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Do Attitudes and Beliefs About Complementary and Alternative Medicine Impact Utilization Among Patients with Cancer? A Cross-Sectional Survey

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Abstract

Background—Complementary and Alternative Medicine (CAM) incorporates treatments used by cancer survivors in the attempt to improve quality of life. While population studies have identified factors associated with use, assessment of why patients use CAM or the barriers against utilization have not been examined.

Patients and Methods—We conducted a cross-sectional survey study in the thoracic, breast, and gastrointestinal medical oncology clinics at an academic cancer center. Clinical and demographic variables were collected by self-report and chart abstraction. Attitudes and beliefs were measured using the validated Attitudes and Beliefs about CAM (ABCAM) instrument. This instrument divides attitudes and beliefs into three domains: expected benefits, perceived barriers, and subjective norms.

Results—Among 969 participants (response rate 82.7%) surveyed between June 2010 and September 2011, patient age 65, female gender and college education were associated with significantly greater expected benefit from CAM ($p < 0.0001$ for all). Non-white patients reported more perceived barriers to CAM use than white patients ($p < 0.0001$), but had a similar degree of expected benefit ($p = 0.76$). In a multivariate logistic regression analysis, all domains of the ABCAM instrument were significantly associated with CAM use ($p < 0.01$ for all) among patients with cancer. Attitudes and beliefs about CAM explained much more variance in CAM use than clinical and demographic variables alone.

Conclusion(s)—Attitudes and beliefs varied by key clinical and demographic characteristics, and predicted CAM utilization. By developing CAM programs based upon attitudes and beliefs, we may be able to remove barriers among underserved patient populations and provide more patient centered care.

Keywords

Complementary and alternative medicine; cancer; attitudes and beliefs

Introduction

Cancer accounts for nearly 1 of every 4 deaths in the U.S.,⁽¹⁾ but recent advances in therapeutics have led to improved survival after diagnosis. As of January 1, 2012 there were approximately 13.7 million cancer survivors living in America, and this patient population is growing.⁽²⁾ To meet their unique needs, patients with cancer seek treatments both within and outside the standard allopathic paradigm.⁽³⁾ Indeed, up to 67% of cancer survivors utilize Complementary and Alternative Medicine (CAM).^(4, 5) Most CAM modalities are based upon centuries old tradition and have historically not been supported by modern evidence. More recently, however, there have been studies showing efficacy for selected therapies in the treatment of multiple cancer related toxicities.^(6–8) The evidence-based incorporation of these modalities into traditional cancer care is an emerging field, termed integrative oncology.⁽⁹⁾ Many leading academic cancer centers are developing integrative oncology centers to ensure that the research on CAM efficacy is performed in a scientifically rigorous fashion.

The decision for an individual to use CAM is complex and driven by multiple factors.^(10, 11) Prior studies have found clinical and demographic variables such as female gender, higher level of education,^(12–14) non-Hispanic white race,⁽⁵⁾ diminished functional status⁽¹⁵⁾ and younger age⁽¹⁶⁾ predict CAM use in the general population and in cancer patients. While clinical and demographic variables are useful in describing CAM users, they provide limited opportunity to understand what prompts a patient to use CAM. Few studies have utilized a theory-driven, validated instrument to characterize why patients with cancer use CAM⁽¹⁷⁾.

Our group has designed such an instrument, based upon the Theory of Planned Behavior (TPB). Our application of the TPB framed CAM use as a health behavior, and purported that the intention to use CAM is an important precursor to utilization. We chose to base our instrument on a theoretical model because prior efforts have shown that this improves the

predictive accuracy of a health behavior instrument.(18) The TPB puts forth that a person chooses a particular behavior as a result of expected consequences of the behavior (e.g. improved symptom burden, fear of adverse side effects from CAM), relative difficulty of engaging in the behavior (e.g. insurance coverage, availability of appropriately trained providers), and social normative pressures regarding the behavior (e.g. cultural attitudes towards CAM use, advice from treating oncology team).(19) The TPB has previously been shown to be predictive of CAM use in cancer and non-cancer populations.(17, 20, 21)

