Complementary and Alternative Medicine Use Among Asian Indians in the United States: A National Study

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Abstract

Background: Asian Americans use complementary and alternative medicine (CAM) at a higher rate than Americans.
Objective: This national study on Asian Indians (AIs), the third largest Asian-American subgroup in the United States, examined the CAM use by gender and its association with acculturation, health behaviors, and access to health care.
Design: This was a cross-sectional survey.
Subjects: The subjects consisted of 1824 AI adults in six states with higher concentration of AIs.
Results: Mean age and years lived in the United States was 45.7 ± 12.8 and 16.6 ± 11.1 years, respectively. The respondent majority was male, immigrants, college graduates, and had access to care. Sixty three percent (63%) of AIs used at least one type of CAM; most common was a vegetarian diet, followed by use of dietary and herbal supplements and alternative medical systems. Females reported a significantly higher use of CAM, a vegetarian diet, and use of dietary and herbal supplements than AI males. Older age, female gender, having no access to care, and spirituality predicted CAM use in the logistic regression model. Older age, female gender, unmarried, and higher income was associated with use of dietary and herbal supplements; AIs who reported being vegetarian were more likely to be female, unmarried, spiritual, and self-reported their physical health to be fair or poor.
Conclusions: This is the first national study of CAM use among AIs by gender and selected respondent characteristics. Results provide important information on health behaviors, beliefs, and patterns of CAM use in this ethnic subgroup to be factored into patient education.

Introduction

ASIAN AMERICANS (AAs) are a heterogeneous racial/ethnic group that comprise 5% of the U.S. population.[1,2] Asian Indians (AIs), the third largest Asian subgroup in the United States (16.4% of AAs), had the highest growth of all AA subgroups.[3] Despite this increase, current understanding of complementary and alternative medicine (CAM) use among AAs does not adequately explore patterns and use, nor health education needs of AIs. Current national surveys have not assessed CAM use and its association with health behaviors, beliefs, and possible gender differences in specific Asian subpopulations due to small sample sizes or because multiple ethnic groups are aggregated into the general category of "Asian Americans."[2]

According to the 2007 National Health Interview Survey (NHIS), 38% of adults used CAM therapy in the past 12 months.[4] AA adults' use of CAM (39.9%) was slightly less than whites (43.1%) and American Indian or Alaskan Natives (50.3%), but greater than blacks (25.5%). Overall, CAM use was higher in women, adults aged 30–69, adults with higher levels of education, not poor, living in Western states, former smokers, or hospitalized in the last year.[4] CAM use was associated with female gender, higher education, and chronic medical conditions, but *not* foreign birth. However, disparities between Hispanic subgroups CAM use was noted between Mexicans (18.2%) and Puerto Ricans (29.7%) in addition to differences in using biologically based versus manipulative therapies. Such disparities are also expected among AA subgroups with distinct differences in AI CAM

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use based on their social and cultural beliefs and paradigms.[5] An example of this would be a vegetarian lifestyle, higher levels of education attainment, or use of Ayurveda.

Although a few studies have addressed CAM use in AAs,[6–9] baseline CAM utilization for AIs has not been established. For example, Mehta et al.[6] reported that AIs had the lowest use (19%) of herbal medicine (biologically based therapies) as compared to Chinese Americans (32%) and Filipinos (26%). Hsiao et al.[9] reported a significantly higher CAM use over the past 12 months among AAs (75%), with highest use in Chinese Americans (86%) and lowest use in South Asians (individuals from various countries in the Indian subcontinent) at 67%. Use of biologically based therapy revealed a similar pattern, but interestingly, its use was not associated with acculturation or compromised access to health care.[9] However, AAs were less likely than whites to disclose CAM/herbal use to their primary physician/conventional health care practitioner.

Given the growth of the AI population in the United States, it is important to have a better understanding of CAM descriptive data in order to educate health care professionals to be culturally sensitive to the specific needs of AIs, including CAM use and possible interactions between pharmaceuticals and supplements commonly used by these individuals. Furthermore, such information can inform and assist health professionals serving this population in addressing use of various CAM modalities as well as trends by sociodemographic and patient factors related to its use. Hence, the purpose of this study was to determine prevalence of AI CAM use by gender and its association with acculturation levels, health behaviors (physical activity, spirituality, and tobacco use), and access to care based on current literature.

