Decreasing Symptoms and Enhancing Satisfaction among Oncology Patients Receiving Therapeutic Yoga during Outpatient Cancer Infusion Therapy

Gigi Robison, MSN, APRN-CNS, AOCN
Oncology Clinical Nurse Specialist
The Christ Hospital Health Network
Jeanene.robison@thechristhospital.com

Tina Walter, C-IAYT 500
Oncology Yoga Therapist
The Christ Hospital Health Network
tawalter@cinci.rr.com

Judi Godsey, PhD, MSN, RN
Assistant Professor of Nursing
Northern Kentucky University
nurse.judi@yahoo.com

Jaimie Robinson, MSW, LISW-S
Elderly Services Program Manager
Council on Aging of Southwestern Ohio
Jaimie.marie.robinson@gmail.com

Abstract

Purpose

This study examined the effect of therapeutic yoga on perceptions of fatigue, pain, nausea, anxiety and distress, as well as overall satisfaction, among oncology patients receiving outpatient cancer infusion therapy.

Design

This prospective study used a pre/post survey design in a convenience sample of cancer patients.

Methods

Researchers developed and administered the Outpatient Cancer Symptom Assessment Scale comprised of cancer and/or treatment related symptoms commonly reported in the oncology population (nausea, pain, fatigue, anxiety, and distress). Following IRB approval, symptoms were rated using a Likert scale of 0 (not present) to 10 (severe) before and after chairside yoga delivered concurrently during outpatient infusion therapy. Overall patient satisfaction was also assessed following the yoga intervention.

Findings

Participants (n=82) reported high levels of satisfaction and statistically less pain ($p<0.001$), fatigue ($p<0.001$), anxiety ($p<0.001$), and distress ($p<0.001$) following the yoga intervention compared to baseline. Nausea was not significantly impacted by the yoga intervention.

Conclusions

Yoga therapy received concurrently during outpatient cancer infusion offers promise for reducing common symptoms which can negatively impact quality of life, including pain, fatigue, anxiety, and distress, while enhancing overall patient experience. Future research with larger, more diverse samples using a randomized longitudinal study design is recommended.

Introduction

Cancer-related symptoms and side effects of chemotherapy, immunotherapy, and radiation therapy are associated with physical and emotional challenges which can negatively impact quality of life, including fatigue, pain, nausea, anxiety, and distress (Buxton, Lazenby, Daugherty, Kennedy, Wagner, Fann, & Pirl, 2014; Danhauer, Sohl, Addington, Chaoul, & Cohen, 2016; Polivich, Olsen & LeFebvre, 2014; Sohl, Birdee, Ridner, Wheeler, Gilbert, Tarantola, et al., 2016; VanHoose, Black, Doty, Sabata, Twumasi-Ankrah, Taylor, & Johnson, 2015). Approximately 35-49% of cancer patients report being distressed at some point during their cancer journey (Carlson, Groff, Maciejewski, & Bultz, 2010; O'Connor, Tanner, Miller, Watts, & Musiello, 2017). Multiple factors contribute to distress in cancer patients, including physical, psychological, social, spiritual and practical challenges which can interfere with a patient's ability to cope effectively with cancer, its physical symptoms and treatments (Carlson, Waller, Groff, Giese-Davis, & Bultz, 2013; National Comprehensive Cancer Network [NCCN], 2018, p. DIS-2; O'Connor, et al, 2017).

More than a quarter of all cancer patients visit complementary and alternative medicine (CAM) providers during treatment to help manage distress and decrease common cancer-related symptoms and treatment side effects (National Center for Complementary and Integrative Health [NCCIH], 2019). Distinct differences exist between complementary and alternative practices. Alternative practices are non-traditional practices used in place of conventional medicine. One example of a non-traditional practice is a calorically-restricted ketogenic diet which might be used as an alternative therapy for malignant brain cancer (Zhou, Mukherjee, Kiebish, Markis, Mantis, & Seyfried, 2007). Complementary practices are practices used along with conventional medicine. For example, a cancer patient receiving chemotherapy may also be concurrently

participating in mind-body practices (e.g., yoga therapy, massage therapy, etc.) (NCCIH, 2019). "Integrative health care" is the umbrella term for practices which bring conventional and complementary approaches together in a coordinated way (NCCIH, 2019).

