Feasibility of Mind–Body Movement Programs for Cancer Survivors

Kristine K. Browning, PhD, ANP-BC, FAANP, Jennifer Kue, PhD, Felisha Lyons, MSW, LISW-S, and Janine Overcash, PhD, GNP-BC, FAANP

Browning is a clinical assistant professor and director of the masters in nursing program and Kue is an assistant professor, both in the College of Nursing at Ohio State University; Lyons is the director of the JamesCare for Life support services at the Ohio State University Comprehensive Cancer Center and Arthur G. James Cancer Hospital and Richard J. Solove Research Institute; and Overcash is a clinical associate professor in the College of Nursing at Ohio State University, all in Columbus.

No financial relationships to disclose.

Browning, Kue, and Overcash provided statistical support. All authors contributed to the conceptualization and design, completed the data collection, provided the analysis, and contributed to the manuscript preparation.

Browning can be reached at browning.99@osu.edu, with copy to editor at ONFEditor@ons.org.

Submitted June 2016. Accepted for publication October 20, 2016.

Keywords: clinical practice; mind–body interventions; quality of life; survivorship; depression

ONF, 44(4), 446–456.

doi: 10.1188/17.ONF.446-456

Purpose/Objectives: To evaluate mind–body movement exercise (MBME) classes (yoga, tai chi, and Qigong) for cancer survivors.

Design: A single-group, repeated-measures design.

Setting: The Ohio State University Wexner Medical Center–Arthur G. James Cancer Hospital in Columbus.

Sample: 33 adult cancer survivors, with any cancer diagnosis, participating in MBME classes.

Methods: The researchers sought to examine feasibility of multiple data collection time points and data collection measures; acceptability; and changes to physical, emotional, and biometric measures over time, as a result of participation in MBME classes.

Main Research Variables: Quality of life, sleep, depressive symptomatology, fatigue, stress, upper body strength, gait and balance, body mass index, heart rate, and blood pressure.

Findings: The current study was feasible because survivors were willing to participate and completed most of the questionnaires. Participants found these classes to be beneficial not only for exercise, but also for social support and social connectedness. Poor sleep quality was consistently reported by participants. MBME classes should be recommended to survivors and are beneficial for oncology practices to offer.

Conclusions: Conducting MBME research with cancer survivors is feasible, and participants find the MBME acceptable and a way of addressing health and managing cancer-related symptoms.

Implications for Nursing: Nurses should help patients and caregivers identify locations and times when MBME class participation is possible, assess MBME class participation during each clinic visit to promote continued involvement and to understand if positive effects are occurring, and continue to provide support for MBME classes throughout the survivorship experience.

The National Coalition for Cancer Survivorship (2014) and National Cancer Institute (2014) define a cancer survivor as a person who is living with cancer from diagnosis through the end of life. The survivorship experience is complex and includes the impact of a cancer diagnosis and treatment on family, friends, and caregivers. Survivorship care proactively enhances quality of life (QOL), establishes a healthy lifestyle, and seeks to reduce distress (O'Brien et al., 2014). Many survivors have turned to complementary health approaches, such as mind–body movement exercise (MBME), to manage symptoms and cope with side effects of cancer treatment (Buffart et al., 2012). Participation in MBMEs (yoga, tai chi, and Qigong) has nearly doubled in the United States, from 5.8% in 2002 to 10.1% in 2012 (Clarke, Black, Strussman, Barnes, & Nahin, 2015). MBMEs have many health benefits and are widely practiced around the world (Hung, Yeh, & Chen, 2016; Hwang

et al., 2016; Youkhana, Dean, Wolff, Sherrington, & Tiedemann, 2016).

The purpose of the current study was to evaluate MBME classes for cancer survivors at a comprehensive cancer center. The researchers sought to examine feasibility of multiple data collection time points and data collection measures; acceptability; and changes to physical, emotional, and biometric measures over time, as a result of participation in MBME classes.

Mind–Body Movement Exercise

MBME is a term used to describe therapeutic exercises, which are considered complementary health approaches vital to the survivorship care plan (Mustian et al., 2013; Sprod et al., 2015). Although Eastern cultures have practiced yoga, tai chi, and Qigong for centuries, they have only been adopted by Western medicine in the past few decades as a health benefit for cancer survivors, particularly in terms of alleviating side effects from cancer treatment, improving QOL, reducing fatigue, and improving overall well-being (Galantino et al., 2012; McCall, Thorne, Ward, & Heneghan, 2015).

The Office of Cancer Complementary and Alternative Medicine defines complementary and alternative medicine as any medical or healthcare intervention that is not considered standard care and can be used in addition to standard, evidence-based cancer therapies (U.S. Department of Health and Human Services, 2005). The National Center for Complementary and Integrative Health considers mind and body practices to include a broad range of techniques, such as yoga, chiropractic services, meditation, and massage therapy, taught by trained practitioners (U.S. Department of Health and Human Services, 2016). The definition of MBME used for this research will be participation in a yoga, tai chi, or Qigong class offered as part of survivorship care.

Yoga

Many cancer survivors (57%) report a desire to participate in yoga as a physical exercise (Tyrrell, Keats, & Blanchard, 2014). Yoga tends to be the most commonly practiced MBME (Clarke et al., 2015) and has many benefits. Yoga has been shown to reduce cancer-related fatigue in older adult patients with cancer (Bower et al., 2012; Sprod et al., 2015) and reduce pain and muscle aches in breast cancer survivors receiving hormonal replacement therapy (Peppone et al., 2015). Yoga improves flexibility (Sudarshan et al., 2013) and reduces depression (Tekur, Nagarathna, Chametcha, Hankey, & Nagendra, 2012). Yoga, tai chi, and Qigong are associated with better sleep quality (Mustian et al., 2013), reduced anxiety (Dhruva et al., 2012; Wu, Kwong, Lan, & Jiang, 2015), and lessened stress and depression (Buffart et al., 2012). Yoga is effective for reducing lymphedema (Lai et al., 2015; Loudon, Barnett, Piller, Immink, & Williams, 2014) and associated tissue induration (Loudon et al., 2014). For those receiving chemotherapy, yoga is a feasible and tolerable exercise that can be practiced at home or in a group setting (Komatsu, Yagasaki, Yamauchi, Yamauchi, & Takebayashi, 2016).

