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Spirituality and the Recovery of Quality of Life Following Hematopoietic Stem Cell Transplantation

Laura A. Leeson, B.A.¹, Ashley M. Nelson, B.A.², Paul J. Rathouz, Ph.D.^{3,4}, Mark B. Juckett, M.D.^{3,5}, Christopher L. Coe, Ph.D.⁶, Elizabeth W. Caes, MDiv, BCC³, and Erin S. Costanzo, Ph.D.^{1,3}

¹Department of Psychiatry, University of Wisconsin-Madison, Madison, WI

²Department of Psychology, University of South Florida, Tampa, FL

³Carbone Cancer Center, University of Wisconsin-Madison, Madison, WI

⁴Department of Biostatistics & Medical Informatics, University of Wisconsin-Madison, Madison, WI

⁵Department of Medicine, Hematology/Oncology Division, University of Wisconsin-Madison, Madison, WI

⁶Department of Psychology, University of Wisconsin-Madison, Madison, WI

Abstract

Objective—Spirituality has been linked to improved adjustment and functioning in individuals with cancer; however, its effect on quality of life following hematopoietic stem cell transplantation (HSCT) has not been well-studied. This study investigated changes in spirituality in hematologic cancer patients recovering from HSCT and relationships between spirituality and dimensions of quality of life following HSCT.

Methods—Participants ($N = 220$) completed measures of two dimensions of spirituality (meaning/peace and religious faith), depression, anxiety, fatigue, pain, and physical and functional well-being prior to transplant and at 1, 3, 6, and 12 months post-transplant.

Results—Meaning/peace declined at 1 month post-transplant and returned to pre-transplant levels by 6 months post-transplant, and faith increased from pre-transplant to 6 months post-transplant. Mixed-effects linear regression models indicated that greater pre-transplant meaning/peace, but not religious faith, predicted less depression, anxiety, and fatigue, and better physical and functional well-being during the 12 months following transplant.

Conclusions—The capacity to find meaning and peace may facilitate recovery following HSCT. Results suggest that spirituality may be a resilience factor that could be targeted to improve quality of life for HSCT recipients.

Keywords

cancer; stem cell transplantation; spirituality; quality of life

Hematopoietic stem cell transplantation (HSCT) is a rigorous treatment that can be life-saving for patients with advanced hematologic cancers including lymphoma, leukemia, and multiple myeloma. However, it carries significant risk of morbidity and mortality, and HSCT recipients typically experience a number of side effects and impairment in their quality of life following transplant. Fatigue, depressed mood, heightened anxiety, pain, and diminished functioning are common concerns in the early post-transplant recovery but can also persist for months to years after transplant (Andrykowski et al., 1997; Andrykowski et al., 2005).

Given the significant psychological and physical effects of HSCT and the life-threatening context, the personal sense of spirituality may also be affected in transplant recipients (Wong et al., 2010). Spirituality has been defined by Pulchalski and colleagues (2009) as “the aspect of humanity that refers to the way individuals seek and express meaning and purpose and the way they experience their connectedness to the moment, to self, to others, to nature and to the significant or sacred” (p. 887). Spirituality is often considered to be a multidimensional construct that incorporates both existential and religious faith facets (Edmondson, Park, Blank, Fenster, & Mills, 2008; Yanez et al., 2009). The existential aspect encompasses an understanding of the meaning and purpose in life, and the faith aspect involves a sense of a connection to God or other higher being and is typically correlated with measures of religiosity.

An enhanced sense of spirituality has been examined in the context of the growth and benefit-finding that individuals with cancer often report as a result of their experience with cancer. For example, compared to women with no history of cancer, breast cancer survivors report experiencing greater spirituality in addition to a greater appreciation of life and better interpersonal relationships as a result of their experience with cancer (Cordova, Cunningham, Carlson, & Andrykowski, 2001). An evaluation of a sample of individuals who developed cancer during the course of a longitudinal study found that while other areas of psychological function declined following the cancer diagnosis, spirituality increased from pre- to post-diagnosis (Costanzo, Ryff, & Singer, 2009). The findings on spirituality in HSCT patients have been mixed. In a study of HSCT recipients nine years post-HSCT, survivors reported psychological growth in several domains, one of which was spirituality (Tallman, Shaw, Schultz, & Altmaier, 2010). Additionally, Wong and colleagues (2010) found that global spiritual well-being increased from pre-HSCT to six months post-HSCT and then remained relatively stable through three years post-transplant. However, Andrykowski et al. (2005) found a trend suggesting poorer overall spiritual well-being among long-term HSCT survivors relative to a comparison group.