Review of the Literature

Integrative Health Care

Integrative health care focuses attention on the whole person, including the mental, emotional, functional, spiritual, social, and community influences on health (NCCIH, 2019). Integrative health care combines standard medical care and complementary methods to emphasize a holistic, patient-focused approach to health and wellness (NCCIH, 2019). An example of conventional medicine enhanced with complementary approaches includes a patient receiving chemotherapy and radiation therapy while also using natural products (e.g., herbs, vitamins, minerals, probiotics) and/or mind-body practices (e.g., yoga, meditation, progressive relaxation, guided imagery) (NCCIH, 2019). The remainder of this discussion will focus on yoga interventions and their implications in the cancer patient population, as is the topic of this paper.

Therapeutic Yoga

Yoga is a mind-body practice which traditionally involves breathing techniques, deep relaxation, meditation, guided imagery, and physical postures focused on movement and stretching (Khalsa, Telles, Cohen, & McCall, 2016). Yoga therapy is defined as "the process of empowering individuals to progress toward improved health and well-being through the application of the teachings and practices of yoga" (International Association of Yoga Therapists [IAYT], 2019, website homepage). While some techniques are used in both yoga and yoga therapy, distinctive differences exist. Yoga is often taught in a class environment and goals may include decreasing stress and improving flexibility, stamina, strength, and mental calmness

(Kraftsow, 2019, IAYT, 2019). However, therapeutic yoga is designed to reach beyond the standard class environment to help heal the whole person as an individual. A Yoga Therapist (YT) works with individuals to modify or simplify yoga practices (e.g. breathing techniques, postures, gentle stretches, meditation/relaxation techniques, and more) in a manner that works best for their unique needs. Goals may include addressing a client's needs from a holistic perspective, improving health and wellness, decreasing disease-related symptoms, and promoting rehabilitation (Khalsa, et al 2016; Kraftsow, 2019; McCall, Satish, & Tiwari, 2016).

Yoga Therapy for Cancer Patients

Chairside yoga, provided to cancer patients in the comfort of their treatment chair during chemotherapy/immunotherapy infusion, provides an opportunity to overcome barriers likely encountered in a traditional yoga setting. Major barriers which may prevent cancer patients' from attending yoga therapy classes include fatigue, symptom burden, transportation and scheduling. Convenience has been described as an important benefit of chairside yoga (Sohl, et al, 2016).

Yoga Therapy in Cancer and Chronic Illness (YCat) is a program specifically created for people with a variety of chronic conditions, including cancer, heart disease, and autoimmune diseases (Chapman, 2018; Chapman & Ashram, 2015; Danhauer, et al, 2016; Hart, 2013). The YCat curriculum teaches YTs how to individualize yoga practice techniques in a manner which addresses specific goals of the patient in relation to the side effects and symptoms of their disease. The trained YCat therapist learns how to modify and adjust yoga instruction based on information about the illness and the patient's description of their own personal experience with cancer. The YCat interventions include specific breathing practices, gentle movements, deep relaxation (e.g., Yoga Nidra), meditation, and guided imagery which may be modified to

compensate for cancer related treatment limitations or enhanced to meet the individual's personal goals (Chapman & Ashram, 2015).

Yoga Therapy for Symptom Management

Numerous research studies support yoga as a therapeutic option for reducing physical and psychosocial symptoms in cancer patients, including cancer-related fatigue, anxiety, pain, nausea and distress. Multiple benefits of using yoga therapy for cancer patients and cancer survivors have been described in multiple meta-analyses and other systematic reviews of literature (Buffart, van Uffelen, Riphagen, Brug, van Mechelen, Brown, & Chinapaw, 2012; Cramer, Lange, Klose, Paul, & Dobos, 2012; Danhauer, et al, 2016; Harder, Parlour, & Jenkins, 2012; Lin, Hu, Chang, Lin, & Tsauo, 2011; Mishra, Scherer, Snyder, Geigle, & Gotay, 2014; Sisk & Fonteyn, 2016; Smith & Pukall, 2009; Zhang, Yang, & Wang, 2012).

