Ethnic Differences in Use of Complementary and Alternative Medicine at Midlife: Longitudinal Results From SWAN Participants

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Objectives. We estimated the prevalence and longitudinal correlates of use of complementary and alternative medicine (CAM) at midlife among participants of the Study of Women's Health Across the Nation (SWAN).

Methods. Multiple logistic regression was used to evaluate the relationship between baseline survey–reported symptoms and use of herbal, spiritual, and physical manipulation therapies 1 year later.

Results. Almost half of all women had used CAM in the past year. Baseline psychological symptoms were associated with subsequent use of spiritual therapies among White and Chinese women. Baseline CAM use was a major predictor of subsequent use in White, Japanese, and Chinese women.

Conclusions. Baseline CAM use, rather than presence of symptoms, was the major predictor of subsequent CAM use. Premenopausal health behaviors are important determinants of choice of therapy during midlife. (*Am J Public Health.* 2002;92:1832–1840)

The menopause transition is characterized by physical, emotional, and lifestyle changes in many women. Use of hormone replacement therapy or other prescription medications remains the standard of care for treating menopausal symptoms.[1] However, midlife women now have information about and access to potential alternatives and adjuncts to conventional hormone replacement therapy that were not universally available in the past.[2–4] The marketing of nonprescription complementary and alternative medicine (CAM) for menopause management continues to increase, yet very little is known about the prevalence of CAM use during midlife or about the characteristics of women who use CAM.[2,5]

Our study had 2 research aims. First, we estimated the prevalence and cross-sectional correlates of CAM use in a large, multiethnic sample of women enrolled in the Study of Women's Health Across the Nation (SWAN). Second, we examined the longitudinal correlates of CAM use in 486 White, Japanese, and Chinese women enrolled at the California SWAN study sites. We hypothesized that those women who reported menopausal symptoms at baseline would be most likely to use herbal, spiritual, and physical manipulation therapies subsequently.

METHODS

Study Population

SWAN is a 10-year prospective cohort study that follows 3302 multiethnic women at 7 clinical sites located nationwide.[6] Each site recruited community-based cohorts of Whites and 1 ethnic minority group: African Americans in Pittsburgh, Boston, Detroit, and Chicago; Hispanics (Puerto Rican, Dominican, Cuban, Central and South American) in Newark, NJ; Japanese in Los Angeles; and Chinese in the Oakland area. Participants were eligible for inclusion in the cohort if they were between the ages of 42 and 52 years and premenopausal or early perimenopausal at the time of the baseline assessment. Potential participants were excluded if they had undergone a hysterectomy or bilateral oophorectomy, were pregnant, or were using hormone replacement therapy or oral contraceptives at the time of the baseline assessment. In addition, participants were required to be able to speak English, Spanish, Cantonese, or Japanese; to provide informed consent to participate; and to comply with the study protocol.

All cohort members from the northern California SWAN site (200 White and 250 Chinese women) were invited to participate in the CAM substudy, of whom 186 White and 210 Chinese participants completed the CAM survey. In the southern California SWAN cohort (210 White and 267 Japanese women), 100 Japanese women who were participants in an ethnographic substudy were invited to participate, and 90 women agreed.

Data Collection

All SWAN participants completed annual self-administered and interviewer-administered surveys eliciting detailed information on sociodemographic factors, lifestyle and health-related behaviors, physical and mental health status, and menopausal symptoms.

Use of complementary and alternative therapies. Participants at *all sites* completed a 5-item survey about general use of CAM at the baseline visit. Participants were asked to indicate use of the following types of self-care therapies during the past 12 months: "Herbs or herbal remedies, such as homeopathy or Chinese herbs or teas"; "Special diets or nutritional remedies, such as macrobiotic or vegetarian diets, vitamins or supplements"; "Psychological methods, such as meditation, mental imagery or relaxation techniques"; "Physical methods, such as massage, acupressure or acupuncture"; and "Folk medicine or traditional Chinese medicine."

Only the *California participants* in the longitudinal study completed an additional detailed 105-item survey of CAM therapies at the first-year follow-up visit (full survey instrument available from the authors). Individual therapies were grouped into the following categories: herbal remedies (16 items), spiritual methods (3 items about spiritual healing or prayer), and physical manipulation methods (6 items about reflexology, massage, acupressure, acupuncture, and chiropractic).

Symptoms. Information about the occurrence and frequency during the past 2 weeks of 15 individual symptoms was collected at baseline. Each symptom was categorized as present or absent, depending on whether it occurred at least once during the past 2 weeks. Using results from factor analysis, we defined 4 symptom groups and 3 individual symptoms. For the purposes of this analysis, we used 1 individual symptom (urine leakage) and 3 symptom groups: vasomotor (hot flashes, night sweats, cold sweats); psychological (mood changes, feeling blue, irritability, nervousness); and anxiety (fearfulness, heart pounding, forgetfulness). The symptoms within each group were summed, and the new variable was divided into the following mutually exclusive categories: no symptoms in a given group, less than half of the symptoms in a given group present, and at least half of the symptoms in a given group present. Urinary incontinence was analyzed separately as a dichotomous variable representing the presence of urine leaks within the past year.