There is also compelling evidence that spirituality may support increased functioning and resilience during cancer treatment and recovery (e.g., Visser, Garssen, & Vingerhoets, 2010). For example, women with breast cancer who reported greater overall spiritual well-being showed better psychological adjustment and better physical, emotional, and functional

well-being (Cotton, Levine, Fitzpatrick, Dold, & Targ, 1999). Among men with prostate cancer, a greater sense of meaning and peace, but not religious faith, was related to better sexual function, reduced urinary symptoms, decreased anxiety, and improved emotional well-being (Krupski et al., 2006). Similar relationships have been found for individuals with leukemia (O'Connor, Guilfoyle, Breen, Mukhardt, & Fisher, 2007). One limitation is that all of these studies were cross-sectional, making it difficult to discern the dynamics of the effects.

Relatively few studies have examined the effects of spirituality among patients experiencing the rigorous treatment, mortality risk, and impaired quality of life that accompany HSCT. One study of long-term survivors of HSCT who were an average of 6 years post-transplant indicated that greater spiritual well-being was associated with better mental health (Wingard et al., 2010). Another cross-sectional study focusing on HSCT recipients who developed chronic graft-versus-host disease found that participants with the lowest overall spiritual well-being reported worse physical, emotional, social, and functional well-being as compared to those with higher spiritual well-being (Harris et al., 2010). However, little is known about spirituality and its effects during the early recovery from transplant. Given that this is a sensitive period that can affect the long-term trajectory of recovery, as well as a time when HSCT recipients experience the most significant physical and psychological sequelae, the benefits of spirituality may be particularly salient.

In considering different dimensions of spirituality, prior research suggests that having a sense of peace, or the ability to find meaning and purpose, are most strongly related to quality of life (e.g., Krupski et al., 2006). For example, while faith and a sense of meaning and peace were both positively associated with health-related quality of life in a large sample of colorectal cancer survivors, the meaning and peace dimension was a more powerful predictor than faith (Salsman, Yost, West, & Cella, 2011). In another cross-sectional study of cancer survivors, having a sense of meaning and peace fully accounted for the relationship between religious faith and both mental and physical quality of life (Edmondson, Park, Blank, Fenster, & Mills, 2008). Finally, in a longitudinal study of women recovering from breast cancer treatment, Yanez and colleagues (2009) found that baseline meaning/peace, as well as an increase in meaning/peace over a 6-month period, predicted a decline in depression and vitality from baseline to 6- and 12-month follow up assessments. In contrast, women who reported high faith in the context of low meaning/peace actually experienced an increase in depressive symptoms and decline in vitality by the 6-month follow up. These multidimensional aspects of spirituality have not been examined among individuals undergoing HSCT.

The first objective of the current study was to investigate changes in spirituality among HSCT recipients from pre- to post-transplant and during the first 12 months following transplant. While past studies have measured spiritual well-being several months to years after HSCT, we focused on changes earlier in recovery that are more likely to be directly affected by transplant and its physical and emotional sequelae. The second objective was to evaluate the extent to which spirituality prior to transplant predicted important dimensions of quality of life post-transplant. We focused on measures of depression, anxiety, fatigue, pain, and overall physical and functional well-being. We opted to examine the predictive

capability of the pre-transplant assessment of spirituality because this is the time that patients receive a comprehensive clinical evaluation, often including a psychosocial assessment, to identify risk factors for response and recovery from HSCT. By using a longitudinal design and tracking changes in quality of life dimensions post-transplant, the present study can enhance understanding of how spirituality may influence the recovery from HSCT. We evaluated both meaning/peace and religious faith dimensions to determine whether relationships with post-transplant quality of life outcomes differed. We hypothesized that patients who reported greater spirituality pre-transplant would have better recovery of emotional and physical well-being during the 12 months following transplant, and that the meaning/peace dimension would be more strongly related to quality of life.

