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Evaluation of Pillars4life: a virtual coping skills program for cancer survivors

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Abstract

***Objective*: Pillars4Life is an educational program that teaches coping skills to cancer patients in a virtual group setting; it was recently implemented at 17 hospitals across the USA. The cost-effective, scalable, and assessable Pillars4Life curriculum targets psychosocial resources (e.g., self-efficacy and coping skills) as a means to reduce symptoms (e.g., depression, anxiety, and posttraumatic stress) and enhance quality of life.**

***Methods*: Cancer patients were recruited from hospitals that received the LIVESTRONG Community Impact Project Award to enroll in a pilot study of Pillars4Life. Consenting participants met with a certified instructor weekly for 10 weeks in a virtual environment; the manualized intervention trained participants in personal coping skills. Longitudinal assessments over 6 months were assessed using validated instruments to determine changes in Pillars4Life targeted resources and outcomes. Multiple linear regression models examined the relationship between changes in targeted resources and changes in outcome from baseline to 3 months post-intervention.**

***Results*: Participants ($n = 130$) had the following characteristics: mean age of 56 ± 11 years, 87% women, 11% non-Caucasian, and 77% with college degree. At 3- and 6-month follow-up, mean scores improved on all key outcome measures such as depression (Patient Health Questionnaire), anxiety (Generalized Anxiety Disorder), posttraumatic stress (Posttraumatic Stress Disorder Checklist), fatigue (Functional Assessment of Chronic Illness Therapy—Fatigue), and well-being (Functional Assessment of Cancer Therapy—General) from baseline (all $p < 0.01$); results were most pronounced among participants who reported ≥4/10 on the Distress Thermometer at baseline (all $p < 0.001$). Changes in each targeted resource were associated with 3-month improvements in at least one outcome.**

***Conclusions*: Participation in the Pillars4Life program was associated with statistically and clinically significant improvements in scores on pre-specified outcomes and targeted resources.**

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Background

Accumulated evidence documents the substantial unmet psychosocial needs of cancer patients, as summarized in the 2007 release of an Institute of Medicine (IOM) report entitled 'Cancer Care for the Whole Patient: Meeting Psychosocial Health Needs' [1]. Many cancer patients indicate that they feel dissatisfied with their providers' attentions to their psychosocial concerns [2–4]. Unmet psychosocial needs lead to increased morbidity and mortality and reduced health care behaviors necessary to manage illness and promote health during survivorship [5–7].

In alignment with the IOM's proposed strategy, the Pillars4Life (formerly, 'Pathfinders') educational program was designed as a strength-based coping skills model. It integrates psychosocial assessment and care for cancer patients through the guidance of a program manual. Pillars4Life draws upon the theories of positive psychology, resiliency theory, and various stress and coping theories, including the importance of self-efficacy and meaning-making coping strategies. Positive psychology focuses on positive subjective experiences or emotions (e.g., love and gratitude), positive traits or inner strengths (e.g., courage and persistence), and positive 'institutions' or external influences (e.g., social support) and examines characteristics such as hope, wisdom, courage, spirituality, and perseverance under stress in order to help individuals flourish [8,9]. Resilience, or features that allow an

individual to thrive despite adverse circumstances, has been shown to be a major factor in the ability of cancer patients to cope with their disease [10,11]. In addition, research demonstrates that coping is a process rather than a trait and that it can be learned (such as the positive psychology concept of 'learned optimism') [12,13]. Therefore, a major aspect of the Pillars4Life intervention is in teaching coping skills to facilitate personal recovery.

Thus was born the Seven Pillars of Personal Strength, a set of seven overarching concepts that shape a patient's cancer journey, forging a positive statement for each concept (Online Supplemental Figure 1) [14]. The Pillars serve as a systematic framework for self-assessing personal needs, activating inner strengths, and building self-care plans to address specific stressors that are impacting quality of life (QOL). The goal of Pillars4Life is to strengthen each Pillar that may have been weakened by the cancer experience. Over the course of the past decade, the founders developed and revised a set of educational materials that form a coherent curriculum for personal recovery based on observation of patients, results, and suggestions from workshops such as the Benson-Henry Institute for Mind Body Medicine at Massachusetts General Hospital [15]. Working iteratively from Pillar to intervention tool to patients' experiences, the toolset was honed into a standardized curriculum under the Seven Pillars framework.

