Gender, Symptom Experience, and Use of Complementary and Alternative Medicine Practices Among Cancer Survivors in the U.S. Cancer Population

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Purpose/Objectives: To identify relationships among gender, physical and psychological symptoms (pain, insomnia, fatigue, and depression), and use of specific complementary and alternative medicine (CAM) practices among survivors in the U.S. cancer population.

Design: Secondary analysis of the 2002 National Health Interview Survey (NHIS). The CAM Healthcare Model, an extension of the Behavioral Model for Health Services Use, guided the study.

Setting: United States.

Sample: 2,262 adults (aged 18 years and older) diagnosed with cancer representing more than 14.3 million cancer survivors in the United States.

Methods: NHIS interview data on use of CAM practices (diet, yoga, tai chi, qigong, meditation, guided imagery, relaxation, and deep breathing) were examined in relationship to gender and symptoms. Analysis was conducted using Stata® 9.2 software for population estimation. Binary logistic regression, the primary statistical model employed in the analysis, focused on between-subject differences in practice use.

Main Research Variables: Dichotomous outcome variables included use of at least one CAM practice and use of specific individual CAM practices. Independent variables included gender, age, education, race, provider contact, cancer diagnosis, pain, insomnia, fatigue, depression, and health status.

Findings: CAM practice use was more prevalent among female, middle-aged, Caucasian, and well-educated subjects. Pain, depression, and insomnia were strong predictors of practice use, with differences noted by gender and practice type.

Conclusions: CAM practices are widely used in the U.S. cancer population, especially among women. Symptom experience influences likelihood of use, with increased odds when men report symptoms.

Implications for Nursing: Study findings inform oncology nurses on the benefits of integrating self-care CAM practices in relationship to gender into the symptom management care plan for cancer survivors. Findings reported in this study will help guide future CAM practice intervention studies.

Complementary and alternative medicine (CAM) therapies are defined as a group of diverse medical and healthcare treatments, practices, and products not considered part of conventional medicine but often used to prevent illness, promote health, avert disease recurrence, and manage symptoms related to cancer and chronic illness (Chatwin & Tovey, 2004; DiGianni, Garber, & Winer, 2002; Eisenberg et al., 1998; Ernst & Cassileth, 1998; Fouladbakhsh, 2007; Fouladbakhsh & Stommel, 2007, 2008; Fouladbakhsh, Stommel, Given, & Given, 2005; Richardson, Sanders, Palmer, Greisinger, & Singletary, 2000). The use of CAM by cancer survivors is widespread, although wide variations exist depending on the specific cancer diagnosis as well as the specific CAM therapy (Fouladbakhsh & Stommel, 2008). Population estimates reveal that more than 39% of individuals in the United States diagnosed with cancer at some point in their lifetime have used CAM (Fouladbakhsh & Stommel, 2008). In 2002, 2.9 million cancer survivors had used CAM, with more than 1.2 million reporting use of CAM practices, over 60% of them women (Fouladbakhsh & Stommel, 2008). In addition, it has been noted that the prevalence of CAM use in the past 10 years is expected to continue (Tindle, Davis, Phillips, & Eisenberg, 2005). Therefore, it is highly probable that oncology nurses and other healthcare providers will likely encounter a large number of CAM practice users in their patient population. A better understanding of what CAM products, services, and practices are used for symptom management is vital to providing quality care and increasing positive health outcomes that enhance quality of life (Fouladbakhsh et al., 2005; Jordan & Delunas, 2001; Lengacher et al., 2006; Ott, 2002).

Significance and Background

CAM therapies are usually viewed as an adjunct to mainstream cancer care to assist with the management

of symptoms experienced by patients with cancer during active treatment and the period of survivorship (Deng, Cassileth, & Yeung, 2004). CAM practices, in particular, are self-care behaviors that can be employed to manage illness or treatment-related symptoms of patients with cancer (Nicholas et al., 2002; Vallerand, Fouladbakhsh, & Templin, 2003, 2004). For example, research has shown that patients with breast cancer may seek out CAM therapies to relieve cancer and treatment-related symptoms, but some patients use CAM with the hope of improving their survival chances or decreasing their risk of cancer recurrence (Jacobson, Workman, & Kronenberg, 2000).

