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Religiosity and physical and emotional functioning among African American and White Colorectal and Lung cancer patients

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Abstract

The literature suggests that religiosity helps cope with illness. The present study examined the role of religiosity in functioning among African Americans and Whites with a cancer diagnosis. Patients were recruited from an existing study and mailed a religiosity survey. Participants (N=269; 36% African American; 56% women) completed the mail survey, and interview data from the larger cohort was utilized in the analysis. Multivariate analyses indicated that in the overall sample, religious behaviors were marginally and positively associated with mental health and negatively with depressive symptoms. Among women, religious behaviors were positively associated with mental health and negatively with depressive symptoms. Religiosity was not a predictor of study outcomes for men. Among African Americans, religious behaviors were positively associated with mental health and vitality. Among Whites, religious behaviors were negatively associated with depressive symptoms. These findings suggest a mixed role of religious involvement in cancer outcomes. The current findings may have applied potential in the areas of emotional functioning and depression.

Keywords

cancer; oncology; cancer patients; religiosity; spirituality; quality of life

Cancer is the second leading cause of death in the United States after heart disease (Centers for Disease Control and Prevention, 2009). Among cancers, lung and colorectal cancer are the first and third most common causes of cancer death, and second and third, respectively, in cancer incidence (American Cancer Society, 2010). Even with the high rates of cancer, patients are surviving longer after their treatments than in previous years. Much research has begun to focus on psychosocial coping mechanisms and factors associated with positive outcomes. Religiosity is one factor on which many individuals rely when faced with a life-threatening illness such as cancer (Bowie, Curbo, Laveist, Fitzgerald, & Pargament, 2001; Gall, 2000). The present study explored the role of religiosity in an existing cohort of African Americans and Whites with lung or colorectal cancer.

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Religiosity in health research

The present study will use the term religiosity to reflect organized worship and religious involvement including religious beliefs (e.g., relationship with higher power/God) and behaviors (e.g., service attendance, watching religious television programs) (Thoresen, 1998). Spirituality on the other hand, reflects a broader construct involving search for meaning and purpose in life (Thoresen, 1998). The term spirituality will be used when discussing the works of others that focused on this broader concept, in such cases where previous work is relevant to the proposed study.

Religiosity is recognized to be a multidimensional construct (Hill & Hood, 1999) involving various aspects of religious beliefs, behaviors and community (Dollahite, Marks, & Goodman, 2004). The present study uses a two-dimensional characterization involving religious beliefs and religious behaviors (Holt, Lukwago, & Kreuter, 2003; see Measures section for further detail). It is possible that different dimensions of religiosity may relate differently to outcomes of interest.

It is well-documented that in general, women are more heavily invested in religious participation than are men, and that African Americans tend to be more religiously engaged than are Whites (Levin & Taylor, 1993; Levin, Taylor, & Chatters, 1994; Ferraro & Koch, 1994; Taylor, Chatters, Jayakody, & Levin, 1996). Therefore, an examination of the role of religious involvement among individuals with cancer would do well to examine these relationships by sex and race. Based on these patterns, the religion-health connection may be stronger for African Americans than for Whites and for women than for men. Thus, it is possible that if religion plays a stronger role in health for one group than another, one would expect stronger religion-health relationships among those with cancer as well. Because African Americans also suffer a disproportionate burden of cancer incidence and mortality (American Cancer Society, 2010), including lung and colorectal cancer (American Cancer Society, 2010), it is appropriate to examine the relationship between religious involvement and physical and emotional functioning and outcomes within this minority population.

Religiosity in those with cancer

There have been a number of studies examining the role of either religious involvement, spirituality, or both, in a variety of outcomes (e.g., quality of life, depression, anxiety, hope) among individuals with cancer.

Among African Americans and Latinos in an urban outpatient palliative care unit (57% with a cancer diagnosis), those who were uninsured and had a religious affiliation had more hopeful pain and symptom attitudes, and those who reported an affiliation but had Medicaid were less hopeful (Francoeur, Payne, Raveis, & Shim, 2007). This suggests that religious involvement may serve as a coping mechanism to deal with lack of insurance. In a sample of older cancer patients, intrinsic religiosity was positively correlated with hope, spirituality, well-being, and positive mood, and was negatively correlated with depression (Fehring, Miller, & Shaw, 1997). Patients with high levels of intrinsic religiosity and spiritual well-being had significantly higher hope and positive mood than those patients low in intrinsic religiosity.

In a study of individuals with advanced cancer in the United Kingdom, spiritual well-being was found to be significantly and negatively associated with both anxiety and depression (McCoubrie, & Davies, 2006). This pattern held for existential well-being scores, but not for religious well-being scores, which involved strength of belief.

Other studies have examined the role of religious involvement and/or spirituality in quality of life among those with cancer. In a sample of individuals with advanced cancer, religious coping was found to have a positive association with overall quality of life. Use of positive religious coping was associated with better overall quality of life, and better existential and support quality of life (Tarakeshwar, et al., 2006). Patients with greater use of positive religious coping also reported more physical symptoms. However, negative religious coping was associated with poorer overall quality of life, and poorer existential and psychological quality of life.

