


Group Yoga Effects on Cancer Patient and Caregiver Symptom Distress: Assessment of Self-reported Symptoms at a Comprehensive Cancer Center

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Abstract

Background. Complementary and integrative health approaches such as yoga provide support for psychosocial health. We explored the effects of group-based yoga classes offered through an integrative medicine center at a comprehensive cancer center. **Methods.** Patients and caregivers had access to two yoga group classes: a lower intensity (YLow) or higher intensity (YHigh) class. Participants completed the Edmonton Symptom Assessment System (ESAS; scale 0-10, 10 most severe) immediately before and after the class. ESAS subscales analyzed included global (GDS; score 0-90), physical (PHS; 0-60), and psychological distress (PSS; 0-20). Data were analyzed examining pre-yoga and post-yoga symptom scores using paired t-tests and between types of classes using ANOVAs. **Results.** From July 18, 2016, to August 8, 2017, 282 unique participants (205 patients, 77 caregivers; 85% female; ages 20-79 years) attended one or more yoga groups (mean 2.3). For all participants, we observed clinically significant reduction/improvement in GDS, PHS, and PSS scores and in symptoms (ESAS decrease ≥ 1 ; means) of anxiety, fatigue, well-being, depression, appetite, drowsiness, and sleep. Clinically significant improvement for both patients and caregivers was observed for anxiety, depression, fatigue, well-being, and all ESAS subscales. Comparing yoga groups, YLow contributed to greater improvement in sleep versus YHigh (-1.33 vs -0.50 , $P = .054$). Improvement in fatigue for YLow was the greatest mean change (YLow -2.12). **Conclusion.** A single yoga group class resulted in clinically meaningful improvement of multiple self-reported symptoms. Further research is needed to better understand how yoga class content, intensity, and duration can affect outcomes.

Keywords

complementary and integrative medicine, integrative oncology, yoga, self-reported outcomes, group program, mind and body, Edmonton Symptom Assessment System

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Introduction

Interest and use of complementary and integrative medicine approaches are increasing in western medical settings,^{1,2} with mind-body approaches such as yoga showing promise in relieving symptoms caused by cancer and its treatment. There has also been increased interest in the education of health care providers regarding the safety and benefits of yoga for their patients in the context of oncology care.³ Yoga is a mind-body movement practice with a focus on yoga *asanas* or physical postures, *pranayama* or controlled

breathing, relaxation, and meditation, with styles and class content varying based on instructor background and training. Yoga falls under the category of mind and body

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complementary health approaches according to the National Center for Complementary and Integrative Health and can either be practiced alone or in a group setting.

For cancer patients, research supports the benefits of yoga for improving health, quality of life, and physical function and reducing distress, anxiety, depression, sleep disturbances, and fatigue.⁴⁻⁷ A recent systematic review of 24 phase II and III clinical trials showed that low-intensity forms of yoga, specifically gentle hatha and restorative, are safe and effective for relief of sleep disruption, fatigue, cognitive impairment, psychosocial distress, and musculoskeletal symptoms.⁸ For cancer survivors, a multicenter randomized controlled trial of a combination hatha/restorative yoga intervention was found to improve sleep quality.⁹ Research has also found that the benefits of yoga translate into better physiological functioning, including reduced stress hormone regulation and enhanced immune function. A recent clinical practice guideline on the evidence-based use of integrative therapies recommends yoga interventions for reducing stress and anxiety during and after breast cancer treatment.¹⁰ For patients and caregivers, our own research suggests that yoga can lead to improvements in mental health quality of life, sleep disturbances, physical functioning, finding meaning in the illness experience, and stress hormone regulation.^{11,12}