With regard to gender, women are more likely than men to use CAM (Cherniack, Senzel, & Pan, 2001; Fouladbakhsh & Stommel, 2008; Fouladbakhsh et al., 2005; Lengacher et al., 2002; Sparber et al., 2000; Spiegel et al., 2003). Estimates range from 1.4–2.5 times greater odds of CAM use among female patients with cancer and longtime survivors (Fouladbakhsh, 2007; Patterson et al., 2002; Spiegel et al., 2003). This pattern of more frequent CAM use by women is consistent with results from the 2002 National Health Interview Survey (NHIS) for the general U.S. population (Barnes, Powell-Griner, McFann, & Nahin, 2004). Further empirical findings from previous analysis of the 2002 NHIS, however, show that gender differences in CAM use are most prevalent with respect to CAM practices (e.g., yoga, meditation, guided imagery), with women having more than twice the odds of engaging in them than men (Fouladbakhsh, 2007; Fouladbakhsh & Stommel, 2008). This greater female emphasis on CAM practices does not extend to CAM services offered by providers or over-the-counter CAM products. The greater likelihood of using practices such as meditation, guided imagery, and deep breathing for relaxation also may reflect the tendency of women to be more actively involved in self-care, as has been previously suggested in the healthcare literature (Burns, Cain, & Husaini, 2001; Dodd, 1988; Dunn, Steginga, Occhipinti, McCaffery, & Collins, 1999; Rennemark & Hagberg, 1999). Given these findings, a gender-based analysis of CAM use among cancer survivors may serve to identify areas of care and treatment that require gender-sensitive interventions that will make a difference (Donner, 2003). Therefore, this article will examine what triggers the use of specific types of CAM practices as self-care strategies to manage symptoms and to determine similarities and differences in their use among men and women in the cancer population.

Purpose and Aims

The purpose of this study is to identify the complex relationships among gender, physical and psychological symptoms, and use of specific CAM health practices among individuals living in the United States who have been diagnosed with cancer. Guided by the CAM Healthcare Model, a modification of Andersen's Behavioral Model of Health Services Use (Andersen, 1995; Fouladbakhsh & Stommel, 2007), this article will illuminate aspects of CAM self-care for symptom management during the first year following cancer diagnosis and the long-term survivorship period. In the CAM Healthcare Model, the use of CAM health services and resources are considered a function of a) predisposition to use services (predisposing variables), b) factors that enable or impede use (enabling variables), and c) the need for health care (need variables). The model also includes self-initiated and self-directed practices that are prevalent in many patients' approaches to CAM (Fouladbakhsh, 2007; Fouladbakhsh & Stommel, 2008). Eight specific CAM practices were examined, focusing on differences in use patterns of men and women as well as distinguishing between long-term cancer survivors (cancer diagnosis more than one year ago) and recent patients with cancer (cancer diagnosis during preceding 12 months) in relationship to their symptom experience.

Methods

Design and Sample

Data from 31,044 adult respondents (aged 18 years and older) included in the 2002 NHIS were analyzed. Of the total sample, a subset of 2,262 survey respondents was created based on their report of a previous cancer diagnosis. Among the cancer survivors were 461 respondents who had been diagnosed within the year preceding the interview (recent patients with cancer).

The special Alternative Medicine/Complementary and Alternative Medicine (ALT) supplement of the NHIS, which provides information on the use of 22 types of CAM therapies, products, and practices, was merged with the regular NHIS sample adult file, as well as parts of the family-level and personal-level files, for the purpose of analysis (National Center for Health Statistics, 2003). The NHIS methodology employs a multistage probability cluster sampling design that is representative of the NHIS target universe, defined as all dwelling units in the U.S. that contain members of "the civilian noninstitutionalized population" (Botman, Moore, Moriarty, & Parsons, 2000, p. 14; National Center for Health Statistics). In the first stage, 339 primary sampling units were selected from about 1,900 area sampling units representing counties, groups of adjacent counties, or metropolitan areas covering the 50 states and the District of Columbia. The selection included all of the most populous primary sampling units in the United States and stratified probability samples (by state, area poverty level, and population size) of the less populous ones. In a second step, primary sampling units were partitioned into substrata (up to 21) based

on concentrations of African American and Hispanic populations. In a third step, clusters of dwelling units form the secondary sampling units selected from each substratum. Finally, within each secondary sampling unit, all African American and Hispanic households were selected for interviews, whereas other households were sampled at differing rates within the substrata. Therefore, the sampling design of the NHIS includes oversampling of minorities. Protection of human subject confidentiality was assured through federal rules governing public use files and the oversight of the Wayne State University Human Investigation Committee.