Cancer-related fatigue (CRF) is a "distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent activity and interferes with usual functioning" (National Comprehensive Cancer Network [NCCN], 2018). Various studies support the use of yoga therapy to decrease cancer patients' experience of fatigue (Chadwani, Perkins, Nagendra, Raghuram, Spelman, Nagarathna, … Cohen, 2014; Cramer, Rabsilber, Lauche, Kummel & Dobos, 2015; Danhauer, Mihalko, Russell, Campbell, Felder, Daley, Levine, 2009; Dhruva, Miaskowski, Abrams, Acree, Cooper, Goodman, & Hecht, 2012; Taso, Lin, Lin, Chen, Huang, & Chen, 2014; Vadiraja, Rao, Nagendra, Nagarathna, Rekha, Vanitha, … Rao, 2009).

Anxiety related to cancer is considered a normal reaction to a potentially life-threatening illness. Caner related anxiety can also be medication-induced, caused by withdrawal from alcohol or nicotine, can be related to disease stage, and can be related to difficulty of treatment

(Economou, 2017a). Numerous studies suggest anxiety in cancer patients can be decreased after yoga therapy interventions (Dhruva, et al, 2012; Raghavendra, Nagarathna, Nagendra, Gopinath, Srinath, Ravi, … Nalini, 2007; Rao, Raghuram, Nagendra, Gopinath, Srinath, Diwakar, … Varambally, 2009; Kovačič, Zagoricnik, & Kovačič, 2013; Taso, et al, 2014; Vadiraja, et al, 2009).

One third of patients actively receiving cancer treatment and two thirds of patients with end-stage cancer experience some form of significant pain (Economou, 2017b). Primary sources of cancer pain are commonly associated with the disease of cancer and/or its treatments. Empirical evidence suggests that yoga therapy offers promise as an intervention to minimize the experience of pain among cancer patients (Carson, Carson, Porter, Keefe, Shaw, & Miller, 2007; Carson, Carson, Porter, Keefe, & Seeweldt, 2009).

Nausea and vomiting may be experienced by up to 80% of patients with cancer and can be the most distressing side effect of cancer treatment. With advances in modern anti-emetic therapy, the experience of chemotherapy-induced nausea and vomiting can be reduced to 13-35%, even among patients receiving moderately or highly emetogenic chemotherapy (Olsen, LeFebvre, & Brassil, 2019). Yoga therapy may also be an effective intervention to help minimize the experience of nausea among cancer patients (Carson, et al, 2009; Raghavendra, et al., 2007).

Distress is common among cancer patients and is defined by the NCCN as:

> A multi-factorial unpleasant experience of a psychological (ie, cognitive, behavioral, emotional), social, spiritual/physical nature that may interfere with the ability to cope effectively with cancer, its difficult symptoms, and its treatments. Distress extends along a continuum, ranging from common, normal feelings of vulnerability, sadness, and fears

> to problems that can become disabling, such as depression, anxiety, panic, social isolation, and existential and spiritual crisis (NCCN, 2018, p. DIS-2).

The NCCN Guidelines include a variety of distress-related interventions for use with cancer patients, including distress screening, which can prompt early treatment, such as the inclusion of complementary and integrative therapies which can decrease symptoms related to cancer and its treatments (Faller, Schuler, Richard, Heckl, Weis, & Kuffner, 2013; NCCN, 2018; O'Connor, et al, 2017). Screening for cancer related distress was initially accomplished through a single-item instrument called the Distress Thermometer (Roth, Kornblith, Batel-Copel, Peabody, Scher, & Holland, 1998). The NCCN updated the Distress Thermometer by pairing it with a distress-related problem list, which included the addition of practical, family, emotional, spiritual/religious, and physical problems (NCCN, 2018; Vitek, Rosenzweig, & Stollings, 2007). The revised tool allows for the collection of more comprehensive clinical evidence of distress. A score of four or greater indicates moderate to severe distress and suggests additional patient assessment and treatment may be necessary (NCCN, 2018). A meta-analysis conducted by Ma and colleagues (2014) found the Distress Thermometer to be a valid tool for detecting distress in persons with a cancer diagnosis (Ma, Zhang, Zhong, Shu, Wang, Wen, . . . Liu, 2014).

