

SOCIOECONOMIC FACTORS AND WOMEN'S USE OF COMPLEMENTARY AND ALTERNATIVE MEDICINE IN FOUR RACIAL/ETHNIC GROUPS

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Objective: Higher socioeconomic status (SES) is associated with using complementary and alternative medicine (CAM) in national surveys. Less is known about how socioeconomic factors affect CAM use in US subpopulations. We examined whether the relationship between SES and CAM use differs by racial/ethnic groups.

Methods: Using national survey data, we assessed education and income effects on women's CAM use in four racial/ethnic groups (Whites, Blacks, Mexican Americans, and Chinese Americans), controlling for age, health status, and geographic region. CAM use was defined as using any of 11 domains in the prior year.

Results: Adjusted effects of SES on CAM use were similar among Mexican American and non-Hispanic White women—education had a distinct gradient effect, with each increasing level of education significantly more likely to use CAM; household income \geq \$60,000 was associated with CAM use compared to income $<$ \$20,000. For Chinese American women, socioeconomic factors were not associated with CAM use when controlling for confounders. Although income was not associated with CAM use among African American women, college graduates were three times more likely to use CAM than those with less than a high school education, adjusting for confounders.

Conclusion: SES effects on CAM use are not uniform across racial/ethnic populations. Other factors, such as culture and social networks, may interact with SES to influence CAM use in minority populations. (*Ethn Dis.* 2008;18:65–71)

Key Words: Alternative Medicines, Complementary Medicine, Race, Ethnicity, Socioeconomic Status

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INTRODUCTION

Complementary and alternative medicine (CAM) refers to healthcare systems, practices, and products outside of conventional medicine.¹ More than two thirds of the US population have used CAM in their lifetimes;² use is higher among women, non-Hispanic Whites, residents of the western region of the United States, and those with poorer health status.^{2–4} Racial/ethnic differences in CAM use are generally attributed to cultural beliefs and practices. With few exceptions,^{5,6} research examining whether or not socio-structural factors account for variation in racial/ethnic CAM use has been lacking. Factors such as education, income, access to resources, and availability of healthcare play a prominent role in the use of conventional healthcare, often mitigating racial/ethnic disparities in healthcare.⁷ The role of socioeconomic factors in the use of CAM is less clear. Studies based primarily on White populations indicate that CAM users tend to be well educated and more affluent,^{3,4} presumably because socioeconomic resources facilitate people's access to information, exposure, and ability to pay for CAM. The highly educated may be more critical of conventional medicine, question the authority of conventional practitioners, and actively seek information about the array of treatments available for illness or to stay healthy, thus leading to greater CAM use.⁸

Yet, studies in minority populations have found an inverse relationship between socioeconomic factors and use of some CAM modalities. Findings based on the National Survey of Black Americans, for instance, indicated that families in which the father had less than a high school education were 77%

more likely to use home remedies than families in which the father had at least some college education.⁹ Similarly, herbal medicine use among Mexican Americans has been associated with lower income and fewer years of education.^{10,11}

Differential effects of socioeconomic status (SES) between racial/ethnic populations have been examined with regard to healthcare resources but not in relation to CAM use. Freiman's analysis of the National Medical Expenditure Survey, for example, found that probability of healthcare use, hospitalization, and level of healthcare spending for Whites were the most sensitive to variations in education and economic factors, compared to either African Americans or Hispanics.¹² A socioeconomic model may also be more predictive of CAM use among non-Hispanic Whites relative to minority populations. Whether the relationship between SES and CAM use differs by racial/ethnic groups has not been examined.

With few notable exceptions,^{13,14} CAM research among racial/ethnic minorities has been based on small convenience samples or included limit-

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ed CAM measures. The purpose of the current study is to use national data to assess socioeconomic effects on women's CAM use across racial/ethnic groups. Prior analyses of these data indicated that women's rates of CAM use differ by race/ethnicity and that racial/ethnic differences remain after controlling for demographic factors.¹⁴ Building on these findings, this study examines the following questions: 1) Do socioeconomic factors account for racial/ethnic differences in women's CAM use? and 2) Do the effects of socioeconomic status on women's CAM use differ by race/ethnicity? Many social science researchers advocate the use of race-specific models, positing that merely including race as a dummy variable in multivariate analyses does little for our understanding of why racial/ethnic differences exist.^{15,16} We examine socioeconomic factors and CAM use in the sample as a whole and also within specific racial/ethnic groups. Furthermore, this research focuses on CAM use among women, who are the primary caretakers, decisionmakers and consumers of healthcare.¹⁷

