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Couple-Based Tibetan Yoga Program for Lung Cancer Patients and their Caregivers

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Non-small cell lung cancer; family caregivers; dyadic mind body intervention; feasibility; quality of life

INTRODUCTION

The cancer diagnosis and treatment does not only reduce patients' but also family caregivers' quality of life (QOL) (1). Caregivers may experience clinical levels of depression, sleep disturbances and fatigue, (2) which may negatively impact their ability to provide quality care and support (3) and may exacerbate patient distress (4). As lung cancer is associated with more debilitating sequelae than any other type of cancer (5) resulting in a high need for care and support, caregivers of lung cancer patients may be particularly vulnerable to poor QOL (6).

Although urgently needed, supportive care interventions that manage symptoms and QOL in *both* lung cancer patients and caregivers are generally lacking. Mind-body interventions such as yoga may improve various aspects of QOL (7); yet, previous investigations have exclude lung cancer patients as well as caregivers. Thus, we pilot-tested a couple-based Tibetan Yoga (TYC) program in lung cancer. Because the practice involves gentle, simple movements performed in a seated position, controlled breathing exercises, and meditation techniques fostering connectedness between patient and caregiver, we expected this type of

yoga practice to be well suited for the needs of this vulnerable population. We examined the feasibility and preliminary efficacy regarding QOL outcomes of this dyadic supportive care approach. We incorporated the intervention into patients' 6-week radiation treatment plans, as the program may be especially useful at this time to buffer treatment side effects and psychological distress that ensues.

METHODS

Participants

Patients with non-small cell lung cancer (NSCLC) stages I through IIIB who were going to receive at least 5 weeks of radiotherapy with a consenting family caregiver (e.g., spouse, sibling,) were eligible. Both patients and caregivers had to be at least 18 years old, proficient in English, and able to provide informed consent. Patients were excluded if they were not oriented to time, place, and person; practiced any form of yoga on a regular basis (self-defined) in the year prior to diagnosis; had a physician-rated Eastern Cooperative Oncology Group performance status score of greater than 2; and/or a life expectancy of less than 6 months.

Procedure

Prior to enrollment, the MD Anderson Institutional Review Board approved all procedures. Research staff identified potentially eligible patients through the institution's electronic medical records system. During clinic visits, research staff approached patients and caregivers, confirmed study eligibility, and obtained written informed consent prior to data collection. Both patients and caregivers completed survey measures at baseline (T1) and during the last week of patients' radiotherapy (T2). Feasibility data were tracked over the course of the study.

TYC Program

Participants attended two to three weekly sessions (45-60 min. each) over the course of 5-6 weeks. The program consisted of five main components: 1) deep breathing awareness with visualization; 2) breath retention exercises (e.g., 4-Part Breath) 3) mindfulness and focused attention through guided meditation; 4) *Tsa Lung* movements; and 5) a brief compassion-based meditation. *Tsa Lung* (see Cohen et al.(8) for a more detailed description) is an ancient, contemplative and gentle movement series coordinated with specific breathing patterns. For this study, we selected two of the five *Tsa Lung* movements especially directed to the upper body, addressing more specifically the needs of this population. The movements involve shoulder and arm rotations and torso stretches to open the rib cage and breathing passages. One of these movements includes a brief self-massage of the whole body, particularly those areas where there is pain or discomfort and is repeated up to three times in each session. The program was performed in a seated position.

Session 1-4 focused on gradually introducing the various techniques. Once participants learned the techniques, the rest of the sessions (session 5-15) focused on refining and practicing the techniques, and answering questions related to the practice and participants' experiences. Starting with session 1, the instructors conveyed the notion that the practice is

intended to target the needs of *both* members of the dyad with a focus on their interconnectedness. Starting with session 5, the dyad became more explicit to the practice with participants facing each other and allowing more time and psychological space for their unique expressions of emotional attachment, closeness, and compassion (e.g., holding hands, gazing into each other's eyes, hugging, crying together, and verbal sharing of love and affection). Participants received printed materials and a CD of the program at session 1 and 5, respectively and were encouraged to practice on their own (individually and/or as a dyad) on the days when they did not meet with the instructor.

Measures

Both patients and caregivers completed the following standard QOL measures at T1 and T2. *Psychological Distress* was assessed with the Centers for Epidemiological Studies-Depression (CES-D) measure and the anxiety dimension of the Brief Symptom Inventory-18 (BSI-18). *Sleep disturbances* was assessed using the Pittsburgh Sleep Quality Index (PSQI). *Fatigue* was assessed using the Brief Fatigue Inventory (BFI). *Health-related QOL* was assessed with the Medical Outcomes Study 36-item short-form survey (SF-36) using the Physical Component (PCS) and Mental Component (MCS) Summaries. *Spiritual well-being* was measured with the Functional Assessment of Cancer Therapy Spiritual Well-Being Scale (v4). *Finding meaning* was measured using the Finding Meaning in Cancer scale developed by Antoni et al. (9).