Variables

The analysis is focused on several outcome variables designated as CAM practices in the CAM Healthcare Model. Nine dichotomous outcomes are considered: use or nonuse of eight specific CAM practices (yoga, tai chi, qigong, special diets, meditation, guided imagery, progressive relaxation, and/or deep breathing exercises) and one summary outcome variable indicating the use of at least one of the eight CAM practices. Potential predictor variables included in the analysis are (a) predisposing factors such as gender, age, education, and race; (b) enabling factors such as conventional provider contact; and (c) need factors such as recency of cancer diagnosis, cancer site, pain, depression, insomnia, and fatigue.

Table 1. Characteristics of Male and Female Cancer Survivor Study Participants

	Males (N = 891)		Females (N = 1,371)	
Characteristic	**$\bar{X}$**	**95% CI**	**$\bar{X}$**	**95% CI**
Age (years)	65.3	64.3–66.4	59.5	58.3–60.6
Education (years)	13.4	13–13.7	12.9	12.7–13.1
Characteristic	**%**	**95% CI**	**%**	**95% CI**
Race or ethnicity				
Caucasian	91.7	89.7–93.3	89.7	87.7–91.4
African American	4.3	3.1–5.7	4.8	3.7–6.2
Hispanic	3.2	2.2–4.5	3.3	2.4–4.4
Other	0.9	0.4–1.9	2.3	1.4–3.6
Recent cancer	22.6	19.5–26.1	19	16.7–21.6
Cancer site				
Breast	0.3	0.1–1.1	24.3	21.6–27.1
Prostate	22	19.3–24.9	–	–
Colon	7.6	5.9–9.6	5.1	4–6.5
Melanoma	6.3	4.7–8.4	5.4	4.1–7.1
Lymphoma	3.7	2.3–5.6	2.3	1.5–3.5
Lung	3.4	2.3–5.1	1.8	1.2–2.8
Pain*	67.1	63.5–70.5	72.8	70–75.4
Insomnia*	22.2	19.1–25.6	33.3	30.4–36.3
Depression*	18.7	16–21.8	29.3	26.9–31.9
Fatigue	14.4	12.1–17	17.3	15.2–19.7
Number of symptoms*				
None	64.6	60.9–68.2	51.3	48.1–59.6
One	19.7	16.8–23	25.9	23.4–28.6
Two	11.6	9.4–14.2	14.5	12.5–16.9
Three	4.1	2.8–5.9	8.3	6.7–10
Health status*				
Poor to fair	32.2	28.9–35.8	25.4	22.6–28.3
Good to excellent	67.8	64.2–71.1	74.6	71.7–77.4
Comorbid conditions ($\bar{X}$ number)	3.5	3.2–3.7	3.5	3.2–3.7

* Pearson chi-squared statistically significant at $p < 0.05$
CI—confidence interval

Data Analysis

The complex sampling design of the NHIS requires special methods of variance estimation given that with multistage designs, parameter estimates are weighted functions of several random quantities. Currently, three alternative methods of variance estimation are used under these circumstances: linearization, the jackknife, and balanced repeated replications (Korn & Graubard, 1999; Levy & Lemeshow, 1999). The sampling design and appropriate weighting information for the 2002 NHIS is contained in three variables (stratum, primary sampling units, and weight-final, annual) of the public release files, which can be used for correct parameter estimations. All statistical analyses were carried out using Stata® 9.2 software (special edition). The "svy" commands of Stata allow for the analysis of subpopulations, taking full advantage of the complete sampling design information in the data. Binary and multinomial logit regressions were the primary statistical models employed in the analysis, with a focus on between-subject differences in CAM practice use. A stepwise procedure was followed in which potential predictor variables were excluded from the model if their p value exceeded 0.1.

