CE 3.0 Contact Hours
See text on pp. 139–140

Complementary and Alternative Modalities Used by Women With Female-Specific Cancers

■ *Valerie S. Eschiti, PhD, RN, CHTP, AHN-BC*

The purposes of this study were to describe the personal factors of women with female-specific cancers and the prevalence and types of complementary and alternative modalities (CAM) used by these women. The study also tested 2 hypotheses regarding personal factors and CAM use. Using a cross-sectional, retrospective, explanatory secondary analysis of the 2002 National Health Interview Survey data set, estimations were made with an initial sample of 725 women with female-specific cancers, using a framework on the basis of Pender's Health Promotion Model. Results of the study include that personal factors associated with those who used CAM include presence of pain and depression/anxiety. Those women having 2 or more types of female-specific cancers were associated with the use of alternative medical systems. The findings provide information for nurses about patients with female-specific cancers who use CAM for health promotion. **KEY WORDS:** *alternative*, *CAM*, *complementary*, *cancer*, *female-specific* *Holist Nurs Pract* 2008;22(3):127–138

Holistic nurses need to know about the use of complementary and alternative modalities (CAM) by women with female-specific cancers so that they can determine whether women are using CAM therapies that may interact negatively with mainstream treatments. Knowledge about CAM use by women with female-specific cancers will also allow nurses to identify women who might benefit most from education regarding CAM therapies.

Female-specific cancers referred to in this article are cancer of the breast, cervix, ovary, and uterus. Complementary modalities are those treatments that are used in conjunction with mainstream treatments. Alternative modalities are those treatments that are used instead of mainstream medical therapies.[1]

As a result of treatment for female-specific cancers, women may experience disturbing aftereffects, including anxiety, depression, hot flashes, pain, surgical scarring, vaginal dryness, impaired sexual functioning, infertility, and changes in bowel and bladder function.[2–4] This is because treatment for such cancers often involves the multiple modalities of surgery, radiation, and chemotherapy.[3]

Breast cancer is the most frequently diagnosed type of cancer among women in the United States and follows lung cancer as the most common cause of cancer deaths among women. The American Cancer Society estimates new cancer cases and deaths on the basis of past incidence rates, as well as information gleaned from national databases. Predictions for new cases and deaths, as well as 5-year survival rates, were provided for 2007 (Table 1).[5] These statistics are indicative of the number of women who may be receiving treatment of female-specific cancers and potentially experiencing aftereffects of such treatment.

Women with breast cancer[6,7] and gynecologic cancers[8] are using CAM. Women with female-specific cancers experience psychological distress, including anxiety and depression.[2,3] Some women use CAMto relieve such distress.[9,10]

CAM use may provide a feeling of control, maintenance of hope, stress relief, hope for prevention of cancer recurrence, or relief of aftereffects of treatment.[8,11–13] CAM may also be used because when women are unable to afford mainstream biomedical care.[14,15]

This study is part of the author's dissertation, "Complementary and Alternative Modalities Used by Women with Female-specific Cancers."[16] The purposes of this portion of the study were to (*a*)

Author Affiliation: University of Oklahoma Health Sciences Center, Oklahoma City.

The author thanks her dissertation chairperson, Dr Patti Hamilton, as well as committee members Dr Gail Davis, Dr Kristin Wiginton, and Dr Susan McBride.

Corresponding Author: Valerie S. Eschiti, PhD, RN, CHTP, AHN-BC, University of Oklahoma Health Sciences Center, PO Box 26901, Oklahoma City, OK 73126 (valerie-eschiti@ouhsc.edu)

TABLE 1. Predictions for female-specific cancers in 2007

Type of cancer	New cases	Deaths	Five-year survival rate
Breast	Invasive: 178 480		Distant metastasis: 26%
	In situ: 62 030	40 460	Regional metastasis: 83%
			Localized: 98%
Cervical	11 150	3 670	Invasive: 73%
			Localized: 92%
Ovarian	22 430	15 280	Distant metastasis: 30%
			Regional metastasis: 69%
			Localized: 93%
Uterine	36 080	7 400	Distant metastasis: 23%
			Regional metastasis: 67%
			Localized: 96%

describe the personal factors of women with female-specific cancers, (*b*) describe the prevalence and types of CAM used by these women, and (*c*) test 2 hypotheses regarding personal factors and CAM use.

The 4 types of CAM examined in the study were alternative medical systems (AMS), biologically based therapies, manipulative and body-based therapies, and mind-body therapies.

Alternative medical systems are those reliant on complete theoretical and practice systems, such as traditional Chinese medicine. Biologically based therapies consist of the use of natural substances, such as herbs and dietary supplements. Manipulative and body-based therapies utilize movement of parts of the body, such as massage. Mind-body therapies engage the use of the mind to enhance body functions, such as meditation.[1]

RATIONALE FOR THE STUDY

Recent estimates regarding CAM use by women with female-specific cancers are not available on nationally representative samples in the United States. Furthermore, a gap exists in knowledge of use by minority populations because samples that have been studied have not included adequate minority representation.

THEORETICAL FRAMEWORK

The theoretical framework that guided this study is based on the Health Promotion Model (HPM)—revised.[17] The HPM was selected, because women with female-specific cancers often use CAM for health promotion. The HPM is "a holistic predictive model of health-promoting behavior for use in research and practice."[18(p2)]

The major categories of constructs of the HPM are individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcomes. The model has empirical support for its concepts and relationships.[17,18] The HPM integrates constructs from expectancy-value theory and social cognitive theory.

The first category of constructs, individual characteristics and experiences, refers to a person's personal characteristics and experiences that may affect health-related actions. This category is composed of 2 constructs, prior-related behavior and personal factors. Personal factors, which are the focus of this study, are categorized as biologic (age, comorbidities, disability, pain, and type of cancer), sociocultural, (marital status, education, race/ethnicity, income, health insurance coverage, and access to healthcare), and psychological factors (psychological distress, depression/anxiety, and perceived health status).