Research Design and Methods

Sample and data collection

The sample comprised 1824 randomly selected Asian Indians, aged 18 years and older, from seven U.S. cities with high concentration of AIs: Houston, TX; Phoenix, AZ; Washington, DC; Boston, MA; San Diego, CA; Edison, NJ; and Parsippany, NJ. Sampling frame and data collection for this study have already been published.[10] Participation was voluntary, and informed consent was obtained from all subjects prior to participation. AIs who declined to participate in the study were requested to respond to a short questionnaire. Thirty percent (30%) of the letters were returned due to incomplete address or no forwarding address and 10% of the phone numbers were disconnected. Eighteen hundred thirty eight (1838) AIs completed the phone interview (response rate was 37%). Nonparticipants did not differ in gender, educational level, family history of diabetes and cardiovascular disease or smoking status, but were significantly older than participants. The overall response rate was higher than in published health surveys of Asians or Asian Indians.[11–14] Telephone interviews were completed by trained, multilingual AI staff; the response rate was 37%. The study was approved by the Institutional Review Board of Texas A&M University.

Measures

Demographic information

Demographic information included age, gender, marital status, education (response options: high school degree or less, or some college/college graduate), income, access to conventional health care (health insurance coverage), and self-reported physical health (response options: poor, fair, good, very good, or excellent). Income was assessed as a categorical variable with response options <$10,000 to ≥$150,000. Body mass index (BMI), was calculated from height and weight (BMI = kg/m^2) and the number of health conditions was a count variable of 11 chronic conditions self-reported by the respondents that included conditions of high blood cholesterol, cancer, diabetes, heart disease, high blood pressure, depression, arthritis, osteoporosis, kidney problems, thyroid problems, and back problems.

Acculturation factors included residency in the United States (more than 10 years) and English language proficiency (speak English very well or pretty well).

Health promotion behavior in the current study included spirituality, physical activity, and tobacco use. Spirituality and physical activity were calculated from the spiritual growth (9 items measured the frequency of self-reported self-actualizing behaviors; Cronbach $\alpha = 0.84$) and exercise subscale (9 items that measured the frequency of rigorous or leisure time physical activity; Cronbach $\alpha = 0.83$) of the revised Health Promotion Lifestyle, Profile II.[15] The scales ranged from never (0) to routinely (3), with a higher score indicative of spirituality and physical activity levels. Respondents were categorized as "physically active" if they responded "*often*" or "*routinely*" and "physically not active" if responses were "*never/sometimes*." Similarly for the spirituality dimension, respondents were categorized as spiritual if they responded "*often*" or "*routinely*" to the questions and "not spiritual" if responses were "*never or sometimes*." Tobacco use (dichotomized) was categorized as nonuser (0) or regular/sometimes use of one or more of the following: chewing tobacco or beetle leaves (*paan*), cigarettes, cigars, and smokeless tobacco (1).

CAM use was defined as "utilization of diverse medical and health care systems, practices, and/or products that are not considered to be part of conventional medicine" and included a broad range of practices and beliefs such as acupuncture, Ayurveda, homeopathic treatment, relaxation techniques, and herbal remedies. The CAM use questions were part of a larger study that examined the prevalence of diabetes and its associated risk factors among Asian Indians.[10] Hence, the CAM questions were not as detailed as the NHIS's CAM questionnaire. For analytical purposes, the AIs' commonly used CAM therapies were grouped into five broad categories using the classification system employed by the National Center for Complementary and Alternative Medicine (NCCAM). *CAM use* was derived from five questions (three close-ended and two open-ended) that assessed respondents' vegetarian status: "Are you a vegetarian?" "Are you currently taking dietary and herbal supplements?" and "Do you use any alternative medical systems (AMS, also referred to as Whole Medical Systems) such as Ayurveda, homeopathic treatment, and naturopathy?" Positive response to the last two questions was probed with an open-ended question for details of use. All open-ended questions were coded by three individuals for consistency, and five responses were discarded because a specific type of therapy was not indicated. The CAM questions were totaled for a total CAM score. Furthermore, individual use of AMS, diet-

TABLE 1. FREQUENCIES AND PERCENTAGES OF ASIAN INDIAN ADULTS 18 YEARS OF AGE AND OLDER WHO USED COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM), BY TYPE OF THERAPY, IN THE UNITED STATES

Therapy	Number (%)
Alternative medical systems	
Ayurveda	160 (8.77)
Homeopathic treatment	73 (4.4)
Acupuncture	4 (0.2)
Total (one or more of the above)	220 (12.1)
Body–mind therapies	
Yoga	2 (0.1)
Biologically based therapies	
Dietary and herbal supplements	555 (30.42)
Diet-based therapies	
Vegetarian diet	902 (49.95)
Manipulative and body-based therapies	
Chiropractic, manipulative, massage, movement therapies	0 (0)
Energy therapy	
Energy healing therapy/Reiki	0 (0)
Total CAM	1151 (63.2)

Number = number of participants; percentages are valid percents.

based therapy (vegetarian diet), and use of dietary and herbal supplements was also calculated.

