Different dimensions of religiousness/spirituality are associated with health behaviors in breast cancer survivors

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Abstract

Objective: Religiousness/spirituality (R/S) may influence cancer survivors' health through multiple pathways. We aimed to examine one potentially key pathway that has seldom been examined: relationships between survivors' R/S and their health behaviors.

Methods: The present study investigated links between four core dimensions of R/S (beliefs, behaviors, identity, and coping) and three health behaviors (fruit/vegetable consumption, physical activity, and maintenance of a healthy weight) in 172 breast cancer survivors.

Results: Both spiritual identity and use of religious coping were positively related to fruit and vegetable intake, while private prayer was marginally positively related. Both service attendance and religious identity (marginally) were related to engaging in less physical activity, while private prayer was positively related. Afterlife beliefs and private prayer were positively associated with BMI.

Conclusions: R/S has complex but meaningful associations with health behaviors in breast cancer survivors. More research is needed to understand these relationships and to determine whether different dimensions of R/S may play useful roles in lifestyle change interventions.

KEYWORDS
Cancer, cancer survivors, health behaviors, oncology, physical well-being, religion/spirituality

1 | INTRODUCTION

Levels of religion/spirituality (R/S) in the United States are quite high in the general population and may be even higher in people living with or having survived cancer. R/S has been shown to be important for many people in dealing with their cancer and its aftermath. In the context of cancer, R/S may provide intrapersonal and interpersonal resources to manage distress and enhance healthy adaptation. R/S may also provide a meaning system that helps people cope with cancer by fostering meaning-making and stress-related growth and offering comfort in the face of existential fears.

Reviews of this literature have generally concluded that R/S is favorably associated with aspects of survivors' mental health, such as depression and anxiety, although not all studies have found such relationships (see Salsman et al for a review). In a recent meta-analysis of studies conducted with cancer patients and survivors, R/S was generally favorably related to mental health, although the strength of relationships was modest and varied as a function of the mental health domains assessed. In addition, different dimensions of R/S appeared differentially associated with mental health: Affective aspects (subjective emotional experiences of R/S, such as a sense of transcendence, meaning, purpose, and connection to a source larger than oneself) were strongly related, cognitive aspects (beliefs, causal attributions, and perceptions of spiritual growth) were modestly related, and behavioral aspects (religious or spiritual practices such as prayer or service attendance) were unrelated.

R/S may also influence physical well-being. Studies of the effects of R/S on physical health outcomes for cancer patients and survivors...
are not meeting these new guidelines. It is important for survivors, who are at heightened risk for cancer recurrence, to engage in healthy behaviors. Although health behaviors are important for everyone, they may be even more important for survivors, who are at heightened risk for cancer recurrence, second primary cancers, long-term treatment sequelae, and other conditions including cardiovascular disease and metabolic syndrome. However, survivors’ health behaviors are about the same as those of the general population (that is, generally not very good) and, as demonstrated in some studies, even worse than demographics-matched peers who did not have cancer. Current guidelines recommend that cancer survivors, like other adults, engage in a minimum of 150 minutes of moderate-to-vigorous or 60 minutes of vigorous exercise each week and eat 5 to 9 servings of fruits and vegetables per day. Many cancer survivors are not meeting these recommendations. For example, in survey of a large, nationally representative sample of cancer survivors, 33.5% reported getting no daily physical activity, significantly higher than those with no cancer history (26.1%). Further, although not statistically different from those without cancer history, 82.8% of cancer survivors reported eating less than five servings of fruit and vegetables per day. Additionally, 66.2% of cancer survivors were overweight or obese, significantly higher than those without a cancer history (63.7%).

Although R/S has been linked with health behaviors in other populations, little research has explicitly examined relationships between R/S factors and survivors’ health behaviors. In a study of middle-aged cancer survivors, religious service attendance was unrelated to health behaviors. However, survivors’ daily spiritual experiences were positively related to eating a healthy diet, engaging in physical activity, and adhering to their medical regimen, while spiritual struggle was related to more alcohol misuse and less adherence. In a large national survey of cancer survivors conducted by the American Cancer Society, both religious and spiritual well-being independently predicted self-reported aggregated positive health behavior change even after controlling for a host of potentially confounding variables (e.g., demographics and quality of life). These few studies suggest that R/S might be an important resource for helping survivors establish and maintain healthier behaviors.