The Pillars4Life curriculum teaches patients two major skill sets as they move through the Seven Pillar themes. The first is solution-focused thinking, which is a way of restructuring people's thinking about stressors that shifts them out of the story of the problem and into a proactive process of identifying and attaining what they need to feel better. Solution-focused thinking starts with clarifying feelings and then jumps right to finding a solution for feeling better. This is not 'positive thinking' but, rather, is about taking an honest look at thoughts and beliefs around particular issues and clearly identifying what people need to feel better about themselves. It is coupled with mind–body skills, including activities such as guided visualization, stream-of-consciousness writing, and drawing that drop people beneath the chatter or their thinking minds into a pool of inner peace and wisdom where they have access to their truest truths about what is best for them. By combining solution-focused thinking skills and mind-body skills in a curriculum that explores seven dimensions of resiliency, Pillars4Life teaches a comprehensive skillset for self-assessing personal needs and building self-care plans to meet those needs. The fundamental belief on which this program is built is, 'You can choose what to focus on at any given moment, and what you focus on will determine how you feel'.

A pilot study of Pathfinders at Duke University's cancer center demonstrated the program's feasibility and acceptability in the academic medical center setting; participation was significantly associated with improvements in distress, despair, and QOL among women with advanced breast cancer [14]. The findings of the Duke pilot study

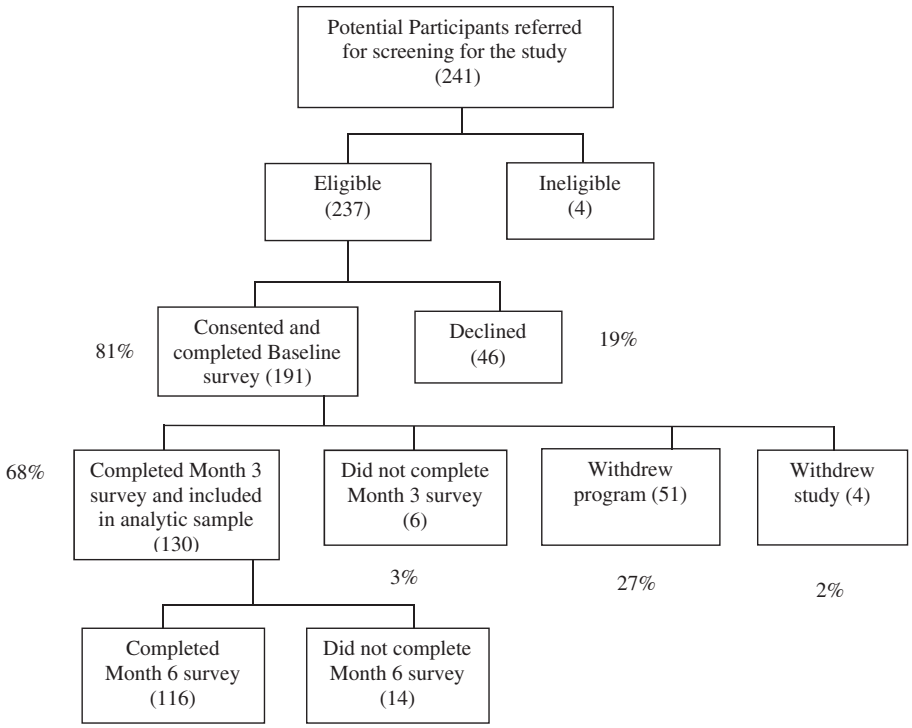

Figure 1. Study participation and data availability

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coupled with the face validity of the Pathfinders model led to the development of a more cost-effective, scalable, and accessible version named Pillars4Life. The online and virtual group format was fundamental for wide-scale implementation at multiple clinical sites in the USA, catalyzed by funding from the LIVESTRONG Foundation. Given that the original model was designed for all cancer types, extensive program revisions were not needed and changes only focused on format and delivery.