While both social factors and the TPB have previously been associated with CAM use independently, no prior work has evaluated how these factors in combination predict CAM utilization. The primary objective of this research is to examine how clinical and demographic factors impact attitudes and beliefs about CAM among patients with cancer, as seen through the lens of the TPB. We also evaluated whether, adjusting for clinical and demographic variables, patient attitudes and beliefs predict CAM utilization. We hypothesized that patient attitudes and beliefs would be correlated with important demographic and clinical factors predicting CAM use and that the attitudes and beliefs would influence CAM utilization. Our hypothesis was also grounded in TPB, as a patient's clinical and demographic profile likely has a direct linkage to how expected consequences, difficulty in engagement, and social normative pressures predict health behaviors.

Methods

Study Design and Patients

We conducted a cross-sectional survey among a consecutive convenience sample of patients seen in the breast, thoracic, and gastrointestinal outpatient medical oncology clinics at the Abramson Cancer Center at the University of Pennsylvania between June 2010 and September 2011. Eligible participants were 18 years of age or older, had a primary diagnosis of cancer, and a Karnofsky performance score of 60 or greater. Additional inclusion criteria stipulated the approval of the patient's oncologist and the patient's ability to understand and provide informed consent in English. Patients were excluded if they were new patients (defined as patients who were being seen for the first time in the outpatient clinic), or if for any reason they were unable to understand the requirements of the study. Trained research assistants approached potential study subjects in the waiting area of the oncology clinics. After a written informed consent process, each participant was given a self-report survey. The survey took approximately 20 minutes to complete, and patients were given a small gift card for completing it. The institutional review board of the Hospital of the University of Pennsylvania approved the study protocol.

Study Variables

Attitudes and Beliefs About CAM: Primary Dependent Variable—To measure attitudes and beliefs, we used the Attitudes and Beliefs about CAM (ABCAM) instrument. ABCAM was based on the TPB, and was developed by our group to evaluate the specific behavioral predictors of CAM use. ABCAM was developed and validated in the outpatient oncology population (n=317), and consists of 15 items divided into 3 domains: expected benefits (4 items, $\alpha=0.91$), perceived barriers (7 items, $\alpha=0.76$) and subjective norms (4

items, $\alpha=0.75$). These domains correlate to behavioral beliefs, control beliefs, and normative beliefs within the TPB.(19) Each domain has a possible score from 0–100, and is evaluated separately without the use of a summative score. A higher score indicates greater expected benefits, perceived barriers, and more positive subjective norms. In the validation cohort, the mean scores (standard deviation) in each domain, respectively, were 60.68 (19.49), 46.10(13.43), and 49.58(14.79). Criterion validity was confirmed through comparison to the CAM Beliefs Inventory, another validated instrument.(22)

CAM Use Since Cancer Diagnosis: Secondary Dependent Variable—To measure CAM use, we asked patients “Have you used the following CAM therapies since your cancer diagnosis?” We then provided a list of CAM treatments, including acupuncture, chiropractic care, special diet, energy healing, expressive arts therapy, herbs, homeopathy, massage, relaxation techniques, supplemental vitamins (besides a daily multivitamin), yoga, tai chi, and other. We specifically excluded prayer for healing because our group had previously shown that this exhibits a distinct epidemiologic profile to other CAM modalities. (5) We then dichotomized participants into those who had used CAM since diagnosis and those who had not. Our prior research in this population revealed a wide distribution of CAM modalities used,(11) and to complete separate analyses for each CAM modality would require more statistical power.

Covariates—Demographic factors, such as age, gender, race, education level, employment status and marital status were acquired through patient self-report. Clinical factors, such as type of cancer, stage, and treatment and diagnostic history were obtained through chart abstraction. Cancer stage was dichotomized into localized or metastatic disease at the time of survey. The Institutional Review Board of the University of Pennsylvania approved this study.