Results

Characteristics of Cancer Survivors

Table 1 compares the characteristics of an estimated 8.2 million women and 6.2 million men among the U.S. cancer population in 2002. While male cancer survivors, on average, were older ($\bar{X}$ age of 65.3 versus 59.5, $p < 0.001$), there were no statistically significant differences by race, education, or the proportion of recent versus long-term cancer survivors. Except for the gender-specific cancer sites of breast and prostate, no significant differences in prevalence rates among male and female cancer survivors are apparent, even though the consistently higher point estimates for colon, melanoma, lymphoma, and lung cancers among men appear to reflect higher incidence rates of these cancers among men. Survivorship status (i.e., recent patient or long-term survivor) did not differ by gender (see Table 1).

Three of the four listed self-reported symptoms (pain, insomnia, and depression) show significantly higher prevalence rates among female survivors when compared with males. Pain was the most prevalent symptom, affecting more than 67% of males and 72% of females. Although not significant, the prevalence of reported fatigue also is higher among female survivors (17.3% versus 14.4%, respectively). Yet, although the overall number of symptoms reported by women is significantly greater ($p < 0.001$) than among men, male cancer survivors were more likely to report their health as "fair" or "poor" (32.2% versus 25.3%, $p < 0.002$).

Prevalence and Patterns of Complementary and Alternative Medicine Practice Use

Twenty-six percent, or more than 2.1 million female cancer survivors in the United States, engaged in at least one CAM practice in the year preceding the 2002 NHIS interview, compared to 13.7%, or about 850,000, male survivors ($p < 0.001$) (see Table 2). With the exception of special diets and qigong, women were significantly more likely to engage in the CAM practices listed in Table 2, including deep breathing, meditation, relaxation, guided imagery, yoga, and tai chi. A macrobiotic diet is the only practice that men appear to adopt more frequently than women (0.6% versus 0.2%, $p < 0.03$), even though this diet (as all other diets) is an infrequent practice overall. The rank order in the prevalence of particular CAM practices appears similar among men and women, except that women were far more likely to practice yoga (third most common practice) than men (fifth most common practice). The two practices with the greatest gender gap (difference in percentage points in favor of females) are breathing exercises (8.8%) and meditation (5.4%).

Table 2. Complementary and Alternative Medicine Practice Use Among Male and Female Cancer Survivors

	Males (N = 891)		Females (N = 1,371)	
Practice	**% Used**	**95% CI**	**% Used**	**95% CI**
Used a practice*	13.7	11.3–16.4	26	23.4–28.8
Deep breathing*	8.3	6.4–10.5	17.1	15–19.4
Meditation*	6.1	4.5–8.2	11.5	9.7–13.5
Used special diet	3.6	2.5–5.8	4.5	3.3–5.9
Vegetarian	2	1.1–3.5	2.1	1.4–3.1
Atkins™	1	0.4–2.3	2.2	1.4–3.3
Macrobiotic*	0.6	0.1–1.9	0.1	0–0.4
Zone™	0.4	0.1–1.3	0.3	0–1.1
Pritikin	0.2	0–0.9	0.1	0–1
Ornish	0.2	0.1–0.2	0.2	0.6–0.7
Relaxation*	3	1.8–4.6	5.3	4–7
Guided imagery*	1.6	0.8–3	4.1	2.8–5.7
Yoga*	1.2	0.6–2.3	6.4	4.8–8.3
Tai chi*	0.8	0.3–1.8	2.4	1.5–3.7
Qigong	0.1	0–0.1	0.5	0.2–1.3

* Pearson chi-squared statistically significant at $p < 0.05$
CI—confidence interval

Predictors of Overall Complementary and Alternative Medicine Practice Use

Predisposing factors: All of the predisposing factors in the model are strong predictors of engaging in at least one CAM practice (see Table 3). Women are more likely to engage in such practices than males (odds ratio [OR] = 2.1, $p < 0.001$). CAM practices also are most common in middle age, peaking at age 46, and falling back at older ages. Cancer survivors at age 46 have 2.6 times greater odds of using CAM practices than young survivors (age 20) and older survivors (age 72). The calculations are based on the estimated quadratic coefficients in Table 3. The odds of using a CAM practice also increased by 15% for each additional year of education (OR = 1.15, $p < 0.0001$), whereas African American and Hispanic cancer survivors have substantially lower odds of engaging in a CAM practice than non-Hispanic Caucasians (OR = 0.5, $p < 0.004$–0.005).

