Depressive Symptoms, Sleep Quality, and Quality of Life in Cancer Survivors Who Participated in Mind-Body Movement Exercise Classes

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Abstract

Background: Cancer survivorship is defined as the term used to describe all persons that have had a diagnosis of cancer, not only those whose cancer is in remission. The number of cancer survivors in the United States is projected to reach 20.3 million by 2026. Significant problems cancer survivors face include depression, poor sleep quality, and poor quality of life (QOL). Mind-body movement exercises (MBME) have the potential to improve depressive symptoms, sleep quality, and QOL among cancer survivors. Purpose: The purpose of this study was to describe the effect of MBME on the depressive symptoms, sleep quality, and quality of life of cancer patients. Method: This study examined cancer survivors enrolled in MBME classes. Baseline data was collected at the time of enrollment and follow up data was collected at 6 months after completion of the class. Theoretical Framework: Wilson and Cleary’s model of health-related QOL defines that symptoms and functional status are two of the five central determinants to QOL; depressive symptoms and sleep quality directly contribute to QOL. Results: Data were collected from 20 participants at baseline and at 6 months. Depressive symptoms were measured with the CES-D, QOL with the FACT-G, and sleep quality with the PSQI. All domains of QOL improved, and less participants were positive for depressive symptoms and poor sleep quality at 6 months. Conclusion: Cancer survivors participate in MBME. Future research using MBME as an intervention to improve depressive symptoms, sleep quality, and quality of life is warranted.
Chapter I: Statement of the Problem

Introduction

Improvements in cancer treatment have led to survivors living longer with their cancers, and the number of survivors grows larger every year. According to the American Cancer Society (2016), in January of 2016, over 15.5 million adults and children with a history of cancer were alive in the United States. By January of 2026, the cancer survivor population is predicted to reach 20.3 million.

The definition of “cancer survivorship” has been a controversial topic. The National Cancer Institute (NCI) states that survivorship focuses on the time period from the end of curative treatment through the end of life, while the Centers for Disease Control and Prevention (CDC) state that survivorship begins at the time of diagnosis (“NCI Dictionary” n.d.; “Who Are Cancer Survivors?”, 2016). In a systematic review of published definitions, Marzorati, Riva, & Pravettoni (2016) conclude that the most widely used definition is that cancer survivorship begins at diagnosis. Cancer survivorship has experienced a shift from focusing on extension of life to improving the quality of life (QOL) of the cancer survivor. According to Leigh (2007), cancer survivorship considers not only how long patients live, but also how well they survive, using the term “thrive”. The use of mind-body movement exercises (MBME) such as yoga, tai chi and Qigong is an example of a set of interventions that have been investigated for the potential to help cancer survivors thrive. Three important problems the growing cancer survivor population faces are depression, poor sleep quality, and a low QOL (Miller et al., 2016; Palesh et al., 2010). The prevalence of depression in cancer survivors is even higher than the already high prevalence in the general population;
studies estimate that up to 29% of cancer survivors have depression (Irwin, 2013). Depression leads to poorer overall QOL and can further negatively impact sleep quality that may or may not already be poor due to chemotherapy treatment (Smith, 2015).

**Theoretical Framework**

The Wilson and Cleary conceptual model of health-related QOL was used as the theoretical framework of this study. The model proposes that measures of health exist on a continuum of five levels of increasing complexity: biological and physiological variables, symptom status, functional status, general health perceptions, and overall QOL. Each level affects the one following it, ultimately resulting in a change in QOL (Wilson & Cleary, 1995). For example, physiological abnormalities in neurotransmitters can contribute to depressive symptoms such as fatigue and anhedonia. These symptoms can lead to lower functioning at work and social gatherings, and because they cannot function like they used to, the person may perceive that they no longer feel happy or satisfied with life. Depressive symptoms and poor sleep quality fit within the model to have the potential of adversely affecting the overall QOL of the cancer survivor.