HYPOTHESES

Using a cross-sectional, retrospective, explanatory secondary analysis of the 2002 National Health Interview Survey (NHIS) data set, the following hypotheses were tested:

- There will be a difference in the personal factors between those women who use CAM and those who do not.
- There will be a difference in the 4 types of CAM used by women with different types of female-specific cancers.

PROTECTION OF HUMAN SUBJECTS

Institutional review board approval to conduct the study was received. Participants in the 2002 NHIS were already de-identified. These data were available to the public. There was informed consent provided to study participants (P. Barnes, written communication, June 2006). To protect participant confidentiality, variables that identify small geographic areas have been withheld from public access.[19]

METHODS

Description of the sample

The sample of 725 women for the full study consisted mainly of non-Hispanic white women ($n = 610$, 84%),

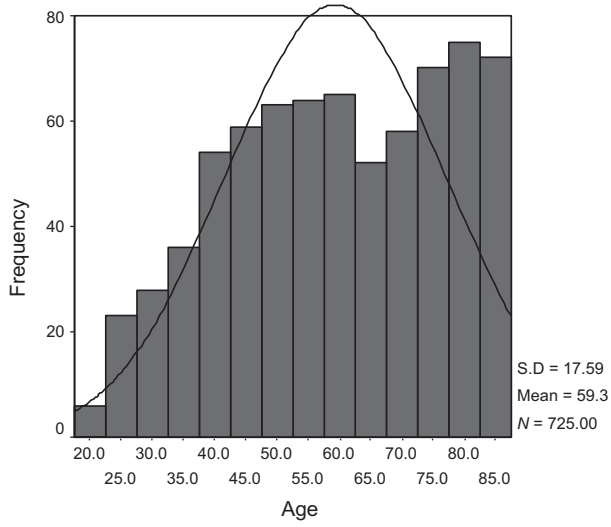

FIGURE 1. Age of women in sample of 725.

followed by non-Hispanic blacks ($n = 52$, 7.2%), Hispanics ($n = 45$, 6.2%), and non-Hispanic Others ($n = 18$, 2.5%).

Examination of the races of those in the non-Hispanic Other category showed that those in the Other Asian category comprised 33.3% ($n = 6$) of the category, followed by American Indian/Alaska Natives and those in the Multiple Race groups ($n = 5$, 27.8%), and Chinese ($n = 2$, 11.1%). Most of the sample of Hispanic respondents was composed of Mexican-American ($n = 16$, 35.6%) and Mexican ($n = 12$, 26.7%) Hispanic subgroup.

There were no missing values for age. Ages ranged from 18 to 85+ years; on the 2002 NHIS, any age over 85 was recorded as 85. The mean age of the women was 59.28 years. A histogram of the age data shows that the sample is slightly skewed to the right (Fig 1).

It was important to consider the cases of women who refused to respond (7), who responded "don't know" (9), or who were marked as not ascertained (8). That is, it was necessary for the researcher to decide how to handle missing data. It was discovered by looking at the missing cases (those in the data file that had a dot in the space for data, which were "system missing") that when the interviewer asked if a woman ever used a particular CAM therapy, if the woman responded "no," then further questions were not asked about the therapy, including whether it was used in the past 12 months. Data had been coded as missing in the 2002 NHIS, rather than a "no" (2) response. It was then vital for the researcher to determine which cases were actually missing, and which needed to be marked as a "no." CAM variables were designated by keeping original coding as 1 (1 = yes, 2 = no, 7 = refused, 8 = not ascertained, 9 = don't know) and recoding 2 as 0 and 7–9 as 99. System missing values were recoded as 99.

Because CAM use is the sole dependent variable, it was vital at this point to note how many cases had missing CAM information, and decide how to handle the data. Frequencies were run on all 30 CAM therapies asking about each, "Have you ever used. . .?" There were 3 to 4 women who refused to answer for each CAM therapy (mean = 3.5). Those answering "don't know" ranged from 2 to 8 (mean = 5). Responses that were not ascertained ranged from 2 to 8 (mean = 5). The researcher ascertained these cases were 5% of women duplicating the same responses across the CAM therapies.

There were 36 women who had missing data regarding CAM use. Because CAM use was going to be recoded as a dichotomous variable and was the dependent variable of interest, and there were relatively few women with missing data, it was decided it would be best to delete cases of women who had missing data regarding CAM use. This provided a sample of 689 women for examining CAM use and when personal factors were not included in the analysis.

When examining personal factors, it was also necessary to consider how to handle missing data. There were a total of 91 cases that had missing data regarding variables measuring personal factors. Because deleting the number of missing cases still yielded a sample size of 598, those cases with missing personal factor data were deleted. This was considered to be a more precise approach than to attempt to impute missing data for the personal factors, particularly because most of the factors were dichotomous.

Gorelick[20] noted in an examination of bias arising from missing data in predictive models that complete case analysis results in ORs that remain relatively unaffected. However, power for predictor variables decreases as the proportion of cases with missing data increases. Imputing data using 2 commonly used methods resulted in a different pattern of biased results. It was decided by the researcher that it was less deleterious to decrease power to obtain accurate results than to impute missing data. Thus, when predictor variables of personal factors are examined, the data set that was used had a sample size of 598 women (see Fig 2).

