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Complementary and alternative therapies among very long-term breast cancer survivors

C. L. Carpenter
Center for Human Nutrition, David Geffen School of Medicine at UCLA, University of California at Los Angeles, 900 Veteran Ave, Box 951742, Los Angeles, CA 90095, USA

P. A. Ganz
Jonsson Comprehensive Cancer Center and School of Public Health, University of California at Los Angeles, Los Angeles, CA 90095, USA

L. Bernstein
Department of Cancer Etiology, City of Hope Comprehensive Cancer Center, Duarte, CA 91010, USA

Abstract

Breast cancer patients may have different complementary and alternative medicine (CAM) usage rates and may turn to CAM for different reasons than healthy adults. CAM has mostly been studied in recently diagnosed women; no studies have included survivors 10 years post-diagnosis. We examined very long-term breast cancer survivors to determine whether CAM users had dissimilar patterns of association with survivorship factors. Interviews of 374 breast cancer case patients from a population-based case–control breast cancer study of young women from Los Angeles County, California, during the 1980s occurred at follow-up; 371 patients with complete information were included. CAM represented 28 herbal remedies. Quality-of-life originated from the Medical Outcomes Study Short Form 36 questionnaire (SF-36). Higher rates of CAM (59%) usage occurred compared to nationwide estimates. CAM users resembled non-users on follow-up age, exercise, original disease, treatment, smoking, body-mass index, alcohol, and fear of recurrence. CAM users had a higher prevalence of medical co-morbidities ($P = 0.0005$), and scored significantly lower on the SF-36 emotional well-being subscale than non-CAM users ($P = 0.01$). CAM users and non-users did not differ on the SF-36 physical sub-scale. Very long-term breast cancer survivors who use CAM may have poorer emotional functioning and more medical problems than non-users.

Keywords

Breast neoplasms; Complementary therapies; Survivors

Introduction

High percentages of Americans use complementary and alternative therapies. Data from the 2002 U.S. National Health Interview Survey (NHIS) show that during the past 12 months, 62% of adults age 18 years and over used some form of complementary and alternative medicine (CAM), including prayer for health reasons, and, when prayer was excluded, 36% of adults used some form of CAM [1]. Among healthy adults, the main reasons for recent

ccarpenter@mednet.ucla.edu .

use of CAM include the belief that "CAM combined with conventional medical treatments would help, or they thought it would be interesting to try [1]." Even with the high prevalence of CAM among healthy adults, however, few studies have been conducted on whether CAM occurs to a greater or lesser degree among adults suffering from serious health conditions such as cancer, and whether CAM might be associated with survivorship factors.

CAM has several definitions. Cassileth and Deng describe complementary therapies as therapies used as "adjuncts" to mainstream cancer care, and alternative therapies as therapies used to replace mainstream treatment [2]. CAM, defined by the CDC is, "a group of diverse medical and health care systems, therapies, and products that are not presently considered part of western conventional medicine," which includes alternative medical systems, biologically based therapies, manipulative and body-based therapies, and mind-body therapies, including prayer [1].

Cancer patients, in general, may be less likely to use CAM because of their serious health condition. That is, in particular, breast cancer patients may be more compliant with conventional treatments due to fear that their cancer may worsen if they do not follow a strictly western medical regimen. On the other hand, some breast cancer patients may be more likely to turn to CAM because of their beliefs that conventional therapies are not working, or more commonly, may use CAM in addition to their conventional therapy.

Most studies that evaluated CAM usage in relation to quality-of-life (QOL) and other prognostic variables were conducted among patients within 5 years of initial diagnosis [3–10]. One study evaluated CAM usage in a large sample of women who were diagnosed from 5 to 10 years earlier [11], but none have evaluated CAM use among survivors of more than 10 years since diagnosis. Several of these studies found poorer mental health functioning among CAM users compared to non-users, including the study of survivors who were between 5 and 10 years post-diagnosis [6, 8, 11], but whether the same occurs among very long-term survivors is not known. To address whether QOL and other differences occur according to CAM usage, we evaluated patterns of association between CAM usage and QOL along with other psychosocial, lifestyle, behavioral, and medical characteristics in a cohort of breast cancer patients diagnosed more than 10 years earlier who were previously studied in a population-based case–control study of young women [12].