**Study Purpose and Aims**

The purpose of this study was to examine depressive symptoms, quality of sleep and QOL among cancer survivors who participated in a MBME class. The study aims were:

1. Describe depressive symptoms (i.e., CES-D scores) among cancer survivors who participated in MBME classes at baseline and 6 months post-class completion.
2. Describe QOL (i.e., FACT-G scores) among cancer survivors who participated in MBME classes at baseline and 6 months post-class completion.
3. Describe sleep quality (i.e., PSQI scores) among cancer survivors who participated in MBME classes at baseline and 6 months post-class completion.

Chapter II: Review of the Literature

Depression

Major depression, also known as clinical depression, major depressive disorder, or simply depression, is a significant problem in the United States (NCHS, 2014). In addition to being one of the most common mental health disorders, depression causes serious problems in the daily activities of those affected by it. During 2009-2012, 7.6% of the population ages 12 and up had moderate or severe depressive symptoms (NCHS, 2014). The most prevalent age group for depression is 40-59 in both females and males, with depression being more prevalent in females than males in all age groups (NCHS, 2014). Nearly 43% of persons with severe depressive symptoms reported serious difficulties in their work, home, and social activities when choosing between any, some, and serious difficulty (NCHS, 2014). A diagnosis of depression is also a risk factor for suicide. In 2013, suicide caused 41,149 deaths, a 12.4% increase from 2012, and was the 10th leading cause of death for all ages in the United States (NVSR, 2015).

Depression in cancer patients

Depression is even more prevalent in cancer patients than in the general population. Studies generally report the prevalence of depression among cancer patients between 15% and 29% (Irwin, 2013). The prevalence of depression varies with the type of cancer. The cancer types with the highest rate of depression are oropharyngeal (22%-57%), pancreatic (33%-50%), breast (1.5%-46%), and lung (11%-44%). Cancer types
with a lower rate of depression include colon (13%-25%), gynecological (12%-23%), and lymphoma (8%-19%) (Massie, 2004). According to the NCI’s Surveillance, Epidemiology, and End Results Program report (2013), not counting breast cancer, the cancers with the highest rate of depression have below average 5-year survival rates: 64.0% for oropharyngeal, 7.7% for pancreatic, and 17.7% for lung. Not counting ovarian cancer, gynecological cancers and lymphomas have above average 5-year survival rates, showing that survival rate and depression rate may be inversely related.

**Cancer Survivorship**

There have been many recent advances in cancer detection and treatment. One example is the use of microarray, which allows measurement of differential expression of a distinct gene complement in different morphological types and grades of a tumor (Xie, 2003). An example of a recent advance in treatment is the development of the drug Lenvatinib, used for thyroid cancer that is unresponsive to radioiodine therapy (Schlumberger, 2014). A growing number of people are living longer with their cancers because of such advancements. The growing survival rate of persons with cancer has led to the switch in terminology used for a person living with a cancer diagnosis from cancer victim to cancer survivor (Bell, 2013). The term cancer survivorship is significant because the number of survivors in the United States has increased steadily during the past 30 years, and in 2001 approximately 10 million cancer survivors in the United States (CDC, 2004). As of January 1, 2016, approximately 15.5 million cancer survivors were living in the United States. This number is projected to reach 20.3 million by 2026 (American Cancer Society, 2016). By 2023, the number of people who have lived 5 years or more after their cancer diagnosis is projected to increase to 11.9 million (de Moor,
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2013). To put this in perspective, that is enough to fill the Ohio Stadium, one of the largest university football stadiums in the country, 113 times. Furthermore, survivorship is an important topic because people with a history of cancer identify the term “cancer survivor” with connotations of trauma, physiological fitness, and psychological fitness. Embracing this role of the cancer survivor seems to lead to a more active approach to dealing with cancer and its aftermath, reducing anxiety and depression and improving self-esteem (Deimling, 2007). Even after completing treatment and being deemed “cancer-free”, the cancer survivor has a “new normal” and does not simply go back to being healthy. Instead, they are stuck in a space of uncertainty that lies between the continuum of healthy and sick (Bell, 2013).