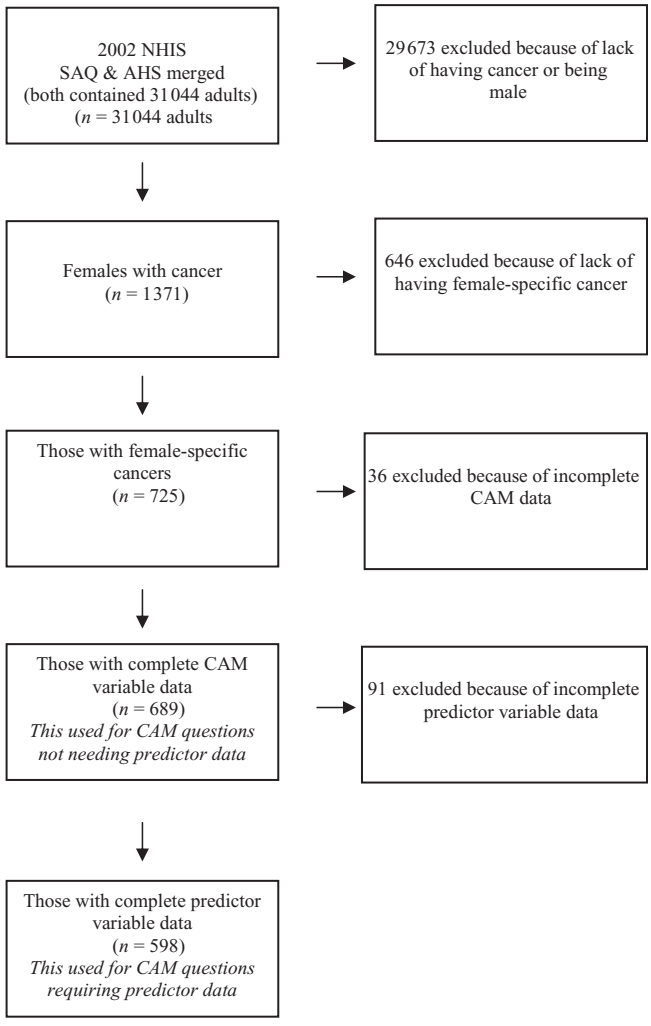

FIGURE 2. Sample inclusion and exclusion criteria.

Setting

The setting was the homes of civilian, noninstitutionalized women in the United States.

Instruments

The Sample Adult Questionnaire of the 2002 NHIS was used to obtain data. Respondents were randomly selected noninstitutionalized adult members who were asked health-related questions. Also used to obtain data was the Alternative Health Supplement, included in the 2002 NHIS, and was sponsored by the National Center for Complementary and Alternative Medicine. The purpose of the Alternative Health Supplement was to improve understanding of knowledge of CAM use.

Statistical testing

Frequencies and percentages were estimated for personal factors and CAM use. Because assumptions for the use of parametric statistics were not met (randomly drawn samples, homogeneity of variance, and measurement on interval or ratio scales), chi-square was estimated for differences between personal factors of women who use CAM and those who do not.[21]

To determine whether there were differences in the types of CAM used by women with 4 different types of female-specific cancers, chi-square was estimated using 1-by-4 tables for each type of CAM therapy (AMS, biologically based therapies, manipulative and body-based therapies, and mind-body therapies) and types of cancer (breast, cervical, ovarian, uterine), and more than 2 types.

SPSS version 11.5 (SPSS Inc., Chicago, IL) statistical software was used for calculating frequencies, percentages, and means. Stata version 9.0 (Stata Corp, College Station, TX) statistical software was used for weighted estimates. A 95% confidence interval was used to test the hypothesis.

To better understand numbers of women in each age group, ages of the women were recoded into the following categories: 1 = 18–29, 2 = 30–39, 3 = 40–49, and 4 = 50–59, 5 = 60–69, 6 = 70–79, 7 = 80+. Most of the women were in the categories of 50–79 years (50–59 years [$n = 139$, 19.2%], 60–69 years [$n = 114$, 15.7%], and 70–79 years [$n = 144$, 19.9%]). These are consistent with the ages at which many women are diagnosed with female-specific cancers.

Marital status was recoded into a dichotomous variable. The categories of married-spouse in household, married-spouse not in household, married-spouse in household-unknown, and living with a partner were collapsed into "married." The categories of widowed, divorced, separated, and never married were collapsed into "not married." The majority of the women in the sample were not married ($n = 415$, 57.2%), as opposed to those who were married ($n = 307$, 42.3%). There were 3 women (0.4%) for whom marital status was unknown.

Income level in the 2002 NHIS was initially described as a 2-category variable of either $20 000 or more annually per family, or less than $20 000. The frequencies for the sample are listed in Table 9. Notably, the majority of the women ($n = 428$, 59.0%) reported income levels of $20 000 or more. There were

TABLE 2. Education of women in a sample of 725

Educational level	Frequency	Percent
Less than high school	141	19.4
High school-no diploma	15	2.1
High school/GED	246	33.9
Some college; no degree	145	20.0
AA degree: technical or vocational	43	5.9
AA degree: professional	26	3.6
Bachelor's degree	74	10.2
Master's degree	27	3.7
Doctoral degree	3	0.4
Missing	5	0.7
Total	725	100

TABLE 3. Frequencies of complementary and alternative modalities (CAM) types used by women with female-specific cancers[a]

Type of CAM	Frequency	Percent	Missing
Prayed for own health	471	65.0	22
Others prayed for your health	299	41.2	18
Herbs for own health (nonvitamin,nonmineral, natural products)	168	23.2	10
Deep breathing exercises	129	17.8	12
Participate in group prayer	123	17.0	20
Meditation	89	12.3	11
Chiropractic care	54	7.4	9
Massage	38	5.2	9
Progressive relaxation	38	5.2	11
Healing ritual for own health	36	5.0	13
Yoga	34	4.7	10
Vitamins for own health (megavitamin therapy)	33	4.6	10
Guided imagery	25	3.4	11
Tai chi	16	2.2	9
Vegetarian diet	16	2.2	13
Atkins diet	14	1.9	14
Energy healing therapy/Reiki	9	1.2	9
Homeopathic treatment	9	1.2	12
Acupuncture	7	1.0	9
Hypnosis	7	1.0	9
Biofeedback	4	0.6	9
Qi gong	4	0.6	8
Chelation therapy	2	0.3	9
Folk medicine	2	0.3	9
Ayurveda	1	0.1	9
Macrobiotic diet	1	0.1	15
Naturopathy	1	0.1	9
Ornish diet	0	0.0	14
Pritkin diet	0	0.0	14
Zone diet	0	0.0	14

[a]Participants could report more than 1 CAM type.

also 39 women (5.4%) who refused to report income, whereas 7 women (1.0%) did not know their income.

Educational level was divided into 9 categories on the 2002 NHIS. The high school/GED category had the highest frequency ($n = 246$; 33.9%; see Table 2).

