

Predictors of Use of Complementary and Alternative Therapies Among Patients With Cancer

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Purpose/Objectives: To determine predictors of use of complementary and alternative medicine (CAM) therapies among patients with cancer.

Design: Secondary analysis of two federally funded panel studies.

Setting: Urban and rural communities in the midwestern United States.

Sample: Patients with lung, breast, colon, or prostate cancer (N = 968) were interviewed at two points in time. 97% received conventional cancer treatment, and 30% used CAM. The sample was divided evenly between men and women, who ranged in age from 28–98; the majority was older than 60.

Methods: Data from a patient self-administered questionnaire were used to determine CAM users. Responses indicated use of herbs and vitamins, spiritual healing, relaxation, massage, acupuncture, energy healing, hypnosis, therapeutic spas, lifestyle diets, audio or videotapes, medication wraps, and osteopathic, homeopathic, and chiropractic treatment.

Main Research Variables: Dependent variable for analysis was use or nonuse of any of the identified CAM therapies at time of interviews. Independent variables fell into the following categories: (a) predisposing (e.g., gender, age, race, education, marital status), (b) enabling (e.g., income, health insurance status, caregiver presence, geographic location), and (c) need (e.g., cancer stage, site, symptoms, treatment, perceived health need).

Findings: Significant predictors of CAM use were gender, marital status, cancer stage, cancer treatment, and number of severe symptoms experienced.

Conclusions: Patients with cancer are using CAM while undergoing conventional cancer treatment.

Implications for Nursing: Nurses need to assess for CAM use, advocate for protocols and guidelines for routine assessment, increase knowledge of CAM, and examine coordination of services between conventional medicine and CAM to maximize positive patient outcomes.

The use of complementary and alternative medicine (CAM) therapies has increased dramatically since the 1990s in the United States and other industrialized countries around the world, in general populations and among those with cancer (Astin, 1998; Eisenberg et al., 1998; Ernst & Cassileth, 1998; Kessler et al., 2001; World Health Organization [WHO], 2002). Population studies have indicated that CAM therapy use ranges from 42%–75% in the United States (Barnes, Powell-Griner, McFann, & Nahin, 2004; Eisenberg et al.), with visits to CAM practitioners exceeding total visits to primary care physicians and out-of-pocket expenditures estimated at more than \$34 billion. The percentage of people using CAM therapies is estimated to be 48% in Australia, 70% in Canada, 38% in Belgium, and 75% in France (WHO), reinforcing the perception of

Key Points . . .

- ▶ The use of complementary and alternative medicine (CAM) therapies continues to increase in general populations and among those with cancer. It is important to understand the factors that predict use of these nonconventional methods of care and symptom management.
- ▶ In our study of patients with lung, breast, colon, or prostate cancer, nearly 30% used CAM therapies. The two most frequently used CAM therapies were herbal and vitamin supplements and spiritual healing.
- ▶ Factors that predict CAM use include gender, marital status, cancer stage, cancer treatment, and number of severe symptoms.
- ▶ To promote comprehensive quality care, nurses should assess for CAM use and increase their understanding of which CAM therapies patients are using and why.

a secular shift in attitudes toward healthcare services and health-seeking behavior.

Data from a nationally representative sample of adult U.S. residents revealed that 75% have used CAM at some time in their lives for health reasons, with 62% using CAM in the preceding 12 months (Barnes et al., 2004). CAM therapies used most frequently include personal prayer (43%), prayer



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by others (24%), natural products (19%), deep breathing exercises (12%), participation in prayer groups (10%), meditation (8%), yoga (5%), massage (5%), and diet-based therapies (4%). Among patients with cancer, current estimates of use vary widely from 7%–64% (Ernst & Cassileth, 1998), with average estimates that 30% of women and 28% of men either are continuing or beginning to use CAM therapies after developing cancer (Salmenpera, 2002).