This manuscript presents the initial outcomes and efficacy results of an evaluation study of the dissemination of the Pillars4Life intervention to 17 hospitals that treat cancer patients and were recipients of the LIVESTRONG Community Impact Project award. The major strength of the Pillars4Life program is that it offers a way to deliver psychosocial care to a heterogenous population of cancer survivors in a cost-effective way through leveraging technology. We hypothesized that participation in the Pillars4Life intervention would be associated with reduction in symptoms and improved QOL outcomes. Although this evaluation program was uncontrolled, we hypothesized that positive changes in the personal coping resources targeted by Pillars4Life would correlate with improvements in the clinical outcomes of interest, thereby providing credible support for the hypothesis that observed improvements in patient outcomes were due to participation in the Pillars4Life program.

Methods

Participants and procedures

This was a multi-site single-arm study. Eligible patients had the following characteristics: age ≥18 years, diagnosed with cancer of any type, actively receiving cancer care at one of 17 sites in the USA approved by the institutional review board that offered the Pillars4Life program to their patients, able and willing to have telephone or video interaction with a Pillars4Life group every week, provided informed consent, and able to read/write English. Survivor is defined as anyone who received a cancer diagnosis (i.e., current and post-treatment) [16]. All levels of distress were eligible given their participation in the LIVESTRONG-funded program implementation.

The Pillars4Life intervention consisted of weekly 75-min virtual training groups of up to 15 participants over a 10-week period. A masters-prepared and certified Pillar Guide (e.g., social worker, therapist, and psychologist) led the group via Adobe Connect (Adobe Systems Incorporated) using a manualized script. Participants without Internet access joined the group sessions by phone. Study participants were given tools in a curriculum workbook for use throughout his/her participation and thereafter. The ten classes consisted of an Introduction class followed by a Full course on each of the Seven Pillars, and finally a Closing session. In each weekly class, the Pillar Guides lead participants through a series of activities, visualizations, dialogues, surveys, and shares. The exercises are done together and then each participant has an opportunity to process what they learned with the Pillar Guide. For example, in the Balance course, participants get specific about how they spend their time and energy in daily life and explore whether the things they are spending time on are in alignment with their true priorities. In this session, patients create a visual perspective of how they spend their time and how they feel in each aspect of their lives. They learn to set boundaries that help them keep stressors from taking up too much time and energy and allow more time for the things that feel good.

Participant resources and outcome data were collected at baseline and 3 and 6 months using validated measures. Data were collected electronically using the Web-based QUALTRICS v2012 (Provo, UT, USA) survey interface or by paper. Planned data collection time points were Baseline, Month3 (post-intervention), and Month6 (follow-up).

Measures

Participant characteristics

Demographic (e.g., gender, age, race, and education) and clinical (e.g., cancer type, date of diagnosis, and treatment status) information were collected via self-report prior to the start of the intervention. Comorbidities were reported via the Self-administered Comorbidity Questionnaire [17]. The Australia-modified Karnofsky Performance Status scale was used to assess functional performance status [18].

Resources

The resources targeted by the Pillars4Life intervention were assessed using validated instruments that employed Likert-type scoring. The Brief COPE is a 28-item coping inventory designed to assess adaptive and maladaptive coping strategies [19]. A higher score indicates increased frequency of coping style usage. The Medical Outcomes Study Social Support Survey is a 19-item measure used to assess the perceived availability of social support and has been used extensively in various populations, including breast cancer survivors [20,21]. Greater perceived availability of social support is indicated by a higher score. The Self-efficacy for Managing Chronic Disease Scale is a six-item measure of self-efficacy for coping with chronic disease [22]. A higher score is indicative of expectancies in achieving an outcome. The Functional Assessment of Chronic Illness Therapy—Spiritual Well-being (FACIT-SP-12) is a 12-item scale that assesses spiritual well-being [23]. A higher score represents better spirituality-related QOL. The 10-item Life Orientation Test—Revised was used to assess optimism and can discriminate between generalized optimism and pessimism; greater optimism is indicated by a higher score [24]. All

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psychosocial resource instruments had excellent internal consistency in our sample ($\alpha > 0.80$) with the exception of the Brief COPE ($\alpha > 0.71$).