Table 3 lists the frequencies of the types of CAM used by women with female-specific cancers, as well as frequencies of CAM with missing data. The 6 most frequently used types of CAM (ie, used by more than 100 women) included the following: prayed for own health ($n = 471$; 65.0%), others prayed for your health ($n = 299$; 41.2%), used herbs for own health ($n = 168$; 23.2%), used deep-breathing exercises ($n = 129$; 17.8%), and participated in prayer group ($n = 123$; 17.0%). Thus, the most commonly used CAM therapies fall under the category of prayer for health. These figures indicate that some women used more than 1 type of CAM therapy in the previous 12 months, as the total of CAM therapies used is 1632. The amount of missing data in the category of prayer for health indicates that there are some individuals who may feel that prayer is a personal matter not to be discussed with others, but rather, a personal experience between them and their Higher Power.

In the 2002 NHIS data set, a total of 1371 women (8% of the women in the sample) reported having cancer at some time in their lives. Of these women, 725 (53% of the women in the sample who reported having cancer) reported having 1 of 4 types of female-specific cancers (breast, $n = 371$; cervical, $n = 196$; uterine, $n = 135$; and ovarian, $n = 57$). These figures indicate that some of the women had more than 1 type of female-specific cancer, as the total of female-specific cancers is 759. To determine how many women had more than 1 cancer type, one cancer at a time was selected, and frequencies were calculated on the other cancers. See Table 4 for the number of women with 2 types of cancers.

A new variable was created by summing the variables of 4 types of female-specific cancers. This was created to ascertain the sum of the number of cancers that each participant had. Frequencies were estimated, revealing 28 (3.8%) of the women had 2 female-specific cancers and 3 women (0.41%) had 3 female-specific cancers.

Using Stata software, the researcher was able to weight the sample using the primary sampling unit, strata, and pweight values, to estimate the proportion

TABLE 4. Number of women with 2 types of cancers

Type of cancer	Breast	Cervical	Ovarian	Uterine
Breast	371	6 (1.6%)	5 (1.3%)	14 (3.8%)
Cervical	6 (3.1%)	196	3 (1.5%)	4 (2.0%)
Ovarian	5 (8.8%)	3 (5.3%)	57	5 (8.8%)
Uterine	14 (10.4%)	4 (3.0%)	5 (3.7%)	135

TABLE 5. Weighted education of women

Educational level	Frequency	Percent
Less than high school	811 561	17.9
High school	1 560 294	36.0
Some college; no degree	859 656	19.8
AA degree	677 672	9.4
Bachelor's degree	503 054	11.6
Master's degree	139 954	3.2
Doctoral degree (PhD, EdD)	20 798	0.5

of the weighted sample with particular characteristics under examination. On the basis of this proportion, the researcher then hand calculated the number of women this proportion represented. This is because Stata's survey data cannot compute percentile or median estimates unless only pweights are involved (U. Duvenhage, written communication, December 5, 2006).

When weighting the sample of 725 women, it was ascertained this sample represented a population of 4 332 945 women in the United States with female-specific cancers. The weighted estimates, therefore, provide powerful information about the demographic characteristics of the women. Frequencies have been rounded to the nearest whole number, whereas percent has been rounded to the nearest tenth. The race/ethnicity of the women consisted of 87.7% non-Hispanic white ($n = 3\ 798\ 693$), 5.3% non-Hispanic black ($n = 229\ 646$), 4.0 Hispanic ($n = 173\ 751$), and 3.0% non-Hispanic Other ($n = 130\ 855$).

Because the proportion of the women is similar in the unweighted and weighted samples, extensive explanation of the information is not necessary. However, there are slight differences in some of the percentage calculations when they are weighted as compared with unweighted estimations.

What is striking from the information is the large number of women in the United States who are affected by female-specific cancers. For instance, when race was coded to a single race, the unweighted sample consisted of 6 (1.4%) American Indian/Alaska Native women. However, when that estimate is weighted, the sample is equivalent to 62 394 American Indian/Alaska Native women in the US population.

This brings up the likely possibility of sampling error for American Indian/Alaska Native women. It is recognized that the standard error for estimations for racial/ethnic groups and subgroups with small sample sizes is too large to be considered reliable.[22] Information for missing data has not been included, as this information is not of primary interest for the weighted estimates.

Other single races identified for the sample of women were 90.7% white ($n = 3\ 927\ 815$), 5.3% black/African American ($n = 229\ 646$), 0.4% Chinese ($n = 16\ 032$), 0.1% Other Asian ($n = 50\ 695$), 0.9% Other Race ($n = 39\ 430$), and 0.2% Multiple Race ($n = 6\ 499$.

There were 6.3% ($n = 271\ 242$) women aged 18–29 years, 9.8% ($n = 422\ 895$) 30–39 years, 17.2% ($n = 743\ 533$) 40–49 years, 20.6% ($n = 890\ 853$) 50–59 years, 15.9% ($n = 690\ 238$) 60–69 years, 18.6% ($n = 805\ 928$) 70–79 years, and 11.7% ($n = 508\ 254$) 80 years and older.

The majority of the women were married, with a spouse in the household ($n = 2\ 252\ 698$, 52.0%). There were 4.8% ($n = 207\ 548$) living with a partner. The remainder were married, with a spouse not in the household (1.2%, $n = 49\ 829$), widowed (20.9%, $n = 905\ 585$), divorced (12.4%, $n = 535\ 985$), separated (3.3%, $n = 140\ 820$); or never married (5.1%, $n = 220\ 114$).

Most women were from families with an annual income of $20 000 or more (68.3%, $n = 2\ 958\ 535$). There were 26.1% ($n = 1\ 131\ 765$) with annual incomes of less than $20 000. Educational levels of the women are listed in Table 5. Types of cancers of the women are listed in Table 6, whereas CAM types used by the women are listed in Table 7.