Statistics

All analyses were done using the Statistical Program for Social Sciences (SPSS) system (version 17.0). Basic descriptive statistics were obtained for demographic and CAM use. Student's t-test and χ^2 analysis (for categorical variables) evaluated the association of CAM and specific domains (AMS, diet-based therapy, and use of dietary and herbal supplements) by gender and selected respondent characteristics. The acceptance level for statistical significance was lowered from 0.05 to 0.003, a Bonferroni correction for multiple comparisons. Logistic regression analysis was used to predict CAM use. Independent variables included number of years in the United States, gender, education, marital status, income, body mass index, spirituality, physical activity, tobacco use, number of health conditions, access to health care (health insurance), English proficiency, and current health status. Age was included as a categorical variable [18–39 years (37%), 40–59 years (45%), and ≥60 years (18%)] in the logistic model since prior studies have reported that middle-aged individuals are more likely to use CAM than other age groups. The primary outcome variables were based on the NCCAM categories, and separate logistic regression models were run for total CAM use, use of AMS, diet-based therapy (vegetarian diet), and use of herbal and dietary supplements.

Results

The mean age and length of residence in the United States was 46.1 ± 12.8 years and 16.4 ± 10.9 years, respectively. The majority were male (60%), married (90%), immigrants (98%), and had some form of health insurance (71.4%). Eighty-two

percent (82%) of the respondents had a graduate or professional degree. The modal income was $50,000–$100,000; 12% reported income below $25,000.00.

Complementary and alternative medicine use, by type of therapy, among respondents

The majority of the respondents (63.2%) indicated using some type of CAM therapy (Table 1). The CAM AMS use by type of therapy indicated 8.8% used Ayurveda, 4.4% homeopathic treatment, and 0.2% acupuncture (which was included here to reflect formulary use of a Traditional Chinese medical system therapy). Many individuals used more than one AMS therapy. Approximately half (49.9%) and one third (30.4%) of AIs reported diet-based therapy (vegetarian diet) and use of dietary and herbal supplements, respectively. Most commonly reported dietary supplements were multivitamins (specifically One-A-Day™ and Centrum) as well as individual vitamins (e.g., vitamins B, E, etc).

CAM use by type of therapy and selected respondent characteristics

Total CAM use as well as individual domains of therapy by selected respondent characteristics is presented in Table 2. Total CAM use was significantly associated with gender, educational level, acculturation, and tobacco use of the respondents; access to care approached significance at $p = 0.004$. In other words, AI females, high school education or below, no health insurance, lack of English proficiency, and those who did not use tobacco reported a higher use of CAM. Use of dietary and herbal supplements was significantly higher among acculturated AIs (proficient in English; $p < 0.001$ and residency in the United States for more than 10 years; $p < 0.001$), who considered themselves to be spiritual ($p = 0.001$), and reported no medical history of chronic health conditions ($p < 0.001$). Furthermore, females, respondents with higher income, and those with a physically active lifestyle reported higher use of dietary and herbal supplements (approaching significance). Similarly, a vegetarian lifestyle was associated with female gender, lower educational level, no access to health care, lack of English proficiency, and no tobacco; use of AMS approached significance for the following variables: age, physical activity, spirituality, and tobacco use (Table 2).

CAM use by gender and selected respondent characteristics

Gender differences in the use of CAM/individual domains of therapy by selected respondent characteristics are presented in Table 3. Males and females differed in their use of total CAM (total of all therapies) by age, educational level, access to care, spirituality, English proficiency, and tobacco use, with significance level ranging from $p = 0.010$ to <0.001. Female AI CAM users were younger, less spiritual, did not use tobacco, had less access to health care, were less proficient in English, and had fewer years of education compared to their male peers. Significant (or approaching significance levels) gender differences in specific domains of CAM therapies were also noted. While AI females were more likely to report they were vegetarian than their male counterparts (Table 2), AI males who reported a preference for vegetarian