Symptoms

The Generalized Anxiety Disorder (GAD-7) [25] and Patient Health Questionnaire (PHQ-9) [26] were used to capture symptoms of anxiety and depression. The Patient Care Monitor (PCM v2) was used to assess for despair and distress [27]. The one-item Distress Thermometer (DT) was also used to assess for distress [28]. The 17-item Posttraumatic Stress Disorder Checklist (PCL-C) was modified so that symptoms were aligned to the specific traumatic stressor of interest (i.e., cancer diagnosis and treatment). Higher scores on all measures are indicative of more symptoms [29]. Strong reliability was found in all symptom measures ($\alpha > 0.80$).

Quality of life

The 27-item Functional Assessment of Cancer Therapy—General (FACT-G) was used to measure QOL [30]. Its four subscales sum to a total score in which a higher score is indicative of a better QOL. The 13-item FACIT-Fatigue scale is scored such that less fatigue is represented by a higher score. Also, the PCM v2 QOL subscale was used to assess QOL; a higher score is representative of better QOL. All QOL measures showed strong reliability in this study ($\alpha > 0.80$).

Statistical analysis

Participants who completed Baseline and Month3 assessments were included in these analyses (Figure 1). To ensure that study instruments were reliable and performing as expected, Cronbach's alpha coefficients were computed using the Baseline data. The paired-samples *t*-test procedure was used to compute the differences between the values of two variables (i.e., Baseline and Month3, and Baseline and Month6) for each participant and test whether the average differed from zero. *t*-Tests were performed for the entire sample as well as for the distressed subsamples (i.e., participants who scored ≥4 on the DT at Baseline) and non-distressed subsamples. For each targeted resource, multiple linear regression models were used to examine the independent associations between changes in resources and select changes in outcomes between Baseline and Month3, adjusted for patient characteristics (age, education, and treatment and performance status).

A two-sided significance level of 0.05 was used for all statistical tests. Clinical significance was defined as moderate to strong effect sizes ranging from 0.5 to 1.0 standard deviation units as calculated using Cohen's *d* (i.e., mean difference divided by pooled standard deviation) [31]. Analyses were conducted using SAS V9.1 (SAS Institute, Cary, NC, USA).

Results

Participants

A total of 241 patients were referred for study screening, of which 237 patients were eligible and 191 consented to participate (81% of those who were eligible; Figure 1). Attrition over the 3-month intervention period was 32%. Reasons cited for withdrawal from the program and/or study ($n = 55$) included lack of time or being overwhelmed, feeling sick, and too fatigued. Participants ($n = 130$) had the following characteristics: mean age 55.7 ± 10.5 years, 87% women, 89% White, 61% married, and 48% employed (Table 1). Most participants were breast cancer survivors (51%), diagnosed with an early stage disease (52%), and currently receiving treatment (63%). The mean years since diagnosis were 2.8 ± 3.6 years. There was no difference in gender, race, type of cancer, stage of disease, treatment status, and distress level between participants who completed the intervention and those who withdrew (all $p > 0.05$).

Change in mean scores

Outcomes

As shown in Table 2, all mean psychosocial symptom scores (i.e., anxiety, depression, despair, distress, and posttraumatic stress) improved from Baseline to Month3 (all $p < 0.001$). Similarly, mean QOL scores (i.e., cancer-related well-being, fatigue, and QOL *t*-score) improved from Baseline to Month3 (all $p < 0.001$), except for the social/family well-being subscale. Month3 results were more pronounced among patients with higher Baseline levels of distress (Table 3). Among participants who reported distress (DT ≥ 4) at Baseline, clinically significant improvements (i.e., moderate to strong effect sizes) in all psychosocial symptoms were detected at Month3 (all $p < 0.001$). Clinically significant changes in cancer-related well-being and QOL *t*-scores were also reported by distressed participants at Month3 (all $p < 0.001$).