Tai Chi

Tai chi is a form of Chinese martial arts and exercise. This MBME combines slow, methodical movements with breathing and imagery to strengthen and relax the mind and body simultaneously (Wayne & Kaptchuk, 2008). The intention of these meditative movements is to move one's life energy or qi. The benefits of tai chi are significant for patients with cancer. Tai chi is associated with improved physical and social well-being, functional capacity, QOL, mental health, and sleep quality (Sprod et al., 2015), and it reduces systolic and diastolic blood pressure and heart rate (Zhang, Li, Sun, & Su, 2013). Among patients with breast cancer, tai chi is associated with improved functional and aerobic capacity, bone health, muscular strength, and flexibility, and it builds self-esteem (Mustian et al., 2013). For breast cancer survivors who experience aromatase inhibitor arthralgia, participating in tai chi twice a week was associated with enhanced functional status, reduced anxiety and depression, and increased relaxation (Galantino, Callens, Cardena, Piela, & Mao, 2013). In older adults, tai chi, as compared to lower extremity training, has been shown to reduce falls and injury from falls (Hwang et al., 2016; Yildirim, Ofluoglu, Aydogan, & Akyuz, 2016) and improve strength of lower extremities (Zhou et al., 2016).

Qigong

Qigong is another traditional Chinese health and healing practice that has been used for thousands of years in China (Oh, Choi, Inamori, Rosenthal, & Yeung, 2013). Qigong involves coordinated, gentle exercise movements along with meditation and deep breathing (Zhang, 1997), and it promotes balance and energy flow throughout the body, contributing to physical and psychological well-being (Oh et al., 2013). Qigong is shown to decrease heart rate, blood pressure, and lipid levels, and improve immune function (Lee, Lee, Kim, & Choi, 2004; Lee, Lee, Kim, & Moon, 2003). Among patients with cancer, Qigong is shown to improve QOL, physical and emotional well-being, and cognitive functioning, and decrease fatigue and depressive symptoms (Campo et al., 2014; Oh et al., 2010, 2013). Although Qigong does not reduce existing lymphedema among

breast cancer survivors, it has been shown to improve vascular measures (Fong et al., 2014).

Mind–Body Movement Exercise Classes

About two-thirds of academic medical centers offer integrative health programing (Russo, Diener, & Stitcher, 2015), such as yoga, tai chi, and Qigong. National Cancer Institute–designated comprehensive cancer centers recognize the benefits of recommending MBME in the survivorship care plan (SCP) to help enhance physical activity and reduce problems associated with sleep quality and fatigue for survivors (Mustian et al., 2013; Sprod et al., 2015). Patients report benefits from participating in healing arts (Garland et al., 2013) and cognitive training (Dodds et al., 2015) classes. For many cancer centers, integrative health services can yield cost savings for inpatient care ranging from $156 per patient per day to $304–$431 per patient per day and decreased use of narcotics, decreased length of stay, and increased patient satisfaction scores (Russo et al., 2015). The costs for drug prescriptions and analgesics increase for patients using conventional care, compared to integrative therapies for which costs tend to decrease (Sundberg, Petzold, Kohls, & Falkenberg, 2014). Decreased use of antiemetics, anxiolytics, and hypnotics for inpatients with cancer also results in cost savings for the medical centers (Kligler et al., 2011).

Generally, cancer centers can offer MBME classes at a relatively low cost (Karbandi, Gorji, Mazloum, Norian, & Aghaei, 2015). Classes usually require relatively little space and an instructor who can guide about 20 participants (Herman, 2013). Most MBME classes are offered to patients and families for a small fee or without charge.

Care Planning

MBME classes can be offered as a component of the SCP as well as the supportive care plan (Dobos et al., 2015), which addresses relieving symptoms associated with a diagnosis of cancer (American Cancer Society, 2016; Faul et al., 2014). SCPs are used to make suggestions about exercise, screening examinations, and dietary changes and include a comprehensive care summary of oncologic treatment and a detailed systematic follow-up plan (Palmer et al., 2015). Supportive care plans help organize the symptom management comfort strategies associated with a diagnosis of cancer (American Cancer Society, 2016). The popularity of MBMEs in SCP and supportive care plans has to do with the benefits in symptom management (Galantino et al., 2013; Jouper, Hassmen, & Johansson, 2006; Lin, Hwang, Wang, Chang, & Wolf, 2006). MBME classes can help to reduce pain and other problems associated with cancer treatment that many patients and survivors face daily (Campo et al., 2014; Larkey et al., 2015; Mustian, Katula, & Zhao, 2006; Peppone et al., 2015).

Social Support

Offering regular classes allows patients and caregivers to develop relationships with others who have similar experiences with illness. Classes can offer a type of support group for patients and families (Galantino et al., 2012). Group exercise can provide the social support necessary for better health outcomes, such as adherence and weight loss (Marquez et al., 2016). For many patients, group exercise classes not only provide therapy and a context to the shared cancer experience, but also encourage personal empowerment (Archer, Phillips, Montague, Bali, & Sowter, 2015; McCall, Thorne, et al., 2015).

The purpose of this research is to better understand how MBME classes influence survivorship care in patients with cancer. The aims of this survivorship study are to (a) examine the feasibility of multiple data collection time points and data collection measures among cancer survivors enrolled in an MBME class (yoga, tai chi, or Qigong); (b) describe perceptions of acceptability of MBME class participation; and (c) examine changes over time in QOL, sleep, depressive symptomatology, fatigue, stress, upper body strength, gait and balance, and biometric assessment (e.g., body mass index [BMI], heart rate, blood pressure).

Methods

This prospective study used mixed methods with a single-group, repeated measures design. The study took place at a large comprehensive cancer center in a major Midwestern city and was approved by the Ohio State University's institutional review board. Eligibility for this study included having a diagnosis of any type of cancer, being 18 years of age or older, and participating in the institution's MBME class.

Procedure

Participants were recruited from MBME classes that were offered for patients as part of the institution's program from March 2014–June 2015. Recruitment took place during the first class. The sessions were 60–90 minutes in length, depending on the class type (e.g., yoga was 60 minutes, tai chi and Qigong were 90 minutes), and met for 10 consecutive weekly sessions. The institution's classes were offered free for any cancer survivor or caregiver. Classes were offered in three locations in the metropolitan area at a variety of times during the day and evening to reach the highest participation. Three yoga courses were

offered in separate locations, on different days of the week, and at different times of the day, and one each of tai chi and Qigong was offered. In the yoga classes, participants were 80%–100% survivors and less than 20% caregivers. Qigong classes had 50% survivors, and tai chi classes were comprised of all survivors.