Recognition of this upward trend in CAM use has focused worldwide attention on the potential consequences of CAM on the use of conventional healthcare services. Concerns about potential interactions of CAM with biomedical and pharmaceutical treatment, safety, efficacy, cost, and establishment of scientific evidence are discussed widely in the literature. Past trends suggest that the demand for CAM services will continue to affect the delivery of conventional healthcare services far into the future (Kessler et al., 2001). As a result, policy and research funding priorities also have begun to change at a national level. In particular, there is now greater interest in the scientific evidence underpinning CAM therapy use, as well as increased demand for the development of guidelines for CAM use in cancer and noncancer populations.

The National Center for Complementary and Alternative Medicine (2002) defined CAM as a group of diverse medical and healthcare systems, practices, and products that are not presently considered to be part of conventional medicine. Recognizing the increased use of CAM by patients with cancer during and following conventional cancer treatment, the American Cancer Society (2000) has issued the challenge to study the use and effects of CAM in this population. A need exists to identify predictors of complementary therapy use in the cancer population. Identifying characteristics of patients who chose to use CAM, either as a supplement to conventional cancer care or as an alternative, is vital in preserving quality care and maximizing positive health outcomes. It is critical to determine the interplay between CAM therapies and conventional cancer treatments to further understand benefits as well as potential risks.

The term “complementary therapy” is defined as a selected therapeutic method, product, or treatment by a practitioner used in conjunction with conventional, mainstream medicine as a health service for patients (National Center for Complementary and Alternative Medicine, 2002). By contrast, the term “alternative therapy” is defined as a selected therapeutic method, product, or treatment by a practitioner used instead of conventional medical therapy (National Center for Complementary and Alternative Medicine). Thus, the words complementary and alternative can, and often do, refer to the same therapy, product, or practitioner. It is the context of use that changes an alternative therapy into a complementary one. For example, herbal medicine used in place of prescribed pharmaceutical agents would be considered alternative, whereas herbal medicine used in combination with pharmaceutical products would be considered complementary. Because it often is difficult to determine empirically whether patients with cancer use nonconventional therapies instead of or in addition to conventional cancer treatments, the term CAM will be used throughout this article.

The purpose of the study was to examine predictors of CAM use among patients with cancer living in urban and rural midwestern U.S. communities. The majority (97%; $n = 935$) was receiving conventional cancer treatment, identified as surgery, chemotherapy, or radiation, at the time of data collection. More specifically, we asked which characteristics

distinguish CAM users from nonusers in a community-based population of patients with lung, breast, prostate, or colon cancer. In addition, we explored factors that included (a) sociodemographic characteristics and attributes of social structure; (b) personal, family, and community resources; and (c) perceived healthcare needs that predicted use of CAM therapies by patients with cancer.

Conceptual Model

Studies documenting predictors of CAM use are emerging in the research literature. The disparate findings, however, have not been examined in light of a consistent theoretical framework (Astin, 1998). Andersen’s Behavioral Model of Health Services Use (Andersen, 1995; Andersen & Newman, 1973) provides such a framework, even though it traditionally has been applied to the use of mainstream medical and health services. The model depicts healthcare services use as a function of (a) predisposing variables (the individual’s predisposition to use services), (b) enabling variables (the factors that enable or impede use of healthcare services), and (c) need or health status variables (the person’s need for care, illness experience and health perceptions).

Andersen (1995) defined predisposing variables as all factors that influence an individual’s propensity to use healthcare services and resources. Among the predisposing characteristics identified in the model are gender, age, education, ethnicity, and marital status, the latter variables being viewed as indicators of social structure. The primary focus of Andersen’s model in general and the predisposing variables in particular is on factors that influence the demand for services, about which information usually can be gathered through survey methods. Enabling variables in the Andersen model denote conditions or factors that facilitate or impede an individual’s use of healthcare services. Among them are personal, family, and community resources, such as income, health insurance status, family support or caregiver presence, geographic location, and established relations with care providers. An individual’s relations with providers include visits to primary care physicians, clinics, the emergency department, and other care providers. Although in Andersen’s model enabling variables are viewed primarily from the individual’s point of view, some do reflect supply-side conditions, such as the density of a healthcare provider network in a given community. Need factors, often the most immediate and important reason for healthcare services use, refer to health status or illness state. This includes objective measures or “evaluated needs,” defined in this study as cancer site, staging of cancer at diagnosis, and type of cancer treatment. Other need factors are symptoms experienced by patients and reported general health ratings.