Established in 1998, the aim of the Integrative Medicine Program at The University of Texas MD Anderson Cancer Center is to provide evidence-informed care to those affected by cancer through a commitment to research, education, and direct patient care. Our clinical model is based on the biopsychosocial model of care, incorporating therapies that address physical, mind-body, and social dimensions of health.^{13,14} Clinical services include oncology massage, acupuncture, meditation, health psychology, nutrition, physical therapy, and music therapy, all with the focus of enhancing and improving the patient experience. Yoga is available to patients and caregivers as group classes in our outpatient center as low-intensity “Yoga for Health” (YLow) and higher-intensity “Yoga for Fitness” (YHigh) classes. Class content was designed by a yoga therapist in collaboration with a physical therapist, with a strong emphasis on safety and achieving the appropriate level of intensity. The yoga classes were an integrated Patanjali-based yoga program designed in collaboration with the Vivekananda Yoga Anusandhana Samsthana, a yoga research foundation and university in Bengaluru, India.

Outside of clinical trials, limited data are available regarding group class effects on patient and caregiver self-reported outcomes in a clinical setting. Our objective was to learn about similarities and differences between patients and caregivers participating in our yoga classes, better understand the effects of yoga practice on participant self-reported symptoms, and explore if differences in class intensity have a differing effect on symptom change.

Methods

Participants (patients and caregivers) include the individuals attending any of the 2 yoga group classes: YLow and YHigh between July 2016 and July 2017. Participants did not need a medical order to register for a class; some may have attended on recommendation from a physician or other clinician. Participants did not have to be patients or caregivers at our institution to attend a group class; those without medical record numbers had one assigned to them as part of class enrollment. However, the majority were from the MD Anderson Cancer Center community. The group classes were offered at no cost in an activity space located within the hospital campus. Group class attendance was limited to 20 participants.

Classes were advertised as part of our Integrative Medicine Center newsletter, highlighting outpatient group classes, available both in print and online. YLow was described as “Yoga for Health, features a gentle form of yoga including stretching, breathing, relaxation and meditation techniques.” YHigh was described as “Yoga for Fitness, a beginning/intermediate level yoga class that focuses on moving through postures with breath.” In addition, alongside the description, a stick figure icon was used as visual indicator of intensity/activity level (hands by side = gentle; 1 hand raised = active; 2 hands raised = very active). The YLow class was associated with the “active” icon, and the YHigh class was associated with the “very active” icon.

Participants were asked to complete the Edmonton Symptom Assessment System (ESAS; scale 0-10, 10 most severe) on paper before and after their class as part of their registration for the class; completion of the assessments was not a requirement for class participation. The ESAS¹⁵ has participants report on 10 symptoms, including pain, fatigue, nausea, depression, anxiety, drowsiness, appetite, sense of well-being, shortness of breath, and sleep. The ESAS Global Distress Score (GDS) is the sum of all the items excluding sleep (total score 0-90). The Physical Distress Score (PHS) is a sum of pain, fatigue, nausea, drowsiness, appetite, and shortness of breath (total 0-60). The Psychological Distress Score (PSS) is a sum of depression and anxiety (total 0-20). Clinically significant reduction for individual ESAS symptoms was defined as a symptom score reduction of ≥ 1 ; for the ESAS subscales,¹⁶ reduction of $GDS \geq 3$, $PHS \geq 2$, and $PSS \geq 2$ indicated clinically significant changes. Outcome data were considered evaluable if the participant completed at least 70% of items on the pre-ESAS assessments for analysis of baseline data and 70% of items on both pre-ESAS and post-ESAS assessments for evaluation of symptom change. Data were collected prospectively and entered into a database as part of an institutional review board (IRB)-approved protocol (MDACC Protocol No. DR11-0149; Registration No. IRB 4 IRB00005015).

Lower intensity (YLow)								
Cardio-respiratory	Muscle Strength	Muscle Endurance	Flexibility	Body Composition	Balance/Coordination	Agility	Speed	Power
N	S	Y	Y	N	Y	N	N	N
Higher Intensity (YHigh)								
Cardio-respiratory	Muscle Strength	Muscle Endurance	Flexibility	Body Composition	Balance/Coordination	Agility	Speed	Power
S	S	Y	Y	S	Y	S	N	N

Figure 1. Yoga class fitness goals.