Four 10-week sessions of yoga, tai chi, and Qigong were offered during the recruitment period, of which the participants could select one. The first three data points included an identical biometric assessment and study questionnaire. The final data point, six months from study completion, included open-ended questions for a program evaluation and an identical study questionnaire to the first three data points. The program evaluation addressed the aim concerning perceptions of acceptability of the MBME classes. Participants were recruited via a flyer that was sent to class registrants prior to the first class. Potential participants were asked to arrive early for the first class of the 10-week session if interested in learning about study participation. Those who were interested provided written informed consent and completed study measures (paper and pencil and biometric) before and after the first class. The biometric and paper and pencil measures were completed prior to the class. Participants who did not finish completed the paper and pencil measures immediately after the class. Biometric data (e.g., blood pressure, BMI, height, weight) were collected by all of the investigators and two trained students (one undergraduate and one graduate student). It took participants about 15 minutes to complete the paper and pencil measures, which were collected in person, and about 5 minutes to collect the biometric data. Identical data were collected at the next two time points: midpoint of the session (5th class) and the last (10th) class. Six months after completion of the last class, participants completed the same paper and pencil measures in addition to open-ended questions regarding their reasons for participation and their enjoyment of the class. Participants received a $10 store card for participating in the study after completing the six-month survey.

Instruments

A demographic questionnaire, completed at enrollment, provided a self-reported measure of participant characteristics including age, gender, race/ethnicity, income, and education. Self-reported health and cancer-specific characteristics included primary cancer; cancer treatment type (e.g., chemotherapy, radiation therapy, hormone therapy, surgery, currently receiving chemotherapy); self-reported health status in general; and self-reported health status currently, compared to one year ago. Location and type of MBME class were also recorded.

Fatigue was measured by the Brief Fatigue Inventory (BFI) (Mendoza et al., 1999). This instrument consists of nine items, each having a numeric rating from 0–10; a nine-item global score is calculated. A score of 7–10 indicates severe fatigue. Three items define the severity of fatigue, and the remaining items consider the extent to which fatigue affects normal life activities. Construct validity for the nine items ranges from 0.81 (usual fatigue) to 0.92 (activity). Concurrent validity was evaluated with the Functional Assessment of Cancer Therapy–Fatigue scale (Yellen, Cella, Webster, Blendowski, & Kaplan, 1997). Cronbach alpha showed high reliability ($\alpha > 0.95$).

The Pittsburgh Sleep Quality Index (PSQI) was used to measure sleep quality. Four-item responses and scores on this measure range from 0–21, with increasing scores indicating worse sleep quality (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). A score of 5 or greater indicates poor sleep. The instrument is a 19-item scale measuring quality of sleep, sleep latency, sleep duration, efficiency, disturbances, use of sleep medication, and daytime sleep dysfunction, and has a global PSQI score. The instrument has a sensitivity of 89.6% and a specificity of 86%.

The Perceived Stress Scale (PSS) is a 10-item scale measuring the degree to which situations in one's life are appraised as stressful. The scale is summed with a range of 0–40, and five-item responses range from 0 (never) to 4 (very often). The recall period for the PSS is during the past month with good internal consistency (Cronbach alpha 0.84–0.86). A greater score indicates greater stress (Cohen, Kamarck, & Mermelstein, 1983).

The Center for Epidemiological Studies–Depression (CES-D) scale is a 20-item measure of depressive symptoms. Internal consistency is 0.9 in people who are hospitalized and 0.85 in people who live in the community. It has a test–retest reliability of 0.54 and a high correlation with other instruments that measure like symptoms. The sum score ranges from 0–60, and four-item responses range from "rarely or none of the time" to "most of the time." People who score a total of 16 or greater indicate positive depressive symptomatology. This was the cut point used for the current study (Lewinsohn, Gotlib, & Seeley, 1997; Radloff, 1977).

QOL was measured by the Functional Assessment of Cancer Therapy–General, which is a reliable and valid 27-item self-assessment questionnaire that assesses QOL in patients with any cancer (Cella et al., 1993). The questionnaire includes four domains: physical well-being (PWB), social/family well-being (SWB), emotional well-being (EWB), and functional well-being (FWB). The internal consistency score for the overall scale is 0.89 (Winstead-Fry & Schultz, 1997). Five-item

responses range from 0 (not at all) to 4 (very much); a greater score corresponds to a better QOL. There is an overall sum score with a range of 0–108 and a domain sum score for each of the subscales (e.g., 0–28 for the PWB, SWB, and FWB scales and 0–24 for the EWB subscales).

Biometric assessment included BMI, heart rate and blood pressure, upper body strength, and gait and balance. The Timed Up and Go (TUG) Test (Podsiadlo & Richardson, 1991) is a measure of gait and balance. The TUG Test considers the ability to rise from a sitting position and ambulate 10 feet and return to a sitting position. The TUG Test has been correlated with falls (Shumway-Cook, Brauer, & Woollacott, 2000), physical function, walking ability (Herman, Giladi, & Hausdorff, 2011), and fear of falling (Moreira Bde et al., 2016). Generally, the cut point on the TUG Test for risk of falls is greater or equal to 12 seconds (Podsiadlo & Richardson, 1991).

The upper body strength measure included grip strength to the right and left hand. The researchers used the Jamar® Hydraulic Hand Dynamometer to measure grip strength. The grip strength measurements can help determine any possible limitations in mobility for patients with breast cancer (Massy-Westropp, Gill, Taylor, Bohannon, & Hill, 2011). Scores of three successive trials for each hand tested were recorded. The average score of the three trials can be compared to the normative data. From a statistic perspective, scores within two standard deviations of the mean are considered within normal limits. In addition, the individual's ability to use his or her hand functionally needs to be considered when interpreting a grip strength performance. The cut point of 37 kg or less is used to determine strength difficulties.

TABLE 1. Sample Characteristics (N = 33)

Characteristic	$\bar{X}$	SD
Age (years)	60.4	7.9
Characteristic		**n**
Gender		
Female		28
Male		5
Race/ethnicity		
Non-Hispanic White		27
African American		3
Asian American		3
Income ($)		
Less than 10,000		1
10,000–20,000		1
20,001–35,000		2
35,001–50,000		5
Greater than 50,000		16
Prefer not to answer		8
Education		
GED and/or high school diploma		3
Some college or technical school		3
College graduate		25
Missing data		2
Class type		
Yoga		20
Tai chi		9
Qigong		4
Primary cancer		
Breast cancer		17
Hematologic cancer		7
Other solid tumor		9
Cancer treatment (ever)		
Chemotherapy		26
Surgery		23
Radiation therapy		18
Still receiving treatment		13
Hormonal therapy		9
Self-reported health status in general		
Excellent		3
Very good		7
Good		16
Fair		5
Missing data		2
Current self-reported health status, compared to one year ago		
Much better		7
Somewhat better		9
About the same		11
Somewhat worse		3
Much worse		1
No response		2

Data Analysis

After data cleaning, descriptive statistics were calculated to ensure the quality of the data (check distributions, examine outliers) and to describe the sample (e.g., age, education, annual income, marital status). As an exploratory study, it was not powered to detect significant differences between or within groups. All analyses were conducted in SPSS®, version 23.0. To address the aims of examining the feasibility of multiple data collection time points and examining changes over time, descriptive statistics were used. Content analysis was used for the aim of describing perceptions of acceptability in comparing written responses among participants.