Literature Review

The use of CAM by patients with cancer during conventional cancer treatment has been documented widely in the literature, examining an array of different CAM therapies (Alferi, Antoni, Ironson, Kilbourn, & Carver, 2001; Patterson et al., 2002; Salmenpera, 2002; Wyatt, Friedman, Given, Given, & Beckrow, 1999). However, the specific measurements of CAM use, including the particular services involved, varied from study to study, making comparisons of results somewhat problematic. In terms of predictors of CAM use, most studies have examined

predisposing variables. In a study of patients with breast, colon, or prostate cancer (Patterson et al.), the reported odds of using a CAM therapy were more than 2.5 times greater among the female participants ($p < 0.05$). The odds of a female patient actually seeing a CAM provider were even greater, exceeding those of a man by a factor of 5.5. Spiegel et al. (2003) also found that a significantly higher number of female patients with cancer used CAM than male patients (33% and 21%, respectively). This pattern of more frequent use of CAM among women also is consistent with study results from the National Health Interview Survey, reflecting use patterns in the general U.S. civilian population (Barnes et al., 2004).

Predictors of CAM therapy use also include younger age and higher education (Alferi et al., 2001; Burstein, Gelber, Guadagnoli, & Weeks, 1999; Lee, Lin, Wrensch, Adler, & Eisenberg, 2000; Richardson, Sanders, Palmer, Greisinger, & Singletary, 2000). Variation in CAM use by ethnicity has been documented in cancer and general populations (Alferi et al.; Barnes et al., 2004; Lee et al.) with higher use among African American women. Although not all study results support the notion of CAM usage rates varying by age (Shen et al., 2002), education, and ethnicity, strong support appears to exist for the notion that women are more likely to be CAM users.

The impact of enabling variables on CAM use has been reported in the literature. Lee et al. (2000) found higher income to be a significant predictor of CAM use by women of varying ethnicity. Other data, however, have not supported a relationship between the enabling variables of income and family support identified in the Andersen model and CAM use by patients with cancer (Shen et al., 2002). Although having health insurance is a potent predictor of the use of conventional healthcare services, it is less clear to what extent insurance coverage is relevant to services that generally are not covered.

By contrast, one disabling supply factor affecting use of CAM may be a patient's place of residence. The literature indicates that rural areas often have less-developed healthcare service infrastructures. Thus, distances to source of care, which affect the use of conventional healthcare services, also should affect access to CAM providers, products, and therapies. In fact, in a study of patients with pain ($N = 595$), place of residence was related significantly to use of CAM, with highest use in suburban communities (82%) (Vallerand, Fouladbakhsh, & Templin, 2003). CAM use in urban and rural communities was 77% and 58%, respectively. National Health Interview Survey data reveal that nearly 63% of urban residents and 60% of rural residents use CAM (Barnes et al., 2004). In part, such inconsistencies go back to the definition of CAM that includes not only personal services but also products that can be mailed or otherwise shipped to users in remote areas. In fact, some researchers have argued that distance from healthcare providers, as experienced by those living in rural areas, increases the potential for self-care and self-treatment (Bartlome, Bartlome, & Bradham, 1992). This may provide an impetus to seek out CAM as a mode of treatment that relies more heavily on self-care. Thus, the impact of rural or urban residency on CAM use remains uncertain, involving numerous factors such as availability, access, and affordability of conventional and CAM services as well as individual tendencies to engage in self-care behaviors.

Among the need variables identified for this study, cancer site often is reported in the literature, with most frequent CAM use by patients with breast cancer (Boon et al., 2000;

Morris, Johnson, Homer, & Walts, 2000; Richardson et al., 2000). Results concerning the impact of cancer staging on CAM use are mixed, with some studies reporting greater use among patients with late-stage cancer (Lee et al., 2000; Shen et al., 2002) and others showing no association with use of alternative therapies (Patterson et al., 2002). Cancer treatment has been reported in association with CAM use, with 56% of patients (Alferi et al., 2001) using at least one complementary therapy during conventional cancer treatment. Therapies used most frequently included meditation, imagery, support groups, psychotherapy, and spiritual healing. Among the predictors of CAM use were prior exposure to chemotherapy, time since diagnosis, and late-stage disease. Dissatisfaction with medical treatment, pain, emotional distress, concern about cancer, and expectation of recurrence were not related to use. Richardson et al. reported that patients treated with surgery and chemotherapy were more likely to use CAM.