Methods

Participants

Participants were adults receiving HSCT and follow-up care at the University of Wisconsin Carbone Cancer Center who were participants in a larger study investigating psychological factors and recovery following HSCT. Prior to transplant, they provided informed consent and completed a battery of self-report measures assessing psychological adjustment and quality of life dimensions. Most participants (89.2%) completed the initial assessment during the two months prior to transplant, with the median time of completion at 18 days prior to transplant (range = 1 to 154 days pre-transplant). Longer time spans were typically due to unanticipated delays in the transplant date. During this time frame, most patients have completed prior treatment regimens and are undergoing pre-transplant medical evaluations and other preparations for transplant. Follow-up measures were completed at approximately 1, 3, 6, and 12 months post-transplant at a clinic visit, or questionnaires were mailed to the participants if they did not have scheduled appointments. Reminder phone calls were made if participants did not return materials promptly.

Data from participants who completed the pre-transplant assessment and at least one post-transplant assessment were included in the analyses ($N = 220$). Due to study attrition, missing data, or mortality, data were available from fewer patients at the 1 (93%), 3 (90%), 6 (85%), and 12 (79%) month follow-up assessments. A full series was obtained for 68% of the sample, with 86% completing 4 of 5 time points. There were no significant differences on any of the pre-transplant spirituality or quality of life measures between individuals who completed the all assessment points and those with missing data (all p values $> .05$).

Most participants had diagnoses of leukemia (34%), lymphoma (31%), or multiple myeloma (31%). Both those receiving autologous ($n = 121$) and allogeneic ($n = 99$) transplants were included. The mean age was 51 years (range = 19 to 74 years). Full demographic and clinical information is summarized in Table 1.

Measures

Spirituality—The Functional Assessment of Chronic Illness Therapy Spirituality (FACIT-Sp) scale assessed the sense of meaning and purpose, harmony and peace, and closeness to God or another higher power (Peterman, Fitchett, Brady, Hernandez, & Cella, 2002).

Participants were asked to report to what extent they experienced different aspects of spirituality in the past week, ranging from 0 (not at all) to 4 (very much). The FACIT-Sp can be divided into two or three subscales (e.g., Peterman et al., 2013; Murphy et al., 2010); we opted for two subscales on conceptual grounds: the 8-item meaning/peace subscale (e.g., “I feel a sense of harmony within myself”) and the 4-item religious faith subscale (e.g., “I find strength in my faith or spiritual beliefs”), which were moderately correlated in our sample ($r = .34-.41$). The FACIT-Sp has been used successfully in prior studies of cancer populations (Cella et al., 1993) and, in our sample, had good reliability for both the meaning/peace ($\alpha = .79-.87$) and religious faith ($\alpha = .85-.89$) scales.

Emotional Well-Being—The Inventory of Depression and Anxiety Symptoms (IDAS) assessed depression and anxiety symptoms over the past week (Watson et al., 2007; 2008). The 20-item general depression and 4-item traumatic intrusions subscales were employed in our analyses. The depression scale reflects DSM-IV based symptoms of major depression, and the traumatic intrusions subscale focuses on anxious thoughts. The IDAS has been shown to have strong convergent validity in relation to other self-report and interview-based measures of depression and anxiety but also has several advantages, including superior ability to discriminate between depression and anxiety symptoms, content that closely reflects DSM criteria, the ability to examine symptom dimensions, and a quick and efficient format. It has been successfully used in a variety of health care samples, including those with psychiatric diagnoses (Watson et. al, 2007; 2008), diabetes (McDade-Montez & Watson, 2011), pregnant and postpartum women (Nylen et al., 2013), and individuals being treated for substance dependence (Farris, Zvolensky, Noden. & Bonn-Miller, 2013), and is particularly well-suited for populations where medical symptoms may overlap with depression and anxiety symptoms (McDade-Montez & Watson, 2011; Nylen et al., 2013). Both the general depression ($\alpha = .89-.91$) and traumatic intrusions ($\alpha = .77-.86$) scales had good reliability in our sample.

