Original Contribution

Prevalence and Correlates of Postdiagnosis Initiation of Complementary and Alternative Medicine Among Patients at a Comprehensive Cancer Center

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Abstract

Purpose: Patients with cancer increasingly use complementary and alternative medicine (CAM) in conjunction with conventional oncology treatments. Previous studies have not investigated postdiagnosis initiation of CAM therapies or independent correlates of use of individual CAM modalities. The purpose of this study was to determine the prevalence and correlates of individual CAM modalities initiated after cancer diagnosis.

Methods: A cross-sectional survey was conducted of a random sample of adults with a cancer diagnosis (N = 1,228) seeking care at a National Cancer Institute–designated comprehensive cancer center within a 12-month period.

Results: The majority of patients were female (64.7%), white (86.9%), and married (72.8%). Three-quarters (75.2%) used at least one CAM modality, and 57.6% of those using CAM initiated use after cancer diagnosis. For all CAM therapies combined, women were 1.7 times more likely than men to initiate any CAM therapy after cancer diagnosis. However, when CAM modalities were differentiated by type, men and women were equally likely to initiate all therapies except for psychotherapy and mind-body approaches. Postdiagnosis initiation of every CAM modality, except mind-body therapies, differed by cancer type.

Conclusion: A significant proportion of patients initiated CAM use after diagnosis. However, specific type of CAM initiated varied by demographics and cancer type, suggesting there is not a "typology" of CAM user. Optimal comprehensive cancer treatment, palliation, and survivorship care will require patient and provider education regarding CAM use by modality type; improved provider-patient communication regarding potential benefits, limitations, and risks; and institutional policies to support integrated conventional and CAM treatment.

Introduction

Individuals diagnosed with cancer are among those whose use of complementary and alternative medicine (CAM) has increased over the past 25 years in the United States.[1-8] Studies have shown that as many as 91% of individuals undergoing cancer treatment use some form of CAM,[9] and individuals with a previous or current cancer diagnosis are more likely to use CAM than the general population.[10] The most common reasons for using CAM include seeking a cure or reducing risk of recurrence[7,11]; mitigating chemotherapy and radiation adverse effects[9,12,13]; and improving overall health, quality of life, and well-being.[14] Among patients undergoing traditional cancer treatments, the most popular CAM modalities include special diets, dietary supplements/botanicals, mind-body techniques, and movement-physical therapy (PT).[9,14-17]

The efficacy of some CAM therapies for cancer treatment and palliation has been documented.[13,18,19] Chinese herbal medications are associated with reduced treatment adverse effects, increased quality of life, and improved survival rates across cancer sites.[20] Estrogenic botanical supplements have been associated with better quality of life in patients with breast cancer.[21] Massage therapy has been shown to reduce lymphedema in breast and gynecologic cancers,[22] and decrease pain and improve mood in patients with advanced cancers.[23] Randomized trials have shown acupuncture reduces the number and severity of hot flashes in women with breast cancer[24] and men with prostate cancer.[25,26]

Despite the documented benefits of some CAM therapies, risks to patient safety exist. Drug-supplement interactions have been documented with chemotherapies.[12,17] St John's wort reduces plasma levels of the active metabolites of three chemotherapy agents: irinotecan, imatinib mesylate, and docetaxel.[27-30] Acupuncture and intensive manipulative therapies are not advisable in patients with bleeding disorders.[13] Macrobiotic-type diets that limit calorically dense foods may cause cachexia in some patients.[31] Certain patients also may be at increased risk for rare events associated with massage, including internal hemorrhage, fractures, and infection.[32]

The majority of individuals diagnosed with cancer continue to use conventional medical therapies alongside CAM therapies.[3,8,9,11,12,33,34] However, many patients fail to disclose CAM use to their oncologists,[7,9,33,35,36] limiting the oncologist's ability to discuss benefits, limitations, and potential risks of the modalities used. We conducted a survey to evaluate how adults receiving treatment at a comprehensive cancer center (CCC) use CAM, with a specific focus on describing patients who initiate CAM after diagnosis. To our knowledge, this is one of the first studies to report incident use of CAM after diagnosis.