Methods

We conducted a follow-up interview with women who participated as case patients in a population-based epidemiological case–control study of breast cancer in young women in Los Angeles County. The original study was restricted to White women who were diagnosed with in situ (n = 68) or invasive (n = 676) breast cancer at age 40 years or younger between July 1, 1983 and December 31, 1988. The design and recruitment procedures for the first study have been detailed previously [12]. The original study was restricted to White women diagnosed at age 40 years or younger to permit detailed study of the impact of oral contraceptive use [13], exercise activity [12], breast-feeding [14], and reproductive practices [15] on breast cancer risk in a homogenous population group.

In 1998 and 1999, we attempted to re-contact every woman who had survived (see reference [16] for more details). Of the 744 women with breast cancer who participated in our original study, 276 were known to have died by that time. We therefore had 468 women potentially eligible for contact. Of these, 78 women were not located (16.7%), 6 subjects refused (1.3%), and 10 women were interested but unable to schedule an interview during the study period (2.1%). Three hundred seventy-four (374) women (response rate 79.9% assumes all

who were not located were alive) were re-contacted and interviewed. Informed consent was obtained from each subject during the initial in-person interview conducted soon after diagnosis and prior to the telephone interview. We restricted the sample to 371 women who had complete information on all covariates. Interviews were conducted on average, 13.2 years after diagnosis. Study procedures were approved by the University of Southern California Research Committee, in accordance with assurances approved by the U.S. Department of Health and Human Services. Telephone interviews were conducted by a single study interviewer, as were in-person interviews during the original case–control study.

Interview

The telephone interview at follow-up covered the following domains: demographic information; surgical and reconstructive history; disease-related factors; reproductive history since diagnosis; lifestyle factors after diagnosis; CAM usage; weight and QOL measures. Subjects were mailed a list of items or scales that related to their questionnaire responses in advance of their telephone interview to assist them with response to scales. This study focuses on CAM usage in relationship to demographic information, exercise activity, medical data, and QOL.

QOL assessment

Health-related QOL was measured using the Medical Outcomes Study Short Form 36 (SF-36) questionnaire. This widely used self-report measure contains 36 items in eight subscales (physical functioning, bodily pain, role limitations due to physical functioning, role limitations due to emotional problems, emotional well-being, social functioning, energy/fatigue, and general health perceptions) [17, 18]. Each subscale represents a combined score (range: 0–100) derived from questions related to a particular health concept. The SF-36 has been shown to be both valid and reliable [18]. Mental health scale (MCS) and physical health scale (PCS) summary scores account for 81.5% of the reliable variance in the eight SF-36 scales and are therefore useful in providing a summarized interpretation [19, 20]. In addition, these scales are scored in reference to a normal population [21].

We measured “Fear About Recurrence,” using six questionnaire items that included, “worrying about future health status,” and “worrying that my cancer will return”, as well as other questions that measured health-related anxiety about the future. Each item contained a 5 point Likert scale that ranged from strongly disagree to strongly agree. “Fear About Recurrence” questions originated from studies of breast cancer survivors and QOL conducted by Ganz et al. [22, 23].

Exercise activity data

In the original case–control study we conducted in-person interviews with each subject, using a life-events calendar to facilitate recall of reproductive events, contraceptive practices, and exercise activity [12]. Initially, we collected detailed information on exercise activities engaged in at least twice a week, recording duration and type of activity at ages 10, 16, and 25 years. Following completing of interviews with the first 199 case patients in our original study, we changed the data collection procedures used with the 545 case patients who were then recruited, and collected lifetime histories of exercise activity in which the woman engaged at least twice a week, recording ages started and stopped activity, duration of activity, and type of activity. The reliability of this method of collecting information on exercise activity, termed “cognitive interviewing,” has been demonstrated [24]. Among the 371 survivors participating in the present study, 95 were in the initial group of 199 and provided information on exercise activity only at the three ages queried; 276 provided a lifetime history of exercise activity. Exercise and body-mass-index data reported in the

original case–control study were included in this study [12]. Data from years two and nine from the follow-up interview were averaged. We selected years two and nine from the follow-up interview because these two years captured activity following recovery as well as activity at a time point reported by all women (minimum follow-up since diagnosis was 10 years). We computed the MET-hours of exercise activity for each of the 20 years prior to diagnosis and each of the 10 years following diagnosis for those women who provided information on lifetime exercise activity in the case–control interview, using the Compendium of Physical Activities [25].