Sociodemographic variables. Age was analyzed continuously. Participants were asked to select the ethnic category with which they most closely identified: White, African American, Hispanic, Chinese, or Japanese. Ethnicity categories may include both US-born and foreign-born participants. Primary language spoken and read on a regular basis was a categorical variable defining English-only speakers, those who were bilingual in English and another language, and those who primarily spoke a non-English language, with non-English speakers as the referent category. Income and education were analyzed categorically in the cross-sectional analysis for all sites; they were dichotomized at the median in the analyses of the California data only, with the highest level used as the referent category for the multivariate longitudinal analyses. Marital status was categorized as married or partnered, relative to those not currently in a committed relationship.

Menopausal status. All participants were premenopausal (had had a regular menstrual period within the past 3 months) or early perimenopausal (had had a menstrual period within the past 3 months but had experienced increased irregularity of cycles in the past 12 months) at baseline. Menopausal transition status was defined longitudinally by a 3-level categorical variable: premenopausal at both time points, perimenopausal at both time points, or premenopausal at baseline and perimenopausal at first-year follow-up.

Physical health variables. Baseline physical health status variables included the extent of physical role limitations and the amount of bodily pain experienced in the past 4 weeks, from the Medical Outcomes Study (MOS) 36-item short form health survey.[7] Perceived health status, assessed on a 5-point scale, was measured at both the baseline and the first-year follow-up visit.[7] A variable indicating change in perceived health assessment from baseline to first-year follow-up was created and then categorized into 3 groups: improved health, no change in health, and worse health status. Body mass index (weight in kilograms divided by height in meters squared) was analyzed as a continuous variable. Physical activity was measured by a composite score based on a modification of the Kaiser Permanente Activity Scale, which assesses physical exertion in 3 domains: sports, leisure, and household.[8,9] Smoking status was categorized as current, former, or never in the cross-sectional analysis. In the longitudinal multivariate analysis, smoking status was defined as a dichotomous variable, comparing current and former smokers with never smokers.

Psychosocial variables. Baseline propensity for depression was a dichotomous variable, defined as a score of 16 or greater (with higher numbers denoting greater depression risk) on the Center for Epidemiologic Studies Depression Scale.[10] Perceived-stress items measured feelings of control, confidence in problem solving, and overcoming difficulties, using a 5-point scale.[11] Social function and emotional role limitations were measured with the MOS 36-item short form health survey.[7] Extent of social support was determined with 4 items from the Rand Medical Outcomes Study survey.[12] Attitude toward aging was assessed from the sum of 7 standard survey items.[13] Awareness of and sensitivity to a variety of physical sensations was measured with the 5-item Somatosensory Amplification Scale.[14]

Data Analysis

Cross-sectional analyses. Unadjusted analyses of categorical variables were performed by the Fisher exact test for comparison of proportions; for continuous variables, means were compared by 2-sided *t* tests.

Longitudinal analyses. In the California sample, separate multiple logistic regression models were used to examine the longitudinal association between symptoms at baseline and each of the following: use of herbs, use of spiritual methods, and use of physical manipulation methods at first-year follow-up. Multivariate analyses were stratified on ethnicity owing to multiple interactions between ethnicity and both outcomes and covariates.

Model selection, which was performed independently for each ethnic group with each CAM outcome, consisted of several steps. First, potential covariates were identified on the basis of unadjusted contingency table analysis. If an association existed between a covariate and an outcome or between a covariate and symptoms at the $P<.15$ level, that variable was considered in the multivariate analysis. Symptom variables were forced into the original models as the variables of interest, baseline CAM use was forced into all models, and age was forced into all models for White and Chinese women. A best-subsets regression approach was used to evaluate the statistical contribution of each covariate and to determine the most parsimonious model that would provide statistically robust estimates. The Hosmer–Lemeshow statistic was used to evaluate overall model fit. Likelihood ratio statistics were used to compare models and to evaluate the contributions of individual variables to model fit. Akaike's information criterion was used to select the final model, on the basis of likelihood estimation and taking into account the number of parameters being estimated. Through this approach, distinct models emerged for each ethnic group and each outcome. Symptom variables that were not statistically significant at the $P=.05$ level and that resulted in poor model fit were removed from the final model. Thus, among Japanese participants, no symptom variables were included in the models for spiritual methods or physical manipulation techniques. Likewise, among Whites, no symptom variables