Results

Overall, 196 participants (survivors and caregivers) attended the MBME classes during the study recruitment period (yoga [n = 142], Qigong [n = 24], and tai chi [n = 30]). Participants who repeated the courses were only eligible to participate in the current study once. Forty-two participants were successfully recruited and enrolled (survivors and caregivers), with a participation rate of 21% (33 survivors and 9 caregivers). Caregivers were not included in the analyses because of the small number of participants. Survivors completed about 73% of the sessions per

course. Yoga, tai chi, and Qigong participants completed 68%, 72%, and 87% of the sessions per course, respectively. Participation of study participants was similar to the other class enrollees. Seven survivors withdrew or dropped out of the study after providing baseline data.

The majority of participants were female, non-Hispanic Caucasian (see Table 1). About half had an annual income of greater than $50,000, and the majority had a college degree. Yoga was the most well-attended class, followed by tai chi and Qigong. Most participants were diagnosed with breast cancer, most had received chemotherapy, and about 20% were receiving chemotherapy at the time of data collection. Most participants reported their health to be good, with 29% reporting their health to be somewhat better than a year ago.

Twenty-four cancer survivors responded to qualitative items evaluating perceptions of acceptability of the MBME classes at the six-month follow-up (yoga [n = 14], tai chi [n = 7], Qigong, [n = 3]), which was a response rate of 72%. For those who responded to the following question, "What were your reasons for taking this class?" 28% of the responses indicated reasons that were related to management of cancer survivorship symptoms (e.g., pain relief, stress reducer, social support, self-help, coping skill, feeling better, fighting cancer). Seventy-two percent

TABLE 2. Mind–Body Movement Exercise Outcomes by Time Point (N = 33)

	Baseline			Mid-Point (5 Weeks)			Final Class (10 Weeks)			Six-Month Follow-Up		
Variable	$\bar{X}$	SD	n	$\bar{X}$	SD	n	$\bar{X}$	SD	n	$\bar{X}$	SD	n
Brief Fatigue Inventory[a]	3.04	2.28	32	2.29	1.76	18	2.57	1.8	18	2.34	1.8	24
Body mass index	28.37	6.23	33	27.06	6.13	18	26.58	3.91	15	–	–	–
CES-D[b]	12.41	10.54	32	8.11	8.39	19	10.44	8.38	18	10.29	11.21	24
Diastolic blood pressure	73	12.94	32	80.94	17.03	17	73.43	9.66	17	–	–	–
FACT-G[c]	58.07	14.56	30	64.92	13.07	19	64.82	11.22	18	64.32	15.05	24
Grip strength, left	52.22	19.22	33	53.72	15.62	18	57.13	22.75	14	–	–	–
Grip strength, right	55.09	16.75	33	61.37	24.86	18	61.12	21.67	14	–	–	–
Pain[d]	1.61	1.96	33	1.72	2.32	18	1.2	1.3	15	–	–	–
PSQI[e]	6.84	4.14	25	5.69	3.46	16	5.29	3.32	14	5.95	3.66	20
Perceived Stress Scale[f]	14.34	6.81	32	11.42	7.12	19	13.01	7.74	18	12.33	8.59	24
Systolic blood pressure	120.44	19.9	32	128.82	16.76	17	121.36	12.87	14	–	–	–
Time Up and Go Test[g]	9.35	2.29	33	8.2	1.59	18	7.85	1.75	15	–	–	–

[a] Rated on a scale of 0–10, with 7–10 indicating severe fatigue
[b] Rated on a scale of 0–60, with a score of 16 or greater indicating positive depressive symptomology
[c] Rated on a scale of 0–108, with a greater score indicating a better quality of life
[d] Rated on a scale of 0–10, with 10 being the greatest amount of pain
[e] Rated on a scale of 0–21, with increasing scores indicating worse sleep quality
[f] Rated on a scale of 0–40, with greater scores indicating greater stress
[g] 12 seconds or more correlates with a higher risk of falls.
CES-D—Center for Epidemiologic Studies–Depression; FACT-G—Functional Assessment of Cancer Therapy–General; PSQI—Pittsburgh Sleep Quality Index

indicated reasons that were health-promoting in nature (e.g., improving health and rehabilitation, exercising, learning a new skill/interest, relaxing). Responses to the question, "What did you like about this class?" showed that 30% of the yoga responses related to cancer survivorship, such as shared worry, support/community, rehabilitation for the mind and body, self-help, coping, and peace. The tai chi and Qigong participants did not provide any of these responses. Fourteen of 24 participants indicated that the yoga instructor was what made the class enjoyable, and 5 indicated that the other participants were what made the class enjoyable. Of note, no complaints were made about the instructor or other class participants. Almost 50% of the cancer survivors who took the yoga class reported that they enjoyed the class for reasons related to managing their cancer survivorship symptoms. Reported reasons included "peace," "meeting others who share my worry," and "learning new ways to cope."

When asked, "What could be improved?" 21% of participants responded that the MBME classes should be conducted more often because many participants used these classes to manage their symptoms, as well as to build a support network. The following yoga participant quotes are also suggestive of this theme:

> The long break from mid-November to January seems unreasonable. I realize the holiday season is busy, but classes into mid-December would be helpful. Community is paramount, not isolation, with this illness.

> Being able to access classes during first year of being diagnosed. Maybe second time attendance could be only for patients.

Statistical changes for each variable over time were not analyzed because of missing data during the middle time points. No statistically significant differences were seen from baseline to six-month follow-up. Means for each variable at each time point are descriptively reported in Table 2. Fatigue, measured with the BFI, at each time point indicated mild fatigue. Sleep quality, measured with the PSQI, indicated poor sleep at each time point. Participants had low stress on the PSS and low depressive symptomatology (CES-D mean and cut point) throughout the study. QOL scores (i.e., Functional Assessment of Cancer Therapy) increased, hand grip strength increased, and TUG Test scores improved throughout the study.

Discussion

The purpose of the current study was to examine feasibility of multiple data collection time points and data collection measures among cancer survivors enrolled in MBME classes; describe perceptions of acceptability of participating in an MBME class; and examine physical, emotional, and biometric changes over time. The current study was feasible because survivors were willing to participate and generally completed most of the questionnaires, which was also noted in a yoga intervention study for people undergoing chemotherapy (Sohl et al., 2016). Participants found these classes to be beneficial not only for exercise benefits, but also for social support and social connectedness, which were also supported in a small qualitative study (McCall, Thorne, et al., 2015). Poor sleep quality was consistently reported by participants. Breast cancer survivors report a higher incidence of sleep problems than women without cancer (Otte et al., 2016).