Abbreviations: Y, addressed directly; S, addressed to some degree; N, not addressed.

Intervention

We have 2 yoga classes as part of our group programs: YLow and YHigh (Figure 1). The overall goals of the yoga classes were to improve strength, balance, flexibility and activity tolerance, as well as relieve stress and enhance relaxation. Both classes were scheduled for 60 minutes, which included 45 minutes of yoga practice, and led by certified yoga instructors with experience working with cancer patients and caregivers in an oncology setting. In all classes, there was an introduction to yoga as a mind-body practice within our integrative medicine approach at MD Anderson, followed by the respective content. YLow was designed as a low- to moderate-intensity beginner/intermediate level yoga class, which included joint loosening and breathing, *asanas* or physical postures, and *pranayama* or breath energization. YHigh included moderate- to high-intensity physical postures beyond the breathing and flexibility focus of postures taught in YLow. This class was designed as a launching point for patients to become stronger and feel more confident in assuming a more physically active lifestyle. Both classes closed with *savasana* or deep relaxation.

A curriculum (Supplemental Material 1, available at <http://journals.sagepub.com/home/ict/supplemental-data>) was designed for each class to serve as a guide for instructors teaching YLow and/or YHigh. To help calibrate class content and intensity, there were 2 meetings with instructors during the period analyzed: first when both classes were made available to patients and another at a midpoint during the period evaluated. Instructors had the opportunity to participate in a class taught by another instructor; a third-party

observer (physical therapist specializing in oncology care) also participated in curriculum design and observation of class content to assess for safety.

Statistics

Data were analyzed examining the pre-yoga and post-yoga symptom scores using paired *t*-tests and between types of yoga classes using ANOVAs. As an individual could attend more than 1 group class, we only analyzed data for the first visit per participant. We first compared baseline mean symptom scores for patients versus caregivers. We also examined differences in symptom change for patients versus caregivers attending their first yoga class. Only those reporting an ESAS symptom score of ≥ 1 before or after the yoga class were included in the analysis. We then examined group class differences, comparing differences in participant symptom burden at baseline and differences in observed symptom score reduction. We compared baseline symptom burden and demographics between those who attended only 1 class versus those who attended 2 or more classes.

Results

Demographics

For the period July 18, 2016, through August 8, 2017, we collected data on 282 unique participants, of whom 205 were patients and 77 were caregivers; age, sex, and ethnicity were well balanced across caregivers and patients (Table 1).

Of these participants, 252 (89%) completed at least 70% of the ESAS preassessment, and 185 (66%) completed at least 70% of items on ESAS preassessments and postassessments. The average class size was 4.2 (range 1-13), with an average number of classes attended per person of 2.3 (range 1-35); 34.7% (98/282) participated in more than 1 class.

Participant attendance was well distributed across both yoga classes offered for a total attendance of 653 across both groups. Overall attendance was as follows: YLow, $n = 393$; YHigh, $n = 260$; a participant could attend a group class more than once and/or attend more than 1 group class. No significant differences were observed in demographic characteristics (caregiver attendance vs patient attendance, age, gender, race, marital status) between participants of either the YLow or YHigh groups.

Baseline Symptoms

Because an individual could attend more than 1 group class (eg, an individual can count once for each group class if they attended both group classes), we analyzed data for the first visit of 279 participants (YLow, $n = 173$; YHigh, $n = 106$). We calculated mean symptom scores at baseline for all participants and compared baseline mean symptom scores for patients versus caregivers (Table 2). Significant differences in patient and caregiver symptom expression at baseline were observed for symptoms of fatigue, nausea, shortness of breath, appetite, drowsiness, depression, well-being, and subscales of PHS and GDS (all $P > .05$); for all symptoms, patient baseline scores were worse/higher.

