

Individual and dyadic relations between spiritual well-being and quality of life among cancer survivors and their spousal caregivers

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Abstract

Objectives: There is evidence that cancer generates existential and spiritual concerns for both survivors and caregivers, and that the survivor's spiritual well-being (SWB) is related to his/her own quality of life (QOL). Yet the degree to which the SWB of each member of the couple has an independent association with the partner's QOL is unknown. Thus, this study examined individual and dyadic associations of SWB with the QOL of couples dealing with cancer.

Methods: A total of 361 married survivor-caregiver dyads participating in the American Cancer Society's Study of Cancer Survivors-I and Quality of Life Survey for Caregivers provided complete data for the study variables. SWB was measured using 12-item Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (assessing faith, meaning, and peace) and QOL was measured using Medical Outcomes Study 36-Item Short Form Health Survey.

Results: Actor and Partner Interdependence Model analyses revealed that each person's SWB was the strongest correlate of his or her own mental health (higher SWB, better mental health). Each person's SWB was also positively related to his or her partner's physical health.

Conclusions: Results suggest that the ability to find meaning and peace may be an important part of overall well-being during the cancer experience for both survivors and caregivers. Interventions designed to assist survivors and caregivers to enhance their ability to find meaning and peace in the cancer experience may help them improve mental health of their own and the physical health of partners when they are dealing with cancer beyond the initial phase of the illness trajectory.

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Introduction

Cancer imposes challenges not only on the individual diagnosed with cancer, but also on family members. Although the 5-year survival rate has improved from 35% in the mid 1930s and 50% in 1978 to 66% in 2004 [1], people still typically perceive cancer as a life-threatening disease. Consequently, cancer survivors, their family, and close friends may have existential concerns after the diagnosis.

Spiritual well-being (SWB) and quality of life (QOL) among cancer survivors

Accumulating evidence supports the view that cancer survivors [2] have elevated needs for spirituality at the time of diagnosis and during palliative care [3–5], which subside during remission. SWB in this context refers to a sense of peace,

wholeness, or harmony with a higher power, and a sense of meaning and purpose in life [6].

Is SWB among cancer survivors related to better mental health? The literature has yielded mixed findings. A number of studies have found that greater SWB related to better mental health. This has been found among survivors of mixed types of cancer [7–9], women with breast cancer [10,11], men with prostate cancer [12], elderly people with cancer [13], patients with advanced cancer [3,14], and during end-of-life care [15–17]. Other studies, however, have found that different aspects of SWB relate differently to mental health. In one study of female cancer survivors, finding meaning and peace were related to better mental health, but faith was related to poorer mental health [18]. The conflict among findings in this literature is reflected in review papers on the effects of religious/spiritual coping. Reviewers agree that evidence does not yet support a firm conclusion about the positive or

negative relation of SWB to cancer survivors' mental health [19,20].

Similarly, research on associations of SWB to physical health has yielded mixed findings. Some studies have found that higher levels of SWB related to better self-reported physical health among survivors of mixed cancer types [7,9], women with breast cancer [10], men with prostate cancer [12], and patients with advanced cancer [3]. Other research has found that the 'finding meaning' component of SWB, but not other components, related to better self-reported physical health among long-term female cancer survivors [18]. On the other hand, reviews of religion/spirituality in physical health have concluded that there is little support for the view that religion or SWB influences cancer progression or mortality; even worse, some evidence suggests that religion or SWB may impede recovery from acute illness [19,21].

SWB and QOL among caregivers of cancer survivors

Cancer may precipitate heightened SWB and greater recognition of spiritual needs not only among patients, but also among the family members who now have intimate experience of this disease [22]. Only a handful of studies have examined SWB of cancer caregivers [23] and only a couple of studies have examined its relation to QOL among cancer caregivers [24,25]. In one study [24], SWB among spousal caregivers was related to better mental health but poorer physical health, as caregiving-related stress increased.

One review of 83 studies, including caregivers of persons with various types of health conditions, such as dementia, cancer, affective disorders, elderly frailty, HIV/AIDS, and mental retardation, found no association or a mixed association between religion/spirituality and the well-being of informal caregivers [23]. It is, however, unclear how generalizable this conclusion is to cancer caregivers, who were poorly represented in the studies reviewed. Cancer caregivers, because they deal with potentially life-threatening disease, may be more likely than other caregivers to experience existential apprehension and concern. Thus, SWB may become a more important resource in their adjustment to the cancer of their relative.