TABLE 2. USE OF COMPLEMENTARY AND ALTERNATIVE MEDICINE BY SELECTED CHARACTERISTICS IN ASIAN INDIAN ADULTS IN THE UNITED STATES

| | All CAM | | Alternative medical systems | | Biologically based therapies | | | |
| | | | | | Dietary and herbal supplement | | Vegetarian diet | |
Variables	Number (%)	p-value	Number (%)	p-Value	Number (%)	p-Value	Number (%)	p-Value
Gender		<0.001		0.652		0.020		<0.001
Male	652 (59.3)		131 (11.7)		316 (28.7)		484 (54.1)	
Female	499 (69.1)		89 (12.4)		239 (33.4)		418 (72.4)	
Age		0.111		0.016		0.264		0.263
18–29	99 (74.4)		42 (26.3)		21 (13.1)		76 (57.1)	
30–39	298 (73.6)		121 (26.9)		49 (10.9)		230 (56.8)	
40–49	235 (78.1)		120 (34.5)		37 (10.6)		188 (62.5)	
50–59	265 (79.1)		145 (36.8)		51 (12.9)		204 (60.9)	
60–69	30 (90.9)		13 (33.3)		5 (12.8)		25 (75.8)	
70+	28 (84.8)		17 (38.6)		10 (22.7)		20 (60.6)	
					173			
Access to care		0.004		0.366		0.008		<0.001
Health insurance	910 (77.0)		175 (13.4)		470 (36.1)		705 (59.6)	
No health insurance	155 (86.6)		31 (15.8)		53 (27.0)		133 (74.3)	
Marital status		0.744		0.431		0.733		0.062
Currently married	1030 (78.3)		197 (13.7)		494 (34.4)		814 (61.9)	
Not currently married	111 (77.1)		19 (11.5)		59 (35.8)		79 (54.9)	
Physical activity		0.177		0.024		0.005		0.503
Physically active	180 (81.4)		43 (17.9)		102 (42.5)		139 (62.9)	
Not physically active	950 (77.4)		173 (12.8)		448 (33.2)		743 (60.5)	
Body–mass index		.805		0.852		0.233		0.939
Healthy weight	514 (78.6)		39 (17.3)		66 (29.3)		99 (58.2)	
Overweight	410 (77.7)		40 (19.4)		67 (32.5)		94 (59.1)	
Obese	86 (80.4)		7 (18.9)		16 (43.2)		15 (55.6)	
Number of years lived in the U.S.		0.09		0.915		<0.001		0.468
<10 years lived in U.S.	345 (65.6)		69 (13.1)		128 (24.3)		273 (60.0)	
≥10 years in the U.S.	728 (70.3)		133 (12.9)		384 (37.3)		562 (62.0)	
English proficiency		<0.001		0.603		<0.001		<0.001
Proficient in English	1014 (77.1)		180 (13.1)		506 (36.8)		772 (58.7)	
Not proficient in English	113 (91.9)		18 (11.6)		35 (22.6)		106 (86.2)	

		p		p		p		p
Education		0.001		0.508		0.348		<0.001
≤High school education	108 (80.8)		16 (11.9)		42 (31.1)		92 (76.7)	
College/professional degree	1024 (70.8)		201 (13.9)		508 (35.5)		791 (59.9)	
Spirituality		0.130		0.046		0.001		0.985
Spiritual	691 (79.3)		139 (14.8)		357 (38.1)		530 (60.8)	
Not spiritual	436 (76.0)		76 (11.7)		192 (29.7)		349 (60.7)	
Income		0.432		0.123		0.014		0.002
<$25,000	99 (82.5)		29 (20.4)		37 (26.1)		85 (70.8)	
$25,000–$75,000	452 (77.3)		89 (13.7)		228 (35.0)		354 (60.5)	
≥$75,000	328 (77.4)		69 (14.9)		182 (39.3)		228 (53.8)	
		0.311		0.135		<0.001		0.639
No health condition								
1–2 conditions	486 (76.9)		83 (12.1)		202 (29.4)		394 (62.3)	
	477 (78.2)		102 (15.1)		247 (36.5)		365 (59.8)	
≥3 conditions	140 (82.4)		32 (16.8)		86 (45.3)		102 (60.0)	
Tobacco use		0.001		0.049		0.401		<0.001
No tobacco use	1083 (79.3)		198 (11.6)		516 (30.2)		857 (62.7)	
Current user (always/sometimes)	68 (64.8)	0.07	20 (17.4)		39 (33.9)		45 (42.9)	
Current health status				0.524		0.096		0.067
Excellent or very good	532 (77.1)		99 (13.3)		246 (32.9)		416 (60.3)	
Good	456 (81.0)		83 (13.5)		234 (38.0)		361 (64.1)	
Fair or poor	137 (73.7)		35 (16.2)		69 (31.9)		102 (54.8)	

