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Examining the effect of peer helping in a coping skills intervention: a randomized controlled trial for advanced gastrointestinal cancer patients and their family caregivers

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Abstract

Purpose At the end of life, spiritual well-being is a central aspect of quality of life for many patients and their family caregivers. A prevalent spiritual value in advanced cancer patients is the need to actively give. To address this need, the current randomized trial examined whether adding a peer helping component to a coping skills intervention leads to improved meaning in life and peace for advanced gastrointestinal cancer patients and their caregivers. Feasibility and acceptability outcomes were also assessed.

Methods Advanced gastrointestinal cancer patients and caregivers ($n = 50$ dyads) were randomly assigned to a 5-session, telephone-based coping skills intervention or a peer helping + coping skills intervention. One or both dyad members had moderate–severe distress. Peer helping involved contributing to handouts on coping skills for other families coping with cancer. Patients and caregivers completed measures of meaning in life/peace, fatigue, psychological symptoms, coping self-efficacy, and emotional support. Patient pain and caregiver burden were also assessed.

Results Small effects in favor of the coping skills group were found regarding meaning in life/peace at 1 and 5 weeks post-intervention. Other outcomes did not vary as a function of group assignment, with both groups showing small decreases in patient and caregiver fatigue and caregiver distress and burden. High recruitment and retention rates supported feasibility, and high participant satisfaction ratings supported acceptability.

Conclusions Although a telephone-based intervention is feasible and acceptable for this population, peer helping in the context of a coping skills intervention does not enhance spiritual well-being relative to coping skills alone.

Keywords Gastrointestinal cancer · Family caregivers · Psychosocial interventions · Spiritual well-being · Peer helping · Distress

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Introduction

A growing literature has demonstrated the importance of spiritual well-being, including a sense of meaning in life and peace, for advanced cancer patients and their family caregivers [1–4]. Indeed, meta-analytic evidence suggests that spiritual well-being is associated with better physical and mental quality-of-life (QoL) outcomes in cancer patients across disease stages [5, 6]. In a recent meta-analysis, meaning in life in particular showed a moderate, negative association with distress in cancer patients, which supports its clinical relevance [7].

Aspects of spiritual well-being have received less research attention in cancer caregivers; however, growing evidence suggests that higher levels of spiritual well-being (i.e., meaning in life/peace and faith) are correlated with better mental health outcomes in this population [1, 2, 8].

Some research supports a stress buffering effect of spiritual well-being in cancer caregivers, such that the association between caregiving stress and poorer mental health is attenuated for those with higher levels of spiritual well-being [2, 8].

A limited number of interventions have aimed to promote meaning in life in advanced cancer patients [9–14], and this work has yet to be adapted for cancer caregivers [15]. Examples of these interventions include meaning-centered psychotherapy [10] and dignity therapy [13]. Meaning-centered psychotherapy involves didactics, discussion, and experiential exercises regarding sources of meaning in life (e.g., creativity, love), whereas dignity therapy involves reflecting on one's legacy, which is recorded and transcribed into a document to share with loved ones. In multiple randomized trials, both meaning-centered psychotherapy and dignity therapy have shown positive short-term effects on spiritual well-being and other QoL outcomes [9–13].

A novel approach to improving meaning in life in advanced cancer patients and caregivers is helping others in similar circumstances. Indeed, the need to actively give was among the most prevalent spiritual needs reported by advanced cancer patients [3]. According to the helper therapy principle [16], helping others can increase psychological and physical well-being in the helper. Consistent with this principle, results of correlational research in the general population suggest that volunteering is associated with reduced physical symptoms, improved emotional well-being and purpose in life, and better social functioning [17–20]. However, this principle has rarely been experimentally tested. For example, one study randomly assigned hematopoietic stem cell transplant survivors to one of four conditions: peer helping (writing about transplant experiences to help others prepare for the procedure), expressive writing (writing expressively about their transplant experience), expressive helping (combination of peer helping and expressive writing), or neutral writing (writing a factual narrative of transplantation) [21]. Although there were no main effects of condition on distress, subgroup analyses showed that among survivors with greater survivorship problems, expressive helping reduced distress compared to peer helping and neutral writing. Another trial with patients with multiple sclerosis found that a coping skills group involving didactics and the provision of telephone support to a peer resulted in better psychosocial role performance and well-being than controls (i.e., receiving telephone peer support) [22].

To our knowledge, peer helping interventions have yet to be tested with cancer caregivers, although correlational evidence suggests that volunteering to help others outside of one's family is associated with mental health benefits in various caregiving populations [23, 24]. Researchers have theorized that volunteering offsets the burden of family caregiving through increasing external resources (e.g., informational and social resources) and internal resources (e.g., feelings of status or emotional gratification) [25].