Fatigue—The Fatigue Symptom Inventory (FSI) assessed fatigue over the past week (Hann et al., 1998). Because functional ability was of primary interest, the analyses focused on the 7-item fatigue interference subscale, which assesses the extent to which fatigue interferes with daily activities, mood, and relationships. The FSI has been validated in several cancer patient populations (Hann, Denniston, & Baker, 2000) and showed very good internal consistency in the present sample ($\alpha = .93-.94$).

Pain—The Brief Pain Inventory (BPI) was used to assess pain over the past week (Cleeland & Ryan, 1994). Consistent with the focus on functioning, analyses used the pain interference subscale, which measures the degree to which pain interferes with daily activities, mood, and relationships. The pain interference subscale has documented validity in cancer samples (Cleeland & Ryan, 1994), and had excellent reliability in the present sample ($\alpha = .95-.97$).

Physical Well-Being—The Functional Assessment of Chronic Illness Therapy (FACIT) assessed physical and functional well-being over the past week (Cella et al., 1993). The physical well-being subscale assesses physical symptoms (e.g., “I have nausea”), while the functional well-being subscales focuses on the ability to participate in normal activities (e.g.,

“I am enjoying the things I usually do for fun”). The FACIT has been shown to be a valid and reliable measure in many cancer populations (Cella et al., 1993), including HSCT recipients. Internal consistency was very good for both physical ($\alpha = .80-.94$) and functional ($\alpha = .82-.86$) well-being scales.

Analyses

STATA statistical package, including the ‘anova’ and ‘xtmixed’ functions, was used to analyze the data. To address the first objective, descriptive statistics were used to characterize the FACIT-Sp subscales over time. Repeated-measures ANOVA with follow-up contrasts examined changes in meaning/peace and religious faith subscales across the five assessment points. The ‘anova’ function in STATA uses maximum likelihood estimation and includes all available data points, including those from participants who have some missing observations.

To address the second objective, mixed-effects linear regression models were utilized to determine the extent to which pre-transplant meaning/peace and religious faith predicted quality of life outcomes (depression, anxiety, fatigue, pain, and physical and functional well-being), as well as the change over time of quality of life measures across the 5 assessment points. The models included the pre-transplant quality of life measures as part of the response trajectory. These models also include all available data points, including those from participants with some missing data. Time since transplant was entered as a factor variable in all models to account for non-linear changes of outcome variables over time (time was centered at 3 months post-transplant given the clinical significance of this follow-up point). Type of transplant (allogeneic or autologous) was entered as a covariate in all models because transplant regimens differ with respect to the degree of risk and intensity of side effects and complications. Allogeneic transplant recipients showed significantly greater depression and fatigue and poorer physical and functional well-being as compared to autologous transplant recipients (all p values $< .05$). Time from the pre-transplant assessment point to transplant date was not significantly associated with outcome variables but was entered in the models as a conservative step given variation in the timing of the pre-transplant assessment. Other potential covariates, including diagnosis, age, sex, relationship status, education, employment, income, religious attendance, and religious preference, were examined using correlations and t -tests to determine the extent to which they were associated with outcome measures. Age was significantly correlated with depression, anxiety, and functional well-being (younger patients had worse scores; all p values $< .05$), and was therefore included as a covariate. There were no significant associations between the other variables tested and the outcome measures, and these variables were not included as covariates in the models. To enhance interpretability of the model coefficients, mean scores for pre-transplant meaning/peace and religious faith scales were used, and quality of life outcome scores were standardized. The models tested the main effects of pre-transplant meaning/peace and religious faith and the interaction between each subscale and time on six quality of life outcomes through 12 months post-transplant. Both subscales, and their interaction terms, were entered in the same model for each outcome variable to determine their relative contributions. Time since transplant and identified covariates were also included in each model.

Results

Changes in Spiritual Well-Being

Mean scores over time for both dimensions of spiritual well-being are displayed in Table 2 and illustrated in Figure 1. Table 2 also provides p values and effects sizes for comparisons of each follow-up assessment with pre-transplant scores.