There are several possible reasons why some people object to the use of the term “cancer survivor” to describe all persons living with a diagnosis of cancer. First, the concept of the cancer survivor ignores any differences between the 100 or more distinct types of malignancies which may have completely different effects, treatments, and outcomes; it asserts that all cancer patients are on equal and common ground despite having a wide variety of different diseases (Marcus, 2004). Second, people object to the use of the word survivor because of its association with Holocaust victims and victims of violent crime; these people point out that people who have had heart attacks are not called heart attack survivors (Marcus, 2004). They argue that the concept of the survivor brings together survivors of the Holocaust, violent crime, and cancer patients with an underlying assumption of trauma, even though it is unclear whether all people who experience cancer think it is traumatizing (Sinding, 2008). Finally, some dislike the term because it only calls attention to the mere existence of life, but not the QOL. Leigh (2007,
p.11) states that “survivorship is not just about if or how long patients live, but also about how well they survive and, hopefully, thrive.”. Because of this, some advocate for the use of the term “thriver” instead of survivor. It should also be noted that in light of the connotations of survival as an achievement, some have renounced the implication that people who have not died in the fight against cancer are somehow braver or better (Ehrenreich, 2001).

**Yoga**

It is well documented that mind-body movement exercises can be helpful to cancer survivors in many ways. Breast cancer survivors have reported that a mind-body movement program gave them greater freedom and reported a sense of rediscovery of their body (Crane-Okada, 2012). Cancer survivors of hematopoietic stem cell transplant (HCT) have shown improvements in physical capacity, anxiety, depression, fatigue, heart rate, respiratory rate, and overall QOL when participating in programs involving mind-body movement (Chakraborty, 2015). These studies suggest that mind-body movements can offer cancer survivors multiple benefits with few or no negative effects. The practice of yoga is one of the most well-known and widely practiced mind-body movement exercises in the United States. It has been shown to benefit cancer patients with many different types of cancers in several capacities, both psychosocial and physical (Buffart, 2012). In a meta-analysis including randomized control trials of cancer patients with lymphomas and breast cancer, large reductions in distress, anxiety, and depressive symptoms were observed, as well as moderate increases in general QOL and moderate reductions in fatigue (Buffart, 2012).
In a meta-analysis, health-related QOL was positively impacted after 12 weeks of an exercise intervention that included a combination of walking and yoga or walking and qigong (Mishra, 2012). Domains of health-related QOL that benefited from these practices include physical functioning, role function, social functioning, and fatigue. Although Mishra’s study included individuals with many different types of cancer, breast cancer patients appeared to have a significantly greater reduction in anxiety. In addition, persons with a cancer other than breast cancer experienced greater improvements in depressive symptoms and fatigue (Mishra, 2012). Yoga for Cancer Survivors (YOCAS®), has shown to be an effective intervention for reducing cancer-related fatigue, physical fatigue, mental fatigue, and global side-effect burden among cancer survivors that are 65 years of age or older (Sprod, 2015). YOCAS® has also been shown to reduce musculoskeletal symptoms such as general pain, muscle aches and total physical discomfort for breast cancer patients on hormonal therapy (Peppone, 2015). In addition, the same program has been found to improve global sleep quality, subjective sleep quality, daytime dysfunction, and sleep efficiency for cancer survivors (Mustian, 2013). Yoga has been found to increase vigor, reduce perceived stress, and reduce depressive symptoms when compared to health education as an intervention for breast cancer patients (Bower, 2012). Yoga sessions with an experienced yoga instructor for breast cancer patients can significantly increase both right and left shoulder abduction flexibility (Sudarshan, 2013). Pranayama, a form of yoga involving series of purposeful changes in breathing, can improve sleep disturbance, anxiety, and mental QOL for cancer patients undergoing chemotherapy (Dhruva, 2012). For dyads of lung cancer patients and their caregivers, a Vivekananda yoga program, which emphasized interconnectedness
through breath synchronization and partner postures, significantly increased the mental health of the patients and significantly decreased sleep disturbances of the caregivers (Milbury, 2015). In a six-week Vinyasa yoga program for caregivers of patients with cancer, significant improvements were observed in the mental component score of overall QOL and in overall psychological distress. Several participants also self-reported perceived improvements in flexibility, core and upper-body strength, balance, breathing, and energy. (Martin, 2014). Qualitative analysis of adult cancer patient semi-structured discussions revealed that patients thought that yoga reduced stress and that the social dimension of yoga was very important, as well as yoga’s ability to encourage personal empowerment and awareness of the physical body and self (McCall, 2015). In a study where patient’s completed journal reflections and received weekly phone calls about a twice weekly 90-minute yoga lasting 8 weeks, patients felt highly motivated to improve physical fitness and reduce pain. They also experienced significant reduction in aromatase-inhibitor associated arthralgia (Galantino, 2012).