Data have revealed that patients with cancer use CAM to enhance benefits from conventional cancer treatment and to improve general well-being. Use was significantly associated with receiving multiple cancer treatments (Alferi et al., 2001; Patterson et al., 2002; VandeCreek, Rodgers, & Lester, 1999) and was not associated with dissatisfaction with medical care. CAM use also has been linked to the management of illness-related symptoms and, in this context, often is viewed as self-care behavior (Vallerand et al., 2004). Jacobson, Workman, and Kronenberg (2000) noted that patients with breast cancer are increasingly seeking CAM on their own as well as through conventional healthcare providers to improve chances of survival, decrease risk of cancer recurrence, and relieve cancer- and treatment-related symptoms. CAM therapies used for treatment of side effects include acupuncture for chemotherapy-associated nausea and vomiting, massage therapy for postmastectomy lymphedema, and mind and body therapies to reduce stress and anxiety related to cancer treatment.

In summary, the current state of the emerging literature on CAM use provides clues and partial evidence, but the complex patterns of use of nonconventional therapies, either as alternatives to or complements of conventional medical approaches to cancer care, require further illumination. In this study, we offer further exploration of how predisposing, enabling, and need variables affect CAM use among patients with cancer.

Methods

Study Design and Sample

Data for this secondary analysis are from two panel studies of patients with cancer and their caregivers conducted from 1993–1998 (Given & Given, 1997a, 1997b). The parent studies employed almost identical data-gathering instruments and study designs but differed in eligibility criteria. One study ($N = 1,200$) sampled patients who were newly diagnosed with lung, colon, breast, or prostate cancer and were 65 years of age or older. The second study ($N = 202$) included adults 21 years of age or older who were newly diagnosed with any type of cancer.

Procedures

A data set combining participant responses for two points in time (at time of diagnosis and three months later) from both studies was created for the secondary analysis. Although a convenience sample in the statistical sense, the patients

with cancer in the parent studies were recruited from different hospitals and clinical settings. Participants lived in 62 of the 68 counties that comprise Michigan's lower peninsula. Despite this wide geographic spread, the study sample is not representative of lower Michigan in one respect: only 24 (3%) of the sample resided in the Detroit metropolitan area that is comprised of Macomb, Oakland, and Wayne counties. In 1995, this area accounted for 42% of the state's population (U.S. Census Bureau, 2005).

The Human Investigation Review Board at a major midwestern university granted approval for the original parent studies and the current research. For this analysis, only cases that met the following criteria were included: at intake, patients with cancer had to have been diagnosed with either lung, colon, breast, or prostate cancer; completed medical record audits that gathered information about cancer site, cancer stage at diagnosis, and cancer treatment; and participated in at least one of the first two interviews of the parent studies. In addition, because information about CAM use was not the major focus of the parent studies, its collection was relegated to a questionnaire that had to be mailed back to the research team. A total of 968 patients with cancer met these criteria.

Instruments

Patients were asked to complete the **Patient Self-Administration Questionnaire** mailed at the intake interview and three months after the initial interview asking whether they used any of the following CAM therapies or practitioners: herbs or vitamin supplements; spiritual healing; acupuncture; relaxation, imagery, or yoga; massage; energy healing; hypnosis; therapeutic spas; lifestyle diets; therapeutic audio and videotapes; medication wraps; osteopathic practitioners; homeopathic practitioners; and chiropractic treatments. Participants also were asked to indicate whether they used other CAM therapies or practitioners not listed on the questionnaire. The study authors accepted what the patients indicated was use of CAM in the "other" category without questioning their assertion about use. Patients were able to indicate "yes" to use of other CAM therapies without necessarily identifying the therapy or practitioner. Information about the other therapies respondents may have identified on the original questionnaire was not available in the datasets used for the current study.