Enabling factors: Contacts with a conventional healthcare provider either do not affect the likelihood of engaging in CAM practices (as is the case with physician contact), or they appear to raise use of CAM. Individuals who had seen or spoken with a nurse practitioner (NP) or physician assistant (PA) were significantly more likely to engage in CAM practices (OR = 1.5, $p < 0.004$). Such odds were even greater among cancer survivors who had contact with a mental health professional (OR = 3, $p < 0.0001$).

Need factors: Among the listed symptoms, only pain and insomnia appear to trigger more frequent CAM practice use. Cancer survivors who reported pain had 70% higher odds ($p < 0.001$) of using at least one CAM practice; those with insomnia had 40% higher odds ($p < 0.02$). By contrast, fatigue and depression were not predictive of overall CAM practice use. There is no indication that the effect of symptoms on CAM practice use differs between men and women; all gender-symptom interactions were statistically insignificant. Finally, the recency of a cancer diagnosis and the primary cancer site do not appear to predict overall CAM practice use.

Predictors of Specific Complementary and Alternative Medicine Practice Use

Predisposing factors: While female gender is a strong predictor of most CAM practices—female cancer survivors are more likely to practice yoga (OR = 13.5, $p < 0.001$), guided imagery (OR = 7.7, $p < 0.001$), meditation (OR = 4.8, $p < 0.001$), progressive relaxation (OR = 3.1, $p < 0.003$), and deep breathing exercises (OR = 2, $p < 0.001$)—there do not seem

Table 3. Predictors of Complementary and Alternative Medicine Practice Use (Reference Category: No Use)

Variable	OR	p value <	95% CI of OR
Gender (Male[a]): Female*	2.1	0.0001	1.55–2.84
Age (years)*	1.1384	0.0001	1.07–1.21
Age (squared)*	0.9986	0.0001	0.9981–0.9991
Education (years)*	1.15	0.0001	1.1–1.2
Race or ethnicity (Caucasian[a])			
African American*	0.5	0.04	0.27–0.96
Hispanic*	0.5	0.05	0.2–1.01
Asian or other	1.4	0.56	0.47–3.89
Recent diagnosis (No[a]): Yes	1.2	0.3	0.86–1.62
Primary site (Other site[a])			
Breast	1	0.99	0.7–1.41
Prostate	0.9	0.79	0.55–1.58
Colon	0.9	0.74	0.49–1.65
Melanoma	1.1	0.8	0.62–1.83
Lung	1.6	0.22	0.76–3.28
Lymphoma	0.7	0.37	0.36–1.48
Provider (No[a])			
Doctor: Yes	1	0.98	0.6–1.67
NP or PA: Yes*	1.5	0.004	1.13–2
Mental health: Yes*	3	0.0001	1.96–4.64
Pain (No[a]): Yes*	1.7	0.001	1.23–2.42
Insomnia (No[a]): Yes*	1.4	0.02	1.06–1.9
Depression (No[a]): Yes	0.9	0.47	0.65–1.22
Fatigue (No[a]): Yes	1.3	0.11	0.93–1.86

* Statistically significant at $p < 0.05$

[a] Reference category

CI—confidence interval; NP—nurse practitioner; OR—odds ratio; PA—physician assistant

Note. Model statistics: number of observations = 30,272; subpopulation number of observations = 2.227; subpopulation size = 14,156,150; design df = 336 F(21,316) = 12.93; prob > F = 0.0000

to be any gender differences in the practicing of various special diets (see Table 4).

The relationship of age to the use of specific CAM practices also displays a remarkably consistent pattern. With the exception of tai chi, all coefficients associated with the linear age term are larger than one, and those associated with the quadratic term are smaller than one, indicating the same general pattern of highest usage in cancer survivors during their 40s to 50s, and lower usage at younger and older ages. Again, with the exception of the diets, cancer survivors with more formal education are more likely to engage in CAM practices. By contrast, the associations between race or ethnic affiliations and the odds of using a CAM practice show few consistent patterns. African Americans are less likely to use deep breathing exercises compared to non-Hispanic Caucasians (OR = 0.2, $p < 0.37$), Hispanics are more likely than non-Hispanic Caucasians to engage in tai chi (OR = 3.5, $p < 0.05$), and individuals with an Asian or other racial background seem to practice more guided imagery (OR = 5.5, $p < 0.01$) (see Table 4).