In this study, we examined the potential spiritual benefits of adding a peer helping component to a coping skills intervention for advanced gastrointestinal (GI) cancer patients and their family caregivers. We chose to focus on this population due to the high prevalence of this cancer [26] and its significant symptom burden [27–29]. Patient–caregiver dyads were randomly assigned to one of two telephone-based interventions: coping skills or peer helping (PH) + coping skills. Dyads assigned to the coping skills condition learned evidence-based coping skills for managing fatigue, pain, depressive symptoms, and anxiety as well as improving social functioning [30–33]. Framed by Social Cognitive Theory [34, 35], the intervention was designed to enhance coping self-efficacy through goal setting and skill practice. In the PH + coping skills condition, the same content was discussed and practiced, but the dyad also assisted the therapist in creating an informational resource for other families coping with cancer. This resource consisted of handouts with coping skills for addressing common QoL concerns (e.g., stress, fatigue). As participants aimed to reduce others' suffering through sharing personal wisdom on handouts, their sense of meaning or purpose in life was expected to increase.

This study tested the feasibility, acceptability, and preliminary efficacy of the interventions. We hypothesized that the interventions would be feasible as indicated by adequate recruitment, retention, and session completion. We also hypothesized that the interventions would be acceptable as indicated by participant satisfaction ratings. Consistent with theories of volunteerism [18, 36], we expected that the PH + coping skills group would experience increased meaning in life and peace relative to the coping skills group. We also compared the interventions with respect to their impact on secondary outcomes (i.e., patient and caregiver fatigue, depressive symptoms, anxiety, general distress, coping self-efficacy, and emotional support; patient pain; and caregiver burden).

Methods

Participants

Eligible patients had been diagnosed with stage IV GI cancer at least 8 weeks prior to enrollment and had a consenting primary family caregiver. Patients were excluded from study participation if they (1) had severe cognitive impairment defined as three or more errors on a six-item cognitive screener [37], (2) had a self-reported Eastern Cooperative

Oncology Group (ECOG) score >2 [38, 39], or (3) were receiving hospice care at the time of enrollment. Eligible caregivers lived with the patient or had visited the patient at least twice a week for the past month. In addition, both patients and caregivers had to be adults (≥18 years of age) who were fluent in English, and one or both dyad members had to report moderate to severe distress, defined as a score of 3 or higher on the Distress Thermometer [40, 41].

Procedures

Participants were recruited from the Indiana University Simon Cancer Center and the Roudebush VA Medical Center in Indianapolis, IN between August 2015 and August 2016. All study procedures received institutional review board approval. Following confirmation of initial patient eligibility via chart review and consultation with the oncologist, a research assistant approached the patient during an oncology clinic visit to describe the study. Interested patients identified their primary family caregiver and were screened for eligibility. With the patient's written consent, caregivers were approached in clinic or through telephone for eligibility screening and consent.

Consenting dyads completed baseline telephone assessments and were randomly assigned to either the coping skills or PH + coping skills group. Randomization was performed by a person who was not a study interviewer or therapist using a SAS procedure and was stratified by study therapist (KC or DT) and patient performance status (self-reported ECOG scores 0 or 1 vs. 2). Participants in both groups completed follow-up telephone assessments at 1 and 5 weeks post-intervention and received $25 gift cards for each assessment. Trained research assistants administering the assessments were blind to study condition.

Measures

Primary and secondary outcomes were assessed with valid self-report measures that have been used with cancer patients and caregivers.

Primary outcome

The 8-item meaning/peace subscale of the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale (FACIT-Sp) [42] was used to assess a sense of meaning in life and peace in patients and caregivers.

Secondary outcomes

Regarding physical symptoms, the 6-item Patient Reported Outcomes Measurement Information System (PROMIS) short-form fatigue measure assessed patient and caregiver fatigue, and the 3-item PROMIS pain intensity measure assessed patient pain [43, 44]. Regarding psychological symptoms, the 6-item PROMIS short-form depression measure and 6-item PROMIS short-form anxiety measure were used to assess patient and caregiver depressive and anxiety symptoms, respectively [45]. For all PROMIS measures, responses are summed to form a raw score that can be converted to a T-score with a mean of 50 and a standard deviation of 10. Additionally, the Distress Thermometer [40, 41] was used to assess patient and caregiver distress on a scale from 0 (no distress) to 10 (extreme distress). Finally, the coping confidence subscale of the Measure of Current Status (MOCS) [46] was used to assess patient and caregiver self-efficacy for coping with challenging situations.

Regarding social functioning, the 4-item PROMIS short-form emotional support measure assessed the perceived availability of emotional support [47]. Finally, the 12-item short form of the Zarit Burden Interview assessed personal and role strain associated with caregiving [48].

Sociodemographics, medical variables, and volunteer activity

Patients and caregivers reported their demographic information and mental health service use at baseline. Patient medical information was obtained through medical record review. In addition, at baseline, patients and caregivers rated their frequency of volunteer work during the past month on a 5-point scale from 0 (never or almost never—0 times per month) to 5 (daily—30 times per month) [49].

Feasibility, acceptability, and treatment fidelity

Feasibility was assessed through study accrual and retention rates. Acceptability was examined through posttreatment ratings of the helpfulness of the number and length of the sessions, topics, therapist, and telephone format on a scale from 1 (did not help at all) to 5 (extremely helpful). Participants also reported whether the sessions met their expectations and their confidence in recommending the treatment to families coping with cancer on a scale from 1 (not at all) to 5 (extremely).