Group Class Effects on Symptom Change: Patient Versus Caregiver

We calculated symptom change for all participants and compared symptom changes for patients versus caregivers attending their first yoga class (reporting an ESAS symptom score of ≥ 1 before or after class), independent of which group class they participated in (Table 3). For all participants, we observed clinically significant reduction in symptoms of anxiety, appetite, depression, drowsiness, fatigue, sleep, well-being, and ESAS subscales of PHS, PSS, and GDS. For patients, symptom score change for all individual symptoms and subscales was statistically significant, with clinically significant improvement for symptoms of fatigue, appetite, drowsiness, depression, anxiety, and well-being. Caregiver pre-post comparisons revealed clinically significant improvement for symptoms of anxiety, depression, fatigue, pain, sleep, well-being, and ESAS subscales of PHS, PSS, and GDS. There were no statistically significant differences in symptom score change between patients and caregivers.

We examined the population of patients and caregivers with regard to worsening, improvement, or no clinical

change in GDS scores. Among the 252 participants at baseline, 185 (137 patients, 48 caregivers) completed both pre assessment and postassessment. Overall, for all participants, 151 (151/185 = 82%) experienced clinically significant improvement in their symptoms, 6 (6/185 = 3%) experienced clinically significant worsening of their symptoms, and 28 (28/185 = 15%) experienced no clinically significant change. Of 137 patients, 112 (112/137 = 82%) experienced clinically significant improvement in their symptoms, 4 (4/137 = 3%) experienced clinically significant worsening of their symptoms, and 20 (20/137 = 15%) experienced no clinically significant change. Of 48 caregivers, 39 (39/48 = 81%) experienced clinically significant improvement in their symptoms, 2 (2/48 = 4%) experienced clinically significant worsening of their symptoms, and 8 (8/48 = 17%) experienced no clinically significant change.

Group Class Differences: YLow Versus YHigh

We examined baseline symptom score differences and pre-post change differences between group classes (Table 4). Symptom burden for the YLow class was higher overall, with symptoms of fatigue, sleep, and well-being (mean symptom scores 4.04, 4.19, and 4.20, respectively) all at a moderate level of intensity with mean scores >4 ; mean scores for YHigh at baseline were all <4 . With regard to pre-post change, we observed statistically significant reduction across all symptoms for YLow (all $P < .01$). Clinically significant symptom score reductions for YLow included fatigue, appetite, drowsiness, depression, anxiety, sleep, and well-being. For YHigh, we observed statistically significant symptom score reductions ($P < .05$) across all symptoms except for nausea. Clinically significant symptom score reductions for YHigh included fatigue, drowsiness, depression, anxiety, and well-being. Only change in sleep score resulted in a statistically significant difference in symptom score reduction comparing YLow versus YHigh (-1.33 vs -0.5 , respectively) classes. Improvement in fatigue for YLow was the greatest mean change and differences with YHigh approached significance (YLow, -2.12 ; YHigh, -1.34 ; $P = .058$).

Predictors of Continued Attendance

Comparing demographics and baseline ESAS individual and subscale scores, there were no significant differences between those who only participated in 1 class versus those who attended 2 or more classes.

Discussion

We report on results of preassessment and postassessment of patient and caregiver self-reported symptoms collected as part of the standard of care for individuals attending our

Table 1. Patient and Caregiver Demographic and Medical Factors.

	Patients, n = 205 (%)	Caregivers, n = 77 (%)
Age		
Mean (SD)	55.4 (12.2)	54.3 (15.3)
Median (Minimum-Maximum)	57 (21-79)	59 (20-77)
Gender		
Female	175 (85.4)	65 (85.4)
Male	30 (14.6)	12 (15.6)
Race/Ethnicity		
White	141 (68.8)	42 (54.5)
Hispanic	31 (15.1)	10 (13.0)
Asian	15 (7.3)	6 (7.8)
Black	8 (3.9)	3 (3.9)
Other/Unknown	10 (4.9)	16 (20.8)
Residence		
Harris County	46 (22.4)	11 (14.3)
Seven surrounding counties	18 (8.8)	1 (1.3)
Rest of Texas	42 (20.5)	20 (25.9)
Rest of the United States	89 (43.4)	41 (53.2)
International	10 (4.9)	4 (5.2)
Disease type		
Breast	100 (35.5)	—
Gastrointestinal	18 (6.4)	—
Thoracic/Head and neck	15 (5.3)	—
Lymphoma/Myeloma	13 (4.6)	—
Gynecological	11 (3.9)	—
Genitourinary	9 (3.2)	—
Skin (including melanoma)	8 (2.8)	—
Leukemia	7 (2.5)	—
Neurological	5 (1.8)	—
Sarcoma	2 (0.7)	—
Other/No cancer	16 (6.1)	—

Table 2. Baseline Mean Symptoms and Subscale Scores.