Disease stage, comorbidity, and treatment data

Stage at breast cancer diagnosis, obtained from the University of Southern California Los Angeles County Cancer Surveillance Program, was categorized into in situ disease, invasive localized breast cancer, and a third category representing regional and metastatic disease. Patient comorbidity at follow-up was assessed from a medical condition checklist. These included 27 medical conditions encompassing cardiovascular diseases (e.g., high blood pressure requiring medication, angina, having had an angiogram, high cholesterol, clotting disorder, or stroke), respiratory problems (asthma or allergy disorder affecting breathing), inflammatory condition (arthritis, gall bladder disease, diabetes), musculoskeletal (osteoporosis, recent fracture), nervous system disorder (migraines, hearing loss psychiatric problem), drug abuse (alcohol or other drug), as well as an option for the subject to state a condition not on the list. Subjects who reported having any of the listed medical conditions in the past six months were considered to have a co-morbid condition. Each medical condition was considered mutually exclusive. If more than one medical condition was reported, subjects were classified as having multiple conditions.

Cancer-related conditions after diagnosis, obtained by self-report, was represented by history of lymphedema, second breast cancer, recurrence of the primary breast cancer, diagnosis of cancer in another site, and history of any metastasis. More than one condition was recorded as multiple.

Breast cancer treatment included type of surgery, history of breast reconstruction, chemotherapy treatment (yes or no), radiation treatment (yes or no), and hormonal therapy (yes or no). In many instances women received additional treatment after their initial treatment episode for their primary diagnosis. That is, women with recurrences or second breast cancers often received additional surgeries such as mastectomies of their unaffected breast, wider excisions of their initial surgery site, or mastectomies that followed lumpectomies. In those instances, the most invasive surgery was considered representative of type of surgery received.

CAM usage

CAM usage was measured by summarizing responses to the “Alternative Remedies List” where subjects reported on whether, they had taken within the past six months, herbal or alternative remedies from a list of 28 commonly used alternative remedies. The herbs and remedies included: bee pollen, licorice root, black cohosh, mother wort, blue cohosh, nux vomica, chaste berries, progesterone topical (vitex agnus cactii), cream (wild Mexican yam), chickweed tincture, pulsatilla, dong quai (tong Kwai), royal jelly, echinacea, sage tea, evening primrose oil, sarsaparilla, false unicorn, sepia, garlic, St. John's Wort, ginko biloba, valeriana, ginseng, wild yam root, herbal tea used as a remedy, shark cartilage, or lachesis. Responses to these questionnaire items were summarized into a “usage of CAM” versus “non-usage of CAM” variable. Demographics, co-morbidity, extent of original disease, lifestyle, QOL, exercise, and body composition were compared according to CAM usage.

Statistical analysis

Analysis of variance and Chi-square tests were used to evaluate differences in medical and demographic characteristics between those subjects who used CAM compared to subjects who did not. QOL variables were retained in the continuous form for analysis of variance.

Because the questionnaire interviews were essentially cross-sectional, we constructed prevalence odds ratios using logistic regression to evaluate associations in relationship to CAM use. QOL variables were divided into 10 point intervals and evaluated in an ordinal form, similar to a large-scale epidemiologic assessment of QOL and stroke [26]. All data analyses were performed using the Statistical Analysis System Version 9.1 (SAS Institute, Cary, NC) [27]. All reported *P* values assume a two-sided alternative hypothesis. *P* values ≤ 0.05 were considered significant. Tests for trend were conducted using ordinal categories of covariates.

Results

Most women in the study sample (see Table 1) were non-Hispanic White (90%). By definition all women in the original case–control study were pre-menopausal. However, at the follow-up interview, 67% of these women were post-menopausal, with the majority over 50 years of age (53%). Most women at follow-up had invasive local breast cancer at diagnosis (56%). Forty percent of the study sample (40%) had post-morbid cancer-related conditions that included lymphedema (9%), second breast cancer (3%), cancer at other sites (5%), recurrence of breast cancer (7%), metastasis of breast cancer (3%), or a combination of these conditions (13%). A much higher percentage of the study sample (83%) had medical conditions of varying severity reported at follow-up, with 52% having multiple medical conditions. Mastectomy was the most predominant surgery (70%), with combinations of chemotherapy, radiation, and hormonal therapy the most common (29%) form of treatment received. The majority of study subjects (59%) used CAM, with the most popular types of CAM represented by Echinecea (29%), herbal tea (21%), Ginko Biloba (19%), Ginseng (13%), and St. Johns Wort (13%).