Although the percentage of enrolled participants was reported to be low (21%), all participants who inquired about the study arrived early for the first class to complete the informed consent forms and answer the questionnaires. Despite a drop in data collection at time points 2 and 3 because of survivors not coming to class, most participants (72%) were willing to complete the six-month post-class survey via postal mail with few reminders. Willing participation was also found in a randomized, controlled feasibility study using yoga in adult patients with cancer (McCall, McDonald, Thorne, Ward, & Heneghan, 2015) and in breast cancer survivors with poor QOL (Levine & Balk, 2012). Most participants returned their last program evaluation via hardcopy mail. As noted, several participants did not attend class sessions at time points 2 and 3. It is possible that participants were too tired, ill, or busy to attend all the MBME classes. Data were collected at four time points during an eight- to nine-month time period. Although this was feasible to administer and seemingly acceptable to the participants, data were missing. The researchers were not able to determine why participants missed class sessions but postulate that the nature of cancer survivorship may have contributed. To obtain the highest yield of data, additional studies should decrease the number of data collection time points, which further reduces participant burden and, ultimately, results in fewer missing data. However, the length of time to follow-up and obtaining data via the mail were feasible and acceptable for this group of cancer survivors. Researchers may consider providing incentives at each data collection time point to encourage a greater response rate. In the current study, a small incentive was provided only once (final time point) to all participants. Another consideration includes ideally having at least three data collectors at each time point because of the number of objective measures being collected (e.g., BMI, weight, height, grip strength). In the current study, having three

research team members present made data collection flow smoothly and efficiently.

The MBME classes were offered in convenient locations and varying times, which may have been conducive for greater class attendance. Convenient locations, low cost, and group classes are important for participation, which was also noted in a feasibility study of yoga therapy for patients with breast cancer (Slocum-Gori, Howard, Balneaves, & Kazanjian, 2013). Barriers for participation in MBME classes tend to include lack of time, scheduling conflicts, and financial burdens (McCall, Thorne, et al., 2015); therefore, additional studies should continue to offer free or low-cost classes and provide several class time options at convenient locations.

Having an experienced and thoughtful instructor who is knowledgeable in MBME can provide survivors with practical skills to manage their symptoms outside of the weekly classes. One of the instructors was reported as particularly kind and enthusiastic, which inspired a larger class size. Many people wanted to attend her classes, and this may be a reason why more of the participants were enrolled in the yoga classes. Some of the participants in the yoga classes conducted by this instructor expressed that the classes offered support and help for the mind and body, coping, and peace. The instructor is an integral part of conducting MBME research (Slocum-Gori et al., 2013).

One of the strengths of the current study was the shared positive experiences in the MBME classes, which will be informative for designing additional studies. It was clear that participants enjoyed taking MBME classes, which was also found in a study of Qigong and tai chi in older community-dwelling adults (Jahnke, Larkey, & Rogers, 2010). Many large comprehensive cancer centers already provide MBME classes for free or for a nominal charge. Given the perceived benefit for patients, and the potential for patient satisfaction, these types of programs could be offered at smaller community and private practice settings with relative ease. Waiting rooms can be transformed into activity space after business hours or during the weekend with little or no cost.

Many participants understood the health benefits and symptom management associated with MBMEs. Participants took the class to specifically reduce pain and stress, and to generally feel better. The current study did not find significant differences in scores of outcome measures, but other studies had similar findings (Dhruva et al., 2012; Sudarshan et al., 2013). With respect to depression, the current study found that participants did not generally screen positive for depressive symptoms upon initiation of the study. Perhaps those who suffered from depression did not consent to be in the study or dropped out at later time points.

Knowledge Translation

- Mind–body movement exercise (MBME) classes should be offered at convenient locations and at varying times to overcome the barriers of lack of time and scheduling conflicts.
- Patients with cancer acknowledged that MBME classes were a source of exercise benefits, as well as social support and social connectedness.
- Having an experienced and thoughtful instructor who is knowledgeable in MBME can provide survivors with practical skills to manage their symptoms outside of the weekly classes.

The current study had several limitations. Caregivers were willing to participate; however, too few participated to report data (n = 9). The current study only included participants who self-selected to enroll in MBME classes. Participants who did not have access to classes because of transportation, scheduling, timing, location, or logistics, or those who were too ill to participate, were not included. Advertisement of these classes was targeted toward the institution's patients and survivors only. The analysis was limited because of missing data, and the sample size was small. The researchers did not ask reasons why participants did not participate in the study and why they did not attend some classes throughout the session and consequently not provide data. Questionnaire burden could have been a reason.

Implications for Nursing

With multiple classes available, MBME classes at minimal or no charge are reasonable for survivors to attend and are feasible in research studies to better understand how classes can be offered and combined with other therapies. People who have never performed MBME can participate with little exertion or ability. The benefits are greater than any perceived negative risk of MBME class participation and may contribute to reduced need for medications used to manage symptoms. Nurses should help patients and caregivers identify locations and times when MBME class participation is possible, assess MBME class participation during each clinic visit to promote continued involvement and to understand if positive effects are occurring, and continue to provide support for MBME classes throughout the survivorship experience.

Conclusion

The benefits of social support are of great value to patients with cancer. Some patients may find attending

MBMEs at oncology offices more palatable for social support as compared to a support group. Although not generally led by a mental health worker, group exercise is beneficial, particularly in a peer community having a shared experience of cancer (Dobos et al., 2015). Providing support options for caregivers is also important, and MBME classes are a viable intervention in supporting those who are affected by cancer. In addition, nurses should recommend MBME classes for symptom management when preparing SCPs or designing supportive care plans.

Based on experience with conducting the current study, intervention fidelity in additional intervention studies should anticipate that participants will miss some sessions because of the nature of their illness. Scheduled data collection and dose of intervention calculations should have modification capabilities.

Conducting MBME research with cancer survivors is feasible. Including several data collection time points is possible, but perhaps not ideal, for this population. Participants did find the MBME acceptable and a way of addressing health and managing cancer-related symptoms.