Importantly, these studies also highlight the multidimensionality of R/S. Many different schemes have been proposed to describe these different dimensions. For example, Stark and Glock described religion as comprising beliefs, knowledge, experiences, practices, and consequences. A group of experts convened by Fetzer Institute and the NIA identified 12 distinct aspects of R/S, including spiritual experiences, meanings, values, beliefs, forgiveness, private religious practices, religious/spiritual coping, religious support, religious/spiritual history, commitment, and organizational religiousness. The series of meta-analyses on R/S and cancer patients’ health and well-being, described above, categorized aspects of R/S as primarily cognitive, behavioral, or emotional. As noted above, different dimensions of R/S may have different effects on health behaviors.

The present study focused on four core dimensions of R/S: religious beliefs (in God and afterlife), religious behaviors (both private [prayer] and public [attendance]), R/S identity (as a spiritual person and a religious person), and religious coping. Each of these R/S aspects has been implicated in the physical health of survivors and has yet to be examined specifically with regard to cancer survivors’ health behaviors. We examined the extent to which each aspect related to three health behaviors (diet, exercise, and maintenance of healthy weight) in a sample of recent cancer survivors.

2 | METHOD

2.1 | Participants and procedure

Participants were breast cancer survivors who participated in a mail-based randomized controlled lifestyle intervention aimed at promoting physical activity and healthy diet. Detailed research design and procedure can be found elsewhere. Briefly, we recruited 173 breast cancer survivors living in the Northeastern United States. Eligible participants were (a) women, (b) first diagnosed with breast cancer in the past 1.5 years, and (c) stages 0 to II. Further, we included survivors able to read/write English and not participating in other health behavior research. Most participants (85%) were recruited through Hartford Hospital, a comprehensive regional cancer center in the Northeastern United States. Remaining participants were recruited through clinicaltrials.gov (4%), another small regional cancer center in the Northeastern United States (3.5%), direct mail marketing targeted at women 40 to 60 years (6.4%), and posted research flyers in the community (1.2%).

The present analyses are based solely on baseline data, collected prior to randomization. Participants were screened via telephone for
2.2 | Measures

2.2.1 | Demographics
Age, race/ethnicity, level of education and household income, and weight and height to calculate body mass index (BMI) were assessed.

Religious beliefs were measured with two items from the Religious Identity Scale. To measure belief in God, participants were asked, "Which of the following statements comes closest to your belief about God?" with responses ranging from (0) "I don't believe in a personal God or in a higher power" to (5) "I am sure that God really exists and that He is active in my life." To measure afterlife belief, participants were asked, "Which of the following statements comes closest to your belief about life after death (immortality)?" from (0) "I don't believe in any kind of life after death" to (5) "I believe in a personal life after death, a soul existing as a specific individual."

Religious behaviors and R/S identity were assessed with measures from the Brief Multidimensional Measure of Religiousness/Spirituality. Religious behaviors were measured using frequency of service attendance and private prayer. To measure frequency of service attendance, participants were asked to respond to the following item, "How often do you go to religious services?" on a rating scale from (0) "never" to (5) "more than once a week." To measure private prayer, participants responded to the item, "How often do you pray privately in places other than at a place of worship?" from (0) "never" to (7) "several times a day."

To measure religious identity, participants were asked, "To what extent do you consider yourself a religious person?" using a rating scale from (0) "not at all" to (3) "very religious." To measure spiritual identity, participants were asked, "To what extent do you consider yourself a spiritual person?" using a rating scale from (0) "not at all" to (3) "very spiritual."

2.2.2 | Religious coping
Religious coping was assessed with the 2-item religious coping subscale from the Brief COPE. A sample item is, "I've been trying to find comfort in my religion or spiritual beliefs." Both items were asked with regard to how much the participant has been doing this to cope with her cancer experience, rated from (1) "I haven't been doing this at all" to (4) "I've been doing this a lot."

2.2.3 | Physical activity
Physical activity was assessed with a widely used validated measure, the Paffenbarger Activity Questionnaire (PAQ). The PAQ asked participants to report the number of flights of stairs they climbed and the number of city blocks they walked, on average, each day in the past week. Participants also report any sports, recreation, or physical activities in which they engaged and their frequency and length (minutes) during the past week. By multiplying frequency and length of moderate and vigorous physical activities, we computed weekly minutes of moderate-to-vigorous physical activity. For participants (n = 52) who answered other items on the scale (e.g., number of flights of stairs and number of city blocks) but left blank the frequency and length of exercise questions on the PAQ, which were used to calculate moderate-to-vigorous physical activity, we imputed their moderate-to-vigorous physical activity as zero. All physical activity variables were positively skewed; thus, they were log10 transformed.