Table 2 presents means and distributions of covariates according to CAM usage. Average age was associated with CAM use, with slightly younger women more likely to report using CAM ($P = 0.01$). Other demographic characteristics such as income ($P = 0.18$) and years of education ($P = 0.38$) were not associated with CAM usage. Post-diagnosis medical conditions were strongly associated with CAM usage ($P = 0.0005$). Women reporting any of the medical conditions queried were more likely to use CAM than women without these medical conditions. This is in contrast to women with post-diagnosis cancer-related conditions who were more evenly distributed between CAM usage and CAM non-usage ($P = 0.29$). Average SF-36 summary scale results according to CAM usage showed lower MCS (Mental Component Summary) scale scores among CAM users ($P = 0.02$), while average Physical Component Summary (PCS) scale scores did not differ according to CAM ($P = 0.97$). Fear About Recurrence was similar among CAM users and non-users ($P = 0.72$).

We constructed prevalence odds ratio association models of CAM usage according to categorical covariates (see Tables 3 and 4). Having one medical condition after diagnosis (OR = 2.5; 95% CI = 1.3–4.8), or, more than one medical condition (OR = 3.2; 95% CI = 1.7–6.0), adjusting for age, race, BMI at interview, average MET hours after diagnosis, PCS, and MCS, was strongly associated with CAM usage (test for trend $P = 0.001$). Cancer-related conditions, surgeries, or treatments after diagnosis were not associated with CAM usage.

Body composition at diagnosis was not associated ($P = 0.57$) with CAM usage, while exercise activity after diagnosis was mildly associated with CAM usage ($P = 0.12$). The mental health well-being component (MCS) of the SF-36 was inversely associated with CAM usage (P for trend = 0.05), with CAM users more likely to have poorer MCS scores (OR = 0.9; 95% CI = 0.7–1.0), adjusting for age, race, post-morbid medical conditions, breast surgeries, treatment received after diagnosis, and cancer-related conditions. The PCS score, on the other hand, was not associated with CAM usage (test for trend $P = 0.97$).

Discussion

Our study was designed to evaluate associations with use of CAM among breast cancer survivors, particularly since information about CAM in long-term (>10 year) survivors had been lacking. CAM is important to study among breast cancer survivors especially because some of the remedies may interact with conventional treatment or may affect prognosis.

We restricted our CAM variable to “herbal or alternative” remedies in an attempt to create a more cohesive assessment of well-recognized alternative treatments. We found that CAM usage was strongly associated with non-cancer-related medical conditions that were present at follow-up. Cancer-related conditions, type of surgery or type of treatment for breast cancer, on the other hand were not associated with CAM usage. CAM was inversely associated with mental health functioning, but was not associated with physical functioning.

The differences in the observed prevalence of CAM across studies may be related to study design, length of time since diagnosis, CAM definition, age, ethnicity, or population-structure. CAM usage in our study (59%) exceeded usage by healthy adults (36%) [1], and unaffected family members at risk for breast cancer (42%) [3], but was similar to that observed in studies of CAM in breast (62–69%) [4–6], and other cancer survivors (55%) [7]. CAM use in our study population was lower compared to a population survey of CAM usage among California cancer survivors (87%) [28], and California residents (73%) [29], and higher than that found in a longitudinal study of women with early stage breast cancer (12%) [8], and, in registry-identified multi-ethnic breast cancer cases in Northern California (48%) [9].

Motivation to alleviate cancer-related symptoms may drive breast cancer patients to seek CAM as an alternative. However, women in our study, who developed second breast cancers, recurrences and other cancer-related-conditions, did not use CAM more frequently than women without these health outcomes. Moreover, women who received chemotherapy, radiation or hormonal therapies were not more likely to use CAM either. Some studies suggest that relief of cancer-related symptoms and treatment of cancer are what induces breast cancer patients to turn to CAM [10]. In the California-based population survey of CAM in cancer survivors, it was found that only a small proportion of CAM use was taken specifically to “treat” cancer [28] suggesting that the majority of use was for other reasons. We found that CAM usage was associated with non-cancer related medical conditions present after diagnosis and that the likelihood of use increased as a function of the number of medical conditions reported (0, 1, or 2 or more). Quite possibly women in our study population are not seeking CAM to treat their breast cancers but are using it to treat other medical conditions. It is important to note that our study participants have survived breast cancer over 10 years, and the impact of their original diagnosis may have, in general, declined.