The experience of distress is so prevalent among cancer patients that the NCCN developed "Clinical Practice Guidelines in Oncology for Distress Management" (NCCN, 2018). These guidelines note that distress is "recognized, monitored, documented and treated promptly at all stages of disease and in all settings." (NCCN, 2018, p. 3). The Guidelines also recommend a variety of distress-related interventions for healthcare providers to incorporate into cancer care, including complementary and integrative therapies (NCCN, 2018). Results from multiple studies support the positive effect of yoga therapy as an intervention to decrease distress levels among

cancer patients (Bower, Garet, Sternlieb, Ganz, Irwin, Olmstead, & Greendale, 2012; Danhauer, et al, 2009; Kovačič & Kovačič, 2011; Moadel, Shah, Wylie-Rosett, Harris, Patel, Hall, & Sparano, 2007; Raghavendra, et al, 2007; Rao, et al, 2009; Vadiraja, et al, 2009).

While the previous summary of literature clearly supports the use of yoga as an adjunct therapy in the oncology patient population, unique challenges do exist. Research findings can be difficult to generalize or apply in practice due to the high degree of variability in research designs, types of yoga therapy, and myriad of cancer diagnoses. Additionally, few studies exist describing the specific impact of chairside yoga therapy to relieve symptoms of cancer patients during chemotherapy/immunotherapy administration in an outpatient infusion setting (Buffart, et al, 2012; Sohl, et.al, 2016).

Purpose

This study examined the effect of therapeutic yoga on perceptions of fatigue, pain, nausea, anxiety and distress, as well as overall satisfaction with the healthcare experience, among oncology patients concurrently receiving outpatient cancer therapy infusions.

Methods

Setting

This study was conducted in the outpatient medical oncology clinic of a 550- bed, academic, tertiary care, healthcare network located in the mid-west. The facility's oncology program is accredited by the Commission on Cancer in the American College of Surgeons.

Study Population

A single convenience sample of patients participating in an individually-guided, chairside yoga session was used in this study. The yoga therapist personally approached qualifying patients with a cancer diagnosis while receiving, or scheduled to receive, a chairside infusion

(e.g., chemotherapy, immunotherapy, hydration fluids, and other infusion services) within an outpatient Cancer Center. All patients were adult (over the age of 18), English speaking, of any gender, mentally competent, and physically capable of verbally consenting and participating in basic yoga therapy.

Ethical Considerations

Approval was obtained from the hospital's Institutional Review Board prior to the initiation of this study. Eligible patients were invited to participate in the research and were assured their participation was voluntary and could be withdrawn without penalty at any time. The YT introduced the chairside yoga therapy program to qualifying participants receiving chemotherapy/immunotherapy in the infusion treatment area. Following verbal consent, the YT described the potential benefits of yoga, explained the basic physiology of yoga therapy, and demonstrated the techniques to be used.

Instrument

A comprehensive review of the literature revealed the lack of a concise instrument to measure the effect of yoga on cancer-related symptoms among patients concurrently receiving infusion therapy in a busy outpatient treatment center. Researchers developed and administered the Outpatient Cancer Symptom Assessment Scale (OCSAS) comprised of cancer and/or treatment related symptoms commonly reported in the oncology population (nausea, pain, fatigue, anxiety, and distress). Symptoms were rated using a Likert scale of 0 (not present) to 10 (severe) before and after chairside yoga delivered concurrently during outpatient infusion therapy. Overall patient satisfaction was also assessed following the yoga intervention. Definitions for each study variable (pain, anxiety, fatigue, nausea, and distress) were based on

patients' own subjective experience. No attempt was made by researchers to define or influence any patient's perception of their own symptom experience.

A survey was developed which included the OCSAS and demographic questions (age, gender, diagnosis, and treatment). The survey also asked patients to identify their yoga treatment goals from among a list of options, which included stress reduction, relaxation, increased feelings of peace/quiet, symptom relief, and the opportunity to learn yoga techniques which could be practiced at home.