In another patient sample, it was proposed that the association between spirituality, distress, and quality of life would be moderated by perceived life threat (Laubmeier, Zakowski, & Bair, 2004). However, spirituality was associated with lower distress and quality of life and perceived life threat did not moderate this relationship. Existential well-being rather than religious well-being accounted for most of the variance in the study outcomes. In a Grecian sample of Greek Christian Orthodox patients, global quality of life was associated with religious beliefs, however this relationship was modest (Assimakopoulos, Karaivazoglou, Ifanti, Gerolymos, Kalofonos, & Iconomou, 2009). In a Croatian sample of women with breast cancer, moderate levels of religious involvement were associated with worse self-rated physical health, and the perception that illness decreased one's faith was negatively associated with a number of quality of life domains (Aukst-Margetic, et al., 2009).

In a diverse sample of over 1,600 patients with a history of cancer and/or HIV/AIDS, spiritual well-being was associated with quality of life to the same extent as was physical well-being (Brady, Peterman, Fitchett, Mo, & Cella, 1999). Spiritual well-being maintained this association after controlling for potential confounding variables. It was concluded that spirituality is particularly salient among those with life-threatening illness and makes unique contributions to the prediction of quality of life, such that it should be assessed in the context of quality of life studies.

A mediational model of spirituality and adjustment to cancer suggested that being a woman, being ill for a longer period, and lower disease stage, predicted sense of purpose and religious beliefs, which then predicted family and social adjustment and psychological health (Schnoll, Harlow, & Brower, 2000). A recent study among men with prostate cancer reported a mediational model of religious involvement, spirituality, and depression, suggesting that the meaning and peace aspect of spirituality mediates the relationship between religiosity and depression (Nelson, et al., 2009). These studies suggest that interventions targeting spirituality, and specifically meaning and peace, may be indicated. Religious involvement may facilitate development of meaning of the illness, which helps one to cope (Kappeli, 2000; Laubmeier, et al., 2004). A meaning-making process may serve as an interpretive framework for patient suffering (Kappeli, 2000). A review on religious involvement and illness coping suggests that religion helps to ease stress (Siegel, et al., 2001).

Fewer studies have examined physical outcomes such as symptoms or disease progression. In a German sample of individuals with head and neck cancer, quality of life was assessed at four points in time (Becker, et al., 2006). Those who were characterized as "believers" reported fewer side effects at all time points than "nonbelievers." Another study found that while the Mormon lifestyle is associated with lower incidence of breast cancer, Mormon women who do get breast cancer have lower survivorship rates than non-Mormon women (Merrill & Folsom, 2005). It was suggested that this was due to parity and breastfeeding.

Literature reviews have attempted to synthesize the literature in this emerging area. In a review examining the positive and negative effects of religious coping with a cancer

diagnosis, it was reported that religious/spiritual coping may serve multiple functions in a patient's adjustment to cancer, such as preserving self-esteem, offering a sense of meaning, providing comfort, and giving hope (Thune-Boyle, Stygall, Keshtgar, & Newman, 2006). While most studies reviewed reported positive relationships between religious coping and outcomes, some reported negative or no relationships. Methodological limitations involving measurement and confounding variables were cited. In another review focused on physical and emotional health and quality of life, it was also concluded that measures of religiosity and spirituality were necessary to fully understand the experience of those with cancer (Mytko & Knight, 1999).

These studies illustrate that this is a complex and developing area of study from a measurement and methodology standpoint, reflecting studies with multiple populations and a wide variety of outcomes. Such factors may in part explain variation in study outcomes and conclusions. A compounding factor in the complexity is that the field is dealing with constructs that are both confusing (religion vs. spirituality) and multidimensional in nature (Hill & Hood, 1999).

The present study

The present study examined the role of religiosity in physical and emotional functioning in a cohort of African Americans and Whites, with lung or colorectal cancer. Previous research has examined the role of religiosity in patient samples and generally found that religiosity is positively associated with physical and emotional functioning and quality of life. The present study provided a unique opportunity to examine these relationships in an existing cohort of individuals with lung or colorectal cancer, and thus the ability to examine the relationships among demographic subgroups such as men and women, and African Americans and Whites in a single study. Based on the literature on religious involvement, we would anticipate the role of religiosity to vary among these population subgroups in its relationship with outcomes in these groups. We also took advantage of the opportunity to examine religiosity using a multidimensional measurement approach, which builds on the limitations of some previous research in this area. Based on the previous literature, the following hypotheses were put forth:

Primary hypotheses

1. Women will report higher religious involvement than men, as evidenced by higher scores on religious beliefs and behaviors scales.
2. African Americans will report higher religious involvement than Whites, as evidenced by higher scores on religious beliefs and behaviors scales.
3. Religious involvement will be significantly and positively associated with physical and mental functioning, and vitality; and negatively associated with depression and physical symptoms.