Study outcomes might facilitate the development of interventions to enhance patient-provider communication about the benefits, limitations, and risks of CAM therapies during cancer treatment, especially during the vulnerable period immediately after diagnosis. Findings might also lay the groundwork for developing models of integrated CAM and traditional medicine for comprehensive cancer treatment, palliation, and survivorship care.

Methods

Participants

We conducted a cross-sectional survey of adults ($\geq$ 18 years of age) seeking care at the Cancer Institute of New Jersey, a National Cancer Institute (NCI)–designated CCC, within the 12-month period of March 1, 2004 to February 29, 2005. Children were excluded, as their CAM use may be determined by parents/guardians. Other inclusion criteria included willingness and ability to complete the study questionnaire and English literacy. There were no exclusions based on years since diagnosis or treatment status. After obtaining institutional review board approval from the University of Medicine and Dentistry of New Jersey, a potential participant list was randomly generated from an existing patient database that included patients seen for cancer, treatment, screening, and prevention at the CINJ to obtain a sample of 33% of the 9,062 cancer center patients seen that year (N = 2,777). This sample size provided adequate power to detect an effect size of 0.10 at 80% power with alpha set at 0.05 assuming a response rate (RR) of 50%. Participants were mailed a cover letter, survey, and self-addressed stamped envelope in which to return the survey. The institutional review board–approved cover letter served as the consent document and explained to potential subjects that completion and return of the survey indicated their consent to participate. To maximize the RR, a postcard was mailed 2 weeks after the survey and a second survey packet with cover letter was mailed 1 month later to all nonresponders. Respondents received a $10 voucher for a local restaurant. A total of 1,755 usable (eg, complete data, met eligibility criteria) surveys were returned (58.6% usable RR). This compares to a 51.4% RR in a similar study conducted at another NCI-designated CCC.[12]

Survey Instrument

The survey instrument was adapted from a tool previously used and validated with patients attending a CCC.[12] To ensure readability and face validity, it was pilot tested by five nonpatient volunteers of representative sociodemographics who were employees of the school of health-related professions at UNDMJ. Survey completion time ranged from 20 to 25 minutes, and no changes to instruction or content were necessary. To assess CAM use, patients were given a list of different modalities (Appendix Table A1, online only) and asked to check whether they had ever used it, currently used it, and if they currently used it, whether they initiated use "only after diagnosis." In addition, demographics including sex, race/ethnicity, marital status, and educational level were measured categorically and age measured continuously based on birth date. On-

cologic information, including cancer site(s), cancer status (recurrence, metastases, cancer free), and treatment type(s) was measured categorically, and years since diagnosis was measured continuously based on self-reported date of diagnosis. Patients' reasons for use, perceived benefit, sources of CAM information, and decision to communicate with health care providers regarding CAM were also collected and will be reported elsewhere. To protect health information, participants' data were deidentified and only study identification numbers were used in the database and on the surveys.

Statistical Analyses

Frequency distributions (No., %) and descriptive statistics (mean, standard deviation) were used to report outcomes, and categories are reported as they appear in the survey. For inferential analyses, categories with small cell sizes were either combined or excluded from the analysis. For instance, the primary cancer diagnosis was recoded from 28 categories to represent the most prevalent cancers in the United States[37]: prostate, breast, lung, skin (melanoma), hematologic (leukemia, Hodgkin and non-Hodgkin lymphomas), colorectal, gynecologic (cervical, vaginal, ovarian, and uterine), and "other." Bivariate associations between postdiagnosis CAM use and demographic and cancer type variables were assessed using χ^2 analyses, and variables with statistically significant bivariate associations were included in the multivariate models specific for each of the CAM practices. Multivariate logistic regression models were used to examine the covariates of postdiagnosis CAM use within each type of CAM practice. Odds ratios and 95% CIs are reported for all independent variables categories. Statistical analyses were performed using SPSS V19.0 for Windows (Chicago, IL, SPSS) A priori alpha was set at $P < .05$.

Results

A total of 1,755 surveys were available for analysis, of which 1,228 (71.5%) respondents indicated a cancer diagnosis. Among those with a cancer diagnosis, 75.2% (n = 923) were currently using at least one CAM modality, and 57.6% (n = 532) of CAM users initiated use after diagnosis. Of those who initiated CAM after cancer diagnosis, 93.2% (n = 496) were still using CAM at the time of the survey.