The meaning/peace dimension changed significantly over time, $F(4, 760) = 4.71, p = .001$ (see Table 2 and Figure 1A). Pairwise comparisons indicated that meaning/peace declined significantly from pre-transplant to 1 month post-transplant ($p < .001; d = .27$) and remained low at 3 months post-transplant. Meaning/peace then increased significantly from 3 to 6 months post-transplant ($p = .032; d = .15$) and then remained stable between 6 and 12 months post-transplant. There were no significant differences between pre-transplant and 6 or 12-month post-transplant scores, suggesting that participants had returned to pre-transplant levels by 6 months post-transplant.

Religious faith also changed significantly over time, $F(4, 760) = 3.44, p = .009$ (see Table 2 and Figure 1B). There was no significant decline in religious faith from pre-transplant to any of the follow-up points. Pairwise comparisons indicated that by 6 months post-transplant, religious faith scores were higher than at pre-transplant ($p = .013; d = .11$) and 1 month post-transplant ($p = .003; d = .13$) assessment points. Scores remained stable between 6 and 12 months post-transplant.

Spiritual Well-Being and Dimensions of Quality of Life

Table 3 summarizes the results of mixed-effects regression models examining the main effects of pre-transplant meaning/peace versus religious faith subscales, and their interactions with time, on quality of life outcomes over the five assessment points. After covarying for religious faith, time since transplant, the meaning/peace and religious faith by time interactions, transplant type, time from pre-transplant assessment to transplant, and age, meaning/peace significantly predicted less depression ($z = -8.88, p < .001$), anxiety ($z = -4.12, p < .001$), fatigue ($z = -5.22, p < .001$), and pain ($z = -2.57, p = .010$), and better physical ($z = 5.25, p < .001$) and functional well-being ($z = 8.43, p < .001$) during the 12 months following transplant. Religious faith was associated with greater fatigue ($z = 1.97, p = .049$), but was not associated with any other outcome variables.

An examination of the interaction of spiritual well-being dimensions and time in the same set of models revealed that pre-transplant meaning/peace predicted changes in depression ($z = 3.27, p = .001$), fatigue ($z = 1.99, p = .046$), and physical well-being ($z = -3.10, p = .002$) over time. There was also a trend toward an interaction between meaning/peace and time in the model predicting functional well-being ($z = -1.83, p = .067$). An examination of the nature of the interactions (see Figure 2) suggested that participants with the highest levels of meaning/peace before transplant maintained higher levels of well-being (better physical and functional well-being, less depression and fatigue) during the initial 6 months following transplant, with the overall effect of pre-transplant spiritual well-being diminishing by 12 months post-transplant. Figure 2 depicts the temporal changes in physical well-being; the other measures showed essentially the same pattern.

Discussion

Our findings suggest that spirituality is a relatively resilient domain that may play a positive role in the transplant recovery for individuals with hematologic cancers undergoing HSCT. Results are consistent with prior research showing that spirituality tends to be an area of functioning that remains stable, or even improves, among individuals with cancer and has the potential to promote quality of life following difficult and demanding treatments (Costanzo et al., 2009; Tallman et al., 2010; Visser et al., 2010).

The HSCT recipients in the present study showed somewhat lower scores on the FACIT-Sp than were seen samples of long-term HSCT survivors (Andrykowski et al., 2005; Wingard et al., 2010; Harris et al., 2010) and in samples with heterogeneous cancer sites (Peterman et al., 2002; Murphy et al., 2010), with pre-transplant scores 1 to 3.5 points lower for both subscales combined than were seen in these samples. Participants in our study experienced a slight decline in the meaning and peace dimension of spiritual well-being during the first month following transplant. This perhaps reflects the rigorous nature of the treatment, long hospital stay, and aversive and debilitating side effects. Individuals may also experience existential concerns in the early post-HSCT period because of the life-threatening context in which transplant occurs. The effect size for the decline in meaning/peace was small but consistent with findings from the initial validation sample for the FACIT-Sp which reports differences in scores based on performance status for a heterogeneous group of cancer and HIV/AIDS patients (Peterman et al., 2002). Specifically, the change in scores seen from pre-transplant to 1- and 3-months post-transplant was equivalent to moving from a performance status of 1 (ambulatory but restricted in strenuous activities) to a performance status of 3–4 (capable of only limited self care or completely disabled; confined to a bed or chair for most or all waking hours) (Peterman et al., 2002). The few studies that have previously examined spirituality among HSCT survivors have focused on later time points, months to years after transplant, and have consequently missed this critical period. Findings suggest that patients' inner sense of peace and purpose in life may be vulnerable in the first few weeks and months of recovery after transplant.