TABLE 6. Weighted frequencies of types of cancer of women

Type of cancer	Frequency	Percent
Breast	2 156 940	49.8
Cervical	1 243 121	29.0
Ovarian	354 435	8.2
Uterine	785 129	18.1

TABLE 7. Weighted frequencies of complementary and alternative modalities (CAM) types used by women with female-specific cancers

Type of CAM	Frequency	Percent
Prayed for own health	2 799 082	64.6
Others prayed for your health	2 312 059	53.4
Herbs for own health (nonvitamin, nonmineral, natural products)	1 000 910	23.1
Deep-breathing exercises	785 563	18.1
Participate in a group prayer	938 516	21.7
Meditation	522 986	12.1
Chiropractic care	363 967	8.4
Massage	266 476	6.2
Progressive relaxation	236 579	5.5
Healing ritual for own health	230 079	5.3
Yoga	237 445	5.5
Vitamins for own health (megavitamin therapy)	207 548	4.8
Guided imagery	169 418	3.9
Tai chi	108 757	2.5
Vegetarian diet	90 125	2.1
Atkins diet	102 258	2.4
Energy healing therapy/Reiki	57 628	1.3
Homeopathic	50 695	1.2
Treatment	42 462	1.0
Hypnosis	60 228	1.4
Biofeedback	19 498	0.5
Qi gong	23 397	0.5
Chelation therapy	16 031	0.5
Folk medicine	9 099	0.4
Ayurveda	9 099	0.2
Macrobiotic diet	3 466	0.2
Naturopathy	9 099	0.1
Ornish diet	12 566	0.3
Pritkin diet	0	0.0
Zone diet	0	0.0

FINDINGS

Hypothesis number 1

Hypothesis number 1 is stated as follows. There will be a difference in the personal factors between those women who use CAM and those who do not. Frequencies and percentages were estimated for personal factors and CAM use. Because assumptions for the use of parametric statistics were not met (randomly drawn samples, homogeneity of variance, and measurement on interval or ratio scales), chi-square was estimated for differences between personal factors of women who use CAM and those who do not (see Table 8). Those who use CAM are associated with presence of pain, as well as presence of depression/anxiety (see Tables 15–16). Hypothesis number 1 was accepted.

TABLE 8. Chi-square analysis of complementary and alternative modalities (CAM) use and personal factors

Personal factor	Pearson χ^2	Probability of error
Age	1.7303	0.188
Comorbidity	3.6533	0.056
Disability	0.6965	0.404
Pain	12.4045	0.000[a]
Type of cancer	1.5089	0.825
Marital status	0.7814	0.377
Education	3.4838	0.062
Income	0.1762	0.675
Race/ethnicity	2.2530	0.522
Insurance	0.7511	0.386
Access to care	0.0930	0.993
Psychological distress	2.2988	0.129
Depression/anxiety	8.9394	0.003[a]
Perceived health status	2.7962	0.592

[a] $P \leq .05$.

In Table 9, the personal factors that are shown to be associated with CAM use are pain and depression/anxiety. To determine which category of each factor was associated with CAM use, it was necessary to estimate chi-square for each variable individually.

Of those women who used CAM, 40.12% had pain and 49.88% had no pain. Of those women who did not use CAM, 22.32% had pain and 77.8% had no pain. The chi-square contribution was greatest (1.5) for CAM users who had pain (see Table 9).

There were 63.79% of women who used CAM who had no depression/anxiety, and 36.21% who had

TABLE 9. Chi-square analysis of pain and complementary and alternative modalities (CAM) use

Pain	Legend	Nonuser	User	Total
No	Frequency	87	291	378
	χ^2	3.7	0.9	4.6
	Row %	23.02	76.98	100.00
	Column %	77.8	49.88	63.21
Yes	Frequency	25	195	220
	χ^2	6.4	1.5[a]	7.8
	Row %	11.36	88.64	100.00
	Column %	22.32	40.12	36.79
Total	Frequency	112	486	598
	χ^2	10.1	2.3	12.4
	Row %	18.73	81.27	100.00
	Column %	100.00	100.00	100.00

[a] = χ^2 contribution that shows significant association

TABLE 10. Chi-square Analysis of Depression/Anxiety and CAM Use

Depression/Anxiety	Legend	Nonuser	User	Total
No	Frequency	88	310	398
	χ^2	2.4	0.6	3.0
	Row %	22.11	77.89	100.00
	Column %	78.57	63.79	66.56
Yes	Frequency	24	176	200
	χ^2	4.8	1.1[a]	5.9
	Row %	12.00	88.00	100.00
	Column %	21.43	36.21	33.44
Total	Frequency	112	486	598
	χ^2	7.3	1.7	809
	Row %	18.73	81.27	100.00
	Column %	100.00	100.00	100.00

[a] χ^2 contribution that shows significant association

depression/anxiety. There were 21.43% of CAM nonusers who had depression/anxiety, and 78.57% who had no depression/anxiety. The chi-square contribution was greatest (1.1) for CAM users who reported having depression/anxiety (see Table 10).

Hypothesis number 2

Hypothesis number 2 is stated as follows. There will be a difference in the 4 types of CAM used by women with different types of female-specific cancers. Chi-square was estimated using 1-by-4 tables for each of the types of CAM therapies (AMS, biologically based therapies, manipulative and body-based therapies, and mind-body therapies) and types of cancer (see Tables 17–18). There was a difference in the use of one type of CAM on the basis of the type of cancer the women had, with those women having 2 or more types of female-specific cancers associated with the use of AMS. Hypothesis number 2 was partially accepted.

In Table 11, the type of CAM shown to be associated with the type of cancer women had is AMS.

TABLE 11. Chi-square analysis of type of cancer and complementary and alternative modalities (CAM) type

CAM type	Pearson χ^2	Pr
Alternative medical systems	19.6114	0.001[a]
Biologically-based	0.2325	0.994
Manipulative and body-based	1.9132	0.752
Mind-body	2.3233	0.677

[a] = statistically significant; $P \leq .05$.