Tobacco users are respondents who indicated regular or sometimes use of cigarettes, chewing tobacco (*paan* or beetle leaves), smokeless tobacco, and cigars. Spirituality is a subscale of the health-promotion lifestyle profile scale (summation of 9 items); Physical activity is a subscale of the health promotion lifestyle profile scale (summation of 9 items); Respondents were categorized "physically active" if they responded often or routinely and "physically not active" if responses were never or sometimes. Similarly, respondents were grouped as "spiritual" if they responded often or routinely for the 9 questions and "not spiritual" if responses were never or sometimes. Health conditions is a count variable of 11 chronic conditions that include conditions of high blood cholesterol, cancer, diabetes, heart disease, high blood pressure, depression, arthritis, osteoporosis, kidney problems, thyroid problems, and back problems. Proficiency in English is assessed by respondents who indicated they can speak English very well or pretty well. Current health status was assessed by self-reported physical health by respondents. P-value is based on χ^2 analysis. Percentages are valid percentages.

TABLE 3. DIFFERENCES IN THE USE OF COMPLEMENTARY AND ALTERNATIVE MEDICINE IN U.S. ASIAN INDIAN ADULTS BY GENDER AND SELECTED CHARACTERISTICS

| | All CAM | | | Alternative medical systems | | | Biologically based therapies | | | | | |
| | | | | | | | Dietary & herbal supplement | | | Vegetarian diet | | |
Variables	Males N=652 Mean±SD	Females N=499 Mean±SD	Sex diff. p-Value	Males N=131 Mean±SD	Females N=89 Mean±SD	Sex diff. p-Value	Males N=316 Mean±SD	Females N=239 Mean±SD	Sex diff. p-Value	Males N=484 Mean±SD	Females N=418 Mean±SD	Sex diff. p-Value
Age[a]	47.2±13.0	45.1±12.2	0.007	50.0±14.2	46.4±12.8	0.060	49.5±13.0	45.8±12.1	0.001	47.0±12.8	45.3±12.1	0.040
Physical activity[a,b]	1.3±.64	1.3±0.65	0.05	0.16±0.37	.26±.44	0.072	1.4±0.64	1.3±0.62	0.156	1.3±0.67	1.2±0.65	0.030
Spirituality[a,c]	2.2±.61	2.0±0.66	0.001	2.1±0.53	2.2±.76	0.407	2.2±.62	2.1±0.67	0.116	2.2±0.63	2.0±0.67	0.003
Body–mass index[a,d]	24.8±6.7	24.8±4.4	0.990	24.5±3.6	25.9±5.8	0.035	24.9±3.5	24.9±4.3	0.911	24.8±7.5	24.9±4.5	0.883
Number of years lived in the U.S.[a]	17.2±11.4	16.4±10.8	0.287	16.8±11.8	16.2±10.9	0.724	19.6±11.4	18.1±11.0	0.145	16.3±11.0	16.2±10.5	0.924
Number of health conditions[a,e]	1.1±12	0.99±1.3	0.326	1.2±1.4	1.2±1.5	0.992	1.3±1.4	1.1±1.3	0.084	1.0±1.2	0.97±1.3	0.578
Access to care[f]	0.89±0.315	0.89±0.37	0.004	0.84±0.37	0.87±0.34	0.629	0.91±0.30	0.90±0.30	0.908	0.87±0.34	0.81±0.39	0.019
Marital status[f]	0.91±0.28	0.89±0.31	0.224	0.89±0.32	0.95±0.21	0.080	0.91±0.28	0.86±0.34	0.058	0.92±0.27	0.90±0.30	0.282
English proficiency[f,g]	0.95±0.22	0.84±0.37	<0.001	0.96±0.19	0.84±0.37	0.002	0.97±0.18	0.89±0.31	<0.001	0.94±0.24	0.81±0.39	<0.001
Education[f]	0.95±0.21	0.84±0.36	<0.001	0.97±0.23	0.89±0.32	0.104	0.95±0.21	0.88±0.32	0.003	0.95±0.22	0.84±0.37	<0.001
Income[f,h]	0.61±0.49	0.57±0.50	0.249	0.53±0.50	0.61±0.49	0.241	0.65±0.48	0.60±0.49	0.257	0.57±0.50	0.56±0.50	0.861
Tobacco use[f,i]	0.13±0.45	0.02±0.15	<0.001	0.24±0.62	0.01±0.11	0.001	0.15±0.48	0.03±0.18	<0.001	0.12±0.44	0.02±0.17	<0.001
Current health status[f,j]	0.89±0.31	0.86±0.35	0.132	0.82±0.38	0.87±0.34	0.406	0.86±0.34	0.89±0.32	0.393	0.90±0.30	0.86±0.34	0.086

[a]Indicates variables are interval level.