Demographic characteristics of sample subjects are reported in Table 1. The majority of respondents were female (64.7%), white (86.9%), and married (72.8%). Only female sex (χ^2 = 10.28; $P = .001$) and younger age group (χ^2 = 29.40; $P < .001$) were significantly associated with current CAM use. For all types of postdiagnosis CAM combined, female sex (χ^2 = 16.80; $P < .001$), younger age (χ^2 = 37.06; $P < .001$) and divorced/separated/single marital status (χ^2 = 10.82; $P = .013$) were significantly associated with initiation of CAM therapy after cancer diagnosis.

Table 2 presents the most frequently reported cancer diagnoses (with at least 20 respondents). Breast cancer was the most frequently reported diagnosis (n = 397, 34.4%), followed by melanoma (n = 151, 13.1%). All other diagnoses were less than 10% of the sample. Mean time since diagnosis ranged from

Table 1. Current CAM Use and CAM Use Initiated After Diagnosis, by Demographic Characteristic

Characteristic	Total With Cancer Diagnosis		Current CAM Use		CAM Use Initiated After Diagnosis	
	No.	%	No.	%	No.	%
Sex						
Male	434	35.3	303	69.8	154	35.5
Female	794	64.7	620	78.1	378	47.6
Total	1,228					
*P**				.001		< .001
Age, years						
18-29	34	2.8	27	79.4	14	41.2
30-39	79	6.4	62	78.5	39	49.4
40-49	191	15.6	154	80.6	98	51.3
50-59	291	23.7	240	82.5	155	53.3
60-69	297	24.2	220	74.1	117	39.4
70-79	250	20.4	165	66.0	77	30.8
80-92	86	7.0	55	64.0	32	37.2
Total	1,228					
P				< .001		< .001
Race/ethnicity						
White	1,056	86.9	795	75.3	445	42.1
Hispanic	51	4.2	40	78.4	25	49.0
African American	57	4.7	46	80.7	30	52.6
Asian	49	4.0	32	65.3	21	42.9
Other†	2	0.2				
Total	1,215					
P				.285		.357
Marital status						
Married/with partner	892	72.8	664	74.4	379	42.5
Divorced/separated	108	8.8	88	81.5	55	50.9
Widowed	142	11.6	104	73.2	52	36.6
Single/never married	80	6.5	63	78.8	45	56.3
Other†	3	0.2				
Total	1,225					
P				.335		.013
Education						
Some high school/graduate	345	28.3	254	73.6	145	42.0
Technical school/associate degree	127	10.4	94	74.0	58	45.7
Some college/bachelors	496	40.8	378	76.2	222	44.8
Graduate degree	249	20.5	190	76.3	102	41.0
Total	1,217					
P				.804		.682
Income, $						
12,500-19,999	244	21.1	174	71.3	99	40.6
20,000-59,999	309	26.7	246	79.6	131	42.4
60,000-99,000	182	15.7	142	78.0	85	46.7
100,000 or more	146	12.6	106	72.6	66	45.2
Don't know or prefer not to say	277	23.9	211	76.2	124	44.8
Total	1,158					
P				.167		.716

Abbreviation: CAM, complementary and alternative medicine.
* All significance values based on χ^2 test of independence.
† Patients listed as Other were excluded from analysis.

Table 2. Most Frequent Cancer Diagnosis by Current CAM Use and Use Initiated After Diagnosis

Diagnosis	Frequency*		Current CAM		CAM Initiated After Diagnosis		Months Since Diagnosis	
	No.	%	No.	%†	No.	%†	Mean	SD
Breast	397	34.4	321	80.9	208	52.4	56.18	65.02
Skin (melanoma)	151	13.1	112	74.2	41	27.2	41.44	49.56
Lymphoma (non-Hodgkin)	93	8.1	72	77.4	44	47.3	62.17	72.45
Prostate	80	6.9	58	72.5	32	40.0	82.47	59.03
Colon/rectal	59	5.1	43	72.9	27	45.8	46.61	35.34
Leukemia	49	4.2	39	79.6	18	36.7	50.03	42.55
Lung	43	3.7	31	72.1	23	53.5	30.77	21.10
Cervix/vagina	31	2.7	24	77.4	16	51.6	63.20	79.12
Ovary	28	2.4	20	71.4	15	53.6	50.97	58.69
Uterus	27	2.3	20	74.1	11	40.7	55.40	88.08
Skin (non-melanoma)	20	1.7	17	85.0	4	20.0	45.24	44.45

Abbreviations: CAM, complementary and alternative medicine; SD, standard deviation.
* N = 1,155 provided a valid response for the primary cancer diagnosis.
† Percentage calculated based on the number of respondents who indicated the indicated diagnosis.