Qualitative data collected on the survey also helped inform the YT's overall assessment of the patient and informed the final selection of yoga therapy which could yield the most individualized therapeutic experience for the patient (selection of therapy is described in the next section). In the post-yoga survey, symptoms were re-assessed (using the same symptom assessment instrument), goals of yoga therapy were evaluated, and patient comments about their experience with yoga therapy were recorded.

Face validity of the OCSAS was generated by selecting specific items from a comprehensive literature review and selecting the most frequently reported symptoms experienced by the cancer patient population. The psychometric properties of the instrument have not yet been performed but will be examined and described in a future paper.

Data Collection

Before and after the yoga intervention, the YT guided patients through the symptom assessment to rate the intensity of the five symptoms frequently caused by cancer or cancer-related therapies (pain, nausea, fatigue, anxiety and distress). Patients were encouraged to also provide any qualitative feedback regarding other benefits derived from the yoga therapy intervention. All quantitative and qualitative survey responses were provided verbally to the YT

during both pre and post surveys. The ability for patients to complete the survey in writing was difficult due to their reclined position, concurrent administration of infusion therapy, experiences of symptoms (e.g., fatigue, nausea), and/or inconvenience. The YT carefully recorded each survey response and clarified answers, as needed.

The Yoga Intervention

During the initial introductory conversation and throughout survey administration, the YT simultaneously assessed each individual patient for the presence of factors which could guide her selection of the most appropriate type (or types) of yoga intervention. Specific yoga interventions were customized for each patient based on the YT's holistic review of responses on the pre-yoga survey, including the Cancer Symptom Assessment Instrument, treatment / personal goals, and qualitative data. The YT assessed for other visible clues such as: breathing pattern (shallow or laborious), level of motivation, emotional state (e.g., sadness, resentment, anger, presence of restlessness), and physical challenges (e.g., energy level, postural limitations). The indication for each type of yoga based on patient symptom is described in Table 1.

<Place Table 1 Approximately Here>

Patients received approximately 20 minutes of individualized, chairside yoga therapy and instruction, taught by a certified YT using standard YCat yoga curriculum/techniques (Chapman & Ashram, 2015). Each yoga intervention selected by the YT included one or more yoga techniques (awareness practice, three-part breath, movement, head and neck movement series, and/or yoga nidra). For example, after considering the patient's personal goals and symptoms,

the YT may have selected three-part breath techniques for persons with low energy levels, or awareness practice for those experiencing distress.

The YT also prioritized and/or combined interventions for patients experiencing multiple symptoms, such as awareness practice, three-part breath, movement, and/or yoga nidra. For example, patients experiencing high levels of anxiety and fatigue were offered an intervention to help decrease anxiety and build energy (e.g., a breathing practice incorporating meditation techniques). The criteria for selecting the most appropriate intervention(s) was guided by the empirical literature (Chapman & Ashram, 2015). The yoga therapy was customized for each individual patient, and general instructions provided to the patient for each type of yoga intervention are described in Table 2.

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The YT was flexible in the time frame provided for yoga therapy due to the typical interruptions of a busy infusion center (medication administration, IV maintenance, treatments, family visits, etc.) (Chapman & Ashram, 2015). For example, if the RN entered the patient's room/bay during a yoga intervention and needed time with the patient, then the YT returned to the patient after the required nursing tasks were completed.

Data Analysis

Data were entered into Microsoft® Excel and imported into SPSS®, version 17.0, for statistical analysis. Demographic characteristics (e.g., cancer diagnosis, age, gender) were analyzed using descriptive statistics. Mean, standard deviation, and paired sample t-tests were performed to determine if significant differences existed between pre-and post-test scores for

pain, fatigue, nausea, anxiety, and distress. Patients shared other symptoms during the pre- and post-yoga interventions; however, feedback was minimal and was insufficient for analysis. Content analysis was used to analyze patients' comments regarding the overall benefit of the yoga intervention. Qualitative data were coded according to common themes by the Principle Investigator (PI) and YT, and coded themes were then reviewed by the hospital's director of nursing research. Number of comments in each category were calculated, and sample comments for each theme were summarized in a table. A research assistant entered qualitative data into an electronic spreadsheet.