Secondary hypotheses

4. Relationships proposed in #3 will be more evident among women than in men.

5. Relationships proposed in #3 will be more evident among African Americans than in Whites.

6. Religious beliefs will be a stronger predictor of the outcomes listed in #3 than will religious behaviors.

Method

The Cancer Care Outcomes Research and Surveillance (CanCORS) Consortium is a multisite, observational cohort study examining the care delivered to population-based cohorts of newly diagnosed patients and assessing predictors and outcomes of that care. The study aimed to identify differences in the delivery of cancer treatment and the reasons for these differences. It consisted of five geographic sites and two health systems, including the Cancer Research Network and the Veterans Administration, that collaboratively collected data from samples of approximately 10,000 patients, about half with lung and about half with colorectal cancer. CanCORS collected data from multiple sources including patient surveys, medical records, and surveys of health care providers, beginning approximately four months after diagnosis and continuing throughout the patient's illness. The present study was conducted in the context of the Alabama CanCORS site, which involved lung and colorectal cancer patients. The present study was an ancillary study to CanCORS that involved a patient mail survey to assess religiosity (primary data collection), and examined the patient survey data as a secondary analysis. The study was approved by the Institutional Review Board at the University of Alabama at Birmingham.

Sampling frame

A total of 932 participants from the Alabama CanCORS study cohort comprised the sampling frame for the current study. Eligibility criteria included that individuals (1) had an oncologist's diagnosis of cancer, (2) were less than one year post-treatment or surgery for cancer; (3) were 18 years of age or older; (4) were able to read and write in English; and, (5) had completed the CanCORS baseline questionnaire themselves.

Measures

Participants completed a self-administered mail questionnaire assessing religious beliefs and behaviors, which has been validated and used with African Americans in previous research (Holt, Lukwago, & Kreuter, 2003; Lukwago, Kreuter, Bucholtz, Holt, & Clark, 2001; Holt, Wynn, & Darrington, 2009; Holt, Haire-Joshu, Lukwago, Lewellyn, & Kreuter, 2005). The development and validation of the religiosity scale is discussed elsewhere (Lukwago, Kreuter, Bucholtz, Holt, & Clark, 2001). Seven of the items were measured in 5-point Likert-type response format (strongly agree, agree, neutral, disagree, strongly disagree). Two additional items assessed religious service attendance and participation in religious activities such as Bible study or choir rehearsal (0, 1-3, or 4+ times per month). Previous research supported a two-factor structure, comprised of religious beliefs (e.g., "I am often aware of the presence of God in my life."; "I have a personal relationship with God.") and behaviors ("I often read religious books, magazines, or pamphlets."; "I often watch or listen to religious programs on TV or radio."; religious service and activities participation). Subscale scores range from 4-20 on the religious beliefs scale and 5-21 on the religious behaviors scale. In the present sample, the internal reliabilities for the subscales were acceptable (beliefs $\alpha = .94$; behaviors $\alpha = .78$), particularly given their brevity (Nunnally, & Bernstein, 1994).

Demographic data was drawn from the parent study, including age, educational level, gender, and race/ethnicity. Included in the patient interview were several measures of patient-rated health status, including the Medical Outcomes Study Short Form-36 (SF-36; Stewart, Hays, & Ware, 1988), the EuroQol (EQ-5D index; Rabin & Charro, 2001), and the Center for Epidemiologic Studies Depression Scale (CES-D; Turvey, Wallace, & Herzog, 1999). The SF-36 is a widely-used health-related quality of life measure that evaluates physical functioning, role limitations resulting from physical health problems, bodily pain, general health, vitality, social functioning, role limitation resulting from emotional

problems, and mental health. The SF-36 includes physical and mental summary scale scores (SF-36 Physical Component Summary [PCS-36] and SF-36 Mental Component Summary [MCS-36]). It should be noted that for one of the SF-36 physical component items, different response options (none of the time…all of the time) were applied rather than the standard response options (not all…extremely). Though this item was retained in scoring, the modification would preclude comparison to SF-36 norms, which was not an aim of the present study. The EQ-5D index is a health status measure based on five dimensions of health (mobility, self-care, usual activities, pain or discomfort, and anxietyor depression). Each item has three levels of severity: “no problems”, “some problems” and “severe problems. ” The CES-D 8-item brief form was used to assess depressive symptoms. Response options indicate how often within the last week respondents experienced symptoms, ranging from 0 or “rarely or none of the time” to 3, “all of the time. ” The scale scores are summed, for a range of possible total scores from 0 to 24, with higher scores indicating lower levels of depressive symptoms.

Cancer stage was assessed using a variable that is found in the CanCORS core dataset. Participants with Stage I, Stage IA, Stage IB, and Stage I NOS cancer were counted as having Stage I cancer; those with Stage II, Stage IIA, Stage IIB, Local, and Stage II NOS cancer were counted as having Stage II cancer; those with Stage III, Stage IIIA, Stage IIIB, Stage IIIC, Regional, and Stage III NOS cancer were counted as having Stage III cancer; and those with Stage IV and Distant cancer were counted as having Stage IV cancer. Of the 269 participants, a cancer stage was reported for 264. Of these, 89 (34%) were determined to have Stage I cancer, 67 (25%) were determined to have Stage II cancer, 68 (26%) were determined to have Stage III cancer, and 40 (15%) were determined to have Stage IV cancer.

Procedure

Letters containing the survey instrument were mailed to CanCORS participants. The survey instrument was accompanied by a letter that briefly described the study and invited participation. If a questionnaire was not returned within four weeks of the initial contact, a follow-up reminder postcard was mailed to the potential participant. Completed surveys were returned to the investigative team, who logged the surveys in as complete and mailed participants a thank-you letter and a $10 gift card.

