "This was the best session yet. I feel really good about how I am changing." She went on to say, "I know that I am really responsive to stress. I know that I can control that stress by getting into heart rate coherence. I just need to be less self-critical." Similarly, another woman spoke about how her increased awareness of her emotions was creating stress that she was not managing well in her life. During one session she stated, "I know that I get really excited and distracted. Now I know that I can control that." The enhanced sense of control felt by the women led to a sense of empowerment. As one person stated, "If nothing else, I am learning to control my emotions and that is having a tremendous impact on my life." Feelings of empowerment appeared to increase in relevance once the women realized the importance of integrating these techniques into their everyday life.

Integrating processes into everyday life. One participant described the process the women went through when realizing the importance of integrating these techniques into everyday life. After completing a seven-minute balloon game in which she maintained consistently high heart rate coherence one woman commented, "I feel great! I could do this all day. Now I just need to integrate this into my everyday life." During recreation therapy sessions the women were encouraged to start each day by getting into heart rate coherence and focusing on positive feelings of love and appreciation. As one woman stated, "I know that happiness is a choice. I am going to try to track my feelings, thoughts, actions and start each day and end each day in a positive

manner." In essence, these techniques gave these women a new emotional perspective on life. These emotional changes manifested themselves as "calming forces in life," "feeling grateful," feeling "less chaotic," and having fewer "imposing thoughts." Just as suggested in the Leisure and Well Being Model, the participants stated that the integration of these techniques into their life allowed them to "feel positive experiences and emotions to draw from and feel that sense of calm." Many of the women spoke about the gratitude they had for what they were learning in the program. Because of the increased empowerment that came from regulating heart rate coherence and focusing on positive emotions the women spoke of how they had transformed their lives.

Emotional transformations. The transformation that the participants experienced were different depending on their individual needs however, they largely centered on feeling more hopeful and optimistic. One participant shared when she first started the program she cried frequently. During one session several weeks into learning HeartMath® techniques, she shared, "Remember when I used to cry a lot? I have noticed that I am not doing that now. I feel more centered." Many women spoke of how the program was really helping them to "see what I need to do to put this all in perspective." The women shared how knowing they had the control to get into heart rate coherence and use those skills as a coping mechanism for stressful situations by developing their optimism and hopefulness for change. One woman articulated this renewed optimism by stating

How could this program not affect your optimism? We have to feel encouraged by exercising three times a week and doing recreation therapy. Many of us never did anything for ourselves prior to having cancer, now we are taking care of ourselves, and getting positive reinforcement for our actions every day. It has to make us feel healthier.

The renewed sense of optimism and feeling positive towards life reflected the transformation and focusing of life priorities. One participant who stated, "You know it is amazing in our society that we spend all this time and money on things but we don't take the time to work on our greatest gift-our heart and mind," captured this sentiment eloquently.

Discussion and Implications

Findings from the case series present preliminary evidence that a 6 week RT intervention using HeartMath and other biofeedback programs can result in significant improvements in HRC ratios and lead to subjective perceptions of improved quality of life. Based on the small sample size and non-random selection of participants the results of this case series are limited. It could be that individuals who volunteered for the GRH program and engaged in this research were more assertive in taking control of their life post cancer treatment and were thus more prone to positive change. Perhaps the well-being of these cancer survivors would improve naturally as they naturally healed after treatment. However, this case series does provide some provocative findings. The significant changes observed with such a small sample indicates significant clinical relevance if this study can be replicated with larger samples. The implications for practitioners and researchers are discussed further below.

Implications for Therapeutic Recreation Practice

The results of this study support the assertion that recreation therapy interventions using HeartMath® and other biofeedback programs can have a significant impact on the HRC ratios of women with breast cancer. Being able to increase and sustain higher levels of HRC result in increased physiological and psychological functioning including improved mental and emotional balance, immune function, hormonal and nervous system function, and reduced pain (McCarty et al., 2006). The perceptions of the women recorded in the RT documentation support the notion that learning to sustain HRC and shift one's emotional focus toward feelings of love and appreciation resulted in a more positive outlook on life and helped them live a healthier and more fulfilling life. The RT appears to have helped these women develop positive coping skills that they in turn used to create a "new normal life" post breast cancer treatment.