Fidelity checklists were developed for both study conditions, and a study psychologist used them to evaluate coverage of session topics, in-session exercises, and home practice assignments. Fidelity scores were the number of correctly delivered topics divided by the total number of fidelity criteria.

Study groups

Participants in both study groups (PH + coping skills and coping skills) were asked to complete five weekly 50 to 60 min telephone sessions. Both dyad members participated simultaneously via speakerphone, and all sessions were audio recorded. Both study conditions were delivered by Ph.D. students in clinical psychology who were trained and supervised by two psychologists. Training involved didactics and roleplays of treatment sessions detailed in manuals. Following the initial training, students received weekly supervision from the psychologists who listened to audio recordings of sessions and provided feedback on treatment quality and adherence to the manual.

Peer helping + coping skills group

Dyads in this condition helped create an informational resource on various QoL issues for other patients and caregivers coping with cancer. The dyad was told that this resource would be available to others in print and online at the conclusion of the study. Each person was mailed identical handouts that were drafts of the informational resource and a CD with instructions for relaxation exercises. A summary of the intervention components is found in Table 1.

The first four sessions had a similar format. The therapist introduced the session topic (e.g., physical symptoms, stress, social changes) and asked about the dyad's experiences related to the topic. Then the therapist asked the dyad for their advice [e.g., "What advice would you give to other cancer patients (family members) for dealing with stress?"]. Next, the dyad reviewed handouts listing evidence-based coping skills related to the session topic and indicated which skills may be most helpful to others. This was followed by in-session practice of one or more coping skills and/or self-evaluation of their use of coping skills. Following in-session practice of a coping skill, the dyad indicated whether the skill should be included in the informational resource for others. Finally, each dyad member set a goal for the upcoming week related to the session focus, and goal progress was assessed during the subsequent session.

Following the fourth session, the dyad received the handouts with their edits and additions that would be an informational resource for others. During the fifth session, the dyad was asked to critique the handouts further and discuss their use of the skills on the handouts during the past 2 weeks. Then the dyad was asked to provide final advice for others on coping with cancer. Finally, each dyad member was asked to set a goal for the coming week related to one of the session topics.

Coping skills group

Dyads in the coping skills condition discussed the same topics as the PH + coping skills condition, but did not help create an informational resource for other patients and caregivers. The same therapists administered both study conditions. Coping skills participants received the same initial handouts and CD with relaxation exercises and completed the same in-session practice of skills and weekly goal setting. Instead of providing advice to others or critiquing the helpfulness of the skills for others, dyads

Table 1 Summary of topics covered in both study conditions

Topic	Selected session content
Session 1: Managing physical symptoms—part 1	Identification of patient's symptoms Discussion of coping skills for pain management (e.g., relaxation) In-session practice: pursed lips breathing Self-evaluation of management of two patient symptoms
Session 2: Managing physical symptoms—part 2	Discussion of coping skills for fatigue management (e.g., exercise) Development of plan for pacing one activity In-session practice: imagery
Session 3: Managing stress	Identification of patient and caregiver signs of stress Discussion of coping skills for stress management (e.g., pleasurable activities) Self-evaluation of self-care habits (e.g., sleep, exercise, diet)
Session 4: Maintaining relationships	Discussion of social changes since the cancer diagnosis Discussion of coping skills for dealing with negative reactions from others and loneliness Self-evaluation of skills for coping with relationship changes
Session 5: Review	Discussion of recent use of the coping skills for managing physical symptoms, stress, and social changes, the effectiveness of the skills, and possible changes in coping

focused on the helpfulness of the skills for themselves. To equalize the time across study conditions, coping skills participants spoke at greater length about their use of coping skills.

Statistical analyses

Descriptive statistics were computed to examine feasibility and acceptability indicators. Using *t*-tests (or, where appropriate, Mann–Whitney U tests), study conditions were compared with respect to intervention satisfaction. Baseline comparisons of study conditions (Fisher's exact tests and *t*-tests) were also conducted for patients and caregivers separately. Potential gender differences were assessed. Linear mixed-model repeated-measures analyses in SPSS were used to evaluate the preliminary efficacy of PH + coping skills. As these analyses use all available data, an intent-to-treat framework was employed. Multilevel modeling for dyadic data, an approach that addresses the non-independence of data from members of the same dyad, was used for outcomes reported by patients and caregivers [50, 51]. Models included the main effect of time, study group, and role (patient or caregiver) and time × group and time × group × role interaction effects. Both time and study group were categorical variables in these models, which focuses the analysis on mean differences across groups and time. Treatment effects are evidenced either by a significant study group main effect or a significant interaction between time and study group. A significant time × study group × role interaction indicates that the treatment effects are different for patients and caregivers. For outcomes that only patients or caregivers reported, models included the main effects of time and study group and the time × group interaction. Gender was not included in the models because only two outcomes varied by gender (data not shown).