Dyadic influence of SWB on QOL

Another largely unexamined issue is whether there are mutual dyadic links to SWB between cancer survivors and their caregivers, with one's SWB spilling over to the other. Although there is evidence that both survivors and caregivers see SWB as an important way to cope with and create meaning in the cancer situation [26], no one has examined the relation of one person's SWB to the

partner's QOL. This is an important gap in our knowledge of the role of SWB in survivors' and caregivers' QOL.

The current study investigates the relation of each person's SWB to each person's QOL as well as his or her partner's QOL. QOL was measured as both mental and physical health. We attempt to expand the literature by examining the unique effects of dyad-level predictor variables (i.e. stage of cancer) and individual-level predictor variables (i.e. the person's SWB and the partner's SWB, patient vs caregiver role, and age) as they relate to mental and physical health among survivors and their caregivers. Furthermore, we re-examine the extent to which three different aspects of SWB (i.e. faith, meaning, and peace) relate to QOL.

Method

Participants and procedure

The American Cancer Society's Study of Cancer Survivors-I (SCS-I) was developed to assess the QOL of cancer survivors [27]. Survivors participating in SCS-I were identified by state cancer registries and met the following eligibility criteria: (a) 18 years or older at diagnosis, (b) diagnosed with 1 of the 10 most highly incident cancers (bladder, breast, colorectal, kidney, lung, non-Hodgkin lymphoma, ovarian, prostate, skin melanoma, or uterine), (c) fluent in either English or Spanish, and (d) a resident of the United States.

SCS-I participants nominated individuals in family-like relationships who consistently helped them during their cancer experience. These nominated caregivers were invited to participate in the Quality of Life Survey for Caregivers, which was designed to assess the impact of cancer on the QOL of family members and close friends who care for cancer survivors. Eligibility criteria for the caregiver study were age 18 years and older, able to speak/read English or Spanish, and residing in the United States. Data reported here are cross-sectional data from the first cohort of the initial data collection of the Quality of Life Survey for Caregivers and their matched survivors.

A total of 739 caregivers completed the initial caregiver survey (66.7% response rate). We included only spousal caregivers ($n = 494$) in this study. Of the 494 spousal caregivers, survivors who were diagnosed with *in situ* (confounded with bladder cancer because *in situ* was eligible to the study only for bladder cancer: $n = 13$) or with unknown/unstaged disease ($n = 27$) were excluded, leaving 454 survivors. Of the 454 survivor-caregiver dyads, 361 dyads provided complete data for the study variables and were included in the analyses. Participants with incomplete data had lower SWB total and subscale scores than participants with complete data ($ps < 0.05$). Participants

Table 1. Medical and socio-demographic characteristics of study sample (361 dyads)

Cancer type		
Breast cancer	89 survivors (24.7%)	
Colorectal cancer	50 survivors (13.9%)	
Kidney cancer	28 survivors (7.8%)	
Lung cancer	23 survivors (6.4%)	
Prostate cancer	92 survivors (25.5%)	
Ovarian cancer	26 survivors (7.2%)	
Bladder, skin melanoma, non-Hodgkin's lymphoma, or uterine. Each <5%		
Stage of cancer		
Localized	231 survivors (64.0%)	
Regional	94 survivors (26.0%)	
Distant	36 survivors (10.0%)	
	Survivors	Caregivers
Age (mean/SD)	59.91 (11.07)	59.32 (10.80)
Education (greater than high school degree)	243 persons (67.3%)	249 persons (69.0%)
Ethnicity (Caucasian %)	329 persons (91.1%)	346 persons (95.8%)
Gender (Female %)	189 persons (52.4%)	189 persons (52.4%)
Household income (\geq \$40,000)	220 dyads (60.9%)	

with incomplete data did not differ in study variables and covariates from those providing complete information ($ps > 0.12$), with the exception that caregivers with incomplete data had lower mental health than caregivers with complete data ($p < 0.001$).

Medical (cancer type and stage of cancer) and demographic (age, education, ethnicity, gender, and income) characteristics of participants who provided complete data are reported in Table 1. The cancer had been diagnosed on an average of 2.20 years (SD = 0.36 year) before the participants completed the survey. This study was conducted in compliance with the regulation of Emory University IRB.