30.77 months for lung cancer to 88.08 months for uterine cancer. Current CAM use was similar across cancer types, ranging from 72.1% for lung cancer to 85.0% for nonmelanoma skin cancer. Postdiagnosis CAM initiation varied more across cancer diagnoses, from 53.6% for ovarian cancer to less than 20% for nonmelanoma skin cancer.

Separate multivariate models were created for the following CAM types: special diet, psychotherapy, movement-PT, spirituality, mind-body, and dietary supplement (Table 3). For special diet use, three variables (age group, level of education, and cancer type) were bivariately associated and remained significantly associated with postdiagnosis special diet use in the multivariate model. All age groups except patients 60 to 69 years old (YO) were significantly more likely to initiate CAM postdiagnosis than those more than 70 YO (odds ratios [ORs], 2.95-6.68). For education level, only those with some college or a bachelor's degree were more likely to use a special diet postdiagnosis than participants with a graduate degree (OR = 1.84; $P = .041$). Participants with breast (OR = 4.07; $P = .004$), colorectal (OR = 5.21; $P = .006$), and prostate (OR = 6.71; $P = .001$) cancers were all significantly more likely to initiate a special diet postdiagnosis than participants with melanoma.

Four variables were bivariately associated with postdiagnosis psychotherapy use and remained significant in the multivariate model: sex, age, income level, and cancer type. Women were 1.86 times more likely to use psychotherapy than men ($P = .029$). All age groups except the youngest (18-29 YO) and the 60- to 69-YO group were significantly more likely to use psychotherapy postdiagnosis than participants in the oldest age group (ORs, 2.72-3.77). For income, participants in the $60,000-$99,000 per year bracket were 1.89 times more likely ($P = .041$) to use psychotherapy than individuals in the lowest income bracket. Except for those with lung cancer, participants with all cancer types were significantly more likely than those

with melanoma to initiate psychotherapy postdiagnosis (ORs ranging from 3.13 for participants with "other" types of cancer to 7.79 for participants with prostate cancer).

Movement-PT had the largest number of variables bivariately associated with postdiagnosis CAM use: sex, age, cancer type, race, marital status, and education. However, after adjusting for other covariates, only cancer type remained statistically significant. Participants with breast (OR = 2.46; $P = .28$), prostate (OR = 3.39; $P = .033$) and hematologic (OR = 2.83; $P = .019$) cancers were more than two times more likely to initiate movement-PT CAM than participants with melanoma.

Only age and cancer type had statistically significant bivariate associations with spirituality. In the adjusted model, participants in all but the youngest age categories (18-29 YO) were significantly more likely to initiate spiritual practices after diagnosis than participants in the oldest age group (ORs, 2.98-3.45). Only participants with colorectal (OR = 3.11; $P = .019$) or lung (OR = 4.45; $P = .003$) cancers were more likely than patients with melanoma to initiate spirituality CAM after diagnosis.

Mind-body modalities were bivariately associated with sex, age, and cancer type. Only sex and age remained significant in the multivariate model. Women were 3.98 times more likely than men to initiate mind-body modalities after diagnosis ($P < .001$). Participants in all age groups were significantly more likely than participants in the oldest age group to initiate mind-body CAM (ORs, 2.63-6.75). There were no differences across cancer type in initiation of mind-body CAM after diagnosis.