The items in the list of CAM therapies reflect the state of the CAM literature at the time of the parent studies. Extensively cited research by Eisenberg et al. (1998) documenting use of CAM in the 1990s used a similar listing of therapies.

The **Perception of Health Measure** was used as a measurement of perceived need in this study. This measurement is one of the subscales from the Medical Outcomes Study 36-Item Short Form Health Survey (SF-36) (Ware & Sherbourne, 1992). The SF-36 was designed for use in clinical practice and research, health policy evaluations, and general population surveys (McHorney, Ware, & Raczek, 1993). The General Perception of Health subscale of the SF-36 consists of six items (Cronbach's alpha for this study = 0.76). The scores for this subscale were standardized in the usual way on a scale of 1–100, with higher scores indicating greater perceived health (McHorney, Ware, Lu, & Sherbourne, 1994).

Study Variables

A positive response to at least one of the 15 items in the questionnaire at either time 1 or time 2 determined a respon-

dent's classification as a "user of CAM," whereas a negative response to all of the items at both times led to the classification of the respondent as a "nonuser." Thus, the dependent (outcome) variable for this analysis is a simple dichotomy: use or nonuse of any of the identified CAM therapies or visits to CAM practitioners listed in the questionnaire.

Predisposing variable indicators (hypothesized predictor variables) were gender, age, race (minority or Caucasian), education, and marital status. Enabling variable indicators (hypothesized predictor variables) included income (less than \$15,000 or more than \$15,000), caregiver presence, geographic location (urban or rural), and past patterns of usage of care providers (sum of doctor visits, including visits to primary care physician, radiologist, surgeon, and medical oncologist). Need variable indicators (hypothesized predictor variables) included cancer stage (early or late stage), cancer site (lung, colon, breast, or prostate), number of self-reported symptoms judged "severe" by a patient, cancer treatment (surgery, chemotherapy, or radiation) as representative of evaluated need, and perception of health (medical outcomes study general health score) as representative of perceived need.

Data Analysis

Binary logistic regression was used as the primary statistical model for analysis, focusing on the between-subject differences in CAM use (disregarding changes in use over time). A stepwise procedure was followed in which potential predictor variables were excluded from the model if their p values exceeded 0.10. All independent variables identified by the theoretical framework were included in the regression model to determine the ability to predict use of CAM by study participants.

Results

Tables 1, 2, and 3 display descriptive statistics for the patients in the study, divided among independent variables. The overall number of cases in the analysis sample was 968; but for a few variables, the number dropped as a result of missing

Table 1. Patient Predisposing Variables

Characteristic	n	%		
Gender				
Male	485			50
Female	483			50
Race				
Caucasian	901			93
Other	64			7
Marital status				
Married	650			68
Widowed	214			22
Divorced, separated	72			8
Single	24			3
Characteristic	\bar{X}	Median	SD	Range
Age (years)	70.6	71.0	7.7	28–98
Education (years)	12.6	12.0	3.0	0–20

N = 968

Note. Respondents did not answer all questionnaire items. Because of rounding, not all percentages total 100.

Table 2. Patient Enabling Variables

Characteristic	n	%
Household income (\$)		
Less than 15,000	174	18
15,000–24,999	174	18
25,000–34,999	128	13
More than 35,000	152	16
Health insurance status		
Medicare	841	87
Private insurance	850	88
Public insurance	45	5
Caregiver presence		
Yes	598	62
No	370	38
Place of residence		
Urban	582	62
Rural	358	38

Characteristic	\bar{X}	Median	SD	Range
Visits to physicians	8.6	6.0	8.5	1–101

N = 968

Note. Respondents did not answer all questionnaire items. Patients could have more than one type of health insurance. Because of rounding, not all percentages total 100.

information, with the general health perception subscale of the SF-36 providing the smallest subsample (n = 921) available for analysis. The sample was divided evenly between men and women, and the majority of patients was older than 60 years, reflecting the fact that one of two constituent parent studies required a minimum age of 65 as eligibility criterion. Ninety-three percent of the participants were Caucasian, and approximately 68% were married. Cancer treatments included surgery (65%), radiation (54%), and chemotherapy (39%). Forty-seven percent of the sample received only one type of conventional treatment, and 12% received all three.