Measures

SWB: The degree to which participants reported finding SWB, in the form of faith, meaning, and peace, was measured by the 12-item Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being [4,28]. This scale includes three sub-components of faith (four items, e.g. 'I find comfort in my faith'), meaning (four items, e.g. 'I feel a sense of purpose in my life'), and peace (four items, e.g. 'I feel peaceful') [18]. Responses were made using a 5-point Likert-style format (0 = *not at all*, 4 = *very much*). The total SWB composite score was calculated by averaging the 12 items; the three-subcomponent scores were calculated by averaging relevant items, after reverse coding, if necessary. Higher scores reflected greater levels of SWB, faith, meaning, and peace. In this study, the SWB total and all subcomponent scores had good internal consistency ($0.82 < \alpha < 0.89$ for both survivors and caregivers).

QOL: Self-reported levels of mental and physical health of participants were measured using the Medical Outcomes Study 36-Item Short Form Health Survey [29]. The mental functioning score was a composite of weighted vitality, social functioning, role-emotional, and mental health subscale scores. The physical functioning score was a composite of weighted physical functioning, role-physical, bodily pain, and general health subscale scores. Higher composite scores reflected better mental and physical health.

Analytic strategies

The effects of self-reported age of the participants and stage of cancer (localized, regional, or distant) which was obtained from the state cancer registry were examined as covariates, as both have been found to be related to mental and physical health aspects of QOL [30,31].

Mean differences between survivors and caregivers on SWB and QOL were tested using paired *t* tests, and the degree to which survivors and their caregivers were similar on these factors was tested by Pearson zero-order correlation coefficients. The Actor Partner Interdependence Model (APIM) [32] served as the general data analytic strategy to address the central questions in this study. In APIM, the relation of a person's own characteristics (e.g. SWB) to that same person's outcomes (e.g. QOL) is called an *actor effect*. A *partner effect* occurs when a person's characteristics relate to his or her partner's outcomes.

The model parameters were estimated using structural equation modeling (SEM) with manifest variables (AMOS 6.0) [33]. In the one-factor SWB model that used the total SWB score, the survivor's SWB score and caregiver's SWB score were exogenous variables, and mental health and physical health scores of survivors and caregivers were endogenous variables. Individuals' age and stage of cancer served as covariates (Figure 1). Measurement errors were allowed to be correlated with each other between survivor's SWB score and caregiver's SWB score; between survivor's mental health and caregiver's mental health scores; between survivor's physical health and caregiver's physical health scores; and between survivor's age and caregiver's age.

Three models were tested as the development of a model of SWB has evolved: a one-factor SWB model, where SWB was operationalized as the total score of the 12 SWB items [4,28]; a two-factor SWB model, where SWB was operationalized as two factors (faith and meaning/peace) [4,28], and a three-factor model, where SWB was operationalized as three factors (faith, meaning, and peace) [18]. In all models, endogenous variables, covariates, and model specification were identified in the same manner as with the one-factor model. Differences

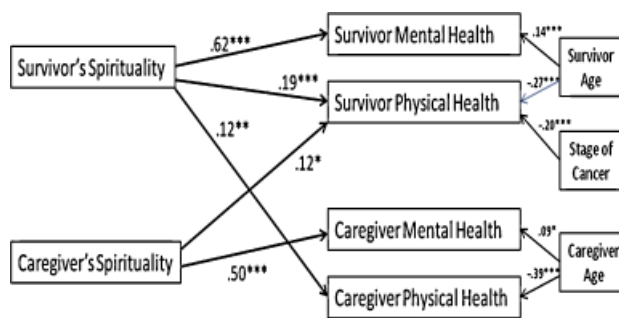


Figure 1. Actor and partner effects of spiritual well-being predicting each individual's QOL: One-factor spiritual well-being model. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Note: $n = 361$ dyads; numbers are significant standardized coefficients; solid lines are for significant paths; stage of cancer: 1 for localized, 2 for regional, and 3 for distant cancer