[b]Physical activity is a subscale of the health-promotion lifestyle profile scale (summation of 9 items; range 0 (never) to 3 (always), higher scores indicates a more physically active lifestyle reported by respondents).

[c]Spirituality is a subscale of the health-promotion lifestyle profile scale (summation of 9 items; range 0 (never) to 3 (always), higher scores indicate higher levels of spirituality reported by respondents). Respondents were categorized "physically active" if they responded "often" or "routinely" and "physically not active" if responses were "never" or "sometimes." Similarly respondents were grouped as spiritual if they responded often or routinely for the 9 questions and "not spiritual" if responses were never or sometimes.

[d]Body–mass index (BMI) calculated from height and weight (BMI = kg/m²).

[e]Number of health conditions is a count variable of 11 chronic conditions that include conditions of high blood cholesterol, cancer, diabetes, heart disease, high blood pressure, depression, arthritis, osteoporosis, kidney problems, thyroid problems, and back problems.

[f]Categorical or variables that were dummy coded to 0 and 1.

[g]Proficiency in English is assessed by respondents who indicated they can speak English very well or pretty well (1) or not very well/not at all (0).

[h]Income was recoded to <$75,000 (0) and ≥$75,000 (1).

[i]Tobacco users are respondents who indicated regular or sometimes use of cigarettes, chewing tobacco (paan or beetle leaves), smokeless tobacco, and cigars (1) and nonusers (0).

[j]Current health status was self-reported physical health by respondents and recoded as Excellent/Very good/Good (1) and Fair/Poor (0). Income was recoded as <$75,000 (0) and ≥$75,000 (1). Access to care indicates have health insurance (private, Medicaid, Medicare) (1) or no health insurance (0).

p-value is based on independent Student's t-test analysis.

diet were more likely to be older, spiritual, were proficient in English, college educated, had access to care, and an active lifestyle as compared to their female counterparts. Age, physical activity, and access to care approached significance at $p = 0.04$, 0.03, and 0.01 levels, respectively. Use of dietary and herbal supplement varied with age ($p = 0.001$), educational level ($p = 0.003$), English proficiency ($p < 0.001$), and tobacco use ($p < 0.001$). Similar to the pattern noted among the CAM and diet-based therapy, use of herbal and dietary supplements among males indicated they were older, more educated, had higher English proficiency, and were tobacco users compared to AI females. Females who were heavier (higher weight), lacked proficiency in English, and did not use tobacco were more likely to use AMS (Ayurveda, homeopathic treatments, and acupuncture treatments) than their male counterparts (Table 3).

Predictors of CAM use by type of therapy

Table 4 shows the probability of using CAM, overall use, and by its domains of therapy. Females were 3.3 times more likely to use CAM, 1.8 times more likely to use AMS and dietary and herbal supplements, and 2.6 times more likely to be a vegetarian compared to males. Odds ratios (ORs) for age suggest a relative moderate effect on use of CAM, AMS, and dietary and herbal supplements. Middle aged and older AIs were more likely to more likely to engage in the use of CAM and its different domains of therapy. AIs between 40–59 years of age were more likely to report the use herbal and dietary supplements and follow a vegetarian diet as compared to their older and younger peers. For every decade increase in age, AIs were just slightly over 1 time more likely to engage in the use of CAM and its different domains of therapy. Respondents who considered themselves to be spiritual were 1.6 times more likely to use CAM and AMS, and 2.66 timely more likely to report they are on a vegetarian diet. Furthermore, married respondents were 2.8 times more likely to use dietary and herbal supplements and a vegetarian diet. ORs for length of time in the United States suggest a relatively weak effect on AMS use. For every decade increase in length of time in the United States, individuals were just slightly over 1 time more likely to engage in the use of Ayurveda, homeopathic, and acupuncture treatments. Similarly, odds ratio for income had a weak effect on use of dietary and herbal supplements [OR = 0.40; confidence interval (CI) 0.14–1.17], indicating individuals with lower income (<$25,000) were less likely (0.5 times) to use dietary supplements. Access to care had a strong effect on CAM use (OR = 4.3; CI 1.29–14.3), and individuals who reported no access to care were 4.3 times more likely to use CAM than those with access to care. AIs who self-reported their physical health as poor/fair health status were also more likely to report they were vegetarians.