Finally, for dietary supplements, sex, age, and cancer type were significantly bivariately associated. However, in the multivariate model, only age and cancer type remained significantly associated. Participants 30 to 39 YO (OR = 2.40; $P = .005$) and 40 to 49 YO (OR = 1.99; $P = .005$) were significantly more likely to begin using dietary supplements after diagnosis compared with those more than 70 YO. Participants with

Table 3. Predictors of CAM Initiation After Diagnosis, by CAM Type

Covariate	Special Diet OR	95% CI	Psychotherapy OR	95% CI	Movement/PT OR	95% CI	Spirituality OR	95% CI	Mind/Body OR	95% CI	Diet Supplement OR	95% CI
Sex												
Male (Ref)			1.00	—	1.00	—			1.00	—	1.00	—
Female			1.86*	1.06 to 3.24	1.79	0.98 to 3.26			3.98†	1.95 to 8.11	1.06	0.68 to 1.66
Age, years												
18-29	6.68‡	2.05 to 21.78	0.79	0.17 to 3.71	0.67	0.13 to 3.40	2.91	0.97 to 8.74	4.41a	1.22 to 15.88	1.41	0.54 to 3.73
30-39	6.26†	2.58 to 15.18	3.77†	1.80 to 7.88	2.06	0.93 to 4.57	3.29‡	1.44 to 7.49	6.75†	2.74 to 16.62	2.40‡	1.30 to 4.45
40-49	2.95‡	1.34 to 6.50	2.72‡	1.47 to 5.05	1.82	0.97 to 3.42	3.45†	1.78 to 6.65	4.43†	1.98 to 9.89	1.99‡	1.23 to 3.23
50-59	3.21‡	1.56 to 6.61	2.93†	1.65 to 5.20	1.25	0.69 to 2.27	2.98†	1.61 to 5.50	4.71†	2.20 to 10.08	1.32	0.84 to 2.07
60-69	1.99	0.95 to 4.18	1.44	0.79 to 2.64	0.94	0.52 to 1.69	1.92	1.02 to 3.62	2.63a	1.18 to 5.85	1.26	0.80 to 1.97
≥ 70 (Ref)	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
Education												
Some high school/graduate	1.22	0.61 to 2.42			1.17	0.63 to 2.16						
Technical school/associate degree	1.06	0.45 to 2.51			1.35	0.65 to 2.79						
Some college/bachelors	1.84*	1.03 to 3.29			1.64	0.97 to 2.79						
Graduate degree (Ref)	1.00	—			1.00	—						
Income, $												
12,500-19,999 (Ref)			1.00	—								
20,000-59,999			1.50	0.85 to 2.62								
60,000-99,000			1.89*	1.03 to 3.47								
100,000 or more			1.51	0.74 to 3.05								
Don't know or prefer not to say			1.45	0.82 to 2.57								
Race/ethnicity												
White (Ref)					1.00	—						
Hispanic					1.43	0.64 to 3.20						
African American					1.05	0.44 to 2.50						
Asian					2.03	0.92 to 4.48						
Marital status												
Married/with partner (Ref)					1.00	—						
Divorced/separated					1.72	0.97 to 3.06						
Widowed					1.07	0.54 to 2.11						
Single/never married					0.79	0.32 to 1.93						
Cancer type												
Melanoma (Ref)	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—
Breast	4.07‡	1.56 to 10.59	5.04†	2.09 to 12.12	2.46*	1.10 to 5.48	1.31	0.63 to 2.74	1.66	0.74 to 3.70	2.37‡	1.29 to 4.34
Colorectal	5.21‡	1.59 to 17.02	4.77‡	1.53 to 14.81	2.20	0.71 to 6.83	3.11*	1.20 to 8.02	2.28	0.68 to 7.58	1.62	0.67 to 3.93
Lung	1.67	0.30 to 9.17	3.50	0.91 to 13.42	2.71	0.81 to 9.01	4.45‡	1.64 to 12.07	3.10	0.91 to 10.57	4.74†	2.06 to 10.92
Prostate	6.71‡	2.11 to 21.35	7.79†	2.46 to 24.64	3.39*	1.11 to 10.41	1.90	0.67 to 5.33	3.92	0.97 to 15.87	2.10	0.90 to 4.86
Hematologic	1.76	0.57 to 5.38	5.84†	2.29 to 14.87	2.83*	1.18 to 6.76	2.07	0.93 to 4.62	2.16	0.87 to 5.36	2.01*	1.04 to 3.89
Gynecologic	3.08	0.98 to 9.68	3.26*	1.14 to 9.34	2.39	0.91 to 6.30	1.70	0.67 to 4.30	1.75	0.67 to 4.59	3.19‡	1.53 to 6.65
Other	1.89	0.62 to 5.74	3.13*	1.16 to 8.41	1.62	0.64 to 4.11	2.08	0.94 to 4.58	1.59	0.60 to 4.20	1.39	0.70 to 2.76

Abbreviations: CAM, complementary and alternative medicine; PT, physical therapy; Ref, reference.
* P ≤ .05.
† P ≤ .001.
‡ P ≤ .01.

breast (OR = 2.37; *P* = .005), lung (OR = 4.74; *P* < .001), hematologic (OR = 2.01; *P* = .039), and gynecologic (OR = 3.19; *P* = .002) cancers were significantly more likely to begin using dietary supplements after diagnosis compared with participants with melanoma.