Results

Feasibility and acceptability

Study enrollment and participation

As shown in Fig. 1, of 130 GI cancer patients who were approached regarding this study, 35 declined participation, 12 were ineligible, and 83 consented. Patients agreeing to the eligibility screening did not differ from refusers with respect to age, gender, or race (all $ps > 0.10$). Of the 79 caregivers who were approached, 2 declined participation and 21 were ineligible. Thus, 56 dyads were eligible and consented to participate. Primary reasons for study refusal were that the patient or caregiver had time constraints, did not like talking on the phone, or were not interested in the study. Six dyads withdrew prior to randomization because of medical reasons, lack of interest, or loss to follow-up. Twenty-five of the remaining 50 dyads were randomized to the PH + coping skills intervention, and 25 were randomized to the coping skills intervention. Retention was high, with 22 dyads in each intervention condition completing all 5 sessions and the 1-week follow-up. Most dyads (39/50, 78%) also completed the 5-week follow-up.

Treatment fidelity and participant satisfaction

All sessions were digitally recorded. Fidelity to the intervention manual was rated for 20% of the sessions, and the average fidelity rating was 99%. Participants rated both telephone interventions favorably with respect to helpfulness and confidence in recommending the intervention to other families coping with cancer (see Table 2). Therapists' helpfulness was also highly rated. Small, statistically significant differences in favor of the PH + coping skills intervention were found for most aspects of intervention satisfaction (see Table 2).

Participant characteristics

Table 3 presents demographic and medical data by study group and group comparisons at baseline. Most patients had been diagnosed with colorectal (38%) or pancreatic cancer (26%). The majority of caregivers (76%) were spouses or partners of the patient. Demographics, medical factors, volunteer activity, and outcome variables at baseline did not vary by study condition.

At baseline, 12% of patients and 30% of caregivers had PROMIS anxiety T-scores ≥ 60 (+1 SD), indicating high levels of anxiety. Also at baseline, 8% of patients and 12% of caregivers had PROMIS depression T-scores ≥ 60, indicating high levels of depressive symptoms. Regarding physical symptoms, at baseline, 48% of patients and 32% of caregivers had PROMIS fatigue T-scores ≥ 60, suggesting high levels of fatigue. In addition, at baseline, 4% of patients had PROMIS pain T-scores ≥ 60, suggesting high levels of pain.

Preliminary efficacy

Table 4 presents means for the primary and secondary outcomes and results from the mixed-model analyses.

Primary outcome

Mixed-model dyadic analyses revealed a significant time × group effect on meaning in life/peace ($d = 0.53$, $p = 0.01$; see Table 4). As shown in Fig. 2, means were relatively