2.2.4 | Fruit and vegetable intake
Daily servings of fruits and vegetables (FV) consumed were assessed and scored according to the National Cancer Institute Quick Food Scan. Participants reported their frequency (i.e., from never to 5 or more times per day) and amount (i.e., from less than one-half cup to more than one cup) of various kinds of FV intake (e.g., 100% juice, fruits, lettuce salad, and vegetable soups) over the last month. Because FV intake was positively skewed, this variable was log10 transformed.

3 | RESULTS

3.1 | Participant characteristics
Mean age of participants was 56.74 years (SD = 10.80; range = 34–86). Most were White/Caucasian (95.7%), married or in a long-term partnered relationship (71.9%), and had at least a 4-year college degree (60.9%) and a household income ≥$50,000 (80.0%). Participant religious affiliations included Agnostic (7.5%), Atheist (5.0%), Baptist (4.2%), Buddhist (1.7%), Catholic (33.4%), Church of Christ (1.7%), Congregational (4.1%), Jewish (9.2%), Mormon (0.8%), Methodist (5.0%), Non-Denominational (Charismatic; 3.3%), Non-Denominational (Non-Charismatic; 1.7%), Presbyterian (1.7%), none (11.7%), and other (7.5%). Fully half (50.5%) of our sample reported getting 0 minute of moderate-to-vigorous physical activity in the past week while 30% reported getting at least the recommended 90 (of those who got more than 0, the M number of minutes/week was 105.5, SD = 15.2). Only 6.4% of the sample reported getting two or more servings of fruit/day (M = 0.77, SD = 0.79), and only 11.5% reported getting two or more servings of vegetables/day (M = 0.90, SD = 0.88). Just 1.7% of the sample was below normal BMI while 40.5 were normal, 34.0% were overweight, and 23.8% were obese.

3.2 | Bivariate correlations
Bivariate relationships among study variables are shown in Table 1. In terms of demographics and religious variables, older age was associated with lower spiritual identity. Higher income was associated with lower belief in God and spiritual identity and less religious coping, while higher level of education was associated with lower belief in God. Minority race/ethnicity was associated only with more religious coping. In terms of demographics and our three health behaviors, older age was associated with less physical activity while higher education and income were related to more physical activity. No demographics were related to fruit/vegetable intake or BMI.
R/S variables examined were all fairly highly correlated (r ranging from 0.43 to 0.77), suggesting these variables overlapped but also negatively and private prayer (positively) related to physical activity, while prayer, beliefs in afterlife, religious identity, and spiritual identity were positively related to BMI. R/S variables were unrelated at the bivariate level to PA.

### 3.3 Regression analysis

Given the relationships of demographic variables with aspects of both R/S and health behaviors, we conducted a series of hierarchical linear regression analyses to examine associations between dimension of R/S and each of the three health behaviors, controlling for demographics. Specifically, we conducted four regression analyses for each of the three health behaviors (i.e., a total of 12 analyses), each with demographics (age, race, education, and income) entered as the first step. Then, as a second step, religious beliefs were entered as a predictor of each of the three health behavior variables (i.e., three separate regression analyses). Next, a second set of regression analyses was conducted entering religious behaviors as a second step, again predicting in turn each of the three health behaviors. Similarly, the third and fourth sets of three regression analyses were conducted entering R/S identity and religious coping, respectively.

Results of these regression analyses are shown in Table 2. After controlling for demographics, both spiritual identity and religious coping with one’s cancer experience were positively related to FV intake; frequency of private prayer was also (marginally) positively related to FV intake. Although not related in bivariate analysis, when the behaviors were considered together, service attendance was negatively—and private prayer was positively—related to greater physical activity, while having a religious identity was marginally positively related to physical activity. Both belief in an afterlife and frequency of private prayer were significantly positively associated with higher BMI.

### 4 | DISCUSSION

Our study is one of the first to examine relations among different dimensions of R/S and health behaviors in cancer survivors. Overall, our results support the notion that R/S is related to health behaviors in breast cancer survivors. However, these results are more complex than we anticipated, in that the findings were somewhat inconsistent across behaviors and dimensions, and not all relationships were in the expected salutary direction: Controlling for age and race, some, but not all, dimensions of R/S related to each of the three health behaviors studied. Because our study was exploratory and based on minimal previous research with survivors, our interpretation of findings is of necessity speculative.