On average, participants' sense of meaning/peace had returned to pre-transplant levels by 6 months post-transplant. Religious faith increased slightly during this time frame. The results for religious faith, but not meaning/peace, are consistent with Wong et al., who found that overall spiritual well-being increased from pre-transplant to 6-months post-transplant and remained stable through 12 months post-transplant. This may reflect core religious precepts that adversity, suffering, and challenge can lead to strengthened faith or seeking of closeness to God or another higher being. It is important to point out that the changes observed in the present study were not substantial, with effect sizes that were small in magnitude. Therefore, our findings also suggest a fair amount of stability in spirituality. Taken as a whole, the data suggest that spirituality is a largely resilient domain, with no persisting declines. This is notable considering deficits in other areas of physical and emotional well-being are typically more persistent (Andrykowski et al., 2005; Syrjala et al., 2004).

Consistent with findings in other cancer patient populations, spirituality among HSCT patients predicted a better recovery of quality of life. Participants with a greater sense of

meaning and peace prior to transplant were less likely to experience depression, fatigue, and anxiety, and more likely to report better physical and functional well-being during the first year after transplant. These effects were seen above and beyond the effects of time on the recovery. Findings further suggested that meaning/peace had the most salient effect during the most rigorous period of early recovery from HSCT.

A notable finding was that patients high in meaning/peace were more resilient to depression, and this buffering effect appeared to be particularly true early after transplant. It is possible that this effect may be due in part to some conceptual and content overlap between the meaning/peace and depression measures. For example, anhedonia and feelings of inadequacy captured by the depression measure may overlap with lacking a sense of meaning and purpose on the spirituality measure. The moderate correlation ($r = .41$) between the two measures suggests that the constructs are related but relatively independent. Taken as a whole, our findings are consistent with extensive research showing that spirituality is protective against depressive symptoms in both healthy individuals and those with chronic diseases (Yanez et al., 2009; Yohannes, Koenig, Baldwin, & Connolly, 2008). There may be special clinical relevance for HSCT patients given the high prevalence of depression and potential link to mortality following transplant (Grulke, Larbig, Kachele, & Bailer, 2008; Prieto et al., 2005). In fact, preliminary evidence indicates that spirituality may be linked to improved survival among HSCT recipients. In a study of allogeneic HSCT recipients, those with an absence of spirituality were less likely to survive the first year following transplant (Pereira et al., 2010). Therefore, it will be important to elucidate how spirituality interacts with other psychosocial and medical factors relevant to post-transplant outcomes.

In this regard, our findings showed that a sense of meaning and peace, but not religious faith per se, was related to better adjustment and functioning among HSCT recipients. It has been suggested that having a “spiritual disposition” may affect the initial appraisal and meaning attributed to an illness as well as the coping mechanisms employed when dealing with it (Gall & Grant, 2005). Patients may be more likely to adaptively manage the threat of cancer if they possess more resources for maintaining their existential well-being prior to their illness. While our findings focused on a measure of meaning and peace rather than overall spiritual disposition, the association seen between possessing a greater sense meaning and peace and better quality of life supports this idea. A sense of meaning and peace may also enable a greater capacity to achieve some transcendence over the physical complications resulting from cancer treatment and help patients to more effectively cope with their symptoms (Brady, Peterman, Fitchett, Mo, & Cella, 1999). In contrast, the traditional index of religious faith had little impact on quality of life. Religious faith may facilitate adjustment during the cancer experience only to the extent that it promotes a sense of inner peace and purpose in life (Edmondson et al., 2008).