Use of alternative therapies may be related to QOL. That is, women may turn to alternative medicine in response to psychological symptoms or distress. We observed significantly lower mental health functioning measured by the SF-36 among CAM users than among non-

users. Low SF-36 mental health scores among CAM users was also reported in the Nurses Health Study [6], the longitudinal study of early stage breast cancer survivors [8], and the Ganz et al. study of longer-term survivors [11]. Ganz et al. studied young breast cancer survivors with late treatment effects in a more recent study and found low mental health scores overall, with even lower scores among younger women under age 35 [22]. We attempted to evaluate CAM usage according to original interview age, however, the proportion of women diagnosed with breast cancer under age 35 in our study population was small, and we could not draw a similar comparison. We further adjusted our association analysis for age and found the association between CAM use and MCS score remained unchanged. The association between CAM use and mental health functioning appears to be independent of age in our study.

We evaluated fear of recurrence in relationship to CAM and found no differences between users and non-users, suggesting that the psychological distress we observed may have reflected other aspects of life rather than breast cancer. Burstein et al. found fear of recurrence, in addition to low mental health functioning, was stronger among CAM users [8]. Their longitudinal cohort was composed of newly diagnosed breast cancer patients recruited within three months of their diagnosis, while our study population consisted of long-term survivors exclusively. Fear of recurrence may be more likely to occur shortly after diagnosis, as compared to longer periods of time, which may explain why we did not observe an association with CAM usage.

Our study has several limitations which may affect the results we observed. We measured CAM usage in a cross-sectional design so it was unclear whether CAM occurred before or after factors we found were associated with CAM. For instance, CAM may have led to adverse medical conditions, or adverse medical conditions may have prompted CAM usage. Burstein et al. found number of symptoms (side effects of surgery, chemotherapy, radiation as well as other health and cancer-related problems) to be related to new CAM usage in their longitudinal design [8], but whether the same trend occurred in our study is unclear.

We relied on self reported information about medical and cancer-related co-morbidities and therefore some misclassification may have occurred. Our questions were carefully worded, and we mailed scales and questionnaire items to our participants in advance of the interview to enhance comprehension and consistency of reporting. Length of time since diagnosis may have influenced accurate recall of events immediately post-diagnosis. Any recall bias that may be in operation, however, is unlikely to be differential [30], since all subjects in the study had breast cancer. Moreover, CAM questions asked about usage within the past six months.

Length of follow-up period is also a strength of our study. We contacted our subjects on the average of 13.2 years since diagnosis. Most studies of CAM in breast cancer survivors have much shorter follow-up periods [3–10]. We observed a high prevalence of medical conditions post-diagnosis (83%) in our study sample with 52% having multiple medical conditions. Having one or more than one medical condition was strongly associated with CAM usage. Our results suggest that CAM users have poorer mental health functioning confirming observations from previous studies. Women in our study may be more likely to use CAM for medical conditions, but do not necessarily turn to CAM for cancer-related symptoms.

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Abbreviations

CAM	Complementary and alternative medicine
QOL	Quality-of-life
SF-36	Medical Outcomes Study Short Form 36 questionnaire
NHIS	National health interview survey
MCS	Mental component summary scale
PCS	Physical component summary scale
MET	Metabolic equivalent energy expenditure
OR	Odds ratio

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Table 1

Study population characteristics

Variable/Category	N	Percent
Ethnicity		
White	335	90.30
Hispanic/Latino	36	9.70
Post-menopausal (at follow-up)	248	66.85
Age (at follow-up interview)		
<45	44	11.86
45–49	129	34.77
50–54	184	49.60
≥55	14	3.77
Years of education		
<10th grade	4	1.08
Partial high school	10	2.70
High school graduate	83	22.37
Partial college	148	39.89
College graduate	77	20.75
Graduate/professional	49	13.21
Income of year prior to interview		
Under $15,000	23	6.20
$15,001–$30,000	20	5.39
$30,001–$45,000	44	11.86
$45,001–$60,000	58	15.63
$60,001–$75,000	43	11.59
$75,001–$100,000	57	15.36
Over $100,000	126	33.96
BMI		
Mean at diagnosis		23.33
Mean at follow-up		26.83
Weight change (percent)		
Mean		15.00
Exercise activity (MET-h/week)		
Mean (prior to diagnosis)		9.68
Mean (after diagnosis)		13.58
Current smoker	44	11.86
Current alcohol user	163	43.94
Stage of cancer at diagnosis		
In situ	51	13.75
Invasive local	208	56.06
Invasive distant	112	30.19
Post-diagnosis cancer-related conditions		