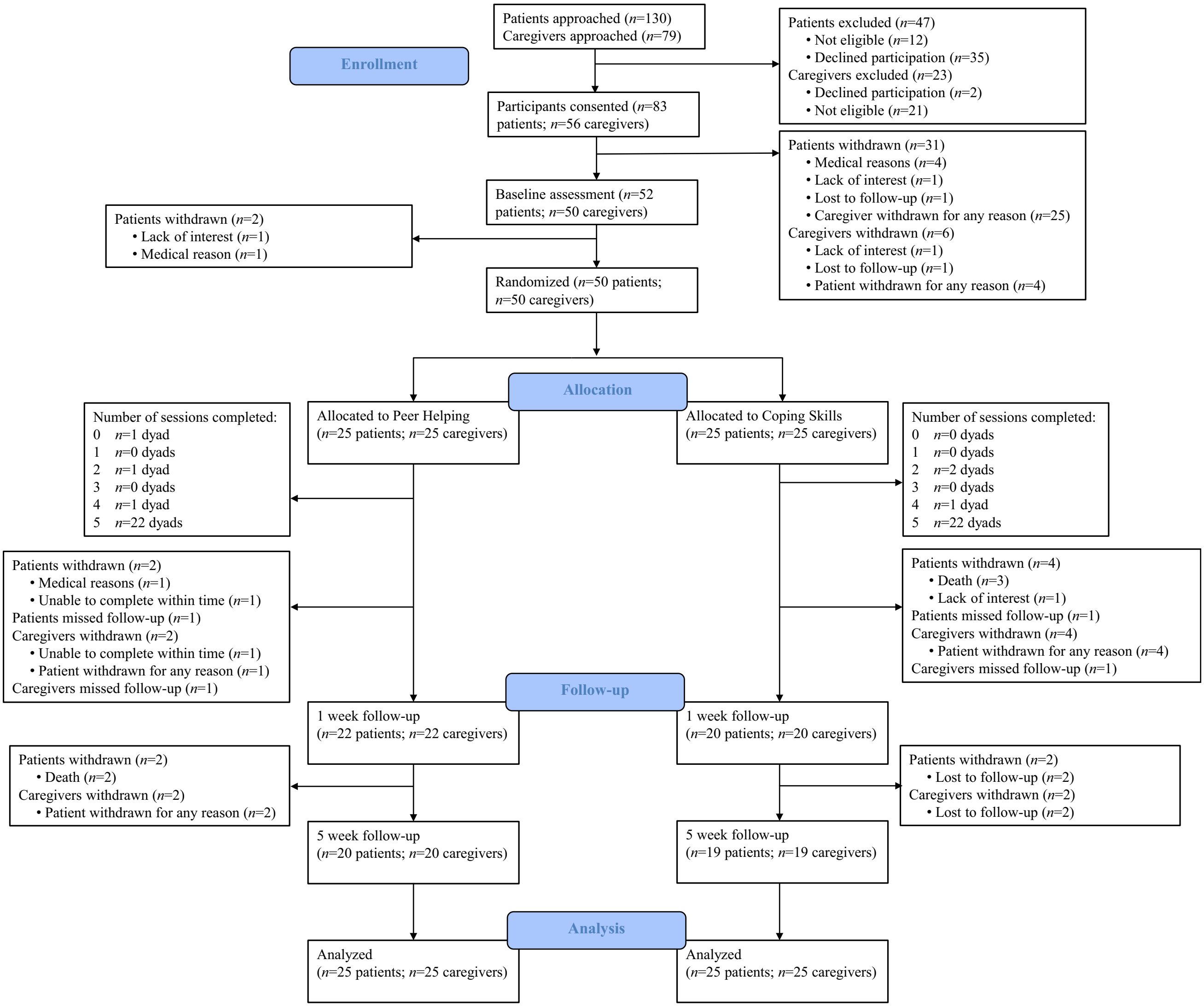

Fig. 1 Study flow chart

stable over time for the PH + coping skills group, whereas means for the coping skills group showed a small increase at 1-week post-intervention, which was maintained at the 5-week follow-up.

Secondary outcomes

Results from the mixed-model dyadic analyses revealed no main effects of study group or time × group effects on fatigue, anxiety, depressive symptoms, general distress, coping self-efficacy, or emotional support ($ds = 0.06–0.30$). However, there were significant main effects of role and time on fatigue, indicating that patients, on average, had higher levels of fatigue than caregivers, and both patients and caregivers experienced small decreases in fatigue over time. In addition, there was a main effect of role on anxiety symptoms, such that caregivers, on average, had higher levels of anxiety than patients. Furthermore, there was a time x role effect on general distress. Means found in Table 4 show relatively stable distress for patients over time, whereas caregivers had small decreases in distress at both follow-ups relative to baseline. Finally, there was a main effect of role on emotional support, such that patients, on average, reported higher levels of emotional support than caregivers.

Regarding individual outcomes, mixed-model analyses showed no main effects of study group or time × group effects on patient pain or caregiver burden ($ds = 0.08–0.18$). However, there was a main effect of time on caregiver burden, with both groups showing small decreases in burden at both follow-ups relative to baseline.

Table 2 Patient and caregiver intervention satisfaction

Intervention satisfaction[a]	Peer helping + coping skills Mean (SD)	coping skills Mean (SD)	df	*t*/*U*	*P*
Telephone sessions met expectations[b]	4.40 (0.70)	3.93 (0.80)	81	−2.87	0.01
Number of sessions was helpful[c]	3.95 (0.73)	3.50 (0.85)	80	−2.59	0.01
Length of sessions was helpful[c]	3.98 (0.90)	3.33 (1.00)	80	−3.11	0.00
Topics of the sessions were helpful[c,d]	4.09 (0.75)	3.90 (1.06)	70	−0.95	0.34
Therapist was helpful[c,d]	4.74 (0.49)	4.53 (0.68)	71	−1.67	0.10
Use of the telephone was helpful[c,d]	4.58 (0.63)	4.08 (1.10)	61	−2.56	0.01
Confidence in recommending this treatment to families coping with cancer[b,e]	4.70 (0.51)	4.33 (1.00)	–	691.00	0.07

df degrees of freedom, *SD* standard deviation, *N*s = 82–83 participants

[a] Intervention satisfaction was assessed at 1-week post-intervention

[b] Rated on a 5-point Likert scale (1 = not at all, 5 = extremely)

[c] Rated on a 5-point Likert scale (1 = did not help at all, 5 = extremely helpful)

[d] Statistics for the *t*-test not assuming homogeneity of variance are presented

[e] Statistics for the Mann–Whitney *U* test are presented

Discussion

This study supports the feasibility and acceptability of 5-session, telephone-based dyadic coping skills interventions for advanced GI cancer patients and their caregivers. The majority (73%) of patients agreed to the eligibility screening and all eligible patients consented to participate, which exceeds recruitment rates of other telephone-based dyadic interventions in cancer [52]. Although participants rated both interventions as helpful, the ratings were slightly higher for the PH + coping skills intervention. Retention was high, with most attrition being due to death or medical factors.

Although the interventions were acceptable to participants, results did not support our hypothesis that the PH + coping skills group would experience higher levels of meaning in life and peace than the coping skills group. Instead, this outcome was stable over time for the PH + coping skills group and showed a small increase in the coping skills group. Furthermore, compared to coping skills alone, the PH + coping skills intervention did not have an impact on patient pain, caregiver burden, or patient and caregiver fatigue, mental health outcomes, or social outcomes. These outcomes did not change over time, with the exception of small decreases in patient and caregiver fatigue and caregiver general distress and burden. Taken together, results do not support the efficacy of our brief, telephone-based dyadic interventions for advanced GI cancer patients and caregivers.