Results

Over a 12 month period, this study enrolled 82 patients (54.95% female, 42.7% male, 2.4% no response) with various forms of cancer receiving chemotherapy/immunotherapy in an outpatient setting. Patients' cancer diagnoses included breast cancer (26.8%), leukemia/lymphoma/multiple myeloma (17.1%), lung cancer (16.4%), colorectal (11.0%), and 11 other solid cancers (28.7%). Mean patient age was 58.5 years (SD = 12.44).

Participants receiving yoga therapy concurrently during the time of infusion reported statistically less pain ($p<0.001$), fatigue ($p<0.001$), anxiety ($p<0.001$), and distress ($p<0.001$) compared to pre-yoga baseline scores (Table 3). No significant change was noted in the symptom of nausea compared to baseline ($p=.062$). Mean differences from pre-yoga to post-yoga ranged from 1.16 points (pain) to 1.87 points (distress), for all symptoms, except nausea. Mean pain score decreased from 2.10 (SD=2.93) to 0.94 (SD=1.98). Mean fatigue score decreased from 3.69 (SD = 3.27) to 1.90 (SD = 2.34). Mean anxiety score decreased from 2.59 (SD = 2.45) to 1.1.17 (SD = 1.50). Mean distress score decreased from 3.84 (SD 3.00) to 1.97 (SD = 1.85) (See Table 3). Patients infrequently described "other" symptoms not included as an option on the

survey. Examples include back pain, vertigo, and insomnia. However, these findings were insufficient to warrant thematic coding and analysis.

<Place Table 3 Approximately Here>

Overall patient satisfaction was also assessed following the yoga intervention. Qualitative feedback provided to the YT revealed themes describing the yoga experience as a positive one which increased relaxation, improved mood, provided skills for future use at home, diminished symptoms, and prompted interest in pursuing yoga therapy in the future (Table 4).

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Discussion

This study represents a significant step towards the implementation of yoga therapy in a non-traditional setting where cancer patients are receiving chemotherapy and immunotherapy infusions. Chairside yoga therapy was selected as an intervention due to cancer patients' barriers to attending group yoga therapy classes (Sohl, et al, 2016). This process allows the YT to bring the intervention directly to the patient, during potential times of distress.

Although an increasing number of yoga studies have been published in the scholarly literature, little is known regarding the effectiveness of chairside yoga received concurrently in cancer patients receiving infusion treatment in an outpatient infusion center. Results from this preliminary study suggest yoga may provide potential benefit to cancer patients experiencing disease symptoms and/or treatment-related side effects of pain, fatigue, anxiety, and distress

during the time of infusion. The experience of nausea was measured but not impacted significantly by the yoga intervention. However, the presence of anti-emetic medications, which is used by most study participants, likely confounded this study finding.

Several modifications were made in the study instrument during the study period. One modification included the addition of a notation when family or caregivers were present and participated in the yoga therapy session with the patient, as became an unexpected but common occurrence (approximately 80% of the time). In the symptom assessment section of the pre- and post-survey, a section labeled "other symptoms" was added, so patients could identify another symptom (e.g., headache") that the patient was experiencing and that was not one of the symptom options provided. An open text box for "other goals" was added to the pre-survey, which prompted patients to consider other goals not mentioned on the list. The availability of "other" options provided a designated area for the YT to record pertinent qualitative data the patient might provide as a reason for pursuing yoga therapy. Finally, a "patient comments" was added to the post-survey to capture general feedback provided by patients for future qualitative analysis. Since these data collection points were added to the instrument during the study, results will be reported in a future paper.

Several practical lessons were learned during the implementation of the yoga therapy program. (See Table 5). Some patients had difficulty independently completing the Likert scale for symptom assessment, which may have been related to their experience of high levels of fatigue, pain or other symptoms. Therefore, the YT frequently interviewed patients to facilitate the collection symptom ratings.