Per Table 2, significant improvements in all mean psychosocial symptom scores were retained at Month6 (all $p < 0.001$). Also, mean QOL scores improved from Baseline to Month6 (all $p < 0.01$), except for the social/family well-being subscale. Among distressed participants, clinically significant improvements were reported at Month6 in all psychosocial symptoms (all $p < 0.001$), cancer-related well-being, fatigue, and QOL *t*-score (all $p < 0.001$; Table 3).

Resources

Table 2 displays improved mean scores from Baseline to Month3 on targeted resources (i.e., coping skills, self-efficacy, and spirituality; all $p < 0.001$). Significant improvements were reported for learned optimism,

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Table 1. Characteristics of the study sample at Baseline ($n = 130$)

	No. of participants		
Characteristic	***N***	**%**	**Mean ± SD**
Demographics			
Female sex	113	87	
Income < $30,000	19	15	
College or postgraduate degree	100	77	
Married or living with partner	79	61	
White race	116	89	
Non-Hispanic	124	96	
Employed full or part time	62	48	
Veteran status	10	8	
Private health insurance	89	69	
Age, years			55.7 ± 10.5
Clinical			
Breast cancer	66	51	
Stage I or II at diagnosis	67	52	
In remission or cured of disease	54	42	
Had received cancer surgery	99	76	
Had received radiation therapy	60	46	
Had received chemotherapy	89	68	
Currently receiving treatment	82	63	
Comorbidities, number			3.2 ± 1.9
Time since diagnosis, years			2.8 ± 3.6
Performance status			82.7 ± 13.3
Symptoms			
Anxiety			6.3 ± 5.3
Depression			7.6 ± 5.5
Despair *t*-score			57.4 ± 10.0
Distress Thermometer			4.5 ± 2.7
Distress *t*-score			57.6 ± 10.2
Posttraumatic stress			32.6 ± 12.8
Quality of life			
Cancer-related well-being			70.4 ± 20.4
Physical well-being			20.3 ± 6.0
Emotional well-being			16.0 ± 5.2
Social/family well-being			18.1 ± 7.1
Functional well-being			15.9 ± 6.4
Fatigue			30.7 ± 11.8
Quality-of-life *t*-score			46.6 ± 9.5
Targeted resources			
Coping skills			68.3 ± 8.3
Learned optimism			16.1 ± 6.4
Self-efficacy			37.7 ± 12.4
Social support			76.0 ± 18.0
Spirituality			30.8 ± 11.4

self-efficacy, and spirituality at Month6 (all $p < 0.01$). Among participants who were distressed at Baseline, clinically and statistically significant improvements in self-efficacy and spirituality were reported at Month3 and Month6 (all $p < 0.001$; Table 3).

Relationship between targeted resources and outcomes

Multiple linear regression models were generated to examine the relationships between the change from Baseline to Month3 for targeted resources and key outcomes after adjustment for patient characteristics (age, education, and treatment and performance status). We focused on Baseline to Month3 for the changes in targeted resources because it was theorized that changes in targeted resources would precede changes in outcomes. After adjustment, the following resources were found to have an independent association with at least one outcome: coping with anxiety ($p = 0.002$); optimism with posttraumatic stress, despair, and QOL *t*-score (all $p < 0.05$); self-efficacy with depression, posttraumatic stress, despair, distress, cancer-related well-being, QOL *t*-score, and fatigue (all $p < 0.01$); social support with anxiety, despair, distress, cancer-related well-being, and QOL *t*-score (all $p < 0.05$); and spirituality with anxiety, depression, despair, distress, cancer-related well-being, and QOL *t*-score (all $p < 0.01$).

Predictors of change in symptoms, outcomes, and resources

Multiple linear regression models were used to examine the predictors of change from Baseline to Month3 in symptoms, outcomes, and targeted resources (Online Supplemental Table 4). Only one independent variable (performance status) was found to be associated with a change in symptom (distress; $p < 0.05$). Two variables were found to have an independent association with change in QOL outcomes: treatment status with cancer-related well-being and performance status with fatigue and QOL (all $p < 0.05$). Six variables were found to have an independent association with changes in targeted resources: comorbidity with coping; non-White race, age, performance status, and class attendance with learned optimism; performance status with self-efficacy; and female gender and age with social support (all $p < 0.05$).