Demographic and Medical Factors and Feasibility Data—Demographic items (e.g., age, marital status) were included in the baseline questionnaires. Patients' medical data were extracted from their medical records. Feasibility data were kept regarding consent rates, class attendance, program evaluations, completion of questionnaires, and attrition.

Data Analyses

To establish feasibility, we calculated descriptive statistics of consent rate, class attendance, assessment completion, and program evaluations. We examined paired (pre/post) t-tests analyses separate for patients and caregivers. We calculated the effect size (Cohen's d (10)) for each paired difference by dividing the mean difference by the standard deviation of the difference and interpreted the effect size in terms of Cohen's taxonomy ("small" effect, $d < .2$; "medium" effect, $d = .5$; and "large" effect, $d > .8$).

RESULTS

Recruitment and Sample Characteristics

Fourteen of the 19 dyads approached consented (74%) and 10 (71%) completed the TYC program (1 became ineligible; 3 withdrew) including the baseline and end-of-treatment assessments. Refusal reasons included time constraints ($n=3$) and lack of interest ($n=1$). Dyads withdrew because of patient's change in interest ($n=1$) and caregiver-related interferences ($n=2$). Dyads who withdrew did not significantly differ from study completers regarding baseline characteristics except for patients who withdrew reported marginally significantly worse physical function compared to those who completed the study (mean of

completers: 37.43 vs. non-completers: 16.19; $F=4.95$, $P=.06$). Baseline sample characteristics for patients and caregivers who completed the study are illustrated in Table 1.

Session Attendance, Perceived Benefit, and Program Evaluation

Dyads completed a mean of 12 TYC sessions ($SD=2.91$; range: 6-15) with 80% of dyads attending more than 50% of all sessions. Between sessions, participants practiced primarily individually with a mean of 2.63 times ($SD=2.62$; range 0-9) and rarely as dyads (mean=0.12 times, $SD=0.33$, range=0-1). The majority of participants (92.2%) rated the program as useful or very useful; 94.4% found the breathing exercises, 86.7% found the movements, and 88.6% found the visualization exercises beneficial or very beneficial. Regarding exertion ratings (0-10 scale), patients rated 93.5% of sessions and caregivers rated 94.5% of sessions at a 3 ("moderate effort") or below (patients: mean=2.21, $SD=.88$; range 0-5; caregivers: mean=1.72, $SD=1.06$, range: 0-4).

Preliminary Efficacy Findings

Table 2 presents means and standard deviation for each outcome measure at baseline and end-of-treatment as well as paired t-test results, p-values, and effect sizes for patients and caregivers. For patients, paired t-tests revealed a significant increase in spiritual well-being ($t=3.0$, $P=.03$; $d=1.12$) and a marginally significant improvement in benefit finding ($t=2.0$, $P=.08$; $d=.71$). There were also medium effect sizes for improvements in sleep disturbances ($d=.60$) and depressive symptoms ($d=.52$) and small effect sizes for anxiety and MCS scores. For caregivers, there were significant decreases in fatigue ($t=2.7$, $P=.03$; $d=.89$) and anxiety ($t=2.4$, $P=.04$; $d=.81$) and a marginally significant reduction in sleep disturbances ($t=2.0$, $P=.08$, $d=.71$). Medium effect size were found for improved benefit finding ($d=.52$) and small effect sizes for depressive symptoms and MCS scores.

Regarding frequencies of clinical levels of symptoms, compared to baseline, there was a 20% reduction in fatigue, 20% in sleep disturbances and 30% in depressive symptoms for patients. For caregivers, we revealed a 30% reduction in fatigue, 30% in sleep disturbances and 10% in depressive symptoms.

Practice Effects—Class attendance and home-practice rates were not significantly associated with the magnitude of difference scores.

DISCUSSION

The current pilot-study revealed that a couple-based yoga program is a feasible supportive care approach for patients with lung cancer on active treatment including those with advanced disease (70% of completers had stage III disease). The TYC program was well accepted as indicated by high rates of class attendance and home practice as well as positive program evaluations. For patients, significant improvements were primarily revealed in the areas of spiritual well-being and benefit finding, which may be of great value to patients considering their general poor prognosis (11). Medium effect sizes were found in the areas of depressive symptoms and sleep disturbances with corresponding reductions in clinical levels. Consistent with the literature, caregivers reported similar or worse levels of

symptoms relative to patients, particularly pertaining to fatigue and depressive symptoms (2). After the TYC program, caregivers reported significantly less fatigue and anxiety compared to baseline ratings (large effects) and marginally significantly less sleep disturbances as seen in mean difference scores (medium effect) as well as reductions in clinical levels. A medium effect was found for caregivers regarding benefit finding. Limitations are primarily small sample size and lack of a control group; thus, future directions involve an RCT-design with longer follow-up periods as well as dyadic analyses (e.g., interdependence of outcomes within dyads) to further examine the efficacy of this novel, dyadic treatment approach. Later phases of this program of research may also involve an attention control group as well as other dyadic intervention comparison groups.