Analysis

Descriptive statistics were used to summarize all study variables of interest. Comparisons between racial groups (African American and White), gender (women and men), and cancer type (lung and colorectal) for the religiosity scales (beliefs, and behaviors), SF-36 mental and physical composite scores, SF-36 vitality score, CES-D, and EQ-5D index were performed using independent t-tests, or the independent t-test for unequal variances when needed. Multiple linear regression analyses were used to determine which religiosity scales were significant predictors of SF-36 mental and physical composite scores, SF-36 vitality score, CES-D, and EQ-5D index. Regression analyses were controlled for age, educational level, gender, racial group, cancer type, and cancer stage (Powell, Shahabi, & Thoresen, 2003). In addition, regression analyses were performed separately for men and women, African Americans and Whites, and those with lung or colorectal cancer. Comparisons of demographic characteristics between our participant sample and our non-response sample were performed using the chi-square test (the use of Fisher’s exact test was not required). All statistical tests were two-sided and were performed using a 5% significance level (i.e. alpha = 0.05). SAS software (version 9.1.3; SAS Institute, Inc., Cary, NC) was used to perform all statistical analyses.

Results

Participant characteristics

Of the 932 surveys mailed to Alabama CanCORS participants, 343 (37%) were completed and returned with a signed consent form in the same envelope. However, 37 of these were surrogate patient interviews in which a significant other person responded for the patient in the main CanCORS study, 28 were determined by the CanCORS Statistical Coordinating Center to be ineligible for the main CanCORS study, 13 were not of African American or White race, 1 completed the main CanCORS protocol through self-administered survey rather than standard telephone interview, 1 was coded as only partially completing the survey, and 1 did not have any data in the main CanCORS study (note that 7 patients fell into more than one of these categories). These participants were excluded from the analyses, leaving 269 eligible cases. The 269 eligible participants ranged in age from 25 to 90, with a mean age of 64 years (SD = 11). Most were White (64%; N = 171) and 98 (36%) were African American. Most were women (56%; N = 150) and 119 (44%) were men. Most had colorectal cancer (65%; N = 174) and 95 (35%) had lung cancer. Regarding education, 63 (24%) did not complete high school, 85 (32%) completed high school, 60 (22%) completed some college, and 60 (22%) were college graduates. Sixty nine percent (N = 177) of the participants were married, 14 percent (N = 37) were widowed, 12 percent (N = 31) were separated or divorced, and 5 percent (N = 13) were never married. Household income ranged from less than $20,000 per year (32%), to the $20,000-$40,000 bracket (28%), to the $40,000-$60,000 bracket (24%), to $60,000 or greater (16%). Most (90%, N = 239) reported belonging to a Christian religion (e.g., Baptist, Methodist), 1 percent (N = 2) were Jehovah's Witness (also a Christian religion), 2 percent (N = 6) reported another (unspecified) affiliation, and 7 percent (N = 18) reported no religious affiliation. Where numbers do not sum to 269, this indicates missing data. The sum of percentages for a specific demographic may exceed 100% due to rounding.

We compared demographic characteristics of the 269 eligible participants, those who completed and returned a survey, to those 391 eligible participants who did not respond to the survey. There were no statistically significant differences in race ($p = 0.44$) or cancer type ($p = 0.13$). However, there were statistically significant differences in gender ($p = 0.033$), marital status ($p = 0.007$), income ($p = 0.002$), and education ($p = 0.006$). The proportion of female participants (56%) was greater than the proportion of females (47%) in the non-response group. The proportion of married participants (69%) was greater than the proportion of married non-responders (58%). The proportion of participants with low incomes (32%) is less than the proportion of non-responders with low incomes (44%). Finally, the proportion of participants that did not complete high school (24%) is less than the proportion of non-responders (32%) that did not complete high school. In sum, those who did not respond were more likely to be male, unmarried, less educated, and have lower income than responders.

Univariate analysis

Religiosity overall was high among the sample, as evidenced by a mean of 17.91 (SD = 3.28) out of 20 on the religious beliefs scale, and 17.07 (SD = 3.24) out of 21 on the religious behaviors scale. Women reported significantly higher religiosity scores than did men on both religious scales, and African Americans reported significantly higher scores than did Whites on the religious behaviors scale (Table 1). These findings provide support for Hypothesis 1 and partial support for Hypothesis 2.

Women scored significantly higher than men on the CES-D, suggesting greater depressive symptoms than men (Table 1). African Americans scored significantly higher than did

Whites on the SF-36 measure of vitality. Those with lung cancer scored more poorly than those with colorectal cancer on all three SF measures, mental, physical, and vitality (Table 1). However, those with colorectal cancer scored higher on the EQ-5D, suggesting a greater presence of health-related symptoms than those with lung cancer.

Multivariate analysis

Overall sample—For the overall sample, religious beliefs were not significantly associated with any of the study outcomes. Religious behaviors were marginally and positively associated with SF-36 mental health scores ($.05 < \underline{p} < .10$, Table 2A), and marginally and negatively associated with CES-D scores, $0.05 < \underline{p} < .10$ (Table 2D). This provides partial support for Hypothesis 3. Hypothesis 6 is not supported.