Discussion

This study examined longitudinal changes in symptoms of psychosocial distress and QOL among a sample of cancer patients participating in the Pillars4Life program. Over 6 months, all outcomes improved. As there was not a comparator group, we cannot confidently attribute the improvements to the Pillars4Life intervention. However, several important findings increase the likelihood that the study findings are related to the intervention. First of all, there was clinically and statistically significant improvement in the psychosocial resources that Pillars4Life is intended to impact, namely self-efficacy and spirituality; this aligns with our conceptual model of how the program could improve personal outcomes by enhancing targeted personal resources, as first published in 2010 [14]. Second, change in these personal resources correlates with longitudinal symptom and QOL outcomes, including depression, despair, distress, cancer-related well-being, and QOL. Third, study participants with the highest levels of distress at Baseline received the most benefit. In

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Table 2. Paired *t*-test results

		Month3 − Baseline ($n = 130$)				Month6 − Baseline ($n = 116$)			
Domain	α	**Mean diff***	**SD**	***t* value**	***p***	**Mean diff†**	**SD**	***t* value**	***p***
Symptoms									
Anxiety	0.90	−2.3	4.7	−5.6	<0.001	−2.6*	4.0	−6.8	<0.001
Depression	0.86	−2.3*	4.5	−5.8	<0.001	−2.7*	4.6	−6.3	<0.001
Despair *t*-score	0.90	−2.9	8.4	−3.9	<0.001	−2.8	7.8	−3.9	<0.001
Distress Thermometer	—	−0.9	2.7	−3.7	<0.001	−1.0	2.5	−4.3	<0.001
Distress *t*-score	0.88	−3.0	8.7	−3.9	<0.001	−3.8	8.6	−4.8	<0.001
Posttraumatic stress	0.94	−4.3	9.1	−5.4	<0.001	−5.2*	8.6	−6.5	<0.001
Quality of life									
Cancer well-being	0.94	4.7	14.0	3.8	<0.001	6.0	13.7	4.7	<0.001
Physical	0.86	1.2	5.3	2.7	0.009	1.5	5.3	3.0	0.003
Emotional	0.83	2.0*	3.9	5.7	<0.001	2.1*	3.7	6.1	<0.001
Social/family	0.89	−0.1	5.5	−0.1	0.97	0.7	4.5	1.7	0.08
Functional	0.88	1.7	5.2	3.6	<0.001	1.8	6.0	3.2	0.002
Fatigue	0.94	3.3	11.3	3.4	0.001	4.9	10.0	5.3	<0.001
Quality-of-life *t*-score	0.89	3.1	7.7	4.4	<0.001	3.2	7.1	4.8	<0.001
Targeted resources									
Coping	0.71	2.3	7.5	3.5	<0.001	0.2	8.6	0.3	0.80
Learned optimism	0.89	0.8	4.6	1.9	0.06	1.1	4.4	2.7	0.009
Self-efficacy	0.91	3.6	9.9	4.1	<0.001	5.3	11.1	5.2	<0.001
Social support	0.96	0.9	11.4	0.9	0.37	1.7	11.6	1.6	0.12
Spirituality	0.93	3.2	7.8	4.7	<0.001	3.0	8.5	3.8	<0.001

*Effect size ≥ 0.5 SD units.
*Mean difference is calculated using the following formula: [Month3 − Baseline score].
†Mean difference is calculated using the following formula: [Month6 − Baseline score].

addition, improvements in resources and outcomes were maintained at 3 months following intervention cessation (i.e., Month6). These findings are consistent with results from a growing portfolio of effective virtual-based psycho-educational interventions [32–34].