To date, limited research has examined dyadic psychosocial interventions in advanced cancer [53–55] or peer helping interventions in cancer [21, 56]; thus, few comparisons of this trial to prior research can be made. For example, one study tested a six-session telephone dyadic intervention in which advanced lung cancer patients and caregivers learned various coping skills and found large effects on patient and caregiver mental health outcomes relative to usual care [54]. Another trial testing a four-session telephone intervention to enhance the coping skills of primarily advanced lung cancer patient–caregiver dyads did not find effects on patient physical symptoms or patient and caregiver mental health outcomes relative to an education/support condition [57]. Regarding peer helping interventions, the two published intervention trials with cancer patients, examining Internet support groups [56] and expressive writing [21], have yielded mixed findings. Given the scarce literature and methodological differences across studies, few conclusions may be drawn at this time.

Several potential explanations for the current findings warrant mention. First, a brief intervention involving the creation of educational materials for peers may not be sufficient to increase a sense of meaning in life and peace in advanced GI cancer patients and caregivers. Although the need to actively give is a prevalent spiritual value for advanced cancer patients [3], other resources (e.g., social support) and challenges (e.g., physical decline) may have a greater impact on their meaning in life and peace. Further research is needed to identify culture-specific factors that may be targeted to bolster patient and caregiver meaning in life and peace towards the end of life.

Another possible explanation for our results is that the brevity of the intervention and telephone delivery lessened its impact. Meta-analytic findings regarding the effect of intervention dose on cancer patient and caregiver outcomes

Table 3 Patient and caregiver characteristics and group comparisons at baseline

Characteristics	Patients ($n = 50$)			Caregivers ($n = 50$)		
	Peer helping + coping skills ($n = 25$)	Coping skills ($n = 25$)	*t*-test/fisher's exact test *p*	Peer helping + coping skills ($n = 25$)	Coping skills ($n = 25$)	*t*-test/fisher's exact test *p*
Sex, *n* (%)			1.00			1.00
Male	16 (64.00)	15 (60.00)		9 (36.00)	8 (32.00)	
Female	9 (36.00)	10 (40.00)		16 (64.00)	17 (68.00)	
Age			0.67			0.46
Mean	58.88	57.48		55.32	52.40	
SD	11.50	11.65		12.23	15.11	
Range	41–82	33-81		35–83	21–73	
Race, *n* (%)						
Non-Hispanic white	21 (84.00)	22 (88.00)	1.00	22 (88.00)	22 (88.00)	1.00
Missing	1 (4.00)	0 (0.00)		0 (0.00)	0 (0.00)	
Employment status, *n* (%)			0.38			0.86
Employed full or part-time	9 (36.00)	5 (20.00)		15 (60.00)	14 (56.00)	
Retired	9 (36.00)	9 (36.00)		6 (24.00)	5 (20.00)	
Unemployed	7 (28.00)	11 (44.00)		4 (16.00)	6 (24.00)	
Household income, *n* (%)			0.75			0.45
\$0–\$50,999	7 (28.00)	10 (40.00)		6 (24.00)	9 (36.00)	
\$51,000–\$99,999	10 (40.00)	9 (36.00)		8 (32.00)	12 (48.00)	
\$100,000 or more	6 (24.00)	5 (20.00)		7 (28.00)	4 (16.00)	
Missing	2 (8.00)	1 (4.00)		4 (16.00)	0 (0.00)	
Years of education			0.38			0.07
Mean	14.96	14.28		15.16	14.04	
SD	2.54	2.84		2.06	2.13	
Range	11–20	9–21		12–19	11–19	
Caregiver relationship to the patient, *n* (%)						0.32
Spouse/partner	–	–		21 (84.00)	17 (68.00)	
Other family member	–	–		4 (16.00)	8 (32.00)	
Caregiver lives with the patient, *n* (%)				22 (88.00)	20 (80.00)	0.70
Married/living with a partner, *n* (%)	21 (84.00)	17 (68.00)	0.32	25 (100.00)	21 (84.00)	0.11
Psychiatric medication, *n* (%)[a]	13 (52.00)	7 (28.00)	0.15	7 (28.00)	6 (24.00)	1.00
Psychotherapy/counseling, *n* (%)[a]	2 (8.00)	1 (4.00)	1.00	0 (0.00)	1 (4.00)	1.00
Study site, *n* (%)			1.00			
Indiana University Simon Cancer Center	25 (100.00)	24 (96.00)				
Roudebush VA Medical Center	0 (0.00)	1 (4.00)				