CAM was used by nearly 30% (n = 286) of the participants. Data revealed that the most frequently used CAM therapy was herbal and vitamin supplements, reported by 55% of the CAM users. Use of spiritual healing or therapy was reported by 33%, and massage was used by 13% of those reporting CAM use. Less than 10% of the CAM users reported use of relaxation, special diets, audio or videotapes, acupuncture or acupressure, or chiropractic treatments. More than 16% of CAM users reported use of “other therapies” that were not otherwise specified (see Table 4).

Tables 5 and 6 show the results from the logistic regression analysis relating the predictor variables to the odds of CAM use (the overall sample odds were 286/682 or about 2/5). Table 5 presents the parameter estimates and Table 6 the goodness-of-fit information, indicating that the logistic model is consistent with the data (Hosmer and Lemeshow Test chi-square: $p \geq 0.96$) and does explain some of the variation in the odds of using CAM (Nagelkerke Pseudo R square = 0.094) (Hosmer & Lemeshow, 2000). Among the predisposing variables, two significant predictors stand out in Table 5: (a) Female patients with cancer had almost twice the odds (odds ratio = 1.99) of using CAM than their male counterparts ($p < 0.01$), and (b) patients with cancer who are separated or divorced had a greater tendency to use CAM, with the odds

of usage more than twice as high as among widowed patients with cancer ($p < 0.02$). No other predisposing variables were significantly associated with CAM use.

None of the enabling variables demonstrated a significant association with CAM use. However, several of the need or health status indicators appeared to be predictors of CAM use.

- Patients with late-stage diagnoses appeared to be less likely to use CAM than patients with early-stage disease. The odds of CAM use among the former were only 57% as large as those of the latter ($p < 0.01$).
- Cancer treatment in the logistic regression model was examined using three dummy variables indicating whether a patient had surgery, chemotherapy, or radiation. The results showed that patients who underwent surgery or chemotherapy were more likely to use CAM. Undergoing surgery appeared to raise the odds of CAM use ($p < 0.02$) by a factor of 1.86 (= 1/0.538), whereas receiving chemotherapy raised the odds ($p < 0.03$) by nearly 1.6 (= 1/0.631). Radiation therapy was unrelated to CAM use.
- Symptom experience was measured by the number of severe symptoms identified by patients at both points in time. A symptom was considered severe if the respondent reported a moderate or greater symptom intensity and a moderate or greater interference from the symptom. Data indicated that patients experiencing three or more severe symptoms were more likely to use CAM therapies. This finding reveals a significant threshold effect for these patients. Their odds of CAM use were nearly 1.6 times greater ($p < 0.01$) than the odds among patients reporting fewer severe symptoms. Primary cancer diagnosis site and perceived overall health status did not show significant associations with CAM use.

Table 3. Patient Need Variables

Characteristic	n	%
Cancer site		
Lung	233	24
Colon	177	18
Breast	297	31
Prostate	261	27
Cancer stage		
Early (0–2)	557	58
Late (3–4)	237	25
Received conventional cancer treatment		
Surgery	628	65
Chemotherapy	373	39
Radiation	526	54
Number of different cancer treatments		
1	455	47
2	368	38
3	112	12

Characteristic	\bar{X}	Median	SD	Range
Symptom status				
Number of severe symptoms	6.1	5.0	5.1	1–25
Perception of Health: Medical Outcomes Study Perception of General Health Scores				
	67.2	72.0	22.3	0–100

N = 968

Note. Respondents did not answer all questionnaire items. Patients could receive more than one type of cancer treatment. Because of rounding, not all percentages total 100.