Discussion

Better understanding of the prevalence and usage patterns of CAM is integral to optimally managing treatment of patients with cancer. To our knowledge, we report for the first time two significant findings regarding CAM use in a CCC. First, 57.6%

of patients reporting CAM use initiated use after diagnosis, suggesting the impact of their changed health status on decision making. Second, in contrast to previous studies, when CAM use was analyzed by specific modality and controlled for covariates, we found important differences in patterns of use compared with findings that grouped and analyzed CAM modalities as a single variable. In aggregate, more women than men use CAM, and "any CAM use" decreases with increasing age after 60 years.[7,9,10,12,17] However, when examining CAM modalities independently, men were no less likely than women to initiate use of special diets, movement-PT, spirituality, or dietary supplements after diagnosis. Similarly, younger age was not associated with initiation of movement-PT or mind-body modalities after diagnosis. Further, in multivariate analyses, cancer type was significantly associated with postdiagnosis initiation of all CAM modalities except for mind-body therapies. These data suggest there is not a "typology" of CAM user, but rather, use depends on the characteristics of the person with cancer and the specific CAM modality. Our findings have important implications for clinical oncology practice and institutional policies regarding integration of CAM into conventional cancer care.

Clinical Oncological Practice

CAM usage is likely to increase as cancer survival rates and access to CAM therapies continue to improve.[34,38] We documented that 75.2% of participants diagnosed with cancer were currently using at least one modality, which is consistent with previous studies.[9,10,12,39] Research shows that the majority of patients who use CAM do not discuss their usage with their physicians,[10,39] and this can pose safety risks.[4,13,17,27-30,32,40] Given the high rates of CAM usage among patients with cancer, and given that the majority of patients in our study initiated use after diagnosis, providers need to communicate early in treatment about potential risks and benefits with the goal of finding the optimal combination of CAM therapies and conventional care. This open communication can demonstrate respect for patients' health-related beliefs and behaviors, foster mutual trust, and possibly encourage better compliance with conventional treatment.[41,42]

Our findings are clinically relevant, because they demonstrate that there is not one typical CAM user, but rather, CAM usage differs by patient factors and CAM modality. Thus, providers cannot make generalizations about who may or may not be using CAM in the context of cancer care. For providers to initiate and tailor their discussions of CAM use in a meaningful way, it will be important to understand trends in the use of specific CAM modalities as presented herein. For example, dietary supplements, which pose some of the greatest risks for adverse events, are equally likely to be used by men and women. This contradicts previous studies, which reported women as the more prevalent general users of CAM,[7,9,10,12,17] a finding that might prevent some providers from querying male patients about CAM use. Similarly, increasing age was not associated with a decreased use of mind-body and movement-PT therapies. Older adults may be at increased risk for adverse events associated with some of these modalities, such as movement (eg,

yoga, exercise) and massage therapy, due to frailer skeletal structures. Thus, it would be important for a provider to discuss these options with their older patients. Finally, patients with breast, lung, hematologic, and gynecologic cancers are more likely to use dietary supplements. Providers caring for these patients will benefit from evidence-based information about the potential for supplements to interact with chemotherapeutic agents commonly used in these cancers. Future research should attend to gaining a more thorough understanding of the broad range of predictors of individual types of CAM therapies, as well as disclosure of such use, including clinical-oncologic, psychologic, behavioral, and sociologic factors.