TABLE 1—Sociodemographic and Clinical Characteristics of Total SWAN Cohort, by Complementary and Alternative Medicine (CAM) Use

	Total (N = 3307)	Any CAM Use (n = 1604)	No CAM Use (n = 1703)	P[a]
SWAN site, %				
Massachusetts (Boston)	13.53	13.37	13.69	<.0001
Michigan (Detroit)	16.82	15.53	18.03	
Illinois (Chicago)	13.69	12.73	14.60	
Northern California (Oakland area)	14.18	16.36	12.12	
Southern California (Los Angeles)	15.30	20.88	10.01	
New Jersey (Newark)	12.23	7.51	16.71	
Pennsylvania (Pittsburgh)	14.25	13.62	14.84	
Age, mean (SD)	46.3 (2.7)	46.2 (2.7)	46.4 (2.7)	.04
Race/ethnicity, %				
White	47.07	55.70	38.90	<.0001
African American	28.46	22.28	34.23	
Hispanic	8.14	3.37	12.67	
Chinese	7.68	7.26	8.08	
Japanese	8.64	11.39	6.03	
Primary language spoken and read, %				
English only	81.90	86.02	78.02	<.0001
Bilingual	7.34	6.55	8.07	
Non-English only	10.76	7.43	13.91	
Married or partnered	74.92	76.38	73.46	.19
Annual income ($), %				
< 20 000	15.3	9.6	20.6	<.0001
20 000–49 999	33.9	31.8	35.9	
50 000–74 999	22.8	25.4	20.4	
> 75 000	28.1	33.2	23.1	
Employed for pay	80.3	82.4	78.3	.004
Education, %				
< High school	7.1	3.3	10.8	<.0001
High school	17.7	12.8	22.4	
> High school	32.4	32.4	32.3	
College	20.1	21.8	18.6	
Postgraduate	22.7	29.8	16.0	
Menopausal status at baseline				
Premenopausal	53.51	49.24	50.76	.51
Perimenopausal	46.49	48.09	51.91	
Physical activity score,[b] mean (SD)	7.7 (1.8)	7.9 (1.8)	7.4 (1.7)	<.0001
Smoking status, %				
Current	17.4	14.4	20.2	<.0001
Former	25.2	29.1	21.5	
Never	57.4	56.5	58.3	
SF-36 measures, % at or above median				
Physical role limits	61.4	55.9	66.6	<.0001
Bodily pain score	56.5	54.6	58.4	.003
Emotional role limits score	65.9	61.7	70.0	<.0001
Social function score	55.1	52.7	57.5	.0002
CES-D positive propensity for depression, %	24.30	22.13	26.35	.005
Perceived stress score, mean (SD)	8.6 (2.9)	8.5 (2.9)	8.7 (3.0)	.05

Note. SWAN = Study of Women's Health Across the Nation; CES-D = Center for Epidemiologic Studies Depression Scale; SF-36 = MOS 36-item short-form health survey.[7]
[a]*P* value is based on Fisher exact test for comparisons of proportions and 2-sided *t* test for comparisons of continuous variables.
[b]Score was based on a modification of the Kaiser Permanente Activity Scale, which assesses physical exertion in the domains of sports, leisure, and household.[8,9]

remained in the models for physical manipulation therapy.

RESULTS

Prevalence and Cross-Sectional Correlates of CAM Use in Full SWAN Cohort

In the total SWAN sample, 48.5% (n=1604) of women used at least 1 CAM therapy during the first year of the study. In the bivariate analysis (Table 1), we found ethnic, geographic, and sociodemographic differences between women who reported using at least 1 CAM therapy in the past year and those who did not. Approximately half of all CAM users were White (55.7%). CAM users in the total SWAN sample were younger, had higher education and incomes, and were more likely to be employed, White, primarily English speaking, and residents of California than were non–CAM users. CAM users reported more positive health behaviors than did nonusers, including more physical activity and less current smoking. CAM users had lower depression scores but poorer health-related quality of life scores than did nonusers. Multivariate analyses of these data (not shown) confirmed these unadjusted associations.