	All Participants, Mean (SD)	Patient, Mean (SD)	Caregiver, Mean (SD)	P Value
Pain	1.83 (2.15)	1.93 (2.15)	1.56 (2.15)	.2331
Fatigue	2.81 (2.41)	3.06 (2.42)	2.1 (2.24)	.0049
Nausea	0.49 (1.55)	0.65 (1.78)	0.03 (0.17)	.0045
Shortness of breath	0.82 (1.63)	1.0 (1.8)	0.32 (0.83)	.0034
Appetite	2.19 (2.66)	2.44 (2.7)	1.51 (2.43)	.0139
Drowsiness	1.37 (2.04)	1.6 (2.19)	0.75 (1.41)	.0034
Depression	1.32 (2.12)	1.48 (2.27)	0.88 (1.56)	.0477
Anxiety	1.84 (2.33)	1.86 (2.31)	1.76 (2.39)	.7523
Sleep	3.29 (2.62)	3.38 (2.67)	3.03 (2.47)	.3496
Well-being	2.88 (2.41)	3.08 (2.42)	2.34 (2.29)	.0313
GDS ^a	15.52 (13.36)	17.03 (13.89)	11.38 (10.85)	.0029
PHS ^a	9.47 (8.71)	10.62 (9.12)	6.32 (6.53)	.0005
PSS ^a	3.13 (3.97)	3.32 (4.1)	2.56 (3.52)	.1877

Abbreviations: GDS, Global Distress Score; PHS, Physical Distress Score; PSS, Psychological Distress Score.

^aGDS equals sum of pain, fatigue, nausea, depression, anxiety, drowsiness, appetite, well-being, and shortness of breath (total score 0-90); PHS equals sum of pain, fatigue, nausea, drowsiness, appetite, and shortness of breath (total 0-60); and PSS equals sum of depression and anxiety.

Table 3. Mean Score Change From Preclass to Postclass for Patients and Caregivers Reporting a Score of at Least 1 on the ESAS (Preclass).^a

	All Participants		Patient		Caregiver		
	Mean (SD)	P Value ^b	Mean (SD)	P Value ^b	Mean (SD)	P Value ^b	P Value ^c
Pain	-0.86 (1.72)	<.0001	-0.78 (1.71)	<.0001	-1.17 (1.76)	.0036	.3298
Fatigue	-1.83 (2.08)	<.0001	-1.74 (1.98)	<.0001	-2.13 (2.4)	.0002	.4265
Nausea	-0.44 (1.52)	.0032	-0.57 (1.71)	.0029	0 (0.29)	1.0000	.1000
Shortness of breath	-0.62 (1.48)	<.0001	-0.7 (1.62)	.0002	-0.33 (0.76)	.0428	.2879
Appetite	-1.06 (1.95)	<.0001	-1.12 (1.95)	<.0001	-0.88 (2.01)	.0383	.5919
Drowsiness	-1.09 (1.91)	<.0001	-1.18 (2.05)	<.0001	-0.8 (1.32)	.0059	.3862
Depression	-1.2 (1.97)	<.0001	-1.25 (2.03)	<.0001	-1.04 (1.76)	.008	.6535
Anxiety	-2.01 (1.8)	<.0001	-1.86 (1.8)	<.0001	-2.54 (1.74)	<.0001	.1015
Sleep	-1.01 (2.03)	<.0001	-0.94 (1.86)	<.0001	-1.22 (2.52)	.0303	.5768
Well-being	-1.68 (2.15)	<.0001	-1.7 (2.2)	<.0001	-1.6 (2)	.0005	.8353
GDS ^d	-10.91 (11.32)	<.0001	-10.99 (11.97)	<.0001	-10.66 (9.02)	<.0001	.8993
PHS ^d	-6.0 (7.61)	<.0001	-6.19 (8.21)	<.0001	-5.4 (5.25)	<.0001	.6530
PSS ^d	-3.21 (3.25)	<.0001	-3.11 (3.38)	<.0001	-3.61 (2.74)	<.0001	.5129