Statistical Analyses

The sample size was based upon a conservative effect size of 0.2 (score equivalent 2.6–3.8) on each of the ABCAM domains. With 969 patients, we would have a power of 86.9% to detect such a difference, assuming a two-sided error of 0.05. We used descriptive statistics to calculate the distribution of the independent and dependent variables. We used t tests or ANOVA to identify clinical and demographic factors that were associated with subdomain scores on the ABCAM. We then created two multivariate logistic regression models to predict CAM use. In the first model, we only included clinical and demographic factors. In the second model, we included the ABCAM subdomain scores. Pseudo- R^2 values were recorded for comparison between the models. All analyses were two sided and a p value of less than 0.05 was considered significant.

Results

Baseline Characteristics of Participants

Of the 1188 consecutive patients approached, 1068 (89.9 %) agreed to participate. Main reasons for 120 (10.1%) patients to decline were inability to complete the survey due to lack of time or sickness (21, 1.8%) and not wanting to participate in research (99, 8.3%).

Additionally, 31 subjects withdrew consent, 33 subjects did not return the survey, and 35 subjects were excluded from the analysis due to incomplete data. This led to the final sample size of 969. This population reflected a response rate of 81.6% among eligible subjects. (See Figure 1)

The mean age of survey participants was 59.1 ± 12.1 , 63.4% were female, 78.6% were Caucasian, 69.1% were married or living with a partner, 74.4% of participants had completed at least some time in college, and 47% were currently employed. There was a relatively even distribution of breast, gastrointestinal and lung cancers represented (32.7%, 32.3% and 30.6%, respectively) and 45.2% of patients had metastatic disease. Patients who were diagnosed less than 1 year before survey participation made up 45.2% of the sample. Of those surveyed, 58.5% of patients surveyed had used some form of CAM since diagnosis. (See Table 1) The distribution of specific CAM modalities in this population has been reported elsewhere(11) and is beyond the scope of this paper, but the most commonly used modalities were vitamins, herbs, relaxation techniques, and special diets.

Relationship Between Clinical/Demographic Factors and Attitudes and Beliefs

The expected benefits subscale characterizes what patients believe they will gain through the use of CAM. Age less than or equal to 65 was associated with significantly greater expected benefit from CAM ($p < 0.0001$, Table 2). Females ($p < 0.0001$) and those who had completed at least some college ($p < 0.0001$) also expected more benefit. Active employment was strongly associated with an expected benefit from CAM ($p = 0.0004$), as was a history of cancer surgery ($p = 0.011$), and increasing time since cancer diagnosis ($p = 0.0071$). As hypothesized, those who had used CAM perceived greater benefit than nonusers ($p < 0.0001$).

The perceived barriers subscale assesses patient perspective on factors that may prevent them from using CAM. Non-white patients perceived more barriers compared to White patients ($p = 0.0001$, Table 2). In an exploratory sub-analysis, we found Non-white patients were more likely to cite problems with transportation to CAM appointments and concern for side effects as barriers than White patients (See Figure 2). In addition, patients who had received chemotherapy perceived more barriers to CAM use ($p=0.024$). Consistent with the findings in the expected benefits subscale, those who were less than or equal to 65 years old ($p=0.027$), females ($p=0.0091$), had completed at least some college ($p < 0.0001$), were employed ($p=0.032$) or had used CAM ($p<0.0001$) perceived fewer barriers.

The subjective norms subscale describes how patients perceive social norms, both positive and negative, regarding the use of CAM. Factors associated with subjective norms were consistent with the other two subscales, with age less than or equal to 65 ($p<0.0001$, Table 2), female gender ($p=0.0097$), having completed at least some college ($p=0.0063$), active employment ($p=0.022$), and history of CAM use ($p<0.0001$) being associated with positive subjective norms about CAM use.

Relationship Between Attitudes and Beliefs, Clinical/Demographic Factors and CAM use

A multivariate logistic regression model was created to evaluate the association of demographic and clinical variables with CAM use. In this model, age less than or equal to

65 years ($p<0.0001$), completion of at least some college ($p=0.002$), absence of chemotherapy exposure ($p=0.025$) and greater than 12 months since cancer diagnosis ($p=0.0002$ and 0.001) were associated with CAM use. The pseudo- R^2 of this model was 0.05. When attitudes and beliefs were incorporated into the model, age no longer reached statistical significance, and all other clinical and demographic factors had a lesser Adjusted Odds Ratios (aOR). This effect was most marked in gender and education, where the aOR changed by over 20% between the two models. (see Table 3). All domains of the ABCAM instrument were strongly associated with CAM use, with expected benefit and subjective norms ($p<0.0001$ for both) having a positive association and perceived barriers ($p=0.007$) having a negative association. The pseudo- R^2 of the model incorporating attitudes and beliefs was 0.14, indicating the second model accounted for a greater degree of variance in CAM use.