When we examined use of specific types of CAM therapies in the total SWAN cohort (data not shown), we found that nutritional remedies were used by 31.8% (n=1053) of participants; approximately 20% (n=659) of women used psychological remedies, 18.1% (n=595) used herbal remedies, 16.9% (n=554) used physical manipulation methods, and 5.5% (n=182) used folk remedies. We observed ethnic differences in the use of specific therapies among the overall SWAN sample. Use of nutritional remedies was most common among White (40.7%, n=616) and Japanese (40.1%, n=112) women. Similar proportions of Chinese (21.8%, n=54) and African American (23.7%, n=217) participants reported use of nutritional remedies. Nutritional remedies were the type of CAM most often reported by Hispanic women (13.3%, n=35). White participants reported the highest proportion of use of psychological therapies (29.6%, n=448), followed by Japanese (17.2%, n=48), African American (11.6%, n=106), Chinese (11.3%, n=28),

and Hispanic (4.9%, n=13) participants. Herb use ranged from 8% (n=21) among Hispanic women to 25.8% (n=64) among Chinese women and 27.6% (n=77) among Japanese women. Among Whites, 18.6% (n=282) used herbs, whereas 14.9% (n=136) of African Americans reported herb use. Use of physical CAM modalities was most prevalent among Japanese (27.6%, n=77) and White (20.2%, n=306) participants. Approximately 16.6% (n=41) of Chinese, 11.7% (n=106) of African American, and 4.9% (n=13) of Hispanic women used physical manipulation methods. Folk medicine was the CAM type least commonly used among women in the total SWAN cohort. As expected, Chinese women were the most likely to report use of folk remedies (19.4%, n=48). Among other ethnic groups, use of folk medicine was 6.8% (n=19) among Japanese, 4.8% (n=73) among Whites, 3.4% (n=9) among Hispanics, and 3.1% (n=28) among African Americans.

Longitudinal Analysis of 2 SWAN California Cohorts

No significant differences were observed between participants and nonparticipants in the longitudinal CAM substudy in terms of income, difficulty paying for basics (food, housing, medical care, heating), smoking status, depression, or body mass index. Compared with nonparticipants, participants were slightly older, had better baseline health status, were more likely to be employed and to have postgraduate education, and were less likely to report CAM use at baseline.

Factors Associated With Use of Herbs

Approximately 46% (n=218) of women in the California cohort reported use of herbal remedies at first-year follow-up. Herb use was most prevalent among Chinese women (53.7%, n=110), whereas similar proportions of Japanese (40.5%, n=36) and White women (40.2%, n=72) reported herb use. Among White participants, baseline symptoms were not associated with use of herbs, but baseline use of herbs (adjusted odds ratio [AOR]=5.72; 95% confidence interval [CI]=2.43, 13.49) and physical manipulation methods (AOR=2.18; 95% CI=1.02, 4.67) were predictors of subsequent herb use (Table 2). Among Japanese women, reporting of most or all of the anxiety symptoms listed in the survey at baseline was associated with herb use at first-year follow-up (AOR=8.97; 95% CI=1.30, 62.09). Chinese women who reported some psychological symptoms at baseline were more likely to report herb use at first-year follow-up than were those who did not report such symptoms (AOR=2.66; 95% CI=1.03, 6.89). Among Chinese women, herb use at baseline was positively associated with herb use at first-year follow-up (AOR=9.60; 95% CI=3.57, 25.78).

Factors Associated With Use of Spiritual Therapies

Spiritual therapies were being used by 34.7% (n=166) of the California cohort at first-year follow-up. Approximately 48.4% (n=90) of White, 28.9% (n=26) of Japanese, and 24.6% (n=50) of Chinese women reported use of spiritual modalities. Among White women, baseline endorsement of most or all of the psychological symptoms listed in the survey (AOR=3.58; 95% CI=1.18, 10.88) or of urine leaks (AOR=3.11; 95% CI=1.43, 6.79) was positively associated with subsequent use of spiritual CAM methods (Table 3). White women who reported use of psychological therapies at baseline (AOR=4.41; 95% CI=2.03, 9.58) were more likely than those who did not indicate such use to report subsequent use of spiritual therapies. Among Japanese women, presence of menopausal symptoms at baseline was not associated with use of spiritual methods at follow-up. Reporting of most or all of the psychological symptoms from the survey (AOR=4.84; 95% CI=1.49, 16.04) or of urine leaks (AOR=3.20; 95% CI=1.33, 7.69) at baseline was the only factor associated with use of spiritual therapies at first-year follow-up among Chinese women.

Factors Associated With Use of Physical Manipulation Methods

Approximately 31.8% (n=153) of the California cohort reported use of physical manipulation therapies at first-year follow-up: 42.3% (n=77) of Whites, 31.1% (n=28) of Japanese, and 23% (n=48) of Chinese. Among Whites, baseline presence of menopausal symptoms was not associated with subsequent use of physical manipulation–based therapies, but use of any CAM therapy at baseline was associated with use of such therapies at first-year follow-up: herbs (AOR=2.90; 95% CI=0.99, 8.50), physical methods (AOR=21.77; 95% CI=7.31, 64.78), psychological methods (AOR=4.00; 95% CI=1.67, 9.54), and folk medicine (AOR=0.09; 95% CI=0.02, 0.49) (Table 4). Among Japanese women, baseline use of physical CAM methods (AOR=8.08; 95% CI=1.81, 35.97), but not baseline presence of menopausal symptoms, was predictive of subsequent use of physical manipulation–based therapies. Chinese women who reported most or all of the vasomotor symptoms listed in the survey at baseline were more likely to report use of manipulation therapy at first-year follow-up, relative to those without vasomotor complaints (AOR=5.66; 95% CI=1.02, 31.30). Chinese women who reported previous use of physical CAM modalities (AOR=7.92; 95% CI=2.83, 22.18) were more likely to report use of such therapies at follow-up.