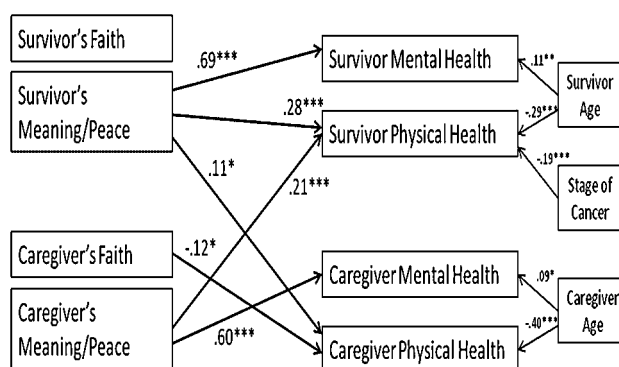


Figure 2. Actor and partner effects of spiritual well-being predicting each individual's QOL: Two-factor spiritual well-being model. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Note: $n = 361$ dyads; numbers are significant standardized coefficients; solid lines are for significant paths; stage of cancer: 1 for localized, 2 for regional, and 3 for distant cancer

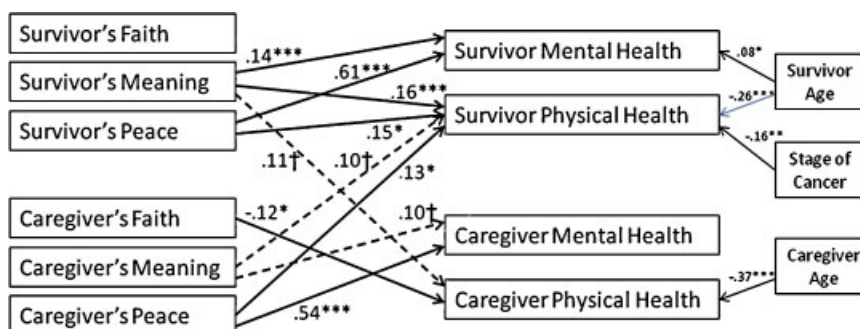


Figure 3. Actor and partner effects of spiritual well-being predicting each individual's QOL: Three-factor spiritual well-being model. † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Note: $n = 361$ dyads; numbers are significant standardized coefficients; solid lines are for significant paths; stage of cancer: 1 for localized, 2 for regional, and 3 for distant cancer

between models include the following: in the two-factor model, the two scores reflecting the survivor's SWB (faith and meaning/peace) and the two scores reflecting the caregiver's SWB were exogenous variables (Figure 2). Measurement errors between survivors' two scores; between caregivers' two scores; and between survivor's faith score and caregiver's faith score were allowed to be correlated. In the three-factor model, the three-subcomponent scores of survivors' SWB and three-subcomponent scores of caregivers' SWB were exogenous variables (Figure 3). Measurement errors among survivors'

three subscale scores; among caregivers' three-subcomponent scores; and between survivors' faith score and caregivers' faith score were allowed to be correlated.

The assumption of multivariate normality was violated in the data. Thus, we implemented the Bollen–Stine (BS) bootstrap method [34] for correcting chi-square values. Three model-fit indices are reported: the adjusted goodness of fit index (AGFI), the confirmatory fit index (CFI), and the root mean squared error of approximation (RMSEA). For the AGFI, values of > 0.90 [35], for

the CFI, values of >0.95 , and for the RMSEA measure, values of <0.06 reflect adequate fit of a specified model to the data [36].

Results

Study sample characteristics

As shown in Table 1, the cancer type and stage of cancer of our sample are comparable to those of large samples of US cancer survivors [37]. The participants were predominantly middle-aged, Caucasian, relatively educated, and affluent, with more women than men. Survivors were on average older than their caregivers [$t_{(360)} = 2.24, p = 0.03$].

A comparison of survivor and caregiver means (Table 2) revealed no significant differences between survivors and caregivers in SWB and QOL indicators. Table 2 also presents the dyadic correlations for survivors and caregivers. SWB (total and subscales), mental health, and physical health were moderately correlated between survivors and caregivers, indicating that survivors and caregivers were at least moderately similar in their levels of SWB and QOL.

Individual and dyadic effects of SWB

The SEM model implied by the APIM is one in which each person's outcomes (i.e. the survivor's and caregiver's mental and physical health) are predicted to be a function of both persons' SWB. The model also included the person's age and the survivor's cancer stage as covariates. Thus, the actor effect of SWB for the survivor was the degree to which the survivor's SWB (i.e. total and subscale scores) predicted the survivor's QOL (i.e. mental and physical health); the partner effect for the survivor was the degree to which the caregiver's SWB predicted the survivor's QOL. In a parallel fashion, the actor effect for the caregiver was the degree to which the caregiver's SWB predicted his or her QOL, and the partner effect for the caregiver was the degree to which the survivor's SWB predicted the caregiver's QOL.