TABLE 12. Further analysis of type of cancer and alternative medical systems

Type of cancer	Legend	AMS nonuser	AMS user	Total
Breast	Frequency	329	2	331
	χ^2	0.1	3.8	3.8
	Row %	99.4	0.60	100.00
	Column %	48.81	13.33	48.04
Cervical	Frequency	167	8	175
	χ^2	0.1	4.6	4.7
	Row %	95.43	4.57	100.00
	Column %	24.78	53.33	25.4
Ovarian	Frequency	40	1	41
	χ^2	0.0	0.9	0.0
	Row %	97.56	2.44	100.00
	Column %	5.93	6.67	5.95
Uterine	Frequency	114	1	115
	χ^2	0.0	0.9	0.9
	Row %	99.13	0.87	100.00
	Column %	16.91	6.67	16.69
2 or more	Frequency	24	3	27
	χ^2	0.2	9.9*	10.1
	Row %	88.89	11.11	100.00
	Column %	3.56	20.00	3.92
Total	Frequency	674	15	689
	χ^2	0.4	19.2	19.6
	Row %	97.82	2.18	100.00
	Column %	100.00	100.00	100.00

[a] χ^2 contribution that shows significant association.

To determine which type of cancer was associated with AMS use, it was necessary to estimate chi-square for each variable individually.

Of those women with breast cancer, 13.33% used AMS and 48.81% did not. Of those with cervical cancer, 53.33% used AMS and 24.78% did not. Of those with ovarian cancer, 6.67% used AMS and 5.93% did not. Of those with uterine cancer, 6.67% used AMS and 16.91% did not. Of those with 2 or more cancers, 11.11% used AMS and 88.89% did not. The chi-square contribution was greatest (9.9) for those AMS users who had 2 or more cancers (see Table 12).

DISCUSSION

Limitations to the research study

Because the sample size of women with female-specific cancers in the 2002 NHIS was relatively small, in that there were cases in strata with single primary sampling units, measures of association

and prediction could not be weighted. As such, these findings cannot be generalized to the US population.

Because women were required to retrospectively answer questions regarding CAM use, it is possible that inaccurate information may have been obtained. In the 2002 NHIS, it was not ascertained whether women used CAM before, during, or after cancer diagnosis, for how long it was used, and how frequently it was used. Findings from this study are based on information collected in 2002. Since that time, CAM use and high-risk CAM use may have changed for these women.

Prior to this study, limited information had been collected regarding CAM use. The researcher has gleaned some meaningful information from the 2002 NHIS data; however, further inquiries would have been helpful. This includes information regarding timing of CAM use, its frequency, duration, and detailed reasons for use, particularly over a period of time.

CONCLUSIONS AND IMPLICATIONS

Clinical implications

Population estimates for use of CAM and high-risk CAM were accurately calculated for women with female-specific cancers in the United States. On the basis of a sample of 689 women in the United States with female-specific cancers, estimations indicate this is representative of 4 128 720 women. Of these, 3 341 373 (80.9%) used CAM therapies. There were 1 030 941 women (25%) who used high-risk CAM therapies, such as herbs and megavitamins, which may interact with Western biomedical treatments.

Because such a large number of women are using CAM and high-risk CAM, it behooves nurses, particularly oncology nurses, as well as other healthcare practitioners, to become knowledgeable regarding CAM therapies. In this way, monitoring patients for CAM use, particularly high-risk CAM use, can prevent untoward interactions between CAM therapies and biomedical treatments.

Many of the women used more than 1 CAM therapy, with up to 15 different CAM therapies being used by some individuals. Thus a large number of CAM therapies used have not been reported in previous studies. However, because so few studies have been conducted with women who have gynecological cancers, it may have been the case that women were using many CAM therapies, but it had just not been known. The other possibility is that as time has progressed, and more people are familiar with CAM therapies, they are more likely to use them. Also, the way in which CAM therapies are categorized into groups often precludes the researcher being able to count the number of therapies being used by participants, as usually what is estimated is use in each category.

According to population estimates, 80.9% of women in the United States with female-specific cancers used CAM. Compared with previous studies, this is a higher percentage. In studies from 1999 to 2001, CAM use by women with breast cancer ranged from 28%[23] to 84%,[24] with a midrange of 56%[25] to 65%.[26] But in studies from 2002 to 2006, the rate of use by these women increased, with only 1 study finding a low rate of 30% use,[27] and most studies finding around 70% CAM use or more,[12,28–30] with up to 90% use by 2006.[31]

Somewhat lower percentages of women with gynecologic cancers than those with breast cancer indicated they use CAM, ranging from the mid-[32] to high 40 percentiles[33] to a maximum reported of 76%.[34] Thus, it appears that CAM use for women with female-specific cancers has increased over time.

The 6 most frequently used types of CAM included the following: prayed for own health ($n = 471$; 65.0%), others prayed for your health ($n = 299$; 41.2%), used herbs for own health ($n = 168$; 23.2%), used deep-breathing exercises ($n = 129$; 17.8%), and participated in prayer group ($n = 123$; 17.0%). Thus, the most commonly used CAM therapies fall under the category of prayer for health. Use of spiritual CAM therapies is commonly found in patients receiving cancer care.[35]

Herbal use is on this list and is a high-risk CAM that may have adverse interactions with mainstream therapies. The other high-risk CAM, megavitamins, is ranked 12th on the list of 30 therapies. So women with female-specific cancers may be at risk for having interactions between CAM therapies and mainstream therapy.

Because women with female-specific cancers may be using high-risk CAM therapies, healthcare providers need to be certain to ask the women whether they are using CAM that can cause adverse interactions. The healthcare provider will need to be educated as to which CAM therapies may cause negative interactions with mainstream treatments women may be using so that appropriate education

and suggestions for treatment choice decisions can be provided to the women.

Because the measures of association and prediction cannot be generalized to the US population, caution needs to be exercised when applying such information from the study. However, such information may serve useful as general guidelines, pending validation from future research with more racially and ethnically diverse samples.

In this sample of women, it was found that personal factors associated with those who used CAM include presence of pain and depression/anxiety. Association between CAM use and pain was found in a past study of women with female-specific cancers.[27] There were no associations between depression/anxiety and CAM use found in previous studies. However, in a review of CAM biomedical literature from 1975 to 2002,[36] CAM use in women with breast cancer was shown to provide relief of anxiety.