DISCUSSION

In this large, multiethnic sample of midlife women, almost half of the participants had used some form of alternative medicine in the previous year. A 1997 national survey of the general English-speaking population estimated that approximately 42.1% of persons had used at least 1 of 16 CAM therapies in the past year.[15] According to this and other national surveys, users of alternative medicine were older, were more likely to be married, and had higher education and incomes and poorer health status compared with nonusers.[15–17] In the cross-sectional multivariate analysis of our total SWAN sample that used 5 general categories of alternative therapies, CAM users were younger, more educated, and more likely to be White and to reside in California than were nonusers. Although this portion of the analysis did not include adjustment for potential confounders, these differences persisted when the analysis was stratified by ethnicity in the longitudinal study. In addition, those who reported CAM use were less likely to be current smokers but more likely to be former smokers, and they reported higher levels of physical activity rel-

TABLE 2—Adjusted Odds Ratios (AOR) and Associated 95% Confidence Intervals (CI) for Factors Associated With Use of Herbs Among California SWAN Participants, by Ethnicity

	White (n = 186)		Japanese (n = 90)		Chinese (n = 210)	
Independent Variables	AOR	95% CI	AOR	95% CI	AOR	95% CI
Symptoms						
Psychological						
Most/all	–[a]		–		0.98	0.39, 2.44
Some	–		–		2.66	1.03, 6.89
None	–		–		1	NA
Vasomotor						
Most/all	–		7.28	0.84, 63.43	–	
Some	–		1.91	0.38, 9.60	–	
None	–		1	NA	–	
Anxiety						
Most/all	–		8.97	1.30, 62.09	–	
Some	–		0.44	0.07, 2.73	–	
None	–		1	NA	–	
Urine leaks	0.59	0.27, 1.28	–		–	
Baseline CAM use						
Herbs	5.72	2.43, 13.49	–		9.60	3.57, 25.78
Physical remedies	2.18	1.02, 4.67	–		–	
CAM for menopause	–		6.04	0.49, 73.80	–	
Other correlates						
Age	1.16	1.02, 1.31	–		.95	0.82, 1.09
Primary language						
English only	–		–		0.19	0.05, 0.70
Bilingual English/other	–		–		0.31	0.99, 1.02
Non-English only	–		–		1	NA
Income < $75 000/y	–		1.12	0.23, 5.38	1.11	0.49, 2.49
Less than college education	–		–		1.25	0.57, 2.75
Married	–		0.12	< 0.001, 0.17	2.61	1.03, 6.66
Somatosensory score	–		0.71	0.54, 0.92	0.91	0.80, 1.07
Physical role limitations	–		0.96	0.93, 0.99	–	
CES-D	3.03	1.05, 8.71	–		–	
Social function score	1.01	1.00, 1.03	–		–	
Aging attitudes	0.86	0.75, 0.97	–		–	
Stress	–		0.71	0.51, 0.98	0.92	0.80, 1.07

Note. SWAN = Study of Women's Health Across the Nation; CAM = complementary and alternative medicine; CES-D = Center for Epidemiologic Studies Depression Scale; NA = not applicable.
[a]Variable not included in model.

ative to those who did not report CAM use, indicating that CAM users were more likely than nonusers to engage in positive health behaviors.

In the longitudinal phase of the analysis, we hypothesized that, among the California cohorts, baseline symptoms would be associated with subsequent use of CAM therapies. Although there is no consensus on which symptoms are specific to menopause,[1] vasomotor symptoms are the ones most consistently associated with menopause[18] and the ones for which women are most likely to seek treatment.[19,20] In the California sample, vasomotor symptoms were associated only with use of physical manipulation methods among Chinese women. Given the low prevalence of symptom reporting among Asian women in general[21] and in our sample,[18] those who were likely to report these symptoms might also have been more likely to seek treatment for them. No known mechanism of action can explain the association between spiritual practices and urine leakage in the White and Chinese women observed in our study. This finding may thus be due to chance, or it may be related to factors that were not assessed in this study.