Our results suggest interventions that target spirituality and/or cultivate a sense of meaning may be a promising avenue for improving quality of life among HSCT patients. Despite accumulating evidence that spirituality is important to address during cancer treatment and recovery, as many as one-third of cancer patients report that their spiritual needs, such as finding hope, talking about the meaning of life and death, and achieving a peace of mind, are

unmet (Astrow et al., 2007; Moadel et al., 1999). When individuals with metastatic or refractory cancer do receive spiritual support from a professional chaplain or other members of the medical team, they experience better quality of life (Balboni et al., 2010).

Psychosocial interventions that enhance meaning through expressive writing or cognitive-behavioral techniques have also been found to improve psychological and physical functioning among cancer patients (e.g., Antoni et al., 2006; Penedo et al., 2006; Stanton et al., 2002). Directly integrating spirituality into psychotherapy may be similarly effective for improving quality of life for those with cancer (Garlick, Wall, Corwin, & Koopman, 2011). An existential intervention that focuses specifically on meaning-making has also shown promise for individuals with breast, colorectal, and ovarian cancer (Henry et al., 2010; Lee, Cohen, Edgar, Laizner, & Gagnon, 2006) and may be particularly well-suited to the HSCT setting given the brief, flexible approach.

There are some limitations of the current study, including the ethnic, racial, and religious homogeneity of the sample (primarily Caucasian participants with protestant or Catholic religious affiliations), which restricts our ability to generalize the findings to other demographic groups. In addition, although the prospective, longitudinal design suggested that pre-transplant spiritual well-being may be a determining factor in post-transplant quality of life, causality cannot be definitively established. It is also important to note that because quality of life measures are typically correlated with one another, it is not surprising to see similar relationships across different domains. Finally, while the results suggest that spirituality is resilient beyond 6 months post-transplant and religious faith increases, an even longer follow up is needed to determine the extent to which these effects are sustained, especially given that HSCT recipients can experience quality of life concerns for several years after transplant.

In summary, our study highlights the importance of having a sense of meaning and purpose as a positive resource for individuals with cancer experiencing the difficult treatment and challenges to quality of life that accompany HSCT. Findings suggest that assessments of spirituality may provide an important perspective as part of the pre-transplant psychosocial evaluations that are routinely performed by many HSCT programs during the clinical workup for transplant. The long hospitalization and acute recovery period post-transplant may be both a critical and an opportune time for addressing patients' spiritual and existential needs. Our findings further suggest that HSCT patients are likely to benefit from spiritual or psychological care that targets more global or existential concerns and cultivates a sense of meaning, rather than targeting specific religious tenants or practices. Enhancing this resilience factor could improve both psychological and physical functioning among individuals undergoing HSCT.

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(A)

(B)

Figure 1.

Changes in meaning/peace and religious faith subscales from pre-transplant to 12 months post-transplant. (A) Meaning/peace declined from pre-transplant to 1 month post-transplant and returned to baseline by 6 months post-transplant. (B) Religious faith increased significantly between 1 and 6 months post-transplant.

Figure 2.

Changes over time in mean physical well-being scores for participants in upper, middle, and lower tertiles on meaning/peace are depicted here to illustrate the nature of the significant interaction between meaning/peace and time. Participants with the highest sense of meaning/peace prior to transplant had better physical well-being across the 1, 3, and 6 month follow-up assessments as compared to participants with average and low meaning/peace. However, physical well-being scores for those with high and low meaning/peace converged and were more similar by 12 months post-transplant. Similar patterns were seen for depression and fatigue, with the largest differences at the earlier post-transplant assessment points.