Enabling factors: Contact with a conventional medical doctor during the year preceding the NHIS interview did not predict use of any individual CAM practices studied. It should be noted, however, that a large majority (93%) of the estimated cancer population had contact with conventional doctors, resulting in little variation in this predictor variable. On the other hand, the less common patient contact with a NP, PA, or physical/occupational therapist, as well as the less common contact with a mental health professional, are all associated with greater odds of engaging in specific CAM practices. The odds of using yoga (OR = 2.1), special diets (OR = 2.2), meditation (OR = 1.9), guided imagery (OR = 2.5), and deep breathing (OR = 1.4) all are higher among those who saw or spoke with an NP or PA (p values range from < 0.001–0.05). A broadly similar pattern holds for cancer survivors who have contact with mental health professionals; the odds of engaging in CAM practices also are generally higher (see Table 4).

Need factors: With the exception of a macrobiotic diet, recency of a cancer diagnosis (within 12 months of the interview) does not appear to be a factor in predicting greater engagement in CAM practices. For the most part, the site of the cancer diagnosis also does not appear to be a large factor in which specific CAM practices are pursued. However, individuals diagnosed with prostate or lung cancer are more likely to use macrobiotic diets (OR = 15, $p < 0.0001$; OR = 7.5, $p < 0.03$, respectively). Lung cancer survivors also used more meditation than survivors with miscellaneous cancers (OR = 2.6, $p < 0.03$). In addition, patients with lymphoma appear to be more inclined to use guided imagery (OR = 3.2, $p < 0.02$), and breast cancer survivors were less likely to practice yoga (OR = 0.4, $p < 0.02$) (see Table 4).

Among the symptoms, pain is the only one whose association with CAM practices does not differ by gender. In particular, cancer survivors who report pain, a 70.4% majority whether male or female, also are more likely to engage in progressive relaxation (OR = 2.6, $p < 0.03$) and deep breathing exercises (OR = 1.9, $p < 0.002$). No other specific CAM appears to be practiced more often as a result of pain experience.

The strength of the relationship between the experience of insomnia, depression, and fatigue, and the use of specific CAM practices varies based on the gender of the cancer survivor. For example, although yoga is more frequently practiced among men who report insomnia than those who do not (ORs of 4.2 versus 1; $p < 0.05$), the opposite is true for women. Women with insomnia have lower odds of engaging in yoga than those without insomnia (ORs of 9.1 versus 13.5; $p < 0.05$). The same pattern occurs with respect to guided imagery. Among men, insomnia is associated with greater use (ORs of 3 versus 1; $p < 0.04$); among women, insomnia is associated with less use (ORs of 1.4 versus 7.7; $p < 0.04$). The experience