In the longitudinal analysis of the California participants, White and Chinese women

TABLE 3—Adjusted Odds Ratios (AOR) and Associated 95% Confidence Intervals (CI) for Factors Associated With Use of Spiritual Therapies Among California SWAN Participants, by Ethnicity

	White (n = 186)		Japanese (n = 90)		Chinese (n = 210)	
Independent Variables	AOR	95% CI	AOR	95% CI	AOR	95% CI
Symptoms						
Psychological						
Most/all	3.58	1.18, 10.88	–[a]		4.84	1.49, 16.04
Some	1.57	0.49, 5.03	–		2.82	0.80, 9.99
None	1	NA	–		1	NA
Urine leaks	3.11	1.43, 6.79	–		3.20	1.33, 7.69
Baseline CAM use						
Nutritional remedies	–		–		2.59	1.05, 6.40
Psychological remedies	4.41	2.03, 9.58	–		–	
CAM for menopause	–		0.08	0.002, 3.88	2.34	0.80, 6.79
Other correlates						
Age	0.96	0.82, 1.05	1.46	0.93, 2.28	0.92	0.78, 1.08
Education	–		0.003	<.001, 0.10	1.18	0.47, 2.98
Income	–		0.07	0.004, 1.06	1.26	0.53, 3.00
Change in health status						
Improved	1.40	0.56, 3.47	0.002	<.001, 0.20	–	
No change	0.58	0.25, 1.37	5.74	0.45, 73.00	–	
Worse	1	NA	1	NA	–	
Physical role limitations	1.01	1.00, 1.02	–		0.99	0.98, 1.00
Vitality score	–		–		1.04	1.01, 1.07
Menopause transition						
Pre- to perimenopausal	–		0.05	0.002, 0.86	–	
Peri- to perimenopausal	–		0.20	0.01, 2.92	–	
Pre- to premenopausal	–		1	NA	–	
Physical activity	0.81	0.65, 1.00	–		–	
CES-D ≥ 16	–		–		0.34	0.09, 1.33
Aging attitudes	1.23	1.08, 1.40	1.58	1.03, 2.41	–	
Stress	–		2.84	1.41, 5.74	1.10	0.93, 1.30

Note. SWAN = Study of Women's Health Across the Nation; CAM = complementary and alternative medicine; CES-D = Center for Epidemiologic Studies Depression Scale; NA = not applicable.
[a]Variable not included in model.

reporting psychological symptoms at baseline were more likely than those not reporting these symptoms to report use of spiritual therapies at the first-year follow-up. One possible explanation for this finding might be that women with psychological symptoms also experienced more physical symptoms and thus may have been more likely to seek remedies. However, we found that presence of other symptoms (vasomotor and somatic) had no effect on the relationship between psychological symptoms and use of spiritual therapy. Although no clinical evidence exists for the benefits of spiritual methods used for psychological symptoms during midlife, there is growing evidence that the individual practice of spirituality and prayer has positive benefits for physical and mental health.[22,23] It was unclear in our study whether the use of spiritual therapies by women with psychological symptoms was a therapeutic or preventive approach. However, given the positive health profile of CAM users in this sample, these women may have been engaging in spirituality-based practices as a health maintenance measure.

Japanese women who reported anxiety symptoms and Chinese women who reported psychological symptoms at baseline were more likely to report herb use at the subsequent visit. There is as yet no reliable evidence that herbal remedies are effective in treating psychological or anxiety-related symptoms in midlife women.[24,25] However, herbal remedies are an important component of traditional Chinese medicine[26,27] and, to a lesser extent, Japanese medicine,[28] which may explain Asian women's greater likelihood of reporting herb use.

Although no studies have been conducted specifically to examine midlife CAM use, a 1997 national survey of the English-speaking population by Eisenberg and colleagues found that chronic conditions, including back pain, depression, and anxiety, were the primary reasons for CAM use.[15] This implies

TABLE 4—Adjusted Odds Ratios (AOR) and Associated 95% Confidence Intervals (CI) for Factors Associated With Use of Physical Manipulation Methods Among California SWAN Participants, by Ethnicity