References

American Cancer Society. (2016). Palliative or supportive care. Retrieved from http://www.cancer.org/treatment/treatmentsandsideeffects/palliativecare/index

Archer, S., Phillips, E., Montague, J., Bali, A., & Sowter, H. (2015). "I'm 100% for it! I'm a convert!": Women's experiences of a yoga programme during treatment for gynaecological cancer; An interpretative phenomenological analysis. *Complementary Therapies in Medicine, 23,* 55–62. doi:10.1016/j.ctim.2014.12.003

Bower, J.E., Garet, D., Sternlieb, B., Ganz, P.A., Irwin, M.R., Olmstead, R., & Greendale, G. (2012). Yoga for persistent fatigue in breast cancer survivors: A randomized controlled trial. *Cancer, 118,* 3766–3775. doi:10.1002/cncr.26702

Buffart, L.M., van Uffelen, J.G., Riphagen, I.I., Brug, J., van Mechelen, W., Brown, W.J., & Chinapaw, M.J. (2012). Physical and psychosocial benefits of yoga in cancer patients and survivors, a systematic review and meta-analysis of randomized controlled trials. *BMC Cancer, 12,* 559. doi:10.1186/1471-2407-12-559

Buysse, D.J., Reynolds, C.F., III, Monk, T.H., Berman, S.R., & Kupfer, D.J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research, 28,* 193–213.

Campo, R.A., Agarwal, N., LaStayo, P.C., O'Connor, K., Pappas, L., Boucher, K.M., . . . Kinney, A.Y. (2014). Levels of fatigue and distress in senior prostate cancer survivors enrolled in a 12-week randomized controlled trial of Qigong. *Journal of Cancer Survivorship, 8,* 60–69. doi:10.1007/s11764-013-0315-5

Cella, D.F., Tulsky, D.S., Gray, G., Sarafian, B., Linn, E., Bonomi, A., . . . Brannon, J., (1993). The Functional Assessment of Cancer Therapy scale: Development and validation of the general measure. *Journal of Clinical Oncology, 11,* 570–579. doi:10.1200/JCO.1993.11.3.570

Clarke, T.C., Black, L.I., Strussman, B.J., Barnes, P.M., & Nahin, R.L. (2015). Trends in the use of complementary health approaches among adults: United States, 2002–2012. *National Health Statistics Reports, 10*(79), 1–16.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24,* 385–396.

Dhruva, A., Miaskowski, C., Abrams, D., Acree, M., Cooper, B., Goodman, S., & Hecht, F.M. (2012). Yoga breathing for cancer chemotherapy-associated symptoms and quality of life: Results of a pilot randomized controlled trial. *Journal of Alternative and Complementary Medicine, 18,* 473–479. doi:10.1089/acm.2011.0555

Dobos, G., Overhamm, T., Büssing, A., Ostermann, T., Langhorst, J., Kümmel, S., . . . Cramer, H. (2015). Integrating mindfulness in supportive cancer care: A cohort study on a mindfulness-based day care clinic for cancer survivors. *Supportive Care in Cancer, 23,* 2945–2955. doi:10.1007/s00520-015-2660-6

Dodds, S.E., Pace, T.W., Bell, M.L., Fiero, M., Negi, L.T., Raison, C.L., & Weihs, K.L. (2015). Feasibility of Cognitively-Based Compassion Training (CBCT) for breast cancer survivors: A randomized, wait list controlled pilot study. *Supportive Care in Cancer, 23,* 3599–3608. doi:10.1007/s00520-015-2888-1

Faul, L.A., Luta, G., Sheppard, V., Isaacs, C., Cohen, H.J., Muss, H.B., . . . Mandelblatt, J.S. (2014). Associations among survivorship care plans, experiences of survivorship care, and functioning in older breast cancer survivors: CALGB/Alliance 369901. *Journal of Cancer Survivorship, 8,* 627–637. doi:10.1007/s11764-014-0371-5

Fong, S.S., Ng, S.S., Luk, W.S., Chung, J.W., Ho, J.S., Ying, M., & Ma, A.W. (2014). Effects of qigong exercise on upper limb lymphedema and blood flow in survivors of breast cancer: A pilot study. *Integrative Cancer Therapies, 13,* 54–61. doi:10.1177/1534735413490797

Galantino, M.L., Callens, M.L., Cardena, G.J., Piela, N.L., & Mao, J.J. (2013). Tai chi for well-being of breast cancer survivors with aromatase inhibitor-associated arthralgias: A feasibility study. *Alternative Therapies in Health and Medicine, 19*(6), 38–44.

Galantino, M.L., Greene, L., Archetto, B., Baumgartner, M., Hassall, P., Murphy, J.K., . . . Desai, K. (2012). A qualitative exploration of the impact of yoga on breast cancer survivors with aromatase inhibitor-associated arthralgias. *Explore, 8,* 40–47. doi:10.1016/j.explore.2011.10.002

Garland, S.N., Valentine, D., Desai, K., Li, S., Langer, C., Evans, T., & Mao, J.J. (2013). Complementary and alternative medicine use and benefit finding among cancer patients. *Journal of Alternative and Complementary Medicine, 19,* 876–881. doi:10.1089/acm.2012.0964

Herman, P.M. (2013). Evaluating the economics of complementary and integrative medicine. *Global Advances in Health and Medicine, 2,* 56–63. doi:10.7453/gahmj.2013.002

Herman, T., Giladi, N., & Hausdorff, J.M. (2011). Properties of the 'timed up and go' test: More than meets the eye. *Gerontology, 57,* 203–210. doi:10.1159/000314963

Hung, H.M., Yeh, S.H., & Chen, C.H. (2016). Effects of qigong exercise on biomarkers and mental and physical health in adults with at least one risk factor for coronary artery disease. *Biological Research for Nursing, 18,* 264–273. doi:10.1177/1099800415617017

Hwang, H.F., Chen, S.J., Lee-Hsieh, J., Chien, D.K., Chen, C.Y., & Lin, M.R. (2016). Effects of home-based tai chi and lower extremity training and self-practice on falls and functional outcomes in older fallers from the emergency department: A randomized controlled trial. *Journal of the American Geriatrics Society, 64,* 518–525. doi:10.1111/jgs.13952

Jahnke, R.A., Larkey, L.K., & Rogers, C. (2010). Dissemination and benefits of a replicable tai chi and qigong program for older adults. *Geriatric Nursing, 31,* 272–280. doi:10.1016/j.gerinurse.2010.04.012

Jouper, J., Hassmen, P., & Johansson, M. (2006). Qigong exercise with concentration predicts increased health. *American Journal of Chinese Medicine, 34,* 949–957. doi:10.1142/S0192415X06004429

Karbandi, S., Gorji, M.A., Mazloum, S.R., Norian, A., & Aghaei, N. (2015). Effectiveness of group versus individual yoga exercises on fatigue of patients with multiple sclerosis. *North American Journal of Medical Sciences, 7,* 266–270. doi:10.4103/1947-2714.159332

Kligler, B., Homel, P., Harrison, L.B., Levenson, H.D., Kenney, J.B., & Merrell, W. (2011). Cost savings in inpatient oncology through an integrative medicine approach. *American Journal of Managed Care, 17,* 779–784.