Men—Among men, neither religious beliefs nor religious behaviors were associated with the study outcomes.

Women—Among women, religious beliefs were not significantly associated with any of the study outcomes. Religious behaviors were significantly and positively associated with SF-36 mental health scores ($\underline{p} < .05$, Table 2A), significantly and negatively associated with CES-D scores ($p < .05$, Table 2D), and marginally and positively associated with SF-36 vitality scores ($.05 < \underline{p} < .10$, Table 2C). Support for Hypothesis 4 is provided. Hypothesis 6 is not supported.

African Americans—Among African Americans, religious beliefs were not significantly associated with any of the study outcomes. Religious behaviors were significantly and positively associated with SF-36 mental health scores ($\underline{p} < .01$, Table2A), and significantly and positively associated with SF-36 vitality scores, $\underline{p} < .05$ (Table 2C). Hypothesis 6 is not supported.

Whites—Among Whites, religious beliefs were marginally and positively associated with CES-D scores ($.05 < \underline{p} < .10$, Table 2D). Religious behaviors were significantly and negatively associated with CES-D scores, $\underline{p} < .05$ (Table 2D). Hypotheses 5 and 6 are not supported.

Lung Cancer Patients—Among those with lung cancer, religious beliefs and religious behaviors were not significantly associated with any of the study outcomes. Hypothesis 6 is not supported.

Colorectal Cancer Patients—Among those with colorectal cancer, religious beliefs were not significantly associated with any of the study outcomes. Religious behaviors were marginally and positively associated with SF-36 mental health scores, $.05 < p < .10$ (Table2A), and marginally and negatively associated with CES-D scores, $.05 < \underline{p} < .10$ (Table 2D). Hypothesis 6 is not supported.

Discussion

The study participants reported high levels of religious beliefs and behaviors, generally supportive of previous research (Ferraro & Koch, 1994; Taylor, Chatters, Jayakody, & Levin, 1996) and hypotheses 1 and 2. The high levels may in addition be a function of several factors. One may be the study location which was in Alabama, located in the Southeastern US, sometimes referred to as the “Bible Belt,” an area suggested to have high religious involvement. Another factor may have been that religiosity may increase as a result of a cancer diagnosis, which was reported by a majority of patients in a qualitative study of

religiosity and cancer coping (Holt, et al., 2009). Third, a self-selection bias may be operating such that individuals who were high in religiosity may have been more inclined to participate in the study and complete the questionnaires than those less religious in nature.

The results of the present analyses are mixed with regard to the role of religious participation in physical and emotional functioning in the present sample of African Americans and Whites with colorectal or lung cancer. These findings provide mixed support for hypothesis 3, specifically with regard to the role of religious behaviors in study outcomes such as emotional/mental health and depressive symptoms.

Some interesting patterns of findings emerged from the present analyses. Individuals with colorectal cancer reported higher scores on the EQ-5D than those with lung cancer, suggesting that the colorectal cancer patients were experiencing more severe health problems. While this is somewhat counter-intuitive, there may be nuances involving the nature of the disease and treatment process itself that led to the modest differences in scores. African Americans reported higher vitality than Whites. The vitality subscale of the SF-36 involves level of energy. However, these results were obtained through univariate analyses, which do not reflect controls for demographic or other potential confounding variables.

Religiosity played no role in study outcomes for men. While in support of hypothesis 4, this is also consistent with the literature that suggests that men are not as religiously involved as women (Ferraro & Koch, 1994; Taylor, Chatters, Jayakody, & Levin, 1996). Therefore, men may not have as much of an opportunity as women to reap the benefits of formal religious participation. A previous study found that religious involvement played a role in lowered mortality risk for women but not for men (Clark, Friedman, & Martin, 1999), however this was not a patient sample. Hypothesis 5 was not supported, as the role of religious involvement was not significant for *more* study outcomes than for Whites, but rather for *different* study outcomes for Whites. This leads to intriguing areas of future study, with findings suggesting that religious behaviors or participation may serve to aid mental health (as assessed in the SF-36) and vitality for African Americans but may play a protective role against depressive symptoms for Whites.

While hypothesis 6 anticipated that religious beliefs would be more predictive of study outcomes than religious behaviors, the opposite was the case. This hypothesis was based on a handful of previous studies that appeared to indicate that religious beliefs play an important role in predicting health behaviors (Holt, Lukwago, & Kreuter, 2003; Holt, Haire-Joshu, Lukwago, Lewellyn, & Kreuter, 2005). However, these studies had focused on cancer prevention and screening behaviors, which may involve different mechanisms than those involved in cancer coping. The literature is still developing on the multidimensional nature of religiosity and which components are predictive under various circumstances. With regard to why religious behaviors were predictive in this context and religious beliefs were not, it may be that the support received from church attendance or from active worship was associated with reduced depression, and better emotional and physical functioning, while simply holding religious beliefs and having a personal relationship with God did not play a protective role for these outcomes. While the present study was not able to examine data on social support, it would be important to determine whether religious behaviors play a unique role above and beyond social support in these relationships. An alternative explanation of the present findings is that the people who were engaged in religious behaviors were those that were well enough to attend services. However, service attendance was only one component of religious behaviors, and analyses controlled for cancer stage, which can be viewed as a proxy for health status.