Variable/Category	N	Percent
Lymphedema	34	9.16
Second breast cancer	11	2.96
Cancer at other site	19	5.12
Recurrence of breast cancer	27	7.28
Metastasis of breast cancer	10	2.70
Multiple cancer conditions	48	12.94
Any of above	149	40.16
None of above	222	59.84
Post-diagnosis medical conditions		
Cardiovascular	18	4.85
Respiratory	35	9.43
Inflammatory disease	20	5.39
Bone disease	9	2.43
Nervous system/psychiatric	20	5.39
Other medical	13	3.50
Multiple medical conditions	194	52.29
Any of above	309	83.29
None of above	62	16.71
Type of surgery		
Lumpectomy	113	30.46
Mastectomy, no reconstruction	93	25.07
Mastectomy with reconstruction	127	34.23
Mastectomy, bilateral	38	10.24
Type of treatment		
No treatment	88	27.85
Chemotherapy (only)	62	19.62
Radiation (only)	59	18.67
Hormonal (only)	14	4.43
Combination	93	29.43
SF-36 component summary scales		
PCS (physical health)-mean		51.27
MCS (mental health)-mean		49.81
Fear about recurrence summary scale		
Mean		18.60
CAM usage (any usage of CAM)		58.76

Table 2

Study population characteristics according to CAM usage

Variable/Category	CAM users		Non-CAM users		*P*-value
	N	Percent	N	Percent	
Ethnicity					
White	200	91.74	135	88.24	0.26
Post-menopausal (at follow-up)	140	64.22	108	70.59	0.20
Age (at follow-up interview)					
Mean		41.28		41.93	0.01
Years of education					
<10th grade	1	0.49	3	1.96	
Partial high school	6	2.94	4	2.61	
High school graduate	44	21.57	39	25.49	
Partial college	91	44.61	57	37.25	
College graduate	50	24.51	27	17.65	
Graduate/professional	26	12.75	23	15.03	0.38
Income of year prior to interview					
Under $15,000	13	6.34	10	6.54	
$15,001–$30,000	12	5.85	8	5.23	
$30,001–$45,000	27	13.17	17	11.11	
$45,001–$60,000	36	17.56	22	14.38	
$60,001–$75,000	28	13.66	15	9.80	
$75,001–$100,000	40	19.51	17	11.11	
Over $100,000	62	30.24	64	41.83	0.18
BMI					
Mean at diagnosis		23.44		23.16	0.67
Mean at follow-up		26.8		26.85	0.95
Weight change (percent)					
Mean		15.55		14.35	0.53
Exercise activity (MET-h/week)					
Mean (prior to diagnosis)		10.67		8.29	0.25
Mean (after diagnosis)		13.88		13.06	0.69

Variable/Category	CAM users		Non-CAM users		*P*-value
	N	Percent	N	Percent	
Current smoker	24	11.01	20	13.07	0.55
Current alcohol user	102	46.80	61	40.00	0.19
Stage of cancer at diagnosis					
In situ	29	13.30	22	14.47	
Invasive local	115	52.75	93	61.18	
Invasive distant	74	33.94	38	25.00	0.17
Post-diagnosis cancer-related conditions					
Lymphedema	23	10.55	11	7.24	
Second breast cancer	4	1.83	7	4.61	
Cancer at other site	11	5.05	8	5.26	
Recurrence of breast cancer	20	9.17	7	4.61	
Metastasis of breast cancer	8	3.67	2	1.32	
Multiple cancer conditions	27	12.39	21	13.82	
Any of above	93	42.66	56	36.84	
None of above	125	57.34	97	63.82	0.29
Post-diagnosis medical conditions					
Cardiovascular	8	3.67	10	6.54	
Respiratory	20	9.17	15	9.80	
Inflammatory disease	15	6.88	5	3.27	
Bone disease	7	3.21	2	1.31	
Nervous system/Psychiatric	9	4.13	11	7.19	
Other Medical	10	4.59	3	1.96	
Multiple conditions	126	57.80	68	44.44	
Any of above	195	89.45	114	74.51	
None of above	23	10.55	39	25.49	0.0005
Type of surgery					
Lumpectomy	74	33.94	39	25.49	
Mastectomy, no reconstruction	47	21.56	46	30.07	
Mastectomy with reconstruction	76	34.86	51	33.33	
Mastectomy, bilateral	21	9.63	17	11.11	0.17