It is important to note that there was a significant change in HRC from baseline to the very first five-minute training using HeartMath® for all six of these women. These results were sustained and presumably reinforced over the course of the six-week intervention. These findings support the results of other studies that discovered immediate and enduring changes in HRC after learning the Quick Coherence Technique

(Childre & Rozman, 2005; McCraty et al., 2006). This is promising for recreation therapists who often have to carry out interventions targeting stress management and the development of coping skills in a short time frame. It is also exciting that the Quick Coherence technique fits within a positive emotion focused explanatory style and therefore may be instrumental in facilitating the well-being of individuals in the midst of negative life experiences.

Another benefit of using HeartMath® to empower clients make positive emotional shifts and effectively cope with negative life experiences is that recreation therapists can easily track the physiological changes that occur. One method that can be used to document outcomes is to track heart rate coherence ratios as demonstrated in this study. Another method that would likely require assistance, but is nonetheless plausible, is also to monitor cortisol and dehydroepiandrosterone (DHEA) levels by taking salivary samples (McCraty et al., 2006). If recreation therapists were better able to monitor the psychophysiological changes that occurred in clients as a result of implementing these simple techniques, and if these changes are accepted as proxies for important clinical outcomes, it could go far in demonstrating the clinical relevance of these techniques and increasing awareness and acceptance of the value of RT among other service providers. It is important to recognize that training is needed to develop the competencies required to deliver HeartMath® interventions. The HeartMath® Institute offers an on-line HeartMath Interventions Certification program for health care professionals or an on-site 1:1 Provider Licensing Program. More information about these trainings can be found on-line.

Demonstrating that recreation therapy interventions have psychophysiological outcomes is important but these outcomes should not distract our attention from the fact that leisure is a fun and enjoyable experience. Research has documented that leisure is often considered to be enjoyable by clients and this enjoyment can enhance some clinical outcomes (Hutchinson, LaBlanc, & Boothe, 2006). Teaching clients how to experience moments of enjoyment on a daily basis is important because enjoyment reflects one's happiness, personal satisfaction, optimism, and hopefulness (Seligman, 2006). These attributes allow individuals to live meaningful and fulfilling lives. This opportunity is especially significant for individuals who feel as if they have had some control, meaning, and purpose stripped from their lives due to negative life experiences. Just as

the women with breast cancer enrolled in the Get REAL & HEEL program illustrated, using leisure as a context in recreation therapy allowed them to feel in control, integrate skills into everyday life, and transform their emotions.

Implications for Therapeutic Recreation Research

The research design utilized in this case series was effective in demonstrating clinically relevant outcomes that can help patients monitor physiological changes that occur as they develop and practice various HM techniques; however, future research could improve upon this design and provide more reliable data. This research protocol needs to be conducted with larger samples. In addition, randomly assigning individuals into various arms of a study that included a control group will be a vital role in demonstrating that the effects on HRC and positive feelings of well-being were the result of the RT intervention. As mentioned above, to establish a clear link between improved HRC and immune functioning researchers also need to collect data utilizing physiological indicators of immune functioning such as DHEA/cortisol.

Summary

Recreational therapists can play a critical role in helping cancer survivors develop the skill and ability to live a high quality of life post cancer treatment. The role that RT's assume in post cancer care will largely be dependent upon the ability to demonstrate to the medical community that services will have a specific measurable impact on decreasing cancer mortality and cancer recurrence. In an effort to demonstrate this role a more sophisticated, yet practical and cost effective, way to demonstrate outcomes must be adopted. As demonstrated in this case series the application of HeartMath® and other biofeedback programs can play a significant role in accomplishing this agenda. In addition, the delivery of RT services under the umbrella of the Leisure and Well-Being model may enhance the continuity and focus of treatment in critical areas required for women to return to their "new normal" life post cancer treatment.

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