METHODS

Data Source

We analyzed data from the first national survey of women's use of CAM, conducted by the Rosenthal Center for Complementary and Alternative Medicine of Columbia University.¹⁴ The cross-sectional survey was designed to provide nationally representative data on women's CAM use during the past year and estimates of use among women in four racial/ethnic groups: non-Hispanic White, African American, Mexican American, and Chinese American. Random digit dialing, geo-targeting, and random selection from a surname database were used to obtain the four racial/ethnic samples. In 2001, telephone interviews were conducted of 3172 women aged ≥ 18 in

English, Spanish, Mandarin, or Cantonese. Details of the survey design and data collection have been previously reported.^{14,18}

Dependent Measure

Respondents were asked about use of "remedies and treatments that are not typically prescribed by medical doctors" for health reasons in the past year including vitamins and nutritional supplements; special diets; medicinal herbs; remedies or practices associated with a particular culture; homeopathy; yoga, meditation, or tai ji; chiropractic; manual therapies (eg, massage or acupuncture); energy therapies; acupuncture; spirituality, religion, or prayer; or any other remedy or treatment not typically prescribed by a medical doctor. Survey pretesting revealed that three domains (energy therapies, remedies associated with a particular culture, and homeopathic remedies) did not translate well and were not meaningful to Chinese American respondents. Three culturally specific categories were substituted: prescribed Chinese medicinal decoctions or broths, proprietary herbal formulas sold in Chinese drugstores, and nonprescription prepackaged traditional Chinese medications. Although these domains were not asked of women in the other racial/ethnic samples, all women were given the same number of opportunities to report use of CAM (ie, an equal number of questions was asked of each respondent). For these analyses, we defined any CAM use as use of at least one of eleven domains, including all domains in the survey except spirituality, religion, or prayer, which was excluded because its use is widely prevalent across both conventional and nonconventional medicines.¹⁹

Independent Measures

The primary independent variables in this study were race/ethnicity and socioeconomic status. Race/ethnicity was classified as non-Hispanic White, African American, Mexican American,

and Chinese American. Dichotomous variables were created from these self-reported data. Socioeconomic status was examined through 1) education, categorized as less than high school, high school graduate, attended some college, and college graduate and 2) household income, categorized as $< \$20,000$, $\$20,000$ – $\$40,000$, $\$40,000$ – $\$60,000$, and $\geq \$60,000$.

Based on previous studies, three confounding variables were included in multiple variable analyses: 1) age assessed as a continuous variable; 2) four geographic Census regions (Northeast, Midwest, South, and West) measured as dichotomous variables; and 3) self-reported health status (1 = poor to 4 = excellent).

Statistical Analyses

Cross-tabulations for bivariate analyses and multiple variable logistic regression of any CAM use were conducted by using SPSS 11.5.²⁰ Weighted analyses accounted for household variation in the probability of selection. Non-response for family income, which ranged from 12% of African American women to 57% of Chinese American women, was of particular concern given the centrality of income to the study aims. As with other national studies,²¹ missing income data were imputed by using hot deck procedures. Respondents who had missing income data were matched to respondents who reported income based on key variables (race/ethnicity, age, education, marital status, and current employment status).

Differences in CAM use were examined in bivariate analyses and multiple variable regression analyses. To address whether SES accounts for racial/ethnic differences in CAM use, we compared two logistic regression models: one with SES and one without. We also analyzed four separate logistic regression models, one in each racial/ethnic group, to examine whether SES effects on CAM use differ by race/ethnicity.

Table 1. Sample demographics and women's complementary and alternative medicine (CAM) use by race/ethnicity