Limitations

The present findings should be interpreted from within the context of several limitations. First there is the issue of generalizability. As previously mentioned, this was a sample of patients from the southeastern US. Religiosity may have been higher than for other areas of the country. This was the case for both men and women. However, the mean levels of religiosity were comparable those from a national probability-based sample (N = 1,006) of African Americans who did not have cancer (mean of 17.73 beliefs scale; mean of 16.66 behaviors scale; Holt & Clark, unpublished data, 2009). Another limitation is that it is likely that individuals who were more religiously-inclined were more likely to participate, resulting in a selection bias. However, given the comparability of data to the national sample, the nature of this bias may not have been significant. The relationship between religious behaviors and study outcomes may be due to those being able to participate being in physically better health. However, the control for cancer stage in the analyses should have reduced the likelihood of this explanation. In a sample of women with breast cancer, spiritual well-being was positively associated with quality of life, and the adjustment style involving fighting spirit (Cotton, Levine, Fitzpatrick, Dold, & Targ, 1999). After controlling for demographic variables and adjustment styles, spiritual well-being contributed little variance to quality of life. This illustrates the importance of controlling for potential confounders when possible. Because study non-responders were in general more likely to be male, unmarried, less educated, and have lower income than responders, this may introduce some level of bias into the study data, even though the percentages of difference were modest. That the data returned were confidential but not anonymous may have also introduced some bias. Finally, the present data are of course cross-sectional and no causal inferences may be drawn.

Future research

The study of cancer survivorship is an emerging area due to the increasing number of individuals who are living longer due to treatment advances and strides in early detection. Thus, the exploration of sociocultural factors associated with survivorship and quality of life is an area that will continue to be relevant and informative for interventions. Based on the current findings, religious participation may play a protective role for emotional functioning and depression in patient samples. Therefore, this area of study may inform development of interventions aimed at supporting survivorship, including community- and church-based interventions.

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Table 1

Univariate comparisons of study variables by demographics and cancer type

Dependent Variable/ possible	Overall[a] Mean (SD)	Male Mean (SD)	Female Mean (SD)	AA Mean (SD)	WH Mean (SD)	Lung Mean (SD)	CRC Mean (SD)
Religious Beliefs/20[b]	17.91 (3.28)	16.98 (3.70) ***	18.66 (2.68) ***	18.38 (3.52)	17.64 (3.12)	17.76 (3.23)	17.98 (3.31)
Religious Behaviors/21[c]	17.07 (3.24)	15.83 (3.46) ***	17.98 (2.75) ***	17.66 (3.15) *	16.64 (3.25) *	16.99 (2.84)	17.12 (3.43)
SF-36 Mental Health/100[d]	51.59 (11.31)	52.98 (11.17)	50.49 (11.33)	50.84 (11.62)	52.02 (11.14)	49.32 (12.79) *	52.80 (10.27) *
SF-36 Physical Health/100[d]	40.26 (10.67)	40.88 (11.19)	39.77 (10.25)	41.38 (10.09)	39.62 (10.96)	38.17 (10.55) *	41.37 (10.59) *
SF-36 Vitality/100[d]	52.58 (26.15)	55.20 (26.93)	50.50 (25.41)	57.72 (24.48) *	49.63 (26.69) *	47.70 (26.44) *	55.51 (25.32) *
CES-D Short Form/8[e]	2.46 (2.35)	1.98 (2.15) **	2.84 (2.44) **	2.57 (2.24)	2.40 (2.42)	2.84 (2.40)	2.24 (2.30)
EQ 5D Index/1[f]	0.83 (0.17)	0.84 (0.18)	0.82 (0.15)	0.85 (0.14)	0.82 (0.18)	(0.16) *	0.84 (0.17) *

* p<0.05

** p<0.01

*** p<0.001 (two-group t test)

[a] N ranges from 205 to 269 for Overall, 74 to 98 for African Americans, 118 to 171 for Whites, 87 to 119 for men, 118 to 150 for women, 69 to 95 for lung cancer, and 136 to 174 for CRC.

[b] Higher scores = Stronger beliefs

[c] Higher scores = More frequent behaviors

[d] Higher scores = Better functioning

[e] Higher scores = Greater depressive symptoms

[f] Higher scores = More extreme health problems

Table 2a

Multivariate Regression Models of Religious Involvement and SF-36 Mental Health

Group	OA[a] N=193		M[b] N=82		F[c] N=111		AA[d] N=81		CA[e] N=112		LC[f] N=62		CRC[g] N=131	
	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.
Religious Beliefs	0.04	0.40	0.22	0.55	−0.29	0.64	−0.55	0.62	−0.01	0.55	0.28	0.92	−0.08	0.46
Religious Behaviors	0.70^	0.37	0.41	0.51	1.12*	0.56	2.08**	0.67	0.10	0.45	0.80	0.81	0.70^	0.42
Age	0.01	0.07	−0.06	0.11	0.10	0.31	−0.01	0.11	0.01	0.10	0.02	0.19	0.01	0.08
Education	1.15	0.73	0.31	1.09	2.00^	1.01	2.21^	1.11	0.08	1.00	2.10	1.60	0.87	0.83
Sex	−4.03*	1.68	NA		NA		−6.44*	2.63	−2.24	2.16	−3.35	3.48	−4.05*	1.96
Race	−1.07	1.63	−0.49	2.48	−1.30	2.20	NA		NA		1.08	3.59	−1.70	1.85
Cancer Type	3.76*	1.63	3.70	2.51	3.43	2.24	1.03	2.66	4.28*	2.12	NA		NA	
Cancer Stage	−1.07	0.76	−2.13^	1.15	0.06	1.04	−1.25	1.20	−0.61	0.97	−0.89	1.52	−1.00	0.90