In studies of women with female-specific cancers, general CAM use was associated with a younger age[7,26,27] and higher education.[30] Higher income and CAM use have also been associated with women who have female-specific cancers in previous studies.[33] This is in contrast to the current study, where low income was surprisingly associated with high-risk CAM use. It is possible that those women who use high-risk CAM do so because they cannot afford mainstream healthcare, as it is generally less expensive to purchase herbs, or harvest them free of charge, than to pay for mainstream medical care.

Although being married has been associated with CAM use in other diagnostic groups,[37,38] this association was found neither in studies of women with female-specific cancers nor in the current study. It is possible that for women with female-specific cancers, they obtain needed support through other means, such as support groups, voluntary agencies, or churches. Thus, marital status may not necessarily be an important variable to consider.

The study findings indicate that women in this sample with 2 or more female-specific cancers were associated with the use of AMS. The National Center for Complementary and Alternative Medicine defined this group of therapies as "complete systems of theory and practice that have evolved independently from or parallel to allopathic (conventional) medicine."[39(intro p1)] Alternative medical systems include seeing individuals for healing such as medicine women, traditional Chinese medicine practitioners, or folk healers. Such healers may administer or prescribe the use of herbal remedies, which may put women at risk for interactions with Western biomedical treatments. Thus, healthcare providers need to pay particular attention to assessing for high-risk CAM use in women who have 2 or more female-specific cancers.

Educational implications

Because there are such a large number of women with female-specific cancers in the United States using CAM, there is a need to educate patients regarding safe CAM use and providers. This is particularly true, because providers have indicated a desire to learn about CAM, admitting they have limited CAM knowledge,[40] including that of high-risk CAM, such as herbs.[41] CAM education could start for beginning nursing students and progress through curriculum. Even after graduation, CAM education could continue through participation by healthcare providers in continuing education programs.

It would also benefit CAM practitioners to have more knowledge about female-specific cancers, to have an idea of what mainstream therapies may be administered, which could interact with CAM therapies. In fact, some CAM practitioners feel they have an important role in postdiagnostic care of women who have cancer.[42]

Recommendations for further study

Recommendations for further study can be gleaned from limitations of the current study. It would be beneficial to have a larger sample size, particularly from racially and ethnically diverse minority groups and subgroups. In this way, population estimates can be accurately calculated so that information can be generalized beyond the sample.

It would be helpful to be able to verify information obtained from self-report through methods such as random record review for some of the women. This type of information might allow researchers to determine whether the method of self-report is accurate for obtaining health information, including CAM use information.

Because information from the 2002 NHIS did not include when CAM use began, as well as how long it lasted, and how frequently CAM was used, the researcher has only a time-limited snapshot of CAM use for the women. Including more detailed questions regarding CAM use, as well as conducting

longitudinal studies of CAM use in this population, would be helpful. It would be valuable to measure CAM use longitudinally, to discover whether CAM use or high-risk CAM use changes over time, and if so, what factors play a part in people's decisions to alter CAM use. Additionally, it is necessary to know when women started using CAM therapies—whether it was before cancer diagnosis or afterward.

It would also be beneficial to know whether women used CAM instead of biomedical treatment, or in addition to it. In addition, knowing whether comorbidities preceded or followed CAM use would be helpful. In that manner, researchers could determine whether CAM use may actually be causing adverse effects for some women. It would be helpful to know if women used CAM to increase their quality of life from symptoms developed as a result of treatment for female-specific cancers, or if CAM use may actually have caused a decreased quality of life due to untoward interactions between CAM and biomedical treatments.

Because of lack of consistency in the way CAM use is measured, as well as a lack of examination of CAM use with racially and ethnically diverse populations, further research is needed, utilizing consistent measures of CAM as well as diverse samples. Because the non-Hispanic Other sample was small in the current study, the researcher was not able to obtain accurate chi-square estimations. By increasing the number of people with racial/ethnic diversity who are interviewed, such statistical difficulties could be avoided.