Komatsu, H., Yagasaki, K., Yamauchi, H., Yamauchi, T., & Takebayashi, T. (2016). A self-directed home yoga programme for women with breast cancer during chemotherapy: A feasibility study. *International Journal of Nursing Practice, 22,* 258–266. doi:10.1111/ijn.12419

Lai, Y.T., Hsieh, C.C., Huang, L.S., Liu, W.S., Lin, S.H., Wang, L.L., . . . Lin, C.C. (2015). The effects of upper limb exercise through yoga on limb swelling in Chinese breast cancer survivors—A pilot study. *Rehabilitation Nursing*. doi:10.1002/rnj.217

Larkey, L.K., Roe, D.J., Weihs, K.L., Jahnke, R., Lopez, A.M., Rogers, C.E., . . . Guillen-Rodriguez, J. (2015). Randomized controlled trial of qigong/tai chi easy on cancer-related fatigue in breast cancer survivors. *Annals of Behavioral Medicine, 49,* 165–176. doi:10.1007/s12160-014-9645-4

Lee, M.S., Lee, M.S., Kim, H.J., & Choi, E.S. (2004). Effects of qigong on blood pressure, high-density lipoprotein cholesterol and other lipid levels in essential hypertension patients. *International Journal of Neuroscience, 114,* 777–786. doi:10.1080/00207450490441028

Lee, M.S., Lee, M.S., Kim, H.J., & Moon, S.R. (2003). Qigong reduced blood pressure and catecholamine levels of patients with essential hypertension. *International Journal of Neuroscience, 113,* 1691–1701. doi:10.1080/00207450390245306

Levine, A.S., & Balk, J.L. (2012). Pilot study of yoga for breast cancer survivors with poor quality of life. *Complementary Therapies in Clinical Practice, 18,* 241–245. doi:10.1016/j.ctcp.2012.06.007

Lewinsohn, P.M., Gotlib, I.H., & Seeley, J.R. (1997). Depression-related psychosocial variables: Are they specific to depression in adolescents? *Journal of Abnormal Psychology, 106,* 365–375.

Lin, M.R., Hwang, H.F., Wang, Y.W., Chang, S.H., & Wolf, S.L. (2006). Community-based tai chi and its effect on injurious falls, balance, gait, and fear of falling in older people. *Physical Therapy, 86,* 1189–1201. doi:10.2522/ptj.20040408

Loudon, A., Barnett, T., Piller, N., Immink, M.A., & Williams, A.D. (2014). Yoga management of breast cancer-related lymphoedema: A randomised controlled pilot-trial. *BMC Complementary and Alternative Medicine, 14,* 214. doi:10.1186/1472-6882-14-214

Marquez, B., Anderson, A., Wing, R.R., West, D.S., Newton, R.L., Meacham, M., . . . Evans-Hudsnall, G. (2016). The relationship of social support with treatment adherence and weight loss in Latinos with type 2 diabetes. *Obesity, 24,* 568–575.

Massy-Westropp, N.M., Gill, T.K., Taylor, A.W., Bohannon, R.W., & Hill, C.L. (2011). Hand grip strength: Age and gender stratified normative data in a population-based study. *BMC Research Notes, 4,* 127. doi:10.1186/1756-0500-4-127

McCall, M., McDonald, M., Thorne, S., Ward, A., & Heneghan, C. (2015). Yoga for health-related quality of life in adult cancer: A randomized-controlled feasibility study. *Evidence-Based Complementary and Alternative Medicine, 2015,* 816820. doi:10.1155/2015/816820

McCall, M., Thorne, S., Ward, A., & Heneghan, C. (2015). Yoga in adult cancer: An exploratory, qualitative analysis of the patient experience. *BMC Complementary and Alternative Medicine, 15,* 245. doi:10.1186/s12906-015-0738-9

Mendoza, T.R., Wang, X.S., Cleeland, C.S., Morrissey, M., Johnson, B.A., Wendt, J.K., & Huber, S.L. (1999). The rapid assessment of fatigue severity in cancer patients: Use of the Brief Fatigue Inventory. *Cancer, 85,* 1186–1196.

Moreira Bde, S., Dos Anjos, D.M., Pereira, D.S., Sampaio, R.F., Pereira, L.S., Dias, R.C., & Kirkwood, R.N. (2016). The geriatric depression scale and the timed up and go test predict fear of falling in community-dwelling elderly women with type 2 diabetes mellitus: A cross-sectional study. *BMC Geriatrics, 16,* 56. doi:10.1186/s12877-016-0234-1

Mustian, K.M., Katula, J.A., & Zhao, H. (2006). A pilot study to assess the influence of tai chi chuan on functional capacity among breast cancer survivors. *Journal of Supportive Oncology, 4,* 139–145.

Mustian, K.M., Sprod, L.K., Janelsins, M., Peppone, L.J., Palesh, O.G., Chandwani, K., . . . Morrow, G.R. (2013). Multicenter, randomized controlled trial of yoga for sleep quality among cancer survivors. *Journal of Clinical Oncology, 31,* 3233–3241. doi:10.1200/JCO.2012.43.7707

National Cancer Institute. (2014). Survivorship definitions. Retrieved from http://cancercontrol.cancer.gov/ocs/statistics/definitions.html

National Cancer Institute. (2016). CAM definitions. Retrieved from https://cam.cancer.gov/health_information/cam_definitions.htm

National Coalition for Cancer Survivorship. (2014, July 24). Defining cancer survivorship. Retrieved from http://www.canceradvocacy.org/news/defining-cancer-survivorship

O'Brien, M., Stricker, C.T., Foster, J.D., Ness, K., Arlen, A.G., & Schwartz, R.N. (2014). Navigating the seasons of survivorship in community oncology. *Clinical Journal of Oncology Nursing, 18*(Suppl. 1), S9–S14. doi:10.1188/14.CJON.S1.9-14

Oh, B., Butow, P., Mullan, B., Clarke, S., Beale, P., Pavlakis, N., . . . Rosenthal, D. (2010). Impact of medical qigong on quality of life, fatigue, mood and inflammation in cancer patients: A randomized controlled trial. *Annals of Oncology, 21,* 608–614. doi:10.1093/annonc/mdp479

Oh, B., Choi, S.M., Inamori, A., Rosenthal, D., & Yeung, A. (2013). Effects of qigong on depression: A systemic review. *Evidence-Based Complementary and Alternative Medicine, 2013,* 134737. doi:10.1155/2013/134737