^ = p < .10

* = p < .05

** = p < .01

*** = p < .001

[a] OA=Overall, F Stat (d.f.) = 2.87 (8,184), p < 0.01

[b] M=Male, F Stat (d.f.) = 1.23 (7,74), p > 0.10

[c] F=Female, F Stat (d.f.) = 2.32 (7,103), p < 0.05

[d] AA=African American, F Stat (d.f.) = 4.41 (7,73), p < 0.001

[e] CA=White, F Stat (d.f.) = 0.90 (7,104), p > 0.10

[f] LC=Lung Cancer, F Stat (d.f.) = 1.00 (7,54), p > 0.10

[g] CRC=Colorectal Cancer, F Stat (d.f.) = 1.45 (7,123), p > 0.10

Table 2b

Multiple Regression Analysis of Religious Involvement and SF-36 Physical Health

Group	OA[a] N=193		M[b] N=82		F[c] N=111		AA[d] N=81		CA[e] N=112		LC[f] N=62		CRC[g] N=131	
	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.
Religious Beliefs	−0.12	0.40	−0.40	0.59	0.38	0.56	−0.14	0.58	−0.48	0.60	0.17	0.80	−0.26	0.48
Religious Behaviors	−0.18	0.37	−0.40	0.55	0.07	0.51	0.35	0.62	−0.29	0.48	−0.61	0.70	0.08	0.45
Age	−0.03	0.07	0.10	0.12	−0.12	0.09	−0.12	0.10	0.04	0.10	−0.03	0.17	−0.02	0.08
Education	0.77	0.72	1.15	1.17	0.27	0.92	0.07	1.02	1.16	1.08	2.55	1.38	−0.10	0.89
Sex	−0.14	1.67	NA		NA		−1.12	2.43	0.54	2.34	3.56	3.00	−2.37	2.08
Race	0.72	1.62	1.52	2.67	0.23	2.00	NA		NA		2.67	3.10	0.72	1.97
Cancer Type	3.78*	1.62	6.06*	2.69	1.67	2.04	3.17	2.46	4.12^	2.29	NA		NA	
Cancer Stage	−0.75	0.75	−1.17	1.23	−0.77	0.95	−0.91	1.11	−0.58	1.05	−0.24	1.31	−1.08	0.95

^ = p < .10

* = p < .05

** = p < .01

*** = p < .001

[a] OA=Overall, F Stat (d.f.) = 1.23 (8,184), p > 0.10

[b] M=Male, F Stat (d.f.) = 1.86 (7,74), p < 0.10

[c] F=Female, F Stat (d.f.) = 0.74 (7,103), p > 0.10

[d] AA=African American, F Stat (d.f.) = 0.70 (7,73), p > 0.10

[e] CA=White, F Stat (d.f.) = 1.22 (7,104), p > 0.10

[f] LC=Lung Cancer, F Stat (d.f.) = 0.74 (7,54), p > 0.10

[g] CRC=Colorectal Cancer, F Stat (d.f.) = 0.50 (7,123), p > 0.10

Table 2c

Multiple Regression Analysis of Religious Involvement and SF-36 Vitality

Group	OA[a] N=199		M[b] N=84		F[c] N=115		AA[d] N=84		CA[e] N=115		LC[f] N=65		CRC[g] N=134	
	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.
Religious Beliefs	−0.73	0.97	−0.46	1.36	−0.65	1.41	−1.09	1.44	−1.65	1.38	0.15	1.93	−1.24	1.16
Religious Behaviors	1.26	0.88	0.32	1.24	2.43^	1.28	3.17*	1.51	0.67	1.12	1.14	1.67	1.58	1.07
Age	0.17	0.17	0.43	0.27	0.09	0.22	0.05	0.24	0.29	0.24	0.16	0.40	0.17	0.19
Education	1.87	1.74	0.12	2.69	2.85	2.29	3.48	2.53	0.47	2.48	6.21^	3.35	0.42	2.11
Sex	−6.05	3.98	NA		NA		−5.56	5.97	−5.43	5.39	3.29	7.11	−10.26*	4.96
Race	8.84*	3.90	8.78	6.10	9.47^	5.04	NA		NA		18.33*	7.51	6.66	4.68
Cancer Type	8.62*	3.87	15.71*	6.07	2.47	5.11	0.70	6.07	11.14*	5.24	NA		NA	
Cancer Stage	−1.41	1.80	−4.06	2.77	0.42	2.38	−1.05	2.75	−1.40	2.40	−2.04	3.13	−0.61	2.27