Integration of CAM Into Conventional Care

Our findings support previous studies that show CAM use among patients with cancer is less about whether patients will incorporate CAM therapies and more about which therapies they will choose. Given the high prevalence of use— especially after diagnosis—the knowledgeable integration of CAM into conventional care is becoming necessary to safely and effectively treat patients during and after cancer therapy. There is a growing trend in community-based hospitals offering CAM therapies, as well as establishing integrative medicine clinics and centers. Independent physicians also are providing CAM services or coordinating referral to CAM providers.[43] Furthermore, health maintenance organizations and insurance companies are increasingly covering CAM services.[44] Although these strategies increase patients' access to CAM therapies, they do not facilitate holistic care in which CAM and conventional providers work collaboratively to employ the best empirically based treatments. Effective integration of CAM and conventional oncology care will require institutions to develop and implement policies, practices, and educational programs that support integrative oncology services. Such an approach will help patients and providers to make informed decisions that maximize benefit and minimize harm.

Limitations

This study has several limitations. First, it was conducted at a single institution, so the sample may not represent all persons with a cancer diagnosis, but rather, the population of cancer patients in the center's catchment area. Individuals more inclined to use CAM therapies might have been more likely to participate, and geographic area mighty affect the variation in CAM modalities as a result of differences in access to providers and knowledge of CAM. However, rates of CAM use were consistent with those from previously published studies.[9,10,12,39] The frequencies of cancer diagnoses in our sample differed from national statistics (eg, prostate was the most frequent cancer nationally, but breast was most frequent in our sample). The sample also was restricted to English-literate patients, although a study of acculturation showed that CAM use in the United States is associated with English language proficiency, even after accounting for socioeconomic status, health insurance coverage, self-reported health status, and other demographic variables.[45] The sample also predominately included

white participants and likely is not representative of the general population of patients with cancer. Finally, a proportion of the eligible patients declined to participate in the study, and the reasons for nonparticipation are unknown.

Despite its limitations, this study provides important information about the types of CAM therapies used by patients with specific cancers, and more important, the initiation of use after diagnosis. In addition, we report independent patient characteristics associated with incident CAM use after diagnosis. These results might be used to facilitate patient-provider communication about CAM use, especially during treatment planning immediately after a cancer diagnosis, and to lay the groundwork for developing educational and clinical models integrating CAM and traditional medicine for comprehensive cancer treatment, palliation, and survivorship care. Future studies should confirm our findings in a more representative sample that includes patients undergoing treatment in community settings as well as CCCs.

Authors' Disclosures of Potential Conflicts of Interest
The author(s) indicated no potential conflicts of interest.

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Conception and design: All authors

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Appendix

Table A1. CAM Therapies: General Types and Specific Therapies

Type of CAM Therapy	Specific Therapies
Special diet	Lacto-ovo vegetarian (no meat)
	Vegan (no meat, dairy, eggs)
	Macrobiotic
	Gerson's diet treatment
	Other (list)
Psychotherapy	Social worker
	Psychologist
	Psychiatrist
	Support group
	Other (list)
Movement/PT	Exercise
	Yoga
	Tai chi
	Chi gong
	Chiropractic/osteopathic
	Massage
	Other (list)
Mind/body	Imagery/visualization
	Hypnosis
	Meditation
	Biofeedback
	Massage therapy
	Reiki
	Energy healing/therapeutic touch
	Journaling
	Music therapy
	Other (list)
Spiritual practices	Prayer
	Prayer/spiritual healing (by others)
	Other (list)
Dietary supplements	Multivitamins/minerals
	Vitamin E
	Vitamin C
	Soy supplement (isoflavones, pills)
	Echinacea
	Garlic (pill form)
	Selenium
	Saw palmetto
	Green tea (EGCG, pills)
	Coenzyme Q10
	St. John's wort
	Melatonin
	Essiac
	Mistletoe (Iscador)
	Continued on next page

Type of CAM Therapy	Specific Therapies
	Milk thistle
	PC SPES
	Laetrile
	Shark cartilage
	Bovine cartilage (Catrix)
	Other (list)
Additional therapies	Homeopathy
	Ayurvedic remedies
	Bioelectro-magnetic therapies
	Acupuncture
	Folk remedies
	Other (list)

Abbreviations: CAM, complementary and alternative medicine; EGCG, epigallocatechin gallate; PC SPES, herbal supplement promoted for prostate health, containing the herbs crysanthemum morifolium, ganoderma lucidum, glycyrrhiza glabra, isatis indigotica, panax pseudoginseng, rabdosia rubescens, scutelleria baicalensis, and serenoa repens; recalled in 2012 after prescription medications found in product; PT, physical therapy.

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