Recent literature has explored the effects of yoga interventions on patients with breast cancer more than any other cancer type. When compared with a control group, a yoga intervention group has statistically significant better outcomes in depression, anxiety, and gastrointestinal symptoms (Pan, 2015). However, positive effects on anxiety were only seen if yoga had been practiced for longer than 3 months, suggesting that the duration of yoga practice may affect some domains of health-related QOL (Pan, 2015). Another study compared yoga versus a traditional supportive therapy. The depressive symptoms of both groups were assessed through self-report before, during, and after surgery, radiotherapy, and chemotherapy. The yoga group experienced a significant
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Decrease in depression scores when compared with the control supportive therapy group (Rao, 2015). This study shows that yoga may offer many benefits to persons with cancer who are undergoing conventional treatment including surgery, radiation therapy, and chemotherapy (Rao, 2015). When specifically investigating women with breast cancer who are only undergoing chemotherapy, an 8-week yoga program has been shown to effectively reduce fatigue but effects on depression and anxiety were not statistically significant (Taso, 2014).

In summary, yoga can benefit many domains of health-related QOL, including fatigue, anxiety, and social functioning. The literature shows that yoga may significantly decrease depression scores, especially in patients with a cancer other than breast cancer. Patients with breast cancer may experience greater reductions in fatigue than patients with other cancer types. In addition, yoga may reduce anxiety scores in patients with breast cancer when practiced for a duration longer than 3 months. Yoga is just one mind-body movement that may be helpful to cancer patients and their families. It is the most studied MBME and its many positive benefits for cancer patients are well documented.

Tai Chi

Tai Chi is martial art created by Chen Wang Ting, a retired army General, over 300 years ago. Despite initially being a martial art, it has since changed to include many “gentle” styles; it is therefore popular for elderly people to practice it at a slow pace. In a meta-analysis using 67 randomized controlled trials, tai chi had no effect on QOL of breast cancer patients when compared with acupuncture; however, tai chi improved the vital capacity of breast cancer patients (Tao, 2016). This study shows that tai chi may not
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improve QOL in cancer patients, specifically those with breast cancer, but may be useful for improving vital capacity and decreasing respiratory symptoms.

Another systematic review and meta-analysis evaluated the benefits of various traditional Chinese medicine interventions on QOL; both qigong and ta chi were examined, along with Traditional Chinese Medicine five elements musical intervention and Traditional Chinese dietary supplementation (Tao, 2015). These interventions reduced functional impairments in cancer patients, reduced pain, reduced depressive symptoms, reduced time to flatulence after surgery, and improved sleep. Improvements in fatigue and gastrointestinal distress were also observed (Tao, 2015). This study suggests that tai chi may benefit cancer patients in many ways, but may not be as effective as other traditional Chinese medicine interventions such as acupuncture.