Table 1

Clinical and Demographic Characteristics of the Patient Sample (N = 220)

	<i>n</i> (%)
<i>Diagnosis</i>	
Leukemias	74 (33.6)
CML	2 (0.9)
CLL	4 (1.8)
AML	35 (15.9)
ALL	21 (9.6)
MDS	13 (5.9)
Lymphomas	69 (31.4)
Non-Hodgkin	51 (23.2)
Hodgkin	18 (8.2)
Multiple Myeloma	69 (31.4)
Other	8 (3.7)
<i>Graft Type</i>	
Autologous	121 (55)
Allogeneic	99 (45)
Myeloblastic	68 (30.9)
Nonmyeloblastic	31 (14.1)
<i>Gender</i>	
Male	136 (61.8)
Female	84 (38.2)
<i>Ethnicity</i>	
Caucasian	213 (96.8)
Native American	2 (0.9)
African American	2 (0.9)
Latina/Latino	2 (0.9)
Declined to Respond	1 (0.5)
<i>Marital Status</i>	
Married	182 (82.7)
Single	19 (8.6)
Divorced/Separated	15 (6.9)
Widowed	4 (1.8)
<i>Education</i>	
Less than 12 years	7 (3.2)
High School	59 (26.8)
Some College/Trade School	59 (26.8)
College Graduate	59 (26.8)
Post-Graduate Degree	36 (16.4)
<i>Annual Household Income</i>	
< \$25,000	30 (13.7)

	<i>n</i> (%)
\$25,000–\$55,000	62 (28.2)
\$55,000–\$85,000	58 (26.4)
> \$85,000	57 (25.9)
Declined to Respond	13 (5.9)
<i>Religious Affiliation</i>	
Lutheran	56 (25.5)
Catholic	51 (23.2)
Methodist	21 (9.5)
Other	54 (24.6)
None	32 (14.5)
Declined to Respond	6 (2.7)

Table 2

Changes in FACIT-Sp Subscale Means Over Time

Assessment Point	Meaning/Peace			Religious Faith		
	<i>M (SD)</i>	<i>p</i>	<i>d</i>	<i>M (SD)</i>	<i>p</i>	<i>d</i>
Pre-Transplant (<i>n</i> = 220)	25.1 (5.0)			9.9 (4.6)		
1 Month Post-Transplant (<i>n</i> = 204)	23.7 (5.3)	<.001	.27	9.8 (4.6)	.558	.02
3 Months Post-Transplant (<i>n</i> = 198)	24.2 (5.5)	.004	.17	10.1 (4.7)	.419	.04
6 Months Post-Transplant (<i>n</i> = 188)	25.0 (5.1)	.524	.02	10.4 (4.7)	.013	.11
12 Months Post-Transplant (<i>n</i> = 174)	25.1 (5.4)	.294	<.01	10.4 (4.7)	.025	.11

Note. *p* values and effect sizes (*d*) are provided for comparisons with the pre-transplant mean.

Table 3

Results from Mixed-Effects Linear Regression Models Examining Relationships Between Pre-Transplant FACIT-Sp Subscales and Quality of Life Outcomes (N = 220)

Quality of Life Measure	Meaning/Peace						Religious Faith					
	Main Effect			Interaction with Time			Main Effect			Interaction with Time		
	Coef.	z	p	Coef.	z	p	Coef.	z	p	Coef.	z	p
Depression	-.762	-8.88	<.001	.400	3.27	.001	.031	0.68	.497	-.061	-0.93	.353
Anxiety	-.347	-4.12	<.001	.023	0.18	.857	-.018	-0.40	.686	-.004	-0.06	.951
Fatigue	-.434	-5.22	<.001	.253	1.99	.046	.085	1.97	.049	-.042	-0.62	.534
Pain	-.249	-2.57	.010	.174	1.64	.101	.035	0.70	.485	-.058	-1.01	.310
Physical Well-Being	.578	5.25	<.001	-.439	-3.10	.002	-.064	-1.11	.268	.001	0.01	.994
Functional Well-Being	.681	8.43	<.001	-.228	-1.83	.067	-.007	-0.16	.873	-.069	-1.04	.299

Note. Both Meaning/Peace and Religious Faith subscales and their interactions with time were included in the same models. All models covaried for time since transplant, transplant type, time from pre-transplant assessment to transplant, and age. Mean scores for Meaning/Peace and Religious Faith were used, and quality of life scores were standardized. Therefore, coefficients for the main effects represent the change in standard deviation units of the quality of life outcome measure for a 1-point mean difference on Meaning/Peace or Religious Faith scales.