Table 4. Predictors of Specific Complementary and Alternative Medicine Practices

Variable	Odds Ratio by Practice								
	Yoga	Tai Chi	Special Diet	Vegetarian Diet	Macrobiotic Diet	Meditation	Guided Imagery	Progressive Relaxation	Deep Breathing
Gender (Male[a]): Female	13.5*	2.4	0.9	1.7	0.1	4.8*	7.7*	3.1*	2*
Age (years)	1.15	0.9356	1.178*	1.12	1.22	1.142*	1.217*	1.135*	1.059
Age (squared)	0.9983*	1	0.998*	0.9986	0.9959	0.9985*	0.998*	0.9986*	0.9993*
Education (years)	1.2*	1.17*	1.05	1.07	1.25	1.16*	1.28*	1.22*	1.14*
Race (Caucasian[a])									
African American	–	–	0.5	0.2	–	1.1	0.6	–	0.2*
Hispanic	0.6	3.5*	0.2	0.5	–	1.1	0.4	3.6	0.6
Asian or other	0.5	3.7	0.9	1.6	–	2	5.5*	2	1.8
Recent diagnosis (No[a]): Yes	1.4	1.4	1.3	1.5	9.9*	1.1	1.7	1.4	1
Primary site (Other[a])									
Breast	0.4*	1.3	1	0.8	–	0.9	0.4	0.5	1.1
Prostate	1.3	–	1.4	0.4	15*	1	2.3	2.4	0.9
Colon	1	1.9	0.4	0.6	–	0.9	0.5	0.8	1.1
Melanoma	1.2	3	1.4	0.6	–	0.9	1	1.1	1
Lung	0.8	3	1.3	0.5	7.5*	2.6*	2	1.9	1.8
Lymphoma	1.6	–	0.4	0.6	–	1.6	3.2*	2.2	0.8
Provider (No[a])									
Doctor: Yes	1	0.8	1.8	2.3	–	0.6	2.9	0.8	0.9
NP or PA: Yes	2.1*	1.4	2.2*	2.3*	0.8	1.9*	2.5*	1.4	1.4*
Mental health: Yes	2.2*	1.8	2.8*	1.5	9.1*	3.5*	5.3*	4.1*	2.5*
Insomnia (No[a]): Yes	–	1.4	1.1	–	0.3	1.5	–	1.8*	1.6*
Interaction effect (Male without insomnia[a])									
Female without insomnia	13.5*	–	–	1.7*	–	–	7.7*	–	–
Male with insomnia	4.2*	–	–	5.6*	–	–	3*	–	–
Female with insomnia	9.1*	–	–	1.8*	–	–	1.4*	–	–
Depression (No[a]): Yes	–	1.9	–	1.2	2.7	0.8	1.4	1	0.8
Interaction effect (Male without depression[a])									
Female without depression	12.2*	–	–	–	–	–	–	–	–
Male with depression	3.5*	–	–	–	–	–	–	–	–
Female with depression	8.8*	–	–	–	–	–	–	–	–
Fatigue (No[a]): Yes	0.7	1	0.8	1	3.1	1.4	1.4	–	1.6*
Interaction effect (Male without fatigue[a])									
Female without fatigue	–	–	–	–	–	–	–	3.1*	–
Male with fatigue	–	–	–	–	–	–	–	2.9*	–
Female with fatigue	–	–	–	–	–	–	–	2.5*	–
Pain (No[a]): Yes	1	1	1.8	1.5	0.7	–	1.6	2.6*	1.9*
Interaction effect (Male without pain[a])									
Female without pain	–	–	–	–	–	–	–	–	–
Male with pain	–	–	–	–	–	–	–	–	–
Female with pain	–	–	–	–	–	–	–	–	–

* $p < 0.05$

[a] Reference category

NP—nurse practitioner; PA—physician assistant

Note. Odds ratio presented only for statistically significant interaction effects.

Note. A dash indicates not computed, dropped because of multicolinearity, or lack of variation within strata.

Note. Model statistics for individual complementary and alternative medicine practice use: number of observations = 30,270; subpopulation number of observations = 2,227; subpopulation size = 14,156,150; design df = 336; prob > F = 0.000

of depression and fatigue also seem to have opposite effects for men and women, with depressed men being more likely to practice yoga (ORs of 3.5 versus 1, $p < 0.05$) and men reporting fatigue being more likely to engage in relaxation techniques (ORs of 2.9 versus 1, $p < 0.05$) than their nondepressed and nonfatigued counterparts; and depressed women less likely to practice yoga (ORs of 8.8 versus 12.2, $p < 0.05$) than nondepressed women, and women reporting fatigue less likely to engage in relaxation techniques (ORs of 2.5 versus 3.1, $p < 0.05$) than women not reporting fatigue. The only exception to this pattern occurs with the vegetarian diet, but even in that case, men experiencing insomnia present a far greater contrast compared to men without insomnia (ORs of 5.6 versus 1) than that which occurs among women (ORs of 1.8 versus 1.7, $p < 0.01$).

Limitations

NHIS data provided only self-report information on four symptoms and eight CAM practices. In addition, because the cancer population included gender-based diagnoses (breast and prostate patients, $n = 546$), potential confounding was considered. Formal testing, however, revealed a nonsignificant interaction between gender and diagnosis, allowing the authors to conclude that the gender effect was not confounded by diagnosis.

Discussion

Overall patterns of CAM practice use are similar among men and women, with highest use noted for what would be considered "no cost" or "low cost" practices, such as deep breathing, meditation, and special diets. Whereas diets may require the purchase of specific food items, meditation and deep breathing can be practiced with only the cost of a time commitment. These practices also may be easier to adopt for self-care, with little need for instruction. Practices such as yoga, guided imagery, and tai chi are used less frequently, possibly because they may require expenses for class attendance or purchase of instructional materials (DVDs, CDs, books, etc).