A randomized controlled trial investigated the effects of qigong and tai chi versus qigong only and a control group on breast cancer patient’s fatigue, depression, and sleep quality (Larkey, 2015). A combined qigong and tai chi program significantly decreased fatigue when compared with the qigong only group after 12 weeks and at 3 months follow-up, but significant effects on depression and sleep quality were not observed. Both the combined tai chi and qigong group and the qigong only group exhibited significant improvements in depression and sleep dysfunction when compared with the control group (Larkey, 2015). This study suggests that either qigong or tai chi can help improve depressive symptoms and sleep dysfunction in breast cancer patients, but a combined qigong and tai chi intervention lasting at least 12 weeks may significantly reduce fatigue more than a qigong intervention alone.
In summary, tai chi does not improve as many QOL domains as yoga, but can still improve several areas of the breast cancer patient’s life, including depressive symptoms, fatigue, and vital capacity. Further randomized controlled trials with a greater number of subjects and many different types of cancers should be completed in order to investigate the effects of tai chi on the cancer patient’s life.

**Qigong**

Qigong, having been considered a type of medical exercise for thousands of years in China, is older than qigong, and encompasses a variety of different styles such as Daoyin, Wu Qin Xi, and Ba Duan Jin. Systematic reviews and meta-analyses have shown that qigong can significantly improve depressive symptoms.

A pilot study investigated whether a medical qigong program can be beneficial in reducing fatigue, depression, and sleep dysfunction in cancer patients according to a pre-intervention and post-intervention evaluation before and after a five-week medical qigong course. Results showed that depression was reduced after completing the five-week medical qigong class (Overcash, 2013). A systematic review and meta-analysis of nine randomized controlled trials observed that a 12-week qigong intervention can significantly reduce depression and anxiety, reduce body mass index, and reduce blood cortisol level (Zeng, 2014). Together, these studies suggest that a qigong intervention between 5- and 12-weeks can at least reduce depression scores, and the benefits increase as the duration of the qigong program increases. The 12-week program showed additional reduction in anxiety, body mass index, and cortisol levels.

Randomized controlled trials have indicated that qigong is able to significantly improve physical fatigue, depressive symptoms, anxiety symptoms, and can marginally
improve mental fatigue in people with a chronic fatigue syndrome-like illness (Chan, 2013). Considering how fatigue is a major problem with many cancer patients and their families and caretakers, qigong could potentially have some positive effects in patients with cancer and their families and caretakers. Besides showing positive effects on depressive symptoms and fatigue, qigong has been shown to promote pulmonary function in COPD patients. In a study with 70 participants in a control group, 69 participants in a conventional exercise group, and 67 in a qigong group, the qigong group improved their forced vital capacity and forced expiratory volume in the first second significantly more than the control group and conventional exercise group (Chan, 2013). In addition, the exercise capacity measured in walking distance improved significantly for the qigong group compared with the control group (Chan, 2013).

Overall, the literature investigating qigong in cancer patients is not as extensive as the amount of literature investigating yoga and tai chi for the same purposes. The findings of studies that have been completed should be interpreted with caution because of the limited amount of results. Further rigorous randomized controlled trials should be carried out to investigate the potential benefits that a qigong intervention can have for the cancer patient.

Cancer and Depression

Depression is a public health problem in the United States. According to the Substance Abuse and Mental Health Services Administrations, a division within the United States Department of Health and Human Services, about 6.7% of all adults in the United States had at least one major depressive episode in the past year (SAMHSA, 2015). The prevalence of depression is even higher in cancer patients than in the general
population, with estimates ranging from 8% to 57%, depending largely on the type of cancer involved (Massie, 2004). Cancers with worse prognoses, such as lung cancer and pancreatic cancer, tend to have higher rates of depression. Breast cancer also has a high rate of concurring depression, possibly because of the associated risks of scarring and body image problems. Even cancers with better prognoses such as colon cancer or gynecological cancer have rates of depression ranging from 8% to 25% (Massie, 2004). The prevalence of depression in the general population is already large, but it is significantly larger in cancer survivors; even those with the cancers with the best prognoses have a higher prevalence of depression.