Discussion

The results from the first randomly selected national sample of AIs show that total CAM use in AIs exceeded that of Americans as a whole. This has implications for clinician-educators attempting to close the health disparities gap regarding minority health care utilization, of which CAM use

has increasingly become an integral part. The five research domains of CAM use, as delineated by the NCCAM, were used to view overall CAM use. CAM use, dietary supplements, and a vegetarian diet varied by respondent's age, education, income, insurance status, health behaviors, and acculturation, indicating that not only are AIs a diverse group within the Asian category, but also that these characteristic differences impact CAM use trends within the AI group living in the United States. Hence, for health care providers to sufficiently serve the AI subgroup, professional education needs to cover this information to minimize health care disparities for AIs.

Results indicate striking differences of AI CAM use by gender not highlighted by most studies. AI females were 2–3 times more likely to use any type of CAM, dietary and herbal supplements, and a vegetarian diet as compared to AI males. The finding that women use more CAM than men is universal, well-documented,[16–19] and often influences the use of CAM for their children. In comparison to the males who aligned themselves with vegetarianism, AI females with a preference for the vegetarian diet were younger, had a lower English proficiency, used less tobacco, had lower education levels, were sedentary, did not consider themselves as spiritual, and were more likely to be uninsured. Similarly, females who used dietary and herbal supplements were younger, lacked proficiency in English, engaged in less tobacco use, and were less educated than male AIs using supplements.

The CAM domain of AMS use of homeopathic and Ayurvedic medicine by females was slightly higher than males. Use of Ayurveda was generally low, and concurs with another study.[5] AI female CAM users were less likely to be proficient in English and less educated than their male peers. Thus, gender-specific and linguistically appropriate educational seminars may be necessary for targeting this group. Furthermore, as AI females are significantly vegetarian (72.3% compared to 54.1% for males), proper nutritional advice geared toward a vegetarian diet becomes central for the female AI living in the United States. Contrary to beliefs by AI vegetarians that they eat a healthy diet, many AIs are unaware of basic nutritional factors and have high fat intake.[20]

Acculturation had both a positive and negative influence on CAM use. For example, lack of English proficiency by AIs was associated with overall CAM use and being vegetarian, yet being proficient in English and U.S. residency of 10 years and longer indicated more likely use of dietary and herbal supplements, perhaps enabling the ability to read the supplement label and improved knowledge due to significant media attention on the importance of healthy lifestyle. Although our results concur with Lee et al.[21] in the higher use of CAM by more acculturated AAs, it differs with the findings of Hsiao et al.[9] that South Asians who were *not* proficient in English were less likely to use CAM. Perhaps AIs' pattern of CAM use differs from South Asians and should be explored in future studies.

AIs who rated themselves as spiritual were 1.5–2.0 times more likely to use CAM, Ayurvedic/homeopathic treatments, and follow a vegetarian diet. Generally, studies do not explicitly address spirituality as a covariate[4,7]; they refer to it more as the use of prayer for health.[9] It is postulated that the majority of AI respondents were of the Hindu faith.

TABLE 4. PREDICTORS OF COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM) USE BY THERAPY USING LOGISTIC REGRESSION