Improvements in each targeted resource were independently associated with improvements in at least one key outcome. The conceptual model was supported in which changes in psychosocial resources targeted by the intervention were associated with improved symptom and QOL outcomes. Improvements in spirituality and self-efficacy scores were associated with improvements in six and seven of the eight outcome scores reported, respectively (all $p < 0.01$). It is curious that the targeted resource with the most face validity and alignment with the goals of Pillars4Life showed the lowest relationship to outcomes, that is, personal coping as measured on the Brief COPE. This may be an indicator that Pillars4Life is not very effective at supporting coping, or it may be a signal that the Brief COPE is a poor measure of personal coping. Psychometrically valid, short coping assessment instruments have been very difficult to develop, and available instruments are often suspect; in fact, the Brief COPE's published psychometrics [19] are lower than that of the rest of the measures in our evaluation framework, and in this study, Cronbach's alpha of 0.71 was lower than the rest of our instruments (otherwise >0.8). In addition, social support (as measured by the FACT-G and MOS instruments) did not increase significantly. A possible explanation is that this sample had high support scores at Baseline, as compared with the general population (76 and 70, respectively) [20].

Results from the linear regressions conducted to identify predictors of change in symptoms, QOL, and targeted resources indicate that most demographic and clinical variables were not predictive of program outcomes. Interestingly, class attendance and education level did not have a bearing on program outcomes, yet most participants had a college degree ($p > 0.05$). In addition, non-White participants reported less improvement in symptoms and QOL outcomes than did White participants, but these differences were not statistically significant ($p > 0.05$). Furthermore, cancer type and stage had no bearing on outcomes, while treatment status was only associated with cancer-related well-being ($p < 0.05$). Of all the variables examined, performance status was the most predictive of the program outcomes. This finding was consistent with the feedback received from participants who dropped out of the program (i.e., cited fatigue and feeling sick as primary reasons for withdrawal).

How do these Pillars4Life study results compare with the one-on-one, in-person administered Pathfinders study results [14]? While the Pillars4Life study employed a larger cadre of instruments than did the Pathfinders study, significant improvements were reported in both studies at Month3 for these common instruments: PCM distress, despair, QOL *t*-scores, and FACT-G emotional subscale. However, the Pillars4Life study also reported

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Table 3. Paired *t*-test results by distress level

	Distressed[a]								Non-distressed[b]							
	Baseline and Month3 ($n = 70$)				Baseline and Month6 ($n = 62$)				Baseline and Month3 ($n = 60$)				Baseline and Month6 ($n = 56$)			
Domain	**Mean Diff[c]**	**SD**	***t* value**	***p***	**Mean Diff[d]**	**SD**	***t* value**	***p***	**Mean Diff[e]**	**SD**	***t* value**	***p***	**Mean Diff [f]**	**SD**	***t* value**	***p***
Symptoms																
Anxiety	−3.6*	5.6	−5.4	<0.001	−3.7*	4.3	−6.8	<0.001	−0.9	3.0	−2.3	0.02	−1.2	3.2	−2.7	0.01
Depression	−3.4*	4.6	−6.3	<0.001	−3.6*	5.3	−5.3	<0.001	−1.0	4.2	−1.9	0.06	−1.7*	3.4	−3.6	<0.001
Despair *t*-score	−4.6*	7.9	−4.9	<0.001	−4.3*	6.3	−5.4	<0.001	−0.7	8.4	−0.7	0.51	−1.0	8.9	−0.8	0.43
Distress Thermometer	−2.3*	2.4	−8.2	<0.001	−2.3*	2.3	−7.6	<0.001	0.9	1.9	3.5	0.001	0.5	1.9	1.9	0.07
Distress *t*-score	−5.3*	8.0	−5.5	<0.001	−5.8*	8.1	−5.6	<0.001	−0.4	8.9	−0.3	0.73	−1.6	8.6	−1.3	0.19
Posttraumatic stress	−5.9*	10.5	−4.7	<0.001	−6.8*	9.9	−5.4	<0.001	−2.4	6.7	−2.8	0.007	−3.4*	6.5	−3.8	<0.001
Quality of life																
Cancer-related well-being	7.5*	13.8	4.5	<0.001	7.9*	14.7	4.2	<0.001	1.6	13.6	0.9	0.39	3.8	12.1	2.2	0.03
Physical	1.9	5.8	2.7	0.009	1.5	6.4	1.8	0.07	−0.5	4.6	0.9	0.40	1.5	3.7	2.9	0.005
Emotional	3.0*	4.1	6.0	<0.001	2.8*	4.1	5.6	<0.001	0.8	3.3	1.9	0.06	1.2	3.1	2.9	0.006
Social/family	0.7	4.5	1.3	0.19	1.5	4.6	2.6	0.01	−0.9	6.4	−1.1	0.29	−0.2	4.3	−0.4	0.72
Functional	1.9	4.3	3.8	<0.001	2.3	5.7	3.2	0.003	1.3	6.1	1.7	0.09	1.2	6.4	1.3	0.19
Fatigue	4.4	11.3	3.2	0.002	5.2*	10.3	4.0	<0.001	2.1	11.3	1.5	0.15	4.5	9.7	3.4	0.001
Quality-of-life *t*-score	5.0*	7.2	5.5	<0.001	4.4*	7.3	4.6	<0.001	0.9	7.8	0.9	0.36	1.9	6.6	2.1	0.04
Targeted resources																
Coping	2.4	8.2	2.4	0.02	0.89	8.8	0.8	0.43	2.2	6.6	2.6	0.01	−0.6	8.3	−0.5	0.59
Learned optimism	1.2	4.8	2.1	0.04	1.6	4.7	2.7	0.008	0.3	4.2	0.5	0.64	0.5	4.0	0.9	0.39
Self-efficacy	5.2*	10.4	4.2	<0.001	6.8*	11.9	4.5	<0.001	1.6	9.0	1.4	0.17	3.7	9.9	2.7	0.01
Social support	2.0	11.4	1.4	0.15	3.7	11.0	2.7	0.009	−0.4	11.2	0.3	0.81	−0.8	11.8	−0.5	0.64
Spirituality	4.4*	7.7	4.8	<0.001	4.9*	8.1	4.8	<0.001	1.8	7.7	1.8	0.07	0.6	8.3	0.6	0.57