Chapter III: Methodology

Setting and Sample

This study was a one group repeated measures design. The study took place at The Ohio State University Wexner Medical Center- James Cancer Hospital (OSUWMC-JCH) JamesCare for Life MBME classes. This study was approved by The Ohio State University Institutional Review Board. Eligibility for this study included: participants who were 18 years of age or older, able to speak and to read English, had a diagnosis of cancer or self-identified caregiver for someone diagnosed with cancer. Participants who were cognitively unable to consent and participants who did not wish to participate were excluded. JamesCare for Life MBME courses are offered for free to the public for any cancer survivor or caregiver. Classes were offered in three locations in the Columbus area at a variety of times during the day and evening. Sessions were 10-weeks in length and classes were 60-90 minutes. There are three yoga courses offered in three separate
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locations, days of the week, and time of the day, and one each of tai chi and qigong. This study collected data from the first class and 6 months after completion of the class. At recruitment, the percentage of participants that were cancer survivors was 85.7% for yoga, 50% for qigong, and 100% for tai chi. Caregiver participants made up the rest of the class.

Data Collection Procedures

Study personnel arrived before the start of each class and invited people in the class to participate. If interested, participants read and signed the consent form, then completed a study questionnaire. Identical data was collected at 6 months from study completion via a mailed survey. The questionnaire took approximately 15-20 minutes for the participants to complete.

Data Collection Instruments

Data collection measures included the Functional Assessment of Cancer Therapy-General (FACT-G) with 27-items to measure QOL, Center for Epidemiological Studies Depression Scale (CES-D) with 20-items to measure depressive symptoms, Pittsburgh Sleep Quality Index (PSQI) with 9-items to measure sleep quality, and a biographical data sheet. Subjective measures included: QOL, depressive symptoms, and sleep quality.

A. Biographical and Clinical Data Sheet

Age, gender, race/ethnicity, primary cancer diagnosis, and self-reported health status now and compared to 1 year age were collected on the Biographical Data Sheet.

B. CES-D
The CES-D (Center for Epidemiologic Studies Depression Scale) is an accepted instrument to assess depressive symptoms. In people who are hospitalized, the internal consistency is 0.90, and in people who live in the community, the internal consistency is 0.85 (Radloff, 1977). The test-retest reliability of the CES-D is 0.54 and it has a high correlation with other instruments used to measure similar symptoms (Radloff, 1977). A cut point of 16 or greater can be classified as positive for depressive symptoms. The CES-D is not used for diagnostic purposes, and a high score is not indicative of a diagnosis of depression.

C. FACT-G

The FACT-G (Functional Assessment of Cancer Therapy-General) is an instrument used to assess QOL in cancer patients. It measures 5 domains: physical wellbeing, social wellbeing, functional wellbeing, emotional wellbeing, and relationship with physician. The physical, functional, and social subscales have 7 questions each, while the emotional subscale has 5 and the relationship with physician subscale has 2. This means there is a total of 28 questions in the FACT-G. Participants respond to statements using a Likert scale of 0-4, with 0 meaning ‘not at all’ and 4 meaning ‘very much’. A higher score corresponds to a higher QOL. The overall score may range from 0 to 112, and is composed from the scores for each of the subscales. The physical, functional and social subscales have a maximum score of 28. The emotional subscale has a maximum score of 20. The relationship with physician subscale has a maximum score of 8 (Cella, 1993). The internal consistency for the overall scale is 0.89 (Winstead-Fry & Schultz, 1997).
D. PSQI

The PSQI (Pittsburgh Sleep Quality Index) is an instrument used to assess sleep quality. It is composed of 19 items which create an overall score that may range from 0 to 21. Higher scores indicate lower quality of sleep, while lower scores indicate higher quality of sleep. The PSQI also differentiates between what is good and poor sleep by using a cut point of 5; a score greater than 5 indicates a poor sleeper. A score under 5 indicates a good sleeper. The PSQI has a sensitivity of 89.6% and a specificity of 86% (Buysse, 1989).