Table 3 presents zero-order correlations among SWB total and subscale scores. The three subscales

were strongly correlated with one another, and meaning and peace were highly correlated with each other for both survivors and caregivers. Table 4 presents the parameter estimates for three models tested: one- to three-factor SWB models. The fit of all the three models was satisfactory: The one-factor model: multivariate kurtosis = 9.20, $p < 0.001$, $\chi^2_{(16)} = 34.02$, BS $p = 0.02$, AGFI = 0.94, CFI = 0.98, and RMSEA = 0.06; the two-factor model: multivariate kurtosis = 14.97, $p < 0.001$, $\chi^2_{(25)} = 60.74$, BS $p = 0.01$, AGFI = 0.92, CFI = 0.97, and RMSEA = 0.06; and the three-factor model: multivariate kurtosis = 21.84, $p < 0.001$, $\chi^2_{(36)} = 90.65$, BS $p = 0.01$, AGFI = 0.90, CFI = 0.97, and RMSEA = 0.06. Although all the three models of SWB fit the data equally satisfactorily, the three-factor SWB model showed statistically significant improvement compared with one- and two-factor SWB models: the two-factor model, $\chi^2_{\text{diff from one-factor model}} = 26.72$ with $df = 9, p < 0.01$; the three-factor model, $\chi^2_{\text{diff from one-factor model}} = 56.63$ with $df = 20, p < 0.001$, and $\chi^2_{\text{diff from two-factor model}} = 29.91$ with $df = 11, p < 0.01$.

Individual and dyadic effects of SWB on mental health

Examination of each person's overall SWB (Table 4 and Figure 1: one-factor SWB model) indicates evidence of actor effects for both survivors and caregivers: the level of a person's SWB (total score) was positively related to his or her own mental health. No evidence was found of partner effects for either survivors or caregivers. In other words, a person's overall level of SWB had no independent

Table 3. Zero-order correlation coefficients among spiritual well-being total and three subscale scores

	Total	Faith	Meaning	Peace
Total	—	0.81	0.79	0.84
Faith	0.82	—	0.42	0.44
Meaning	0.77	0.40	—	0.67
Peace	0.85	0.46	0.65	—

Coefficients for survivors are above diagonal; coefficients for caregivers are below diagonal; all correlation coefficients were significant at $p < 0.001$; $N = 361$ survivor-caregiver dyads.

Table 2. Paired *t*-tests and Pearson correlation coefficients of spiritual well-being and QOL

	Survivors		Caregivers		<i>t</i>	<i>r</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Spiritual well-being—total	3.02	0.71	3.01	0.69	−0.15	0.26	<0.001
Spiritual well-being—faith	2.83	1.07	2.81	1.06	−0.28	0.32	<0.001
Spiritual well-being—meaning/peace	3.11	0.70	3.11	0.68	0.02	0.19	<0.001
Spiritual well-being—meaning	3.39	0.66	3.45	0.61	1.39	0.10	0.03
Spiritual well-being—peace	2.83	0.87	2.77	0.88	−1.05	0.22	<0.001
QOL: mental health	51.55	10.18	51.05	10.49	−0.74	0.24	<0.001
QOL: physical health	48.02	10.70	48.71	9.49	1.09	0.29	<0.001

$N = 361$ dyads.