Abbreviations: ESAS, Edmonton Symptom Assessment System; GDS, Global Distress Score; PHS, Physical Distress Score; PSS, Psychological Distress Score.

^aFor all symptoms, a change score of ≥ 1 is considered clinically significant. For predetermined subscales, clinical significance is defined as follows: ≥ 3 for GDS; ≥ 2 for PHS and PSS.

^bIndicates P value for change from baseline.

^cIndicates P value comparing patient and caregiver change scores.

^dGDS equals sum of pain, fatigue, nausea, depression, anxiety, drowsiness, appetite, sense of well-being, and shortness of breath (total score 0-90); PHS equals sum of pain, fatigue, nausea, drowsiness, appetite, and shortness of breath (total 0-60); and PSS equals sum of depression and anxiety.

Table 4. Within- and Between-Group Analyses for Those Reporting a Symptom Burden of ≥ 1 on the ESAS.

	Lower-Intensity Yoga (YLow)				Higher-Intensity Yoga (YHigh)				Mean Change YLow (delta)	Mean Change YHigh (delta)	P Value ^b
	n	Mean Preclass	Mean Postclass	P Value ^a	n	Mean Preclass	Mean Postclass	P Value ^a			
Pain	68	2.47	1.49	<.0001	41	2	1.34	.0020	-0.99	-0.66	.3401
Fatigue	68	4.04	1.93	<.0001	41	2.93	1.59	<.0001	-2.12	-1.34	.0583
Nausea	68	0.79	0.25	.0142	41	0.49	0.22	.0779	-0.54	-0.27	.3625
Shortness of Breath	68	1.18	0.41	.0004	39	0.69	0.33	.0248	-0.76	-0.36	.1726
Appetite	69	3.42	2.14	<.0001	39	2.08	1.38	.0137	-1.28	-0.69	.1371
Drowsiness	68	2.18	1.15	.0001	41	1.68	0.49	<.0001	-1.03	-1.2	.6625
Depression	68	2.29	1	<.0001	41	1.88	0.83	.0002	-1.29	-1.05	.5305
Anxiety	68	3.24	1.25	<.0001	41	3.27	1.22	<.0001	-1.99	-2.05	.8596
Sleep	58	4.19	2.86	<.0001	36	3.14	2.64	.0424	-1.33	-0.50	.0541
Well-being	69	4.20	2.25	<.0001	40	2.7	1.50	<.0001	-1.96	-1.2	.0761

Abbreviation: ESAS, Edmonton Symptom Assessment System.

^aP values of paired t-test comparing preclass and postclass symptoms.

^bP values of ANOVA comparing YLow and YHigh classes.

outpatient yoga group programs. Collecting patient-reported outcomes measured in a real-life clinical setting can provide valuable insight into how to develop and include yoga classes as part of mind-body/integrative medicine programs serving those affected by cancer, including patients and caregivers. Increased awareness of how yoga classes in a real-life setting can affect symptom burden can also provide

valuable insight into clinical decision making for clinicians asked about how mind-body programs such as yoga can benefit their patients and families.