Discussion

To our knowledge, we report for the first time the clinical and demographic factors associated with attitudes and beliefs about CAM as well as the predictive value of these attitudes and beliefs to utilization among cancer patients. We found that clinical and demographic factors previously associated with CAM use(4, 11, 16) were associated with various aspects of attitudes and beliefs. We also found that attitudes and beliefs explained a greater proportion of variance in CAM utilization than clinical and demographic factors alone. This suggests that attitudes and beliefs are an important and potentially modifiable factor regarding CAM utilization, and that attitudes and beliefs may be targeted as integrative oncology services are being developed to better meet the needs of varied patient populations in the context of conventional cancer care.

Our finding that age, gender and education level were associated with greater expected benefits from CAM confirms our primary hypothesis, given how consistently these factors have been associated with CAM utilization.(4, 16) On a research level, the next step would be to target CAM efficacy trials based upon attitudes and beliefs. We now have data that these patients are using these treatments and believe they gain benefit from them. As a scientific community, we must perform rigorous research on these widely used therapies, so that we can counsel patients appropriately on treatment efficacy and how they can be used safely in the context of conventional cancer care. On a clinical level, where CAM and integrative oncology programs are already in place, we must ensure we are aligning our service delivery with patient desires so that we can further optimize outcomes

The perception of greater barriers to CAM treatments among minority patients represents a potential source of access disparity. While prior work has shown that patient preferences regarding CAM treatment modalities vary by race and ethnicity,(23) such work cannot fully explain racial/ethnic variations in perceived access barriers to CAM treatments. In our study, the significantly different access barriers between White and Non-white patients were focused on concern for side effects and transportation to CAM appointments. The issue of transportation emphasizes the fact that current CAM programs may be in areas with a large White population, where CAM utilization is already high. Non-white patients may thus need to travel a longer distance to reach their CAM appointments. Concerns about side effects are

a very real and legitimate concern regarding the use of CAM. Integrative oncology as a field aims to incorporate CAM treatments in an evidence-based fashion, under the guidance of physicians and after consultation with treating oncologists. The goal is to provide CAM therapies in the safest possible fashion.(9) The presence of increased perceived barriers secondary to both transportation and side effect concerns thus make the case for prioritization of the development of integrative oncology programs in populations with many Non-white patients. In future research, one could compare the relative perceived barriers when a CAM or integrative oncology program is in an area with a largely Non-white versus a largely White population. As efficacy has been noted with the use of certain CAM modalities,(8, 24, 25) wider access to these treatments should be prioritized.

We were able to show that attitudes and beliefs accounted for more variance in CAM utilization than clinical and demographic factors alone. The ABCAM instrument was designed using the TPB as a theoretical model, and evaluates CAM use as a health behavior. This theoretical model has already effectively been used to help health systems target behaviors and make changes to improve patient outcomes.(26, 27) In viewing CAM use as a health behavior that aims to improve specific cancer related toxicities, we can potentially target attitudes and beliefs to develop patient-centered integration of CAM to usual cancer care. This would lead to broader access to CAM, and allow for further research into the efficacy of these treatment modalities. For instance patients with lung cancer have a high symptom burden relative to other malignancies,(28) but based purely on demographic factors classically associated with CAM utilization (e.g. female gender, lack of a tobacco history) they may not be targeted for CAM interventions. However, our group has previously shown that CAM utilization in lung cancer is comparable to that seen in population studies. (11) The current study indicates that attitudes and beliefs regarding CAM may be an important force driving this discrepancy. By targeting integrative oncology programs based upon attitudes and beliefs, we will be able to evaluate efficacy in the broadest possible population.