Data Analysis

Descriptive data with means, percentages, frequencies, standard deviations and cut points were reported. All analyses were conducted in SPSS 23 (IBM Corporation, Armonk, NY). Only measures from participants who provided data at baseline and 6 months were included in the current analysis. There were nine participants who provided data at baseline, but dropped out during the study. Some reasons for drop out included death and cancer progression.

Chapter IV: Results

There were 33 cancer survivors who enrolled in the study. However, only participants who reported data at baseline and at 6 months are included in this analysis. There were 20 participants who reported data at both time points (Table 1). At baseline, most of the participants identified as female and Non-Hispanic White. Almost all of the participants were college graduates, and more than half reported earning an income greater than $50,000 per year. Most participants were enrolled in a yoga class (60.0%).
About half had breast cancer. Some participants were actively receiving treatment for cancer such as surgery, hormonal therapy, radiation therapy, or chemotherapy.

Table 1. Participant Characteristics at Baseline

<table>
<thead>
<tr>
<th>Participant Characteristics (n=20)</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Age [M (SD)]</strong></td>
<td>60.7 (8.76)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>16 (80.0%)</td>
</tr>
<tr>
<td>Male</td>
<td>4 (20.0%)</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>18 (90.0%)</td>
</tr>
<tr>
<td>Asian American/Pacific Islander</td>
<td>2 (9.1%)</td>
</tr>
<tr>
<td><strong>Income (n=19)</strong></td>
<td></td>
</tr>
<tr>
<td>$15,001 to $20,000</td>
<td>1 (5.3%)</td>
</tr>
<tr>
<td>$20,001 to $35,000</td>
<td>1 (5.3%)</td>
</tr>
<tr>
<td>$35,001 to $50,000</td>
<td>4 (21.1%)</td>
</tr>
<tr>
<td>&gt;$50,000</td>
<td>11 (57.9%)</td>
</tr>
<tr>
<td>Prefer to not answer</td>
<td>2 (10.5%)</td>
</tr>
<tr>
<td><strong>Education (n=19)</strong></td>
<td></td>
</tr>
<tr>
<td>High school diploma</td>
<td>2 (10.5%)</td>
</tr>
<tr>
<td>Some college or technical school</td>
<td>1 (5.5%)</td>
</tr>
<tr>
<td>College or university degree</td>
<td>16 (84.2%)</td>
</tr>
<tr>
<td><strong>Class Type</strong></td>
<td></td>
</tr>
<tr>
<td>Yoga</td>
<td>12 (60.0%)</td>
</tr>
<tr>
<td>Tai Chi</td>
<td>6 (30.0%)</td>
</tr>
<tr>
<td>Qigong</td>
<td>2 (10.0%)</td>
</tr>
<tr>
<td><strong>Primary Cancer</strong></td>
<td></td>
</tr>
<tr>
<td>Breast cancer</td>
<td>9 (45.0%)</td>
</tr>
<tr>
<td>Other cancer</td>
<td>11 (55.0%)</td>
</tr>
</tbody>
</table>

At baseline, 60% of participants screened positive for depressive symptoms and the mean CES-D score was 17.5 (see Table 2). Six months post-class completion, the mean CES-D score increased to 18.2, showing that some participant’s depressive symptoms had worsened; however, the percentage of participants screening positive for depressive symptoms decreased from 60% to 45% (see Table 2).
Table 2. Depressive Symptoms at Baseline and at 6 months (n=20)

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>CES-D, Mean (SD)</td>
<td>17.5 (6.0)</td>
<td>18.2 (7.1)</td>
</tr>
<tr>
<td>+ Depressive Symptoms [n,%]*</td>
<td>12.0, 60%</td>
<td>9.0, 45%</td>
</tr>
</tbody>
</table>

*A cut point of ≥16 on the CES-D indicates positive depressive symptoms.