	White (n = 186)		Japanese (n = 90)		Chinese (n = 210)	
Independent Variables	AOR	95% CI	AOR	95% CI	AOR	95% CI
Symptoms						
Vasomotor						
Most/all	–[a]		–		5.66	1.02, 31.30
Some	–		–		1.60	0.53, 4.85
None	–		–		1	NA
Baseline CAM use						
Herbs	2.90	0.99, 8.50	–		–	
Physical remedies	21.77	7.31, 64.78	8.08	1.81, 35.97	7.92	2.83, 22.18
Psychological remedies	4.00	1.67, 9.54	–		–	
Folk remedies	0.09	0.02, 0.49	–		–	
Other correlates						
Age	0.93	0.81, 1.07	–		0.77	0.64, 0.92
Income <$75 000/y	–		–		0.61	0.24, 1.56
Less than college education	–		0.21	0.05, 0.85	0.71	0.27, 1.90
Change in health status						
Improved	1.15	0.37, 3.61	–		–	
No change	1.50	0.54, 4.20	–		–	
Worse	1	NA	–		–	
Menopause transition						
Pre- to perimenopausal	–		3.86	0.53, 28.07	–	
Peri- to perimenopausal	–		1.46	0.23, 9.22	–	
Pre- to premenopausal	–		1	NA	–	
Ever smoked	3.28	1.33, 8.08	–		–	
Physical activity	–		–		0.98	0.74, 1.29
Body mass index	–		–		1.01	0.90, 1.13
Bodily pain score	–		–		0.97	0.95, 1.00
Somatosensory score	1.08	0.91, 1.28	–		0.91	0.76, 1.09
Aging attitudes	–		1.39	1.01, 1.93	1.16	1.01, 1.33
Emotional role limitations	0.98	0.97, 0.99	–		–	
Social support	–		0.61	0.43, 0.88	–	
Stress	–		–		0.84	0.69, 1.01

Note. SWAN = Study of Women's Health Across the Nation; CAM = complementary and alternative medicine; NA = not applicable.
[a]Variable not included in model.

that CAM is primarily a therapeutic, rather than preventive, approach for the general adult population. However, among the California SWAN sample, baseline use of CAM therapy was the most consistent predictor of subsequent use, which indicates that women were already using these therapies and that, at the point in midlife at which they were surveyed, symptom relief was not a primary reason for CAM use. In our sample, premenopausal health behaviors and beliefs were the primary determinants of choosing CAM therapy in the early stages of the menopausal transition.

Our study had several limitations. The 2 California cohorts used in the longitudinal study are not representative of midlife women in the general population. The study participants lived on the West Coast, were highly educated, had higher-than-average incomes, and were health conscious enough to participate in a longitudinal study of women's health. However, the sample was selected to be largely representative of the communities from which they were derived, and ethnic and sociodemographic variation was taken into account in the multivariate models. Furthermore, this study was conducted in a geographic area with enough CAM users to make the analyses statistically robust. There were few differences between participants and nonparticipants in terms of demographic variables. Compared with nonparticipants in the longitudinal CAM study, participants were slightly older, more educated, and less likely to use CAM at baseline. Therefore, although

we may be underestimating CAM use in this study, there is no reason to expect participation bias to affect the relationship between symptom reports and CAM use.

The longitudinal associations between symptoms, sociodemographic factors, and CAM use would be more informative if the reasons for CAM use were better documented. At the baseline visit, participants were asked whether they chose CAM therapies specifically to address menopausal concerns. However, we had too few respondents to analyze the data with reasonable precision.

In addition, it would have been optimal to examine the timing of initiation of CAM therapy with respect to symptom reports. For example, women who were not symptomatic at baseline but who developed symptoms during the first year of follow-up may have initiated CAM use during that time for symptom relief. When we analyzed the incidence of symptoms during the first year by CAM use at first-year follow-up and then by ethnicity, the proportion of women who developed symptoms during the first year of follow-up was similar for those who did and those who did not report use of each of the CAM therapies at first-year follow-up. In a small percentage of these comparisons, a higher proportion of women in the non–CAM use group developed symptoms within the first year, relative to those who were using CAM by first-year follow-up. This finding lends further evidence to our conclusion that the presence of symptoms, either at baseline or during the first year, was not the primary factor associated with CAM use at the first-year follow-up visit.

In this cohort of Asian and White women in California, use of alternative therapies was prevalent and diverse. During the early stages of menopause, psychological symptoms were predictive of use of spiritual therapies, but symptom relief per se did not appear to be a primary reason for CAM use. Baseline CAM use was a primary predictor of subsequent use, which implies that premenopausal health behaviors were important determinants of choice of therapy during the transition. Studies are under way in this cohort to examine long-term CAM use during the perimenopausal and postmenopausal periods. ■

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Contributors

Y. Bair, the principal investigator, was responsible for generating the study hypotheses and analytic design, analyzing and interpreting the data, drafting and revising the article, and coordinating its submission for publication. E. B. Gold, the co–principal investigator for SWAN at the northern California site, worked on study design, analyses, and data interpretation. G. A. Greendale, the principal investigator for SWAN at the southern California site, worked on the design of the alternative medicine survey instruments and study design and data interpretation. B. Sternfeld, the co–principal investigator for SWAN at the northern California site, was the author of the physical activity survey instrument used in SWAN and worked on study design and data interpretation. S. R. Adler, one of the primary authors of the alternative medicine surveys used in SWAN, worked on data interpretation. R. Azari was the statistician responsible for analytic design and data interpretation. M. Harkey, an alternative medicine expert, played a significant role in study design and data interpretation for this study. All authors took part in the preparation and revision of the article.