Collaboration with nursing staff was a significant step in the process of entering patients into this study. The YT collaborated with nurses to determine which patients might benefit from

and participate in the yoga therapy. Nurses provided patients with brief education on the yoga therapy intervention and encouraged patients to participate. In summary, the most significant steps to effectively implement a yoga therapy program in an outpatient oncology clinic included:

- Use strategies to increase the patient / caregiver's acceptance of yoga therapy (e.g., establishing a therapeutic relationship, describing yoga therapy as a stress-reducing activity, and wearing facility name badge).
- Provide patient education about yoga therapy interventions, and correct any misconceptions (e.g., they will not be asked to do difficult yoga poses; it is a stress reducing activity).
- Provide nurse education related to yoga therapy to increase their understanding of the yoga therapy interventions for cancer patients.
- Plan logistics in implementing the yoga therapy program in the outpatient oncology clinic, including dates, times, etc..

Limitations

A variety of yoga interventions were used during the patient's yoga experience (e.g., yoga nidra, breathing practices, movement, guided imagery) so it was not possible to determine which single intervention most significantly impacted the patient's symptom relief. Other limitations were also noted during this study. The sample size was small (n=96) and data were collected from only one outpatient cancer center. The study design did not include a control group with which to compare patient responses to the yoga intervention. The frequent use of anti-emetics by this study population likely impacted the low scores regarding the experience of nausea and made this variable difficult to objectively measure. Distractions, such as nursing care or family

visits, may have decreased the effectiveness of the yoga intervention. Finally, the data was collected by the YT who also provided the intervention.

Conclusions and Nursing Implications

Yoga therapy offers promise for reducing many common symptoms which negatively impact cancer patients' distress and quality of life. Future yoga therapy interventions could include a more formalized patient and family education on yoga practices for home use, which would support them after discharge. This educational program could include a variety of teaching strategies, including CDs, websites, group yoga classes, or other resources. Yoga education in the outpatient population should reinforce learning and provide both a meaningful and practical way for patients to practice yoga after discharge.

A common, yet unanticipated finding concerned the lack of awareness that anxiety was present prior to the yoga intervention, but the intensity had not been fully recognized until after the relaxing effects of yoga. Future studies might include the question "did yoga lower your anxiety" as part of the post survey evaluation. Inclusion of this question could further quantify the experience of participants whose initial self-assessment was one of lacking anxiety, but was later re-considered to be present at baseline, since the therapeutic effect of yoga had helped diminish it.

Patients receiving cancer infusions were commonly accompanied by family or caregivers who also frequently participated in the yoga therapy session with the patient. Future studies should examine if family/caregiver participation in yoga therapy, and/or their perception of the value of the intervention, impacted the patient's own experience.

Future research should include a randomized control study design and multiple sessions of outpatient YT. Additionally, future research with larger sample sizes, use of a longitudinal

study design, and use of multiple healthcare sites could make study findings more generalizable to other populations. A longitudinal design could include measurement of specific symptoms or complaints, implementation of a defined type of yoga intervention, followed by a series of measures over time to evaluate the efficacy of the therapeutic yoga intervention for the identified symptom(s).

Table 1

Choice of Yoga Interventions Based on Symptom Assessment

Symptoms	Awareness Practice	Breath Practice (3 Part)	Movement	Yoga Nidra
Distress	x	x	x	x
Anxiety	x	x	x	x
Pain	x	x		x
Nausea		x		x
Fatigue		x	x	x
Shallow/laborious breathing	x	x		x
Hyperactivity, high strung/tense	x	x	x	x

Table 2

Explanations / Instructions for each Yoga Interventions

Yoga Intervention	Explanation of Yoga Intervention and Patient Instructions
Awareness Practice: Mental scan of patient's own body	Instructions: • Guided to sit in a comfortable position. • Verbally guided in a whole body scan, beginning awareness from crown of patient's head to eventually reaching legs and feet. • Asked to notice sensations and feelings present in the physical, emotional, energetic and the thinking self. • Encouraged to be aware of places in their body which are experiencing tension, discomfort or pain; places that feel uneven or asymmetrical (e.g., after a surgery). • Asked to notice energy level and emotional levels. • Encouraged to observe these places in their body as an objective observer. • Guided to meet these places in their body with friendliness, or at least acceptance, instead of judgement.
Three Part Breath: Breathing to expand: (1) abdomen, (2) rib cage, and (3) chest	Instructions: • Encouraged to sit in a comfortable position. • Verbally guided in breathing practice, as follows: (1) Expand the abdominal muscles while inhaling, letting the belly fill with breath first. (2) Move the breath up into the rib cage. As belly and ribs fill with air, the higher parts of lungs fill. (3) Inhale to fill the chest completely to apex of the lungs.
Movement-Head and Neck Series: Five step process of head and neck movements	Instructions: • Encouraged to sit in a comfortable position. • Asked to do the following (1) Lower chin while exhaling, and lift chin to open throat while inhaling.