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KEY POINTS

1. Due to the high symptom burden in lung cancer, family caregivers are vulnerable to poor quality of life (QOL), which may impede their ability to provide effective care and support.
2. To address QOL concerns in both lung cancer patients and their caregivers, the purpose of this study was to establish feasibility and preliminary efficacy of a dyadic mind-body intervention.
3. We examined a couple-based Tibetan Yoga (TYC) program that focuses on breathing exercises, gentle movements, guided visualizations and emotional connectedness. The 15-session intervention was delivered over the course of patients' radiotherapy treatment schedule.
4. Results of 10 patient-caregiver dyads revealed that TYC is a feasible, safe and acceptable supportive care program.
5. Preliminary evidence regarding QOL outcomes was also found particularly in the areas of spiritual well-being for patients, fatigue for caregivers, and sleep disturbances and mental health for both members of the dyad.

Table 1

Patient and Caregiver Demographics and Patient Medical Factors of Study Completers

Variable	Patient (n=10)	Caregiver (n=10)
Gender, n (%)		
Female	5 (35.7)	9 (64.3)
Mean age, years $\pm$ SD, (range)	71.22 $\pm$ 6.16 (61-82)	68.77 $\pm$ 5.99 (61-78)
Marital Status, n (%)		
Married	10 (100.0)	100 (100.0)
Relationship to Patient, n (%)		
Spouse	9 (90.0)	
Sibling	1 (10.0)	
Ethnicity, n (%)		
White	8 (80.0)	8 (80.0)
Latino/Hispanic	1 (10)	1 (10)
Other	1 (10)	1 (10)
Highest Level of Education, n (%)		
Some college or higher	7 (50)	8 (57.1)
Missing	3 (21.4)	4 (28.6)
Household Income, n (%)		
50,000 or more	7 (70.0)	8 (80.0)
Missing	2 (20.0)	2 (20.0)
Employment Status, n (%)		
Retired	6 (60.0)	5 (50.0)
Missing	2 (20.0)	2 (20.0)
Stage at Diagnosis, n (%)		
IA	3 (30.0)	
IIIA	2 (20.0)	
IIIB	5 (50.0)	
Time since diagnoses, months $\pm$ SD, (range)	2.88 $\pm$ 1.36 (1.13-5.97)	
Radiation fraction, n (%)		
25-30	2 (20.0)	
>30	8 (80.0)	
COPD Stage, n (%)		
1	2 (20.0)	
2	3 (30.0)	
3	1 (10.0)	
missing	4 (40.0)	
Radiation, single modality, n (%)		
Yes	1 (10.0)	
Radiation, adjuvant to surgery, n (%)		
Yes	2 (20.0)	
Radiation with adjuvant chemotherapy, n%		

Variable	Patient (n=10)	Caregiver (n=10)
Yes	1 (10.0)	
Chemoradiation, n (%)		
Yes	6 (60.0)	
Clinical levels of depressive symptoms ^a , n (%)	4 (40.0)	4 (40.0)
Clinical level of sleep disturbances ^b , n (%)	8 (80.0)	7 (70.0)
Clinical levels of fatigue ^c , n (%)	5 (50.0)	6 (60.0)

Abbreviations: SD, Standard deviation;

^aScore of 16 on the Centers for Epidemiological Studies-Depression measure;

^bscore >3 on the Brief Fatigue Inventory;

^cscore 10 on the Pittsburgh Sleep Quality Index

Table 2

Raw Means for Study Completers at Each Assessment Point, Results of Paired t-Tests, and Effect Sizes for Patients and Caregivers

Measure	Patients						Caregivers					
	Baseline			Post Program			Baseline			Post Program		
	Mean	SD		Mean	SD	<i>d</i>	Mean	SD		Mean	SD	<i>d</i>
CES-D	12.7	8.32		8.60	5.82	1.55	13.11	6.91		10.55	9.45	0.70
BSI-Anx	0.44	0.42		0.30	0.29	0.48	0.76	0.60		0.42	0.44	0.51
BFI	3.19	2.30		2.72	2.39	0.26	3.72	2.31		2.09	2.34	0.04
PSQI	12.82	3.34		10.70	3.34	0.81	11.75	2.55		9.50	2.68	0.23
PCS	37.43	9.06		38.47	11.16	0.11	46.24	11.57		46.08	9.39	0.08
MCS	48.11	13.64		51.69	7.68	0.80	44.71	11.59		43.70	15.00	0.23
Fact-Sp	37.71	5.99		39.40	4.99	0.56	37.86	6.17		36.43	8.12	0.58
BF	36.63	16.18		45.20	13.96	0.03	39.40	17.54		48.00	22.16	0.37
						0.08						0.31
						0.71						0.52

Note: Abbreviations: ES, effect size; d, Cohen's d. Small effect, *d* .2; medium effect, *d* .5; and large effect, *d* .8 (10). CES-D, Center for Epidemiologic Studies Depression Scale; BSI-Anx, Brief Symptom Inventory-Anxiety Dimension; BFI, Brief Fatigue Inventory; PSQI, Pittsburgh Sleep Quality Index; PCS, SF-36 Physical Health Component Summary Subscale; MCS, SF-36 Mental Health Component Subscale; FACT-Sp, Spiritual well-being subscale; BF, Benefit Finding Scale