Overall, a single yoga group class resulted in statistically and clinically significant improvement of multiple patient and caregiver self-reported symptoms. Patient participant characteristics were consistent with the population of

patients in our hospital seeking integrative medicine physician consultations in our outpatient center, with a greater representation of women, diagnosis of breast cancer, and white race/ethnicity.¹⁴ Although patients were more likely to have worse/higher self-reported symptoms than caregivers at baseline, both populations had an overall low to moderate symptom burden, with no statistically significant difference in baseline scores for symptoms of pain, anxiety, and sleep disturbance. Our findings are consistent with prior literature examining symptom burden in cancer patients and their caregivers, demonstrating similar levels of distress in physical and psychosocial health domains.^{17,18} Future directions could include exploring the effects on self-reported outcomes of participating in a group class alone versus as part of a patient-caregiver dyad.

The observation that participants in the lower-intensity yoga class had overall higher symptom burden at baseline may be explained by a process of self-selection, where participants with greater symptom burden chose to participate in a lower- versus higher-intensity class. The class title and associated class description used for recruiting participants (YLow = “Yoga for Health” and Yhigh = “Yoga for Fitness”) may have influenced what class participants selected. When comparing the 2 different class formats on self-reported symptoms, our results suggest that both classes were equally effective in reducing symptom distress for all symptoms except sleep. The lower-intensity yoga class resulted in the greatest improvement for sleep disturbance. Although the assessment was provided to participants before and after a class on the same day, those in the lower-intensity yoga class (YLow) perceived a greater improvement in their sleep quality; this may be a result of their future expectation of how this class would help their sleep. Improvement in sleep is consistent with our own prior research, which suggests lower-intensity yoga programs can have significant benefits for sleep quality over time in cancer patients and their caregivers.^{11,12} Of note, in prior real-world research using the ESAS tool immediately before and after a single outpatient oncology massage treatment, we also observed clinically significant improvements in sleep for patients and caregivers.¹⁹ Assessing sleep as a symptom when included as part of the ESAS tool has greater value when observing change in sleep quality over time. More research is needed to learn about the immediate pre-post effects of a single yoga intervention on sleep perception.

There are a number of limitations with the current article, including that the study was conducted at a single institution. Also, participants were self-selected, not randomized to different group classes, and there was no control group. Some participants may have attended a group class on recommendation of a physician or health care provider within our health care institution, but could also

have participated as a member of the community without any clinical recommendation. Also, we did not account for patients and/or caregivers who may have attended a yoga group class prior to the study period or who may engage in their own regular practice of mind-body approaches such as yoga. It is possible we did not detect additional differences in effects of yoga class content on symptom change because of group heterogeneity (patients with different cancer types and stages, inclusion of caregivers). Also of note, although efforts were made to calibrate intensity and maintain consistency of class content, fidelity monitoring was not as strict as may have been expected in a research-based intervention (eg, use of video monitoring). Future studies may benefit from examining a more homogeneous participant population (eg, patients with a single cancer, stage) to learn more about the effect of class content on symptom change. However, the generalizability of these findings is better because data were collected as part of routine clinical care.

Our results show that a single yoga class can result in significant beneficial effects for several symptoms. Questions remain regarding the longitudinal effects of yoga practice on specific symptoms as well as the impact of continued practice on quality of life. Prior research has shown that regular practice of yoga can have benefits on quality of life, sleep disturbance, and symptoms of anxiety, fatigue, depression, and multiple other outcomes.⁸⁻¹² We have yet to examine the effects of longitudinal yoga group class attendance on quality of life and self-reported symptoms within our clinical center.

Further research with a larger sample size is needed to better understand the symptoms that yoga can help control and how differences in yoga class content can affect outcomes. To better understand effects of yoga on symptom stability over time, the amount of instruction exposure needed, and the ideal frequency of practice to improve outcomes, it would be valuable to examine how differences in group class content, frequency, and duration can affect symptom expression and patient/caregiver quality of life.

Authors' Note

The research was conducted by members of the Department of Palliative, Rehabilitation, and Integrative Medicine at The University of Texas MD Anderson Cancer Center. All authors have read and approved the article. This article is not under consideration elsewhere. There are no financial disclosures from any authors. The study was conducted as part of an institutional board-approved protocol.

Declaration of Conflicting Interests

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