Variable/Category	CAM users		Non-CAM users		*P*-value
	N	Percent	N	Percent	
Type of treatment					
Chemotherapy (only)	36	16.51	26	16.99	
Radiation (only)	34	15.60	25	16.34	
Hormonal (only)	9	4.13	5	3.27	
Combination	58	26.61	35	22.88	
Any of above	170	77.98	113	73.86	
None of above	48	22.02	40	26.14	0.36
Fear about recurrence summary scale		18.60		18.50	0.72
SF-36 component summary scales					
PCS (physical health)-mean		51.25		51.29	0.97
MCS (mental health)-mean		48.81		51.23	0.02

Table 3

Prevalence odds ratio associations between selected prognostic variables and CAM usage

Variable/Category	Number of CAM users	Number of non-CAM users	Unadjusted		Adjusted[a]		Test for trend
			OR	95% CI	OR	95% CI	*P*-value
Medical conditions[b]							
None	23	39	1.00	-	1.00	-	
1 medical condition	69	46	2.54	(1.35–4.80)	2.52	(1.32–4.80)	
1+medical condition	126	68	3.14	(1.74–5.69)	3.16	(1.66–6.01)	0.001
Cancer-related conditions[c]							
None	125	97	1.00	-	1.00	-	
1 cancer condition	66	35	1.46	(0.90–2.38)	1.44	(0.88–2.38)	
1+cancer condition	27	21	0.99	(0.53–1.87)	0.85	(0.44–1.66)	0.82
Summary surgery[d]							
Lumpectomy	74	39	1.00	-	1.00	-	
Mastectomy	144	114	0.67	(0.42–1.05)	0.65	(0.41–1.05)	
Summary treatment[e]							
No treatment	48	40	1.00	-	1.00	-	
1 treatment	79	56	1.18	(0.68–2.02)	1.17	(0.67–2.03)	
Multiple treatments	91	57	1.33	(0.78–2.27)	1.26	(0.72–2.19)	0.44

[a] Adjusted for age, race, BMI at interview, average MET-hours after diagnosis, physical health (PCS) mental health (MCS)

[b] Post-diagnosis medical conditions: respiratory, cardiovascular, inflammatory, bone disease, nervous system, psychiatric

[c] Breast cancer recurrence, lymphedema, metastasis, second breast cancer, or cancer at another site

[d] Breast surgeries received after diagnosis

[e] Treatment (chemotherapy, radiation, hormonal) received after diagnosis

Table 4

Prevalence odds ratio associations between selected body composition, exercise activity, quality-of-life and CAM-usage variables

Variable/Category	Number of CAM users	Number of non-CAM users	Unadjusted		Adjusted[a]		Test for trend
			OR	95% CI	OR	95% CI	*P*-value
BMI[b]							
<25.0	110	73	1.00	-	1.00	-	
25.0–29.9	62	47	0.88	(0.54–1.42)	0.90	(0.54–1.48)	
30.0+	46	33	0.93	(0.54–1.58)	0.86	(0.49–1.51)	0.57
Average MET-h[c]/week							
After diagnosis							
0	84	79	1.00	-	1.00	-	
>0–16.9	69	32	2.03	(1.21–3.41)	1.98	(1.16–3.39)	
17.0+	65	42	1.46	(0.89–2.39)	1.42	(0.85–2.36)	0.12
PCS-Physical component							
Summary (per 10 unit increase)			1.00	(0.81–1.24)	1.21	(0.95–1.53)	0.97
MCS-Mental component							
Summary (per 10 unit increase)			0.80	(0.64–0.93)	0.88	(0.70–1.0)	0.05

[a] Adjusted for age, race, post-diagnosis medical conditions, breast surgeries, treatment received after diagnosis, cancer related conditions

[b] Weight in kilograms divided by height in meters squared

[c] Metabolic equivalents of energy expenditure