Table 3 continued

Characteristics	Patients (n = 50)			Caregivers (n = 50)		
	Peer helping + coping skills (n = 25)	Coping skills (n = 25)	*t*-test/fisher's exact test *p*	Peer helping + coping skills (n = 25)	Coping skills (n = 25)	*t*-test/fisher's exact test *p*
Type of gastrointestinal cancer, *n* (%)			0.36			
Colorectal	10 (40.00)	9 (36.00)		–	–	
Pancreatic	8 (32.00)	5 (20.00)		–	–	
Esophageal	1 (4.00)	5 (20.00)		–	–	
Other	6 (24.00)	6 (24.00)		–	–	
Time since diagnosis in years			0.69			
Mean	1.63	1.43		–	–	
SD	2.14	1.24		–	–	
Range	0.18-10.27	0.18–4.79		–	–	
Treatments received, *n* (%)						
Chemotherapy	23 (92.00)	24 (96.00)	1.00	–	–	
Radiation	1 (4.00)	5 (20.00)	0.19	–	–	
Surgery to remove primary tumor	15 (60.00)	13 (52.00)	0.78	–	–	
Surgery to remove metastases	5 (20.00)	7 (28.00)	0.74	–	–	
Targeted therapy	8 (32.00)	9 (36.00)	1.00	–	–	
Patient ECOG score			0.26			
Mean	0.76	1.00		–	–	
SD	0.78	0.71		–	–	
Range	0–2	0–2		–	–	
Distress thermometer score at screening			0.61			0.53
Mean	3.20	3.56		5.32	4.88	
SD	2.75	2.10		2.51	2.46	
Range	0–9	0-9		0–9	1–10	
Volunteer activity			1.00			0.50
Mean	0.92	0.92		0.72	0.92	
SD	1.04	1.38		0.89	1.19	

SD standard deviation, *ECOG* Eastern Cooperative Oncology Group

[a] Treatment received in the past month at baseline

Table 4 Intent-to-treat results for multilevel linear models predicting outcomes ($n = 50$ Dyads)

Outcome fixed effect	Peer helping + coping skills			Coping skills			df	*F*	*P*
	Baseline Mean (SD)	1-week Post-intervention Mean (SD)	5 weeks Post-intervention Mean (SD)	Baseline Mean (SD)	1-week Post-intervention Mean (SD)	5 weeks Post-intervention Mean (SD)			
Primary outcome									
Patient meaning in life/peace	25.40 (6.16)	24.95 (7.63)	24.65 (8.00)	23.36 (6.18)	25.20 (5.27)	24.80 (4.37)			
Caregiver meaning in life/peace	23.88 (4.48)	25.18 (4.73)	23.75 (4.73)	21.52 (4.92)	23.90 (4.61)	24.63 (5.20)			
Group							49	0.38	0.54
Time							76	3.37	0.04
Role							45	0.75	0.39
Time × role							72	2.34	0.10
Group × time							76	5.26	0.01
Group × role							45	0.21	0.65
Group × time × role							72	0.28	0.76
Secondary outcomes									
Patient fatigue	17.44 (5.64)	17.43 (6.24)	16.00 (6.74)	19.28 (5.44)	18.80 (5.53)	17.35 (6.71)			
Caregiver fatigue	16.32 (4.80)	14.23 (3.77)	15.50 (5.46)	17.88 (5.39)	15.65 (5.40)	14.84 (5.04)			
Group							49	1.07	0.31
Time							79	7.08	0.00
Role							43	4.94	0.03
Time × role							73	1.43	0.25
Group × time							79	0.94	0.40
Group × role							43	0.12	0.73
Group × time × role							73	0.12	0.89
Patient pain	6.24 (2.79)	6.05 (3.02)	5.75 (2.45)	6.16 (2.37)	6.45 (2.67)	6.35 (3.07)			
Group							48	0.09	0.77
Time							79	0.15	0.86
Group × time							79	0.39	0.68
Patient depressive symptoms	9.52 (4.14)	9.76 (5.58)	9.00 (4.38)	9.96 (3.81)	9.90 (3.48)	10.35 (4.85)			
Caregiver depressive symptoms	10.44 (3.42)	8.86 (3.03)	9.85 (3.39)	11.92 (4.73)	10.50 (4.68)	10.80 (4.63)			
Group							49	0.45	0.51
Time							80	2.55	0.09
Role							43	1.57	0.22
Time × role							78	2.29	0.11
Group × time							80	0.32	0.73
Group × role							43	0.60	0.44
Group × time × role							78	0.53	0.59
Patient anxiety symptoms	9.88 (3.83)	10.19 (5.22)	9.50 (3.41)	10.64 (3.94)	10.70 (4.61)	11.25 (5.96)			
Caregiver anxiety symptoms	11.72 (3.47)	10.91 (4.72)	11.25 (4.45)	14.16 (5.34)	11.40 (4.76)	11.80 (4.54)			
Group							49	0.83	0.37
Time							81	1.88	0.16
Role							46	6.23	0.02
Time × role							81	2.93	0.06
Group × time							81	0.96	0.39
Group × role							46	0.06	0.81