Independent variable	Total CAM		Alternative medical system		Herbal and dietary supplements		Vegetarian diet	
	p-Value	OR[a] (95% CI)	p-Value	OR[a] (95% CI)	p-Value	OR[a] (95% CI)	p-Value	OR[a] (95% CI)
Years lived in the U.S.	NS	—	0.017	0.95 (0.92, 0.99)	NS	—	NS	—
Body-mass index	NS	—	NS	—	NS	—	NS	—
Number of health conditions[b]	NS	—	NS	—	NS	—	NS	—
Spirituality[c]	0.04	1.48 (1.03, 1.76)	0.080	1.58 (0.94, 2.63)	NS	—	0.006	2.06 (1.23, 3.44)
Physical activity[d]	NS	—	0.005	0.50 (0.30, 0.81)	NS	—	NS	—
Gender								
Male	Ref	—	Ref	—	Ref	—	Ref	—
Female	0.001	3.36 (2.25, 5.02)	0.095	1.79 (0.90, 3.58)	0.053	1.76 (0.99, 3.12)	0.002	2.66 (1.45, 4.89)
Marital status								
Currently married	Ref		Ref		Ref		Ref	
Not currently Married	NS	—	NS	—	0.024	2.77 (1.14, 6.71)	0.007	2.79 (0.11, 0.70)
Tobacco use[e]								
Current user	Ref		Ref		Ref		Ref	
Non user	NS	—	NS	—	NS	—	NS	—
Income								
<$25,000	NS	—	NS	—	0.097	0.40 (0.14, 1.17)	NS	—
$25,000–$75,000	NS	—	NS	—	0.023	0.51 (0.29, 0.91)	NS	—
≥$75,000	Ref		Ref		Ref		Ref	
Access to care								
No health insurance	0.02	4.3 (1.29, 14.3)	NS	—	NS	—	NS	—
Health insurance	Ref		Ref		Ref		Ref	
English proficiency[f]								
Proficient in English	NS	—	NS	—	NS	—	NS	—
Not proficient in English	Ref		Ref		Ref		Ref	
Current health status[g]								
Excellent or very good	Ref		Ref		Ref		Ref	
Good	NS	—	NS	—	NS	—	NS	—
Fair or poor	NS	—	NS	—	NS	—	0.02	0.42 (0.20, 0.88)
Education								
≤High school	NS	—	NS	—	NS	—	NS	—
College graduate	Ref		Ref		Ref		Ref	
Age								
18–39 years	Ref	—	Ref	—	Ref	—	Ref	—
40–59 years	0.001	1.42 (1.25, 1.71)	NS	—	0.03	1.15 (1.07, 1.85)	0.05	1.55 (1.28, 2.06)
60 years+	0.04	1.18 (1.35, 1.98)	NS	—	NS	—	NS	—

[a]Odds ratio (OR) calculated from logistic regression analysis.
[b]Number of health conditions is a count variable of 11 chronic conditions that include conditions of high blood cholesterol, cancer, diabetes, heart disease, high blood pressure, depression, arthritis, osteoporosis, kidney problems, thyroid problems, and back problems.
[c]Spirituality is a subscale of the health-promotion lifestyle profile scale (summation of 9 items).
[d]Physical activity is a subscale of the health-promotion lifestyle profile scale (summation of 9 items).
[e]Tobacco users are respondents who indicated regular or sometimes use of cigarettes, chewing tobacco (*paan* or beetle leaves), smokeless tobacco, and cigars.
[f]Proficiency in English is assessed by respondents who indicated they can speak English very well or pretty well.
[g]Current health status was assessed by self-reported physical health by respondents.
CI, 95% confidence interval; NS, not significant.

Hindu beliefs and spirituality are closely linked, as the textbook on Ayurveda in the "*Charak Samhita*" states that the first cause of illness is a loss of faith in the Divine. Therefore, awakening the sense of Divine Self is believed to take one closer to good health and well-being. Thus, secondary therapies such as herbs and meditation are used as tools. Higher use of Ayurvedic and homeopathic treatments among older AIs is not surprising as they are still widely practiced in India and growing in popularity in the West.[22]

CAM use was higher among uninsured AIs and differs from prior studies on AAs and South Asians.[6,9,23] Other characteristics associated with CAM use were the middle/elderly age category, self-rated poor/fair health status, and sedentary lifestyle. This concurs with a recent study[24] that found 27.7% of older adults use CAM, with the highest pooled ethnic group being Asians at 48.6%. Higher income impacted dietary and herbal supplement use, indicating that cost is a possible factor associated with its utilization.

These findings must be considered in the context of our study's limitations. The main dependent variable in our study was current CAM use totaled summed from five questions. A detailed CAM questionnaire assessing types of CAM across the five domains would provide the true prevalence of CAM use. Furthermore, we did not gauge the probability of AIs disclosing use of CAM (especially dietary and herbal supplements) to allopathic/conventional medical professionals.

In conclusion, results of the present study contextually presents CAM use by selected characteristics in AIs as associated with gender. These gender-specific data can be used in clinical algorithms in clinician's offices to serve as "prompts" for the clinician to inquire about supplement use among whole families. For example, AI women who tend to use dietary supplements have a "profile" best described as that of (1) low English proficiency; (2) infrequent tobacco use; and (3) less than high school education. It is well documented that AAs are less likely than other ethnic groups to disclose CAM use to conventional health care providers.[6,8] It has also been reported that approximately half of herbal users from populations take prescription drugs and herbs concomitantly and that they believe this practice to be more effective than either modality alone.[8] The numerous herb/prescription medication interactions are beyond the scope of this article; however, this finding would help the conventional health care provider in protocols for inquiring about CAM use so as to achieve optimal overall care and health outcomes for their patients. Gender, specific health behaviors, beliefs, and patterns of CAM use in this ethnic subgroup need to be factored into both health care provider and patient education.

Disclosure Statement

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