There are important limitations to consider in interpreting our results. First, the cross sectional design limits inferences of causality, and prospective validation should be done to confirm the temporal relationship between attitudes and beliefs and CAM utilization. Second, our study focused on three malignancy groups. While we do not know the degree of generalizability to the overall cancer population, these cancers represent a significant portion of the overall cancer burden in the United States.(1) Next, our measure of CAM utilization dichotomized use into users and non-users. This binary grouping enhanced our statistical power, but prevents a deeper understanding of the nuances of CAM utilization. For instance, we are unable to evaluate how attitudes and beliefs affect the extent of CAM utilization (e.g. one time massage use versus daily use of multiple modalities). Lastly we used the TPB as a theoretical model and, as with any theory-based research, we may have missed other important attributes that predict CAM use.

These limitations notwithstanding, our study has a number of important implications. While population studies have established clinical and demographic factors associated with CAM use,(4, 5, 16) such analyses have limited ability to characterize why patients with cancer utilize CAM. For instance, clinical and demographic factors fail to identify patients who are

interested in CAM but do not utilize services due to perceived barriers. Our identified social-demographic variations in attitudes and beliefs may serve as a foundation to develop theory-driven interventions that can target the beliefs and attitudes that ultimately influence the use of CAM among patients with cancer. A better understanding of the psychological components of CAM use is essential to delivering comprehensive, patient-centered care. By targeting new integrative oncology programs based upon attitudes and beliefs, rather than on clinical and demographic factors or existing utilization, we may be able to broaden access to these treatments.

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Figure. 1.

Figure. 2.
Barriers to CAM by Race

TABLE 1

Characteristics of Survey Participants

Characteristic	Total	%
Age, y		
65	660	68.1
65	309	31.9
Sex		
Male	355	36.6
Female	614	63.4
Race/ethnicity		
White	761	78.6
Nonwhite	207	21.4
Education		
High school	248	25.6
>College	719	74.4
Employment		
No	508	53
Yes	451	47
Marital status		
Not married	294	30.9
Married/living with partner	657	69.1
Cancer type		
Breast	316	32.7
Gastrointestinal	313	32.3
Lung	296	30.6
Other	43	4.4
Cancer stage		
Localized disease	526	54.8
Metastatic disease	434	45.2
Surgery		
No	356	36.9
Yes	608	63.1
Radiotherapy		
No	503	52.2
Yes	461	47.8
Chemotherapy		
No	142	14.7
Yes	822	85.3
Time since diagnosis		
12 mo	433	45.2
>12 and 36 mo	242	25.3
>36 mo	283	29.5

Characteristic	Total	%
CAM use		
No	401	41.5
Yes	566	58.5

Abbreviation: CAM, complementary and alternative medicine.

TABLE 2

Factors Related to Attitudes and Beliefs Regarding CAM Use

	Expected Benefits			Perceived Barriers			Subjective Norms		
	Mean	SD	p Value ^a	Mean	SD	p Value ^a	Mean	SD	p Value ^a
Age, y			<.001			.027			<.001
65	63.9	18.6		45.4	14.7		50.3	13.1	
65	57.6	19.7		47.6	14.6		462	14.4	
Sex			<.001			.0091			.0097
Male	56.3	19.2		47.7	13.8		47.5	13.3	
Female	65.2	18.5		45.2	15.2		49.9	13.8	
Race/ethnicity			.76			<.001			.92
White	61.8	19.3		45.1	14.7		49.0	13.5	
Nonwhite	62.3	18.8		49.7	14.2		48.9	14.4	
Education			<.001			<.001			.0063
High school	57.4	18.6		49.6	14.1		46.9	13.8	
>College	63.5	19.2		44.9	14.7		49.7	13.6	
Employment			<.001			.032			.022
No	59.9	18.9		47.0	14.6		48.1	14.8	
Yes	64.3	19.5		45.0	14.8		50.1	12.1	
Marital status			.7			.32			.50
Not married	61.6	19.1		46.6	15.5		48.6	14.6	
Married/living with partner	62.1	19.4		45.6	14.4		49.3	13.2	
Cancer type			<.001			.35			.066
Breast	67.9	17.6		44.9	14.8		50.6	14.2	
Gastrointestinal	59.4	18.9		46.7	14.7		47.7	12.7	
Lung	58.9	19.7		46.8	14.4		48.6	13.9	
Other	57.1	19.6		45.6	15.6		49.8	13.6	
Cancer stage			.49			.062			.93
Localized	62.3	19.5		45.3	15.1		49.0	13.9	
Metastatic	61.5	19.0		47.1	14.1		49.0	13.4	
Surgery			.011			.12			.70