Table 4 continued

Outcome fixed effect	Peer helping + coping skills			Coping skills			df	*F*	*P*
	Baseline Mean (SD)	1-week Post-intervention Mean (SD)	5 weeks Post-intervention Mean (SD)	Baseline Mean (SD)	1-week Post-intervention Mean (SD)	5 weeks Post-intervention Mean (SD)			
Group × time × role							81	1.14	0.33
Patient general distress	2.76 (2.39)	3.10 (2.49)	2.65 (2.46)	4.00 (2.55)	3.60 (2.14)	4.25 (2.85)			
Caregiver general distress	4.96 (1.84)	3.73 (2.19)	3.65 (2.21)	4.72 (2.32)	3.70 (2.39)	4.00 (2.65)			
Group							48	0.54	0.47
Time							77	2.57	0.08
Role							41	6.49	0.02
Time × role							75	3.69	0.03
Group × time							77	0.55	0.58
Group × role							41	2.86	0.10
Group × time × role							75	0.61	0.55
Patient coping self-efficacy	2.96 (0.67)	2.84 (0.89)	2.85 (0.89)	2.98 (0.64)	2.99 (0.59)	2.89 (0.68)			
Caregiver coping self-efficacy	2.86 (0.62)	3.01 (0.56)	2.78 (0.62)	2.68 (0.61)	2.68 (0.59)	2.67 (0.69)			
Group							49	0.25	0.62
Time							77	1.31	0.28
Role							47	1.36	0.25
Time × role							75	1.03	0.36
Group × time							77	0.06	0.94
Group × role							47	2.91	0.10
Group × time × role							75	1.27	0.29
Patient emotional support	18.52 (2.00)	18.43 (2.54)	17.75 (2.99)	18.52 (1.96)	18.55 (2.11)	17.70 (2.87)			
Caregiver emotional support	16.20 (4.27)	17.86 (2.93)	17.20 (3.22)	17.84 (2.44)	17.45 (2.61)	17.37 (2.73)			
Group							47	0.37	0.55
Time							80	1.64	0.20
Role							44	4.58	0.04
Time × role							77	2.84	0.07
Group × time							80	1.64	0.20
Group × role							44	0.35	0.56
Group × time × role							77	2.81	0.07
Caregiver caregiving burden	14.36 (7.44)	12.32 (7.91)	13.00 (9.57)	14.64 (8.40)	10.85 (7.01)	11.63 (8.70)			
Group							47	0.09	0.76
Time							78	4.74	0.01
Group × time							78	0.66	0.52

df degrees of freedom, *SD* standard deviation

have been mixed [52, 58]. Additionally, the cancer literature has not yielded evidence that telephone delivery of psychosocial interventions is inferior to in-person delivery; however, intervention modalities have rarely been compared [58]. Further work is needed to determine the optimal intervention dose and modality for advanced cancer patients and caregivers.

Sample characteristics may have also influenced the current results. Despite the inclusion requirement that one or both dyad members endorse moderate distress, rates of clinically meaningful distress were relatively low, with the exception of caregiver anxiety. Additionally, both patients and caregivers, on average, endorsed moderately high levels of meaning in life/peace and coping self-efficacy;

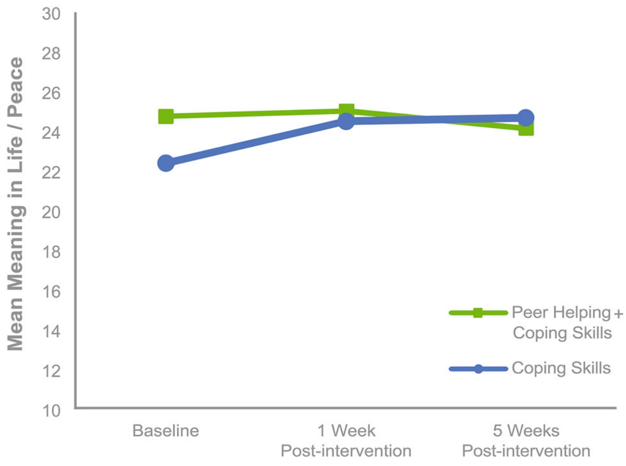

Fig. 2 Changes in meaning in life/peace by study group

thus, there was little room for positive change during the intervention period. Furthermore, null findings may be related to the perception of participants in both groups that they were helping others through research participation.

Finally, a usual care group was not included in this study. This group may have shown worsening outcomes over time relative to the intervention conditions. Three-arm trials are needed to examine intervention components relative to usual care.

Several research directions may build upon the current findings. First, examining different types of helping (e.g., direct vs. indirect helping) and formats (e.g., dyadic vs. individual) might elucidate conditions in which helping confers spiritual or health benefits for helpers. In addition, if peer helping is found to benefit helpers, then determining the mechanisms underlying this effect would advance theory. For example, theory suggests that enhanced coping self-efficacy or meaning in life may help explain positive effects of peer helping or volunteerism on mental health [18, 36]. Finally, having a clinically meaningful distress criterion for study entry would ensure generalizability of study findings to those who warrant psychosocial care.

Limitations of this study should be noted. Participants were primarily Caucasian, middle class, and residing in the Midwestern United States. Thus, results may not generalize to ethnic minorities, people with low incomes, or those from other geographic regions. Additionally, the low prevalence of clinically elevated depressive symptoms in patients and caregivers and anxiety in patients may have reduced intervention impact. Finally, this trial was underpowered for detecting moderators of intervention effects. Further work is needed to determine for whom the interventions are most efficacious.

In conclusion, this study is one of the first to show that dyadic telephone interventions are feasible and acceptable to advanced GI cancer patients and caregivers. Although the addition of peer helping to a coping skills intervention did not produce spiritual benefits, it warrants further experimental study due to the ubiquity of peer support and its associations with positive health outcomes for helpers in the general population [59]. Identifying ways to promote the spiritual well-being of advanced cancer patients and caregivers is central to improving their QoL.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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