Higher spiritual identity and higher religious coping with one’s cancer experience were both positively related to FV intake, while private prayer was marginally positively related. These findings suggest that relatively internal aspects of R/S are most closely related to one’s diet; perhaps they reflect aspects of R/S that are pervasive in daily life as survivors make the many daily decisions regarding what they eat. Our previous study of cancer survivors found that daily spiritual experiences were associated with higher F/V intake, suggesting that this interior aspect of R/S may indeed promote healthier eating. Similar findings in other populations, such as older adults, have been reported, but much more research is needed to understand the ways that spirituality influence survivors’ daily dietary choices.

Although not related in bivariate analysis, both service attendance (negatively) and private prayer (positively) related to physical activity, while having a religious identity was marginally positively related. These findings, in contrast to the F/V relationships, reflect the potentially adverse aspects of R/S in the context of health behaviors.

### TABLE 1 Bivariate correlations among study variables

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<td>6 Prayer</td>
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<td>7 Religious identity</td>
<td>0.05</td>
<td>-0.10</td>
<td>-0.09</td>
<td>0.04</td>
<td>0.67**</td>
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<td>8 Spiritual identity</td>
<td>-0.16</td>
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<td>-0.19*</td>
<td>0.06</td>
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<td>-0.18*</td>
<td>0.14</td>
<td>0.53**</td>
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<td>10 Belief in Afterlife</td>
<td>-0.14</td>
<td>-0.11</td>
<td>-0.15</td>
<td>0.02</td>
<td>0.47**</td>
<td>0.58**</td>
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<td>11 Religious coping</td>
<td>0.01</td>
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<td>-0.21**</td>
<td>0.16</td>
<td>0.61**</td>
<td>0.77**</td>
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<td>0.14</td>
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<td>0.20**</td>
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<td>13 PA</td>
<td>-0.21**</td>
<td>0.34**</td>
<td>0.28**</td>
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<td>0.02</td>
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<td>-0.08</td>
<td>0.26**</td>
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<td>14 BMI</td>
<td>0.06</td>
<td>-0.09</td>
<td>-0.03</td>
<td>-0.04</td>
<td>0.07</td>
<td>0.19*</td>
<td>0.16*</td>
<td>0.19*</td>
<td>0.05</td>
<td>0.18*</td>
<td>0.10</td>
<td>-0.02</td>
<td>-0.26**</td>
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*P < 0.05.  **P < 0.01.
Attendance at worship services may provide opportunities to engage in more sedentary social activities and also requires discretionary time that could also be spent exercising. However, survivors who prayed more frequently and had a higher religious identity were exercising more, indicating the complex relationships of different dimensions of R/S with any given health behavior. The internal aspects of R/S of our participants in terms of identifying as religious and engaging frequently in prayer may have provided the necessary day-to-day motivation to engage in physical activity, similar to that proposed for FV intake and reported previously in cancer survivors.17 Unfortunately, little research is available linking R/S dimensions to physical activity in any population and particularly little with cancer survivors. Further, available studies often report few relationships but do not examine unique effects, such as considering the independent effects for private and public religious behaviors, which may obscure differential relationships,26 as we found here.

Further complicating the picture, both belief in an afterlife and private prayer were significantly positively associated with higher BMI. Thus, although those who prayed more frequently and reported eating more FV and exercising more, they were more likely to be overweight or obese. We did not assess caloric intake, so it may be that those who eat more FV simply eat more calories in general, and caloric intake is a far larger factor driving BMI than is physical activity.27,28 Thus, findings are not necessarily inconsistent but clearly suggest the complexity of relationships among R/S and health behaviors. Studies in other populations have suggested that individuals who attended religious services were more likely to be overweight.29

Future research that looks at survivors’ overall food intake and the factors underlying their dietary behaviors and physical activity is sorely needed to better understand how R/S may influence survivors’ physical health. The relationships between both certainty in an afterlife and engaging in prayer with higher BMI may reflect believers’ placing of a lower value on their Earthly experience, or perhaps a sense of fatalism. Previous research with cancer survivors has found that R/S is related to lower perceived risk of recurrence, which may lead survivors to neglect their physical health after reaching survivorship despite being vulnerable to deleterious health conditions as a result of the cancer itself and/or the treatment process.30