connected to breath.	(2) Turn head sideways while exhaling and bring head to center while inhaling. (3) Lower one ear down towards shoulder while exhaling and move head back to center while inhaling. (4) Shrug shoulders up toward the ears while inhaling and press shoulders down towards hips while exhaling. (5) Make larger circles with shoulders by bringing them forward and lifting while inhaling; move shoulders back down and into neutral position while exhaling.
Movement-Cat/Table Connecting breath with spine extensions and flexion movement.	Instructions: • Encouraged to sit in a comfortable position. • Asked to round the back, while exhaling, • Guided to lift chin, open chest, and arch back, while inhaling. (This practice can be modified, as clinically indicated.
Yoga Nidra "Yogic sleep" or a state where the patient is completely relaxed while following a set of verbal instructions.	Instructions: Find the most comfortable, reclined position and do the following: • Systematically tense, engage, and release different muscles groups. • Move awareness to various body parts, beginning at feet and moving to facial muscles. • Release and relax using visualization and other various deep relaxation techniques to move up the body from the feet to facial muscles. • Be aware when the body relaxes, how the breath and mind become relaxed also. • Participate in this guided practice for about 20-40 minutes.

Table 3

Repeated Measures t-Tests Comparing Pre- and Post-Yoga Scores

Variable (n)	Pre Score Mean (SD)	Post Score Mean (SD)	Mean Difference (SE)	p-value
Pain (71)	2.10 (2.93)	0.94 (1.98)	-1.16 (0.27)	< 0.001
Nausea (76)	0.45 (1.24)	0.25 (0.94)	-0.20 (0.10)	0.062
Fatigue (77)	3.69 (3.27)	1.90 (2.34)	-1.79 (0.22)	< 0.001
Anxiety (58)	2.59 (2.45)	1.17 (1.50)	-1.41 (0.18)	< 0.001
Distress (38)	3.84 (3.00)	1.97 (1.85)	-1.87 (0.33)	< 0.001

Table 4

Overall Benefit of Yoga: Themes from Qualitative Data

Themes	Examples of Patient Comments Post-Yoga Intervention
Positive experience (20 mentions)	"You can't believe how much I got out of this" “I haven't felt like that in a long time. You made my day so much better. That turned my day around.” "I learned something new. It made me feel good in my heart." “I liked the end part of yoga nidra - letting go of everything where I laid back was the best.”
Improved relaxation (19 mentions)	"You really relaxed me." "Stuff going on around me and I was still able to relax." “I am always skeptical but, I really did feel some benefit to it. It was cool how when you were talking about relaxing parts, I could actually zone in on specific ones.” “I've always wanted to come to a yoga class. I feel really relaxed.”
Improved mood (9 mentions)	"The anxiety felt reduced when I was doing it". "I felt lighter" " I imagined myself at the ocean cause there I feel free." “I feel so different than when I come in. I don't feel stress right now. I feel much brighter.” “You escalated my feeling of well-being.”
Skill Building for Yoga Home Practice (8 mentions)	“I will try some of the breathing practices at home.” "I think once I am home I will be able to do this/want to be more active." “It was beneficial when it was being taught. I will use some of these techniques when I go home.” “I will used these techniques at home.”
Decreased symptoms (5 mentions)	“I feel more energized. I don't have any discomfort.” “That made me feel very relaxed. I liked it. I'm breathing better.” “I feel better and more relaxed. I want to get back to a normal life.”
Interested in attending yoga classes (4 mentions)	“I'd like to come to class. I don't have good body awareness or self-image. I'd like to get over this.” "I might do chair yoga class" “I would like to come to class in future.” “I'd like to do some standing poses. I really miss yoga.”

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