Table 4. Complementary and Alternative Medicine Therapies Used

Therapy	n	%
Herbal and vitamin supplements	157	55
Spiritual healing or therapy	93	33
Massage	37	13
Relaxation techniques, imagery, or yoga	28	10
Chiropractic treatments	27	9
Lifestyle diets	26	9
Therapeutic audio or videotapes	18	6
Homeopathic treatments	7	3
Acupuncture or acupressure	6	2
Therapeutic spas	5	< 1
Energy balancing	2	< 1
Osteopathic treatments	4	< 1
Medication wraps	1	< 1
Hypnosis	—	—
Other complementary and alternative medicine therapies	47	16

N = 286

Discussion

The analysis has provided valuable information about predictors of CAM use by patients with cancer living in the study community. The evidence concerning the effects of predisposing, enabling, and need factors on use of CAM by patients with lung, colon, breast, or prostate cancer confirms and extends results in the existing literature. One finding was that gender was a strong predictor of use, as already shown in earlier studies: Women used CAM more frequently than men did. Previous studies have also found that women were more likely to use numerous CAM therapies (Sparber et al., 2000). Women generally have been more involved in self-care and self-treatment, which are major factors involved in the use of CAM. Race, although not a significant predictor in this research, requires further study given the limited diversity of the study sample.

An interesting finding was the predictive ability of marital status on CAM use. Because we were unable to analyze motivation for use, we can only speculate as to why divorced or separated participants were more likely to use CAM during the cancer experience. Further study is indicated to determine whether perceived need is greater in this subset of the sample. Health beliefs and perceived need as factors influencing motivation to use CAM warrant investigation.

Frequency data revealed that CAM users most often selected herbs and vitamin supplements, products that are noted to be increasingly available over the counter and through mail-order supply houses. Access to these CAM products exists throughout urban, suburban, and rural communities. Use highlights the independent nature of self-treatment with CAM, often without recommendation or supervision from healthcare professionals. Further study is needed to determine the effect of independent self-treatment with CAM on use of conventional health services and treatment for cancer. Data on spiritual healing raise questions about the importance of spirituality and a sense of connectedness to a higher power at a critical point in time. Facing a life-threatening diagnosis and confronted with imagined and actual discomforts associated with cancer treatment, many patients with cancer apparently turn to spiritual healing and spiritual practices. Further research is needed to understand more fully what constitutes

spiritual healing, the patterns and predictors of such practices, and their influence on quality-of-life outcomes during the cancer experience.

The effect of symptoms experienced by patients with cancer who are using CAM requires more extensive study. Patients who experienced three or more severe symptoms were more likely to use CAM. Apparently, substantial symptom experience was an inducement for many patients

Table 5. Predictors of Complementary and Alternative Medicine Use by Patients With Cancer

Variable	OR	p	Wald	95% CI of OR
Predisposing variables				
Gender	1.990	0.009	6.832	1.188–3.332
Age (years)	1.023	0.08	3.065	0.997–1.050
Race	0.842	0.632	0.229	0.416–1.703
Marital status				
Widowed ^a	—	0.108	6.078	—
Married	1.429	0.115	2.482	0.917–2.227
Separated or divorced	2.180	0.017	5.678	1.148–4.138
Single	1.182	0.744	0.107	0.433–3.225
Formal education (years)	1.023	0.433	0.616	0.967–1.082
Enabling variables				
Geographic location urban^a	1.145	0.452	0.567	0.805–1.630
Caregiver presence	1.079	0.66	0.194	0.768–1.517
Household income (\$)				
Less than 15,000 ^a	—	0.146	3.847	—
15,000 or more	1.580	0.057	3.615	0.986–2.533
No information	1.307	0.294	1.101	0.793–2.156
Traditional provider connection				
Sum of doctor visits	0.995	0.676	0.174	0.974–1.017
Need variables				
Cancer site				
Lung ^a	—	0.503	2.351	—
Colon	0.727	0.254	1.301	0.420–1.258
Breast	0.749	0.317	1.003	0.425–1.319
Prostate	1.118	0.703	0.146	0.631–1.980
Cancer stage				
Early (0–2) ^a	—	0.021	7.719	—
Late (3–4)	0.569	0.01	6.635	0.371–0.874
Unstaged	0.600	0.11	2.560	0.321–1.122
Cancer treatment—surgery				
Had surgery ^a	—	0.023	7.552	—
Did not have surgery	0.538	0.016	5.754	0.325–0.893
No information	0.591	0.048	3.915	0.351–0.995
Cancer treatment—chemotherapy				
Had chemotherapy ^a	—	0.066	5.440	—
Did not have chemotherapy	0.631	0.028	4.822	0.419–0.952
No information	0.642	0.124	2.371	0.365–1.129
Cancer treatment—radiation				
Had radiation ^a	—	0.93	0.145	—
Did not have radiation	0.957	0.83	0.046	0.638–1.434
No information	0.902	0.715	0.134	0.518–1.570
Perception of Health Symptoms (three or more severe)	1.006	0.16	1.979	0.998–1.014
Symptoms (three or more severe)	1.591	0.01	6.582	1.116–2.268