Also interesting is the lack of relationships for some dimensions of R/S and some health behaviors. For example, certainty in a belief in God was unrelated to any of the three health behaviors, while service attendance was related only to physical activity. Further, given the high interrelationships among our R/S variables, findings for associations of specific R/S dimensions with specific health behaviors suggest that they exert unique effects even though they often operate conjointly. More research is needed to understand what unique effects mean—for example, what does it mean to be religious but not spiritual as compared with being religious and spiritual in terms of health behaviors? In addition, survivors’ religious affiliation may influence their health behaviors,31 a potentially key issue that should be examined in future research.

| TABLE 2 | Results of multiple regression analyses predicting fruit/vegetable intake, physical activity, and body mass index |
| --- | --- | --- | --- |
| | FV Intake | PA Moderate to vigorous | BMI |
| | B | SEB | Beta | B | SEB | Beta | B | SEB | Beta |
| **Step 1** | | | | | | | | | |
| **Demographics** | | | | | | | | | |
| Age | 0.000 | 0.002 | −0.007 | −0.013 | 0.008 | −0.126 | 0.013 | 0.046 | 0.023 |
| Income | 0.004 | 0.008 | 0.045 | 0.043 | 0.043 | 0.091 | 0.058 | 0.241 | 0.023 |
| Education | 0.016 | 0.012 | 0.126 | 0.168 | 0.065 | 0.228 | −0.473 | 0.367 | −0.122 |
| Minority Status | −0.004 | 0.074 | −0.005 | −0.635 | 0.398 | −0.121 | −2.217 | 2.237 | −0.081 |
| **Step 2** | | | | | | | | | |
| **Religious beliefs** | | | | | | | | | |
| Belief in God | 0.015 | 0.015 | 0.111 | 0.048 | 0.082 | 0.063 | −0.601 | 0.455 | −0.149 |
| Belief in Afterlife | −0.003 | 0.016 | −0.023 | −0.086 | 0.084 | −0.110 | 1.187 | 0.469 | 0.287** |
| **Step 2** | | | | | | | | | |
| **Religious behaviors** | | | | | | | | | |
| Service | 0.006 | 0.011 | 0.052 | −0.166 | 0.057 | −0.245** | −0.137 | 0.324 | −0.038 |
| Attendance | 0.012 | 0.007 | 0.162 | 0.072 | 0.036 | 0.171* | 0.451 | 0.204 | 0.206* |
| **Step 2** | | | | | | | | | |
| **R/S Identity** | | | | | | | | | |
| "Religious" | 0.002 | 0.019 | 0.012 | −0.195 | 0.105 | −0.170 | 0.370 | 0.584 | 0.062 |
| "Spiritual" | 0.041 | 0.021 | 0.201** | 0.166 | 0.110 | 0.140 | 1.016 | 0.628 | 0.164 |
| **Step 2** | | | | | | | | | |
| **Religious coping** | | | | | | | | | |
| Religious coping | 0.019 | 0.007 | 0.207** | −0.003 | 0.040 | −0.007 | 0.232 | 0.221 | 0.085 |

Note: Step 1 is the same in all analyses. Step 2 differs for each set of analyses.

*P < 0.05.

**P < 0.01.
4.1 | Clinical implications

Our results, while preliminary, suggest that aspects of R/S may be important considerations in developing interventions for promoting health behavior change in survivorship. Although not relevant to all survivors, many may benefit from interventions that incorporate or leverage their R/S resources to assist them make or maintain changes in their diet and PA. Such faith-based or faith-sensitive lifestyle change interventions have been developed for other groups, but not yet for cancer survivors. Taking R/S factors into account may open new avenues for survivorship interventions.

4.2 | Study limitations

As an exploratory secondary analysis of cross-sectional data, its limitations are obvious. Causality cannot be demonstrated or even inferred, given our nonexperimental design. Our sample of breast cancer survivors was relatively educated and affluent, and generalizability of our results to other breast cancer survivors or other groups is unknown. Our approach was necessarily exploratory rather than hypothesis-driven, and our sample size may have limited power to detect some relationships.

In spite of these limitations, however, our study is useful in demonstrating that R/S factors are related to health behaviors. Very little research has examined this topic—even though R/S has been noted as a factor in health in many domains and contexts and has been implicated in many aspects of cancer survivors’ health. More research is needed, particularly longitudinal research with larger samples of survivors of different types of cancer. Research that specifically focuses on the underlying mechanisms (e.g., decision-making processes and social norms of one’s congregation) may be particularly fruitful. This research may lay the groundwork for designing future lifestyle change interventions that include R/S dimensions as targets.

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