Table 4. Spiritual well-being predicting individuals' QOL

Predictors	Mental health				Physical health			
	Survivor		Caregiver		Survivor		Caregiver	
	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
<i>One-factor spiritual well-being model</i>								
Survivor's spiritual well-being	0.62	<0.001	0.03	0.50	0.19	<0.001	0.12	0.02
Caregiver's spiritual well-being	0.02	0.63	0.50	<0.001	0.12	0.02	-0.01	0.83
Individual's age	0.14	<0.001	0.09	0.04	-0.27	<0.001	-0.39	<0.001
Stage of cancer	0.01	0.81	-0.08	0.09	-0.20	<0.001	-0.06	0.22
<i>Two-factor spiritual well-being model</i>								
Survivor's spiritual well-being—faith	0.01	0.84	0.01	0.84	-0.06	0.29	0.04	0.50
Survivor's spiritual well-being—meaning/peace	0.69	<0.001	0.05	0.27	0.28	<0.001	0.11	0.05
Caregiver's spiritual well-being—Faith	-0.01	0.83	-0.04	0.43	-0.06	0.26	-0.12	0.04
Caregiver's spiritual well-being—meaning/peace	0.06	0.15	0.60	<0.001	0.21	<0.001	0.09	0.08
Individual's age	0.11	0.004	0.09	0.04	-0.29	<0.001	-0.40	<0.001
Stage of cancer	0.03	0.48	-0.08	0.06	-0.19	<0.001	-0.06	0.22
<i>Three-factor spiritual well-being model</i>								
Survivor's spiritual well-being—faith	0.01	0.87	0.02	0.94	-0.06	0.16	0.04	0.32
Survivor's spiritual well-being—meaning	0.14	0.002	-0.06	0.60	0.16	<0.001	0.08	0.20
Survivor's spiritual well-being—peace	0.61	<0.001	0.11	0.06	0.15	0.02	0.03	0.63
Caregiver's spiritual well-being—faith	0.00	0.93	-0.04	0.39	-0.06	0.26	-0.12	0.04
Caregiver's spiritual well-being—meaning	0.00	0.96	0.10	0.06	0.10	0.09	0.01	0.88
Caregiver's spiritual well-being—peace	0.05	0.33	0.54	<0.001	0.13	0.05	0.09	0.15
Individual's age	0.07	0.05	0.07	0.12	-0.29	<0.001	-0.39	<0.001
Stage of cancer	0.03	0.45	-0.07	0.10	-0.19	<0.001	-0.06	0.24

N = 361 dyads; β = standardized coefficient; stage of cancer: 1 for localized, 2 for regional, 3 for distant cancer.

association with his or her partner's mental health. In addition, the person's age significantly related to mental functioning score: older individuals (survivors or caregivers) reported better mental health. Stage of cancer was not related to the mental health of either survivors or caregivers.

The two- and three-factor SWB models (Table 4 and Figures 2 and 3) further revealed that the actor effects of SWB were derived mainly from the meaning and peace components of SWB, particularly peace. The more a person found meaning and peace, the more the person was likely to report better mental health. The faith component of SWB was not related to each person's mental health.

Individual and dyadic effects of SWB on physical health

In prediction of physical health, an actor effect of the total SWB score emerged again for survivors (Table 4 and Figure 1): survivors reporting greater SWB reported better physical health. A comparable effect did not occur among caregivers. In this analysis, evidence of partner effects was also found. Higher levels of SWB among survivors related to better physical health of their caregivers, and higher levels of SWB among caregivers related to better physical health of the survivors. The person's age also related negatively to his or her physical health. Finally, stage of cancer related to poorer physical health of the survivor but not of the caregiver.

The two- and three-factor SWB models (Table 4 and Figures 2 and 3) further revealed that the actor effect of survivors' SWB was derived mainly from his or her capacity to find meaning and peace, and was not related to faith. In the two- and three-factor model, the actor effect of caregivers' SWB became significant with faith but not with meaning and peace components. The more caregivers found faith, however, the more they were likely to report poorer physical health. With regard to partner effects, the two- and three-factor models showed that the partner effects were derived mainly from meaning and peace components, more weighted by survivors' meaning and caregivers' peace. The more survivors found meaning, the more their caregivers were likely to report better physical health: The more caregivers found peace, the more their survivors were likely to report better physical health.

Discussion

This study examined the individual and dyadic involvement of SWB in the QOL of individuals dealing with cancer. The levels of SWB of our sample were similar to those of a large sample of cancer patients who were recruited during their treatment [28] and 2–10 year after the initial diagnosis [38]. Our finding thus adds to the literature indicating that survivors and their caregivers (now at 2 years post-diagnosis) experience high levels of SWB beyond the earlier phase of the illness trajectory.