The results reported in this article, in part, reinforce a well-established pattern in the literature: Not only in the general population but also among cancer survivors, women are generally more likely to engage in CAM practices than men (Cherniack et al., 2001; Fouladbakhsh & Stommel, 2008; Lengacher et al., 2002; Sparber et al., 2000; Spiegel et al., 2003). However, one exception among cancer survivors concerns the various diets. Even though special diets (vegetarian, macrobiotic, etc.) are used by only a small percentage of cancer survivors, there is no indication that women are more likely to use them. The greatest differences in frequency of use by gender include time-consuming CAM practices that generally promote relaxation, including deep breathing exercises, meditation, and yoga.

Concerning the symptom experience among cancer survivors, there are both familiar and less familiar patterns. Although females among U.S. cancer survivors are, on average, younger than male cancer survivors, they more often report symptoms of pain, insomnia, and depression than males, a finding that also holds for the noncancer population (Fouladbakhsh & Stommel, 2008). Despite the apparent heavier symptom burden reported by women in the cancer population, they report, on average, better health status than men which may either indicate that men tend to under-report their symptoms or that they report them only when the experience is quite severe. If the latter interpretation is correct, this may explain why male cancer survivors' symptom experience appears to be a stronger trigger of CAM practices than the female cancer survivors' symptom experience. If men admit to having symptoms, they may in fact be in greater need for a solution to their problem than women who report such symptoms. Whatever the reason for this pattern, it is apparent that the experience of symptoms has different consequences for CAM use among men and women.

None of the other variables examined in this study, whether predisposing or enabling factors, show any gender-specific effects on the prevalence of CAM practices.

Predisposing variables such as age, education, and race are strong predictors of CAM practice use in the cancer population, providing support for previous findings in the literature indicating a link between higher education and greater likelihood of CAM use. This pattern is clearly evident in the data, with increased odds of use ranging from 14%–28% for each additional year of education completed for six of the practices studied. By contrast, minority status is associated with reduced odds of CAM use. For example, the comparatively low odds of using deep breathing exercises among African Americans are striking when compared with non-Hispanic Caucasians.

"No cost" practices such as deep breathing could be invaluable to a population that suffers from a very high incidence of hypertension and stress related to lower socioeconomic status. One may speculate that this practice is particularly uncommon among African American and Hispanic cancer survivors because of a lack of information or misinformation related to specific practices, a lack of access and availability of resources (i.e., books, classes, and DVDs) on CAM practices, and cultural and religious belief systems that prohibit use. Therefore, nurses should provide education and resource information on practices such as deep breathing, particularly when caring for African American and Hispanic patients.

Contact with conventional healthcare providers is one of the enabling factors that predict the use of CAM practices. The grouping of provider categories is based

on the available data in the NHIS dataset, which separates physician from nonphysician providers (NP, PA, etc.) and mental health professionals (physician and nonphysician). Particularly noteworthy are the very high odds of use of guided imagery (5.3 times greater), relaxation (4.1 times greater) and macrobiotic diets (9.1 times greater) among cancer survivors who had contact with a mental health provider. Although the relationship of the first two practices to psychological care is evident, the reasons for the greater use of a macrobiotic diet are less so.

Overall, the specific cancer diagnosis (primary cancer site) appears to play a minor role in affecting the use of CAM practices. In part, this is from the mediating effect of the reported symptoms, which already capture some of the differences in experience associated with specific cancers; in part, most of the cancer survivors in the NHIS are relatively long-term cancer survivors, and few of them were likely to be in active treatment at the time of the interview.

Conclusion

Predisposing, enabling, and need factors identified in the CAM Healthcare Model are predictive of the use of CAM practices in the population of U.S. cancer survivors. In particular, it appears that apart from the strong predisposing factors of gender, age, and education, the gender-specific experience of chronic symptoms such as insomnia and depression affects the likelihood of engaging in specific CAM practices. The authors of this article conclude that symptoms may actually prompt men, who would not use them otherwise, to use CAM practices, whereas women may be engaged in certain CAM practices regardless of their specific symptom experience. The results may serve to inform oncology healthcare providers on the potential benefits of integrating self-care CAM practices into the symptom management care plan for cancer survivors, particularly men.

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