Otte, J.L., Davis, L., Carpenter, J.S., Krier, C., Skaar, T.C., Rand, K.L., . . . Manchanda, S. (2016). Sleep disorders in breast cancer survivors. *Supportive Care in Cancer, 24,* 4197–4205. doi:10.1007/s00520-016-3247-6

Palmer, S.C., Stricker, C.T., Panzer, S.L., Arvey, S.A., Baker, K.S., Casillas, J., . . . Jacobs, L.A. (2015). Outcomes and satisfaction after delivery of a breast cancer survivorship care plan: Results of a multicenter trial. *Journal of Oncology Practice, 11*(2), E222–E229. doi:10.1200/JOP.2014.001404

Peppone, L.J., Janelsins, M.C., Kamen, C., Mohile, S.G., Sprod, L.K., Gewandter, J.S., . . . Mustian, K.M. (2015). The effect of YOCAS©® yoga for musculoskeletal symptoms among breast cancer survivors on hormonal therapy. *Breast Cancer Research and Treatment, 150,* 597–604. doi:10.1007/s10549-015-3351-1

Podsiadlo, D., & Richardson, S. (1991). The timed "Up & Go": A test of basic functional mobility for frail elderly persons. *Journal of the American Geriatrics Society, 39,* 142–148.

Radloff, L.S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1,* 385–401. doi:10.1177/014662167700100306

Russo, R., Diener, I., & Stitcher, M. (2015). The low risk and high return of integrative health services. *Healthcare Financial Management, 69*(11), 114–120.

Shumway-Cook, A., Brauer, S., & Woollacott, M. (2000). Predicting the probability for falls in community-dwelling older adults using the Timed Up and Go Test. *Physical Therapy, 80,* 896–903.

Slocum-Gori, S., Howard, A.F., Balneaves, L.G., & Kazanjian, A. (2013). Investigating the perceived feasibility of integrative medicine in a conventional oncology setting: Yoga therapy as a treatment for breast cancer survivors. *Integrative Cancer Therapies, 12,* 103–112. doi:10.1177/1534735412443851

Sohl, S.J., Danhauer, S.C., Birdee, G.S., Nicklas, B.J., Yacoub, G., Aklilu, M., & Avis, N.E. (2016). A brief yoga intervention implemented

during chemotherapy: A randomized controlled pilot study. *Complementary Therapies in Medicine, 25,* 139–142. doi:10.1016/j.ctim.2016.02.003

Sprod, L.K., Fernandez, I.D., Janelsins, M.C., Peppone, L.J., Atkins, J.N., Giguere, J., . . . Mustian, K.M. (2015). Effects of yoga on cancer-related fatigue and global side-effect burden in older cancer survivors. *Journal of Geriatric Oncology, 6,* 8–14. doi:10.1016/j.jgo.2014.09.184

Sudarshan, M., Petrucci, A., Dumitra, S., Duplisea, J., Wexler, S., & Meterissian, S. (2013). Yoga therapy for breast cancer patients: A prospective cohort study. *Complementary Therapies in Clinical Practice, 19,* 227–229. doi:10.1016/j.ctcp.2013.06.004

Sundberg, T., Petzold, M., Kohls, N., & Falkenberg, T. (2014). Opposite drug prescription and cost trajectories following integrative and conventional care for pain—A case-control study. *PLOS ONE, 9,* e96717. doi:10.1371/journal.pone.0096717

Tekur, P., Nagarathna, R., Chametcha, S., Hankey, A., & Nagendra, H.R. (2012). A comprehensive yoga programs improves pain, anxiety and depression in chronic low back pain patients more than exercise: An RCT. *Complementary Therapies in Medicine, 20,* 107–118. doi:10.1016/j.ctim.2011

Tyrrell, A., Keats, M., & Blanchard, C. (2014). The physical activity preferences of gynecologic cancer survivors. *Oncology Nursing Forum, 41,* 461–469. doi:10.1188/14.ONF.461-469

U.S. Department of Health and Human Services. (2005). *Thinking about complementary and alternative medicine: A guide for people with cancer*. Bethesda, MD: National Cancer Institute. Retrieved from https://www.cancer.gov/publications/patient-education/367NCINewV2.pdf

U.S. Department of Health and Human Services. (2016). Complementary, alternative, or integrative health: What's in a name? Bethesda, MD: National Center for Complementary and Integrative Health. Retrieved from https://nccih.nih.gov/health/integrative-health

Wayne, P.M., & Kaptchuk, T.J. (2008). Challenges inherent to t'ai chi research: Part I–T'ai chi as a complex multicomponent intervention. *Journal of Alternative and Complementary Medicine, 14,* 95–102. doi:10.1089/acm.2007.7170A

Winstead-Fry, P., & Schultz, A. (1997). Psychometric analysis of the Functional Assessment of Cancer Therapy-General (FACT-G) scale in a rural sample. *Cancer, 79,* 2446–2452.

Wu, W.W., Kwong, E., Lan, X.Y., & Jiang, X.Y. (2015). The effect of a meditative movement intervention on quality of sleep in the elderly: A systematic review and meta-analysis. *Journal of Alternative and Complementary Medicine, 21,* 509–519. doi:10.1089/acm.2014.0251

Yellen, S.B., Cella, D.F., Webster, K., Blendowski, C., & Kaplan, E. (1997). Measuring fatigue and other anemia-related symptoms with the Functional Assessment of Cancer Therapy (FACT) measurement system. *Journal of Pain and Symptom Management, 13,* 63–74.

Yildirim, P., Ofluoglu, D., Aydogan, S., & Akyuz, G. (2016). Tai Chi vs. combined exercise prescription: A comparison of their effects on factors related to falls. *Journal of Back and Musculoskeletal Rehabilitation, 29,* 493–501. doi:10.3233/BMR-150645

Youkhana, S., Dean, C.M., Wolff, M., Sherrington, C., & Tiedemann, A. (2016). Yoga-based exercise improves balance and mobility in people aged 60 and over: A systematic review and meta-analysis. *Age and Ageing, 45,* 21–29. doi:10.1093/ageing/afv175

Zhang, J. (1997). *Qigong exercise therapy*. Beijing, China: Shandong Science and Technology Press.

Zhang, Y., Li, N., Sun, J., & Su, Q. (2013). Effects of combined traditional Chinese exercises on blood pressure and arterial function of adult female hypertensive patients. *Research in Sports Medicine, 21,* 98–109. doi:10.1080/15438627.2013.741030

Zhou, M., Peng, N., Dai, Q., Li, H.W., Shi, R.G., & Huang, W. (2016). Effect of tai chi on muscle strength of the lower extremities in the elderly. *Chinese Journal of Integrative Medicine, 22,* 861–866. doi:10.1007/s11655-015-2104-7