More interestingly, SWB had significant relations with two aspects of QOL, but the relations differed. First, each person's SWB was positively linked to his or her mental health. This was true for both survivors and caregivers. For survivors, this effect replicates existing findings [3,7,9]; for caregivers, the effect is new. SWB, more particularly the ability to find meaning and peace, was related to better mental well-being. This finding is readily interpreted, whether one views well-being as a consequence of, or as a precursor to, finding meaning and peace. Similar relations with regard to mental well-being have been documented in the literature on finding benefit from cancer among cancer survivors [39,40] and their family caregivers [41,42].

With regard to physical health, a different pattern emerged. Specifically, survivors who reported greater SWB also reported better physical health. This actor effect was not the case among caregivers. It appears that better physical health has existential connotations among cancer survivors, whereas such connotation may be feeble among individuals without chronic disease such as cancer. Other interesting result with regard to physical health was that survivors whose caregivers reported greater SWB also reported better physical health. This is the first evidence of the cross-over relationship of a partner's SWB to one's own physical health. How should these associations be interpreted? One possibility is that when becoming a long-term survivor [2], one's own ability to find meaning and peace is a protective resource that helps one return to normal levels of physical functioning. Having a close family member who also has strength in finding meaning and peace is an additional beneficial resource. Another possibility is that knowing one's partner is relatively well off physically serves to induce a sense of peace and meaning. Clarification of these possibilities can come only from prospective studies.

Of particular interest is that the faith component of SWB was not significantly related to mental health and physical health with one exception: higher levels of caregivers' faith were related to caregivers' poorer physical health. A study with long-term female survivors has also reported a negative association between faith and both mental and physical health [18]. Our finding that only caregivers' faith, as opposed to other aspects of SWB, such as the sense of meaning, peace, and purpose in life, related to poorer physical health of their own needs further replication before going too far in interpretation.

Similarly, although the three-factor SWB model, compared with one- and two-factor models, was statistically superior, due in part to strong correlations among the three components of SWB, the findings were also subjected to statistical suppression effects. While results of the one-factor and two-factor model were consistent to each other and

more easily interpreted, additional information revealed by the three-factor model does not appear to make a substantial contribution to our understanding of the nuances of different aspects of SWB and weakens the intriguing partner effect for survivors. Researchers and clinicians may need to take cautious approaches in conceptualizing SWB and subsequent data analyses when it involves both survivors and caregivers.

The current findings, however, suggest that interventions aiming to improve the QOL (mental and physical health) of cancer survivors and their caregivers should consider ways to enhance the individuals' ability to find meaning and peace in the cancer experience. Interventions targeting spiritual concerns in general have shown effectiveness in improving mental health of patients with advanced cancer [43] or cancer patients during end-of-life care [44]. Whether or not such interventions would have the same effects for survivors and caregivers who are approaching a longer-term survivorship phase in the illness trajectory is as yet unknown.

Limitations and directions for future studies

Some limitations of this study should also be noted. First, participants were demographically and socio-economically homogeneous. Therefore, generalizability of the findings is limited to survivor-caregiver dyads who are Caucasian, relatively educated, and relatively affluent. Studies have found that African-American and Hispanic cancer survivors [3,38] and informal caregivers [23,45] are more likely than Caucasians to experience greater levels of SWB following the cancer diagnosis and inception of caregiving. Other studies found that African Americans diagnosed with advanced lung or colorectal cancer used spiritual coping to a greater extent than did Whites [20,46]. Future studies are needed on these issues with ethnic minorities and individuals of lower socio-economic status.

Second, participants who provided complete data for the study had better mental health and higher SWB than those who did not provide complete data; thus, our findings might be skewed toward more psychologically healthy and spiritual individuals. Third, all variables included in this study were self-reported. Thus, reports pertaining to physical health may not reflect objective health status; and components of SWB, particularly peace, may be an indicator of lower levels of anxiety. Future studies should include behavioral and physiological indicators of QOL as well as survivors' co-morbid conditions. Fourth, although presenting an intriguing pattern, our findings are based on cross-sectional data, which clearly

preclude definitive causal interpretations. We plan to address these concerns with follow-up data of this sample.

Conclusions

Despite these limitations, the findings add information to a growing body of research on the QOL of cancer survivors and their family caregivers. Results suggest that both survivors and caregivers may benefit from interventions that enhance their ability to find meaning and peace in the cancer experience, which may be related to better mental health of their own and the physical health of partners when they are dealing with cancer beyond the initial phase of the illness trajectory.

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