*Effect size $\geq$ 0.5 SD units.

[a]Distress Thermometer score $\geq$ 4.

[b]Distress Thermometer score $<$ 4.

[c]Mean difference is calculated using the following formula: [Month3 score − Baseline score].

[d]Mean difference is calculated using the following formula: [Month3 score − Baseline score].

[e]Mean difference is calculated using the following formula: [Month6 score − Baseline score].

[f]Mean difference is calculated using the following formula: [Month6 score − Baseline score].

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improvements in these shared instruments: FACIT-SP; FACIT-Fatigue; and FACT-G, FACT-physical, and FACT-functional. These findings are encouraging and provide an early indication that moving to a more cost-effective, scalable, and accessible Pillars4Life model was not detrimental to the outcomes reported by program participants.

Study limitations include the lack of a control group, thereby preventing any determinations regarding causality (i.e., if the improvements in resources and outcomes were caused by participation in the program). It is possible that the participants improved because of the passage of time. However, the use of longitudinal data collection and deliberate timing of assessments and related analyses assisted in the establishment of sustained improvements in resources and outcomes. Second, a majority of women with breast cancer were enrolled, thereby limiting generalizability among men and survivors who were diagnosed with a different type of cancer. However, cancer type was not found to be predictive of changes in symptom and QOL outcomes and targeted resources. Third, subscales within the MOS-SSS and FACT-G overlap, which could account for observed correlations. Fourth, the heterogeneity of the sample in terms of cancer type, gender, race, ethnicity, and education limits power in examining predictors of outcomes. However, the sample's diversity may enhance the generalizability of these findings to the greater population. Fifth, multiple testing is an issue that always requires careful consideration but does not always require formal adjustment of *p*-values. Here, the level of statistical significance was so strong, and the directional pattern of the results so consistent, as to provide confidence about the conclusions.

Despite these limitations, these data provide compelling support that the Pillars4Life participants derive important improvements in targeted resources and outcomes. A future study that employs a more definitive experimental study design is needed to determine whether the Pillars4Life intervention is superior to regular standard for care for reducing psychosocial symptoms and improving QOL in cancer survivors.

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