At baseline, 73% of participants screened positive for problems with sleep, and the mean PSQI score was 6.9 (See Table 3). Six months post-class completion, the PSQI mean decreased to 6.0, showing an improvement in sleep quality, and the percentage of participants with poor sleep quality decreased from 73.3% to 60% (see Table 3).

Table 3. Sleep Quality at Baseline and at 6 months (n=15)

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSQI Mean (SD)</td>
<td>6.9 (4.4)</td>
<td>6.0 (3.9)</td>
</tr>
<tr>
<td>+ Sleep Problems [n,%]*</td>
<td>11.0 (73.3)</td>
<td>9.0 (60)</td>
</tr>
</tbody>
</table>

*A cut point of ≥16 on the PSQI indicates positive problems with sleep.

At baseline, the mean total FACT-G score was approximately 79%. The mean scores for the subscales ranged from 18-22% (see Table 4). Six months post-class completion, the means for all subdomains of the FACT-G increased, showing an improvement in overall QOL (See Table 4).
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Table 4. QOL at Baseline and at 6 months (n=20)

<table>
<thead>
<tr>
<th></th>
<th>Baseline (Mean, SD)</th>
<th>6 months (Mean, SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total FACT-G</td>
<td>78.8 (15.5)</td>
<td>81.7 (20.8)</td>
</tr>
<tr>
<td>PWB</td>
<td>21.5 (5.7)</td>
<td>22.9 (5.5)</td>
</tr>
<tr>
<td>FWB</td>
<td>19.0 (5.9)</td>
<td>20.2 (6.8)</td>
</tr>
<tr>
<td>EWB</td>
<td>18.0 (3.6)</td>
<td>18.1 (4.9)</td>
</tr>
<tr>
<td>SWB</td>
<td>20.4 (5.2)</td>
<td>20.5 (6.3)</td>
</tr>
</tbody>
</table>

Chapter V: Conclusions and Recommendations

Summary of Findings

This study described depressive symptoms, sleep quality, and QOL from the beginning of MBME classes to 6 months after the end of the classes. No statistically significant improvements were found, but clinically significant findings include less participants having depressive symptoms and poor sleep quality. Notably, 83% of participants reported practicing MBME within the 6 months post-class completion. The results of this study are consistent with the results of existing literature investigating MBME as an intervention for cancer survivors. A study done by Mishra (2012) found yoga and qigong interventions to increase health-related QOL. Another study done by Rao et al. (2015) found that yoga interventions significantly decreased depressive symptoms. Similarly, a study done by Larkey et al. (2015) found that tai chi improved sleep quality and depressive symptoms.
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Limitations

The sample was a small convenience sample, mostly female and breast cancer survivors; therefore, may not be representative of the cancer survivor population with the United States. This was a descriptive study that relied on self-reported data and recall. Participants may have had recall bias or there could have been bias in those participants who stayed in the study or provided data at each timepoint. Only participants who continued with the MBME classes and provided data at 6 months post study completion were included in the analysis. A strength of the study was that data were collected at multiple time points.

Conclusions

By 2023, the number of cancer survivors who will have lived 5 years or longer after their diagnosis is projected to reach 11.9 million (de Moor, 2013). By 2026, the number of cancer survivors in the United States is estimated to reach 20.3 million (American Cancer Society, 2016). The rapidly growing cancer survivor population makes cancer survivorship a topic of utmost importance. Cancer survivors experience significant problems with depressive symptoms, sleep quality, and QOL. Potential interventions to help cancer survivors with these problems include MBME classes such as yoga, tai chi, and qigong. Additionally, cancer survivors may continue practicing and reaping the benefits of MBME even after the end of the class, showing that MBME may have potential to help cancer survivors over longer periods of time.

Recommendations

Future studies investigating MBME as interventions for improving depressive symptoms, sleep quality, and QOL in cancer survivors are warranted. More studies
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should be done with a control group and a sample representative of the cancer survivor population. Furthermore, studies should be done to distinguish the effects MBME have on cancer survivors from the general population.
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References


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