REFERENCES

1. National Center for Complementary and Alternative Medicine. What is complementary and alternative medicine? http://nccam.nih.gov/health/whatiscam/. Published 2002. Accessed December 15, 2006.
2. Coleman C. Literature review of psychic morbidity in breast cancer patients. *Nurse Nurse Mag.* 2004;4(1). http://www.n2nmagazine.co.uk/print.asp?ArticleID = 244. Accessed September 28, 2004.
3. Pearman T. Quality of life and psychosocial adjustment in gynecologic cancer survivors. *Health Qual Life Outcomes*. 2003;1(33). http://www.hqlo.com/content/1/1/33. Accessed September 2, 2005.
4. Tasmuth T, Von Smitten K, Hietanen P, Kataja M, Kalso E. Pain and other symptoms after different treatment modalities of breast cancer. *Ann Oncol.* 1995;6:453–459.
5. American Cancer Society. *Cancer Facts and Figures 2007*. Atlanta, GA: American Cancer Society; 2007.
6. Henderson JW, Donatelle RJ. Complementary and alternative medicine use by women after completion of allopathic treatment for breast cancer. *Alt Ther Health Med.* 2004;10(1):52–57.
7. Rakovitch E, Pignol J, Chartier C, et al. Complementary and alternative medicine use is associated with an increased perception of breast cancer risk and death. *Breast Cancer Res Treat.* 2005;90:139–148.
8. Briere C, Dal Bello D, Fung Kee Fung M, Chambers A. Alternative and complementary therapy in the prevention and management of gynecologic cancers: special report *#4*-Ontario: Cancer Care Ontario. http://www.cancercare.on.ca/pdf/pebc4-7s.pdf. Published 2004. Accessed December 1, 2006.
9. Kessler RC, Soukup J, Davis RB, et al. The use of complementary and alternative therapies to treat anxiety and depression in the United States. *Am J Psychiatry.* 2001;158:289–294.
10. Montazeri A, Sajadian A, Ebrahimi M, Akbari ME. Depression and the use of complementary medicine among breast cancer patients. *Support Care Cancer.* 2005;13(5):339–342.
11. Granai CO. Expectations about alternative therapies and women with gynecological cancer. *Curr Opin Obstet Gynecol.* 1999;11:3–10.
12. Henderson JW, Donatelle RJ. Complementary and alternative medicine use by women after completion of allopathic treatment for breast cancer. *Altern Ther Health Med.* 2004;10:52–57.
13. Truant T, Bottorff JL. Decision making related to complementary therapies: a process of regaining control. *Patient Educ Couns.* 1999;38(2):205–209.
14. Pagán JA, Pauly MV. Complementary and alternative medicine: personal preference or low cost option? *LDI Issue Brief.* 2004;10(4):1–4.
15. Tu HT, Hargraves JL. High cost of medical care prompts consumers to seek alternatives. Data Bulletin No. 28. Washington, DC: Center for Studying Health System Change. http://www.hschange.com/CONTENT/722/. Accessed October 13, 2005.
16. Eschiti VS. *Complementary and Alternative Modalities Used by Women with Female-Specific Cancers* [dissertation]. Denton, TX : Texas Womans University; 2007.
17. Pender NJ, Murdaugh CL, Parsons MA. Individual models to promote health behavior. In: *Health Promotion in Nursing Practice*. 5th ed. Upper Saddle River, NJ: Pearson Prentice Hall; 2006:35–73.
18. Pender NJ. Biographical sketch. *Health Promot Model*. 2003. University of Michigan Web site: http://www.nursing.umich.edu/faculty/pender/pender_bio.html. Accessed April 29, 2006.
19. US Department of Health and Human Services. *Design and Estimation for the National Health Interview Survey, 1995–2004* (DHHS Publication No. PHS 2000-1330). Hyattsville, MD: US Dept of Health and Human Services; 2000.
20. Gorelick MH. Bias arising from missing data in predictive models. *J Clin Epidemiol.* 2006;59:1115–1123.
21. Portney LG, Watkins MP. *Foundations of Clinical Research: Applications to Practice*. 2nd ed. Upper Saddle River, NJ: Prentice Hall; 2000.
22. Barnes PM, Powell-Grinner E, McFann K, Nahin RL. *Complementary and Alternative Medicine Use Among Adults: United States, 2002.* DHHS Publication No. 2004-1250-04-0342. Hyattsville, MD: US Department of Health and Human Services; 2004.
23. Burnstein HJ, Gelber S, Guadagnoli E, Weeks JC. Use of alternative medicine by women with early-stage breast cancer. *N Eng J Med.* 1999;340:1733–1739.
24. Morris KT, Johnson N, Homer L, Walts D. A comparison of complementary therapy use between breast cancer patients and patients with other primary tumor sites. *Am J Surg.* 2000;179:407–411.
25. Alferi SM, Antoni MH, Ironson G, Kilbourn KM, Carver CS. Factors predicting the use of complementary therapies in a multi-ethnic sample of early-stage breast cancer patients. *JAMWA.* 2001;56:120–123.
26. Adler SR, Fosket JR. Disclosing complementary and alternative medicine use in the medical encounter: a qualitative study in women with breast cancer. *J Fam Pract.* 1999;48:453–458.
27. Ashinkaga T, Bosompra K, O-Brien P, Nelson L. Use of complementary and alternative medicine by breast cancer patients: prevalence, patterns and communication with physicians. *Support Care Cancer.* 2002;10:542–548.
28. Lengacher CA, Bennett MP, Kip KE, Berarducci A, Cox CE. Design and testing of the use of a complementary and alternative therapies survey in women with breast cancer. *Oncol Nurs Forum.* 2003;30:811–821.

29. Hann DM, Baker F, Roberts CS, et al. Use of complementary therapies among breast and prostate cancer patients during treatment: a multisite study. *Integr Cancer Ther.* 2005;4:294–300.
30. Shen J, Andersen R, Albert PS, et al. Use of complementary/alternative therapies by women with advanced-stage breast cancer. *BMC Comp Altern Med.* 2002. http://www.biomedcentral.com/1472-6882/2/8. Accessed September 28, 2004.
31. Bauer-Wu S, Gross A, Liu Q. Prevalence and predictors of complementary and alternative therapies use by women with advanced breast cancer [Abstract]. *Oncol Nurs Forum.* 2006;33:470–471.
32. Navo MA, Phan J, Vaughan C, et al. An assessment of the utilization of complementary and alternative medication in women with gynecologic or breast malignancies. *J Clin Oncol.* 2004;22:671–677.
33. Swisher EM, Cohn DE, Goff BA, et al. Use of complementary and alternative medicine among women with gynecologic cancers. *Gynecol Oncol.* 2002;84:363–367.
34. McKay DJ, Bentley JR, Grimshaw RN. Complementary and alternative medicine in gynaecologic oncology. *J Obstet Gynaecol Cancer.* 2005;27:562–568.
35. Taylor EJ. Spiritual complementary therapies in cancer care. *Semin Oncol Nurs*. 2005;21(3):159–163.
36. Nahleh Z, Tabbara IA. Complementary and alternative medicine in breast cancer patients. *Palliat Support Care.* 2006;1:267–273.
37. Langmead L, Chitnis M, Rampton DS. Use of complementary therapies by patients with IBD may indicate psychosocial distress. *Inflamm Bowel Dis.* 2002;8:174–179.
38. Rajendran PR, Thompson RE, Reich SG. The use of alternative therapies by patients with Parkinson's disease. *Neurology.* 2001;57:790–794.
39. National Center for Complementary and Alternative Medicine. Whole medical systems: an overview. http://nccam.nih.gov/health/backgrounds/wholemed.htm. Published 2004. Accessed January 29, 2007.
40. Kemper KJ, Gardiner P, Gobble J, Woods C. Expertise about herbs and dietary supplements among diverse health professionals. *BMC Complement Altern Med.* 2006;6(15). http://www.biomedcentral.com/1472-6882-6-15. Accessed December 15, 2006.
41. Wahner-Roedler DL, Vincent A, Elkin PL, Loehrer LL, Cha SS, Bauer BB. Physician's attitudes toward complementary and alternative medicine and their knowledge of specific therapies: a survey at an academic medical center. *ECAM*. 2006;3(4):465–501.
42. Gray RE, Fitch M, Saunders PR, et al. Complementary health practitioners' attitudes, practices and knowledge related to women's cancers. *Cancer Prev Control.* 1999;3(1):77–82.