N = 968

^aReference category

CI—confidence interval; OR—odds ratio

Table 6. Goodness-of-Fit Indicators for the Logistic Regression Model

Statistic	Value	df	p
Model chi-square	59.777	25	0.000
Hosmer and Lemeshow Test chi-square	2.520	8	0.96
Wald statistic	140.905	1	0.000
Nagelkerke R square	0.094	–	–
Cox and Snell R square	0.066	–	–

to seek out CAM. This relationship needs further exploration in terms of the specific symptoms experienced as well as their severity and possible limitations on daily activities associated with them.

Analysis of need factors in this study provides relevant information about patients with cancer to healthcare providers. Based on the data, we concluded that (a) patients with early-stage cancer may use sources of care outside of conventional medicine and (b) patients undergoing cancer surgery and chemotherapy are more likely to supplement their medical care with CAM therapies. These results promote further understanding of what factors predict use of CAM and thereby may serve to help identify patients who are CAM users. This understanding is essential in providing comprehensive care for patients with cancer that maximizes the potential for positive outcomes. The Andersen Model of Health Services Use has been effective in providing a solid framework for determining predictors of CAM use in this population of patients with cancer.

Limitations

The vast majority of the study participants (99%) had health insurance. Thus, we were not able to explore the effect of insurance status on use of CAM. On the other hand, CAM therapies, services, products, and healthcare provider visits often are not reimbursable healthcare services, although a change has occurred in the area of chiropractic services since the 1990s. Still, the possible effect of health insurance coverage on health-seeking behaviors such as use of CAM requires further study. Probably the most important limitation of the current study was the lack of data on health beliefs related to CAM use. Without such information, it is difficult to explore fully a patient's predisposition to use CAM. Similarly, it would be useful to know to what extent

patients view nontraditional therapies as true alternatives to mainstream medicine or as complementary "insurance policies." If the former view prevails, this might have substantial implications for adherence to prescribed conventional therapies.

Conclusions and Recommendations for Practice

Patients with cancer receiving conventional treatment are increasingly using CAM therapies. Many may not inform their healthcare providers of the use of CAM. Oncology nurses likely will encounter increasing numbers of patients who use CAM.

One area of potential concern for practicing nurses is the possible interactions between CAM use and conventional therapies. The increasing trend of CAM use highlights the need for nurses to consider professional practice issues related to use, such as safety, establishment of the evidence base for CAM, and patient education (Lengacher, Bennett, Kipp, Berarducci, & Cox, 2003; Richardson, 2000). In particular, nurses should make every effort to determine the use of herbs and vitamin supplements by their patients. Data reveal increasing availability of, access to, and use of supplements across all populations. Concurrently, discussion in the literature indicates potential negative interactions associated with unguided use, when combined with chemotherapeutic agents and surgical intervention. Thus, patients with cancer should be asked about CAM use during initial interviews to establish a comprehensive picture of what patients are using and why. Nurses should also strive to foster open communication so that patients are willing to share information about CAM use (Sparber et al., 2000). Additionally, nurses caring for patients with cancer should advocate for protocols guiding routine assessment of CAM use; examine coordination of services between these two diverse systems of health care; increase their knowledge of CAM, recognizing cultural and gender factors related to use; and become involved in guideline development to maximize positive outcomes for patients with cancer who use complementary therapies. Finally, further study on predictors of CAM use is indicated to address the role of health beliefs and social networks.

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