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Human Participant Protection

The institutional review board for each site granted approval for the inclusion of human participants in SWAN. Each participant signed an approved consent form before data collection began.

References

1. Greendale GA, Sowers M. The menopause transition. *Endocrinol Metab Clin North Am.* 1997;26:261–277.

2. Conboy L, Domar A, O'Connell E. Women at mid-life: symptoms, attitudes, and choices, an Internet based survey. *Maturitas.* 2001;38:129–136.

3. Kass-Annese B. Alternative therapies for menopause. *Clin Obstet Gynecol.* 2000;43:162–183.

4. Thacker HL, Booher DL. Management of perimenopause: focus on alternative therapies. *Cleve Clin J Med.* 1999;66:213–218.

5. Seidl MM, Stewart DE. Alternative treatments for menopausal symptoms. Qualitative study of women's experiences [published erratum appears in *Can Fam Physician.* 1998;44:1598]. *Can Fam Physician.* 1998;44:1271–1276.

6. Sowers MF, Crawford SL, Sternfeld B, et al. SWAN: a multicenter, multiethnic community-based cohort study of women and the menopausal transition. In: Lobo RA, Kelsey J, Marcus R, eds. *Menopause: Biology and Pathobiology.* San Diego, Calif: Academic Press; 2000.

7. Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36), I: conceptual framework and item selection. *Med Care.* 1992;30:473–483.

8. Sternfeld B, Ainsworth BE, Quesenberry CP. Physical activity patterns in a diverse population of women. *Prev Med.* 1999;28:313–323.

9. Baecke JA, Burema J, Frijters JE. A short questionnaire for the measurement of habitual physical activity in epidemiological studies. *Am J Clin Nutr.* 1982;36:936–942.

10. Radloff L. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas.* 1977;1:385–401.

11. Cohen S, Williamson G. Perceived stress in a probability sample of the United States. In: Spacan S, Oskam S, eds. *The Social Psychology of Health.* Newbury Park, Calif: Sage; 1988:31–67.

12. Sherbourne CD, Stewart AL. The MOS social support survey. *Soc Sci Med.* 1991;32:705–714.

13. Lasher KP, Faulkender PJ. Measurement of aging anxiety: development of the Anxiety about Aging Scale. *Int J Aging Hum Dev.* 1993;37:247–259.

14. Barsky AJ, Goodson JD, Lane RS, Cleary PD. The amplification of somatic symptoms. *Psychosom Med.* 1988;50:510–519.

15. Eisenberg DM, Davis RB, Ettner SL, et al. Trends in alternative medicine use in the United States, 1990–1997: results of a follow-up national survey. *JAMA.* 1998;280:1569–1575.

16. Paramore LC. Use of alternative therapies: estimates from the 1994 Robert Wood Johnson Foundation National Access to Care Survey. *J Pain Symptom Manage.* 1997;13:83–89.

17. Astin JA. Why patients use alternative medicine: results of a national study. *JAMA.* 1998;279:1548–1553.

18. Gold EB, Sternfeld B, Kelsey JL, et al. Relation of demographic and lifestyle factors to symptoms in a multi-racial/ethnic population of women 40–55 years of age. *Am J Epidemiol.* 2000;152:463–473.

19. Bachmann GA. Vasomotor flushes in menopausal women. *Am J Obstet Gynecol.* 1999;180(3 Pt 2):S312–S316.

20. Johnson SR. Menopause and hormone replacement therapy. *Med Clin North Am.* 1998;82:297–320.

21. Boulet MJ, Oddens BJ, Lehert P, Vemer HM, Visser A. Climacteric and menopause in seven Southeast Asian countries. *Maturitas.* 1994;19:157–176.

22. Mueller PS, Plevak DJ, Rummans TA. Religious involvement, spirituality, and medicine: implications for clinical practice. *Mayo Clin Proc.* 2001;76:1225–1235.

23. Strawbridge WJ, Shema SJ, Cohen RD, Kaplan GA. Religious attendance increases survival by improving and maintaining good health behaviors, mental health, and social relationships. *Ann Behav Med.* 2001;23:68–74.

24. Hardy ML. Herbs of special interest to women. *J Am Pharm Assoc (Wash).* 2000;40:234–242; quiz 327–329.

25. *A Handbook of Traditional Chinese Gynecology.* Boulder, Colo: Blue Poppy Press; 1995.

26. Ernst E, ed. *The Desktop Guide to Complementary and Alternative Medicine.* London, England: Harcourt Publishers Limited; 2001.

27. Chen YC. Chinese values, health and nursing. *J Adv Nurs.* 2001;36:270–273.

28. Lock M. *Encounters With Aging: Mythologies of Menopause in Japan and North America.* Berkeley: University of California Press; 1993.