^ = p < .10

* = p < .05

** = p < .01

*** = p < .001

[a] OA=Overall, F Stat (d.f.) = 2.16 (8,190), p < 0.05

[b] M=Male, F Stat (d.f.) = 1.92 (7,76), p < 0.10

[c] F=Female, F Stat (d.f.) = 1.99 (7,107), p < 0.10

[d] AA=African American, F Stat (d.f.) = 1.65 (7,76), p > 0.10

[e] CA=White, F Stat (d.f.) = 1.51 (7,107), p > 0.10

[f] LC=Lung Cancer, F Stat (d.f.) = 1.48 (7,57), p > 0.10

[g] CRC=Colorectal Cancer, F Stat (d.f.) = 1.15 (7,126), p > 0.10

Table 2d

Multiple Regression Analysis of Religious Involvement and CES-D Short Form

Group	OA[a] N=159		M[b] N=65		F[c] N=94		AA[d] N=64		CA[e] N=95		LC[f] N=55		CRC[g] N=104	
	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.
Religious Beliefs	0.09	0.10	0.06	0.14	0.08	0.16	−0.15	0.17	0.25^	0.14	−0.06	0.24	0.12	0.12
Religious Behaviors	−0.17^	0.09	−0.04	0.12	−0.33*	0.13	−0.10	0.15	−0.24*	0.12	−0.12	0.15	−0.21^	0.11
Age	−0.03^	0.02	−0.02	0.03	−0.04	0.02	−0.03	0.02	−0.03	0.02	−0.04	0.04	−0.03	0.02
Education	−0.30	0.17	−0.36	0.26	−0.25	0.24	−0.39	0.26	−0.34	0.25	−1.02**	0.33	−0.08	0.21
Sex	0.99*	0.40	NA		NA		1.30*	0.59	0.76	0.56	0.56	0.67	1.22*	0.52
Race	0.03	0.40	−0.46	0.60	0.30	0.54	NA		NA		−1.19	0.75	0.37	0.50
Cancer Type	−0.75^	0.38	−1.01	0.59	−0.42	0.53	−0.29	0.64	−1.13*	0.52	NA		NA	
Cancer Stage	−0.09	0.18	0.18	0.26	−0.28	0.25	−0.15	0.28	−0.01	0.25	0.20	0.30	−0.25	0.24

^ = p < .10

* = p < .05

** = p < .01

*** = p < .001

[a] OA=Overall, F Stat (d.f.) = 2.54 (8,150), p < 0.05

[b] M=Male, F Stat (d.f.) = 1.14 (7,57), p > 0.10

[c] F=Female, F Stat (d.f.) = 1.99 (7,86), p < 0.10

[d] AA=African American, F Stat (d.f.) = 2.15 (7,56), p < 0.10

[e] CA=White, F Stat (d.f.) = 1.83 (7,87), p < 0.10

[f] LC=Lung Cancer, F Stat (d.f.) = 1.91 (7,47), p < 0.10

[g] CRC=Colorectal Cancer, F Stat (d.f.) = 1.93 (7,96), p < 0.10

Table 2e

Multiple Regression Analysis of Religious Involvement and EQ 5D Index

Group	OA[a] N=165		M[b] N=67		F[c] N=98		AA[d] N=66		CA[e] N=99		LC[f] N=56		CRC[g] N=109	
	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.
Religious Beliefs	−0.002	0.007	−0.008	0.011	0.006	0.008	0.011	0.010	−0.008	0.009	0.015	0.014	−0.004	0.008
Religious Behaviors	0.009	0.006	0.009	0.010	0.008	0.007	0.014	0.008	0.006	0.008	0.008	0.009	0.008	0.007
Age	−0.001	0.001	0.001	0.002	−0.001	0.001	−0.001	0.001	−0.001	0.002	0.001	0.002	−0.001	0.001
Education	0.025	0.011	0.037^	0.021	0.016	0.012	0.013	0.015	0.029	0.016	0.030	0.020	0.022	0.014
Sex	−0.037	0.026	NA		NA		−0.081*	0.033	−0.003	0.037	−0.024	0.041	−0.037	0.035
Race	0.015	0.025	0.050	0.049	−0.012	0.027	NA		NA		−0.004	0.041	0.026	0.033
Cancer Type	0.058*	0.024	0.055	0.048	0.053^	0.027	0.087*	0.035	0.051	0.035	NA		NA	
Cancer Stage	−0.013	0.011	−0.027	0.021	−0.004	0.013	−0.014	0.015	−0.009	0.016	−0.013	0.018	−0.011	0.015

^ = p < .10

* = p < .05

** = p < .01

*** = p < .001

[a] OA=Overall, F Stat (d.f.) = 2.32 (8,156), p < 0.05

[b] M=Male, F Stat (d.f.) = 1.19 (7,59), p > 0.10

[c] F=Female, F Stat (d.f.) = 2.37 (7,90), p < 0.05

[d] AA=African American, F Stat (d.f.) = 4.21 (7,58), p < 0.001

[e] CA=White, F Stat (d.f.) = 0.80 (7,91), p > 0.10

[f] LC=Lung Cancer, F Stat (d.f.) = 1.05 (7,48), p > 0.10

[g] CRC=Colorectal Cancer, F Stat (d.f.) = 0.95 (7,101), p > 0.10