	Expected Benefits			Perceived Barriers			Subjective Norms		
	Mean	SD	p Value ^a	Mean	SD	p Value ^a	Mean	SD	p Value ^a
No	59.8	18.2		47.1	13.7		48.8	12.8	
Yes	63.1	19.8		45.5	15.3		49.1	14.2	
Radiotherapy			.62			.21			.15
No	62.2	18.6		46.7	14.4		48.4	12.9	
Yes	61.6	20.0		45.5	15.1		49.7	14.4	
Chemotherapy			.85			.024			.84
No	62.2	20.4		43.5	15.1		49.2	13.1	
Yes	61.9	19.1		46.5	14.6		49.0	13.8	
Time since diagnosis			.0071			.41			.74
12 mo	59.8	20.0		46.8	14.4		49.0	13.0	
12–36 mo	63.3	19.3		45.2	15		48.5	14.1	
>36 mo	64.0	17.7		45.8	15.1		49.4	14.4	
Integrative oncology use			< .001			< .001			< .001
No	54.0	17.5		49.6	12.7		44.9	13.0	
Yes	67.5	18.4		43.7	15.5		51.8	13.4	

Abbreviations: CAM, complementary and alternative medicine; SD, standard deviation.

^a Bold type indicates statistical significance.

TABLE 3

Factors Associated With Use of Integrative Oncology

Characteristic	Multivariate Analyses: Model 1				Multivariate Analyses: Model 2			
	OR	95% CI	p Value ^a	OR	95% CI	p Value ^a	OR	p Value ^a
Age, y								
65	1.00	—	—	1.00	—	—	—	—
>65	0.71	0.52–0.98	.035	0.84	0.60–1.18	.320		
Sex								
Male	1.00	—	—	1.00	—	—	—	—
Female	1.73	1.30–2.30	<.001	1.43	1.05–1.94	.023		
Race/ethnicity								
White	1.00	—	—	1.00	—	—	—	—
Nonwhite	1.06	0.75–1.48	.75	1.10	0.76–1.57	.62		
Education								
High school	1.00	—	—	1.00	—	—	—	—
College	1.66	1.21–2.29	.002	1.44	1.02–2.02	.037		
Employment								
No	1.00	—	—	1.00	—	—	—	—
Yes	1.15	0.86–1.53	.35	1.00	0.73–1.37	1.00		
Surgery								
No	1.00	—	—	1.00	—	—	—	—
Yes	1.02	0.76–1.37	.87	0.99	0.73–1.36	.98		
Chemotherapy								
No	1.00	—	—	1.00	—	—	—	—
Yes	0.63	0.42–0.94	.025	0.64	0.41–0.98	.041		
Time since diagnosis								
12 mo	1.00	—	—	1.00	—	—	—	—
12–36 mo	1.72	1.22–2.42	.002	1.6	1.11–2.31	.012		
>36 mo	1.81	1.29–2.54	.001	1.76	1.23–2.53	.002		
Expected benefits	—	—	—	1.37	1.24–1.51	<.001		
Perceived barriers	—	—	—	0.85	0.76–0.96	.007		

Multivariate Analyses: Model 1					Multivariate Analyses: Model 2				
Characteristic	OR	95% CI	p Value ^a		OR	95% CI	p Value ^a		
Subjective norms	–	–	–		1.29	1.14–1.47	<.001		
Pseudo-R ² value					.0514		.1442		

Abbreviations: 95% CI, 95% confidence interval; OR, odds ratio.

^a Bold type indicates statistical significance.