| | Non-Hispanic White | African American | Mexican American | Chinese American |
|-------------------------------|--------------------|------------------|------------------|------------------|
| <i>n</i> (weighted) | 757 | 1081 | 1057 | 1026 |
| Age (mean)* | 47.8 | 41.4 | 35.8 | 43.6 |
| Region of residence* | | | | |
| Northeast | 20.7% | 19.1% | 1.0% | 33.2% |
| Midwest | 29.2% | 16.6% | 7.0% | 14.7% |
| South | 30.8% | 60.0% | 30.6% | 5.8% |
| West | 19.3% | 4.3% | 61.4% | 26.3% |
| Self-assessed health status* | | | | |
| Poor | 4.6% | 5.2% | 6.3% | 5.0% |
| Fair | 16.5% | 22.3% | 35.9% | 28.1% |
| Good | 49.7% | 55.6% | 39.3% | 47.5% |
| Excellent | 29.2% | 16.9% | 18.5% | 19.4% |
| Educational attainment* | | | | |
| Less than high school | 9.7% | 16.2% | 50.6% | 16.4% |
| High school | 34.0% | 34.2% | 27.2% | 21.3% |
| 2-year or some college | 30.3% | 31.7% | 15.7% | 9.1% |
| College or more | 26.1% | 17.9% | 6.5% | 53.2% |
| Annual household income* | | | | |
| <\$20,000 | 20.7% | 29.1% | 43.6% | 16.5% |
| \$20,000–\$40,000 | 27.1% | 37.0% | 38.3% | 24.8% |
| \$40,000–\$60,000 | 21.7% | 17.2% | 10.3% | 25.4% |
| ≥\$60,000 | 30.5% | 16.7% | 7.8% | 33.3% |
| Used any 1 of 11 CAM domains* | 51.6% | 37.9% | 36.4% | 40.8% |

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Note: Samples were weighted to account for selection probability in households with more than one eligible woman.

* $P < .05$.

RESULTS

Weighted samples included 757 White, 1081 Black, 1057 Mexican American, and 1026 Chinese American women (Table 1). Refusal rates ranged from 21% for the random national sample to 31% among Mexican American women. On average, Mexican American women were youngest (36 years), and White women were oldest (48 years). White and Chinese American women reported the highest levels of household income and education. Black women predominantly lived in the South, reported good health status, and had at least a high school education. Most Mexican American women lived in the West and reported having less than a high school education. As reported previously,¹⁴ CAM

use ranged from slightly more than one third among Mexican American women to more than half of non-Hispanic White women (Table 1).

Consistent with bivariate findings, non-Hispanic White women were more likely to use CAM in the previous year than were other women in multiple variable analyses (Model 1, Table 2). Most notably, accounting for age, region, and health status, Mexican American women were less than half as likely to use CAM compared to White women. With the exception of age, confounding variables behaved as expected: CAM use was associated with living in the West and lower health status. Age, however, was not associated with CAM use in multiple variable models.

Differences in CAM use between White women compared to Black and

Mexican American women persisted, but were slightly attenuated when socioeconomic factors were taken into account (Model 2, Table 2). Socioeconomic factors were significantly associated with CAM use. College graduates were twice as likely to use CAM compared to those with less than high school education, controlling for race/ethnicity and sociodemographics. Those with income \geq \$60,000 were one and a half times more likely to use CAM compared to those with incomes $<$ \$20,000 in adjusted analyses.

To assess whether SES effects vary across race/ethnicity, we conducted multiple variable logistic regressions in each group (Table 3). As hypothesized, SES effects varied depending on race/ethnicity. The adjusted effects of SES on CAM use were similar among Mexican American and Non-Hispanic White women—education had a distinct gradient effect, with women at each increasing level of education significantly more likely to use CAM. White women who graduated from college were more than four times as likely to use CAM compared to those with less than high school education. Among Mexican American women, college graduates were more than twice as likely to use CAM relative to women who did not graduate from high school. In both of these groups, those with household income \geq \$60,000 were significantly more likely to use CAM than those with income $<$ \$20,000. For Chinese American women, neither level of education nor household income was associated with CAM use, controlling for confounders. Although income was not associated with CAM use among Black women, college graduates were three times more likely to use CAM than were those women with less than a high school education in this subsample.

DISCUSSION

Previous studies of primarily White populations indicate higher CAM use

Table 2. Adjusted odds ratios (AOR) and 95% confidence intervals (CI) of women's use of complementary and alternative medicine, including race/ethnicity (Model 1) and socioeconomic factors (Model 2)

| | Model 1 AOR (95% CI) | Model 2 AOR (95% CI) |
|-----------------------|----------------------|-------------------------|
| Race/ethnicity | | |
| Non-Hispanic White | 1.00 | 1.00 |
| African American | .57 (.47-.70) | .63 (.51-.77) |
| Mexican American | .42 (.34-.52) | .58 (.45-.73) |
| Chinese American | .62 (.51-.76) | .59 (.48-.72) |
| Age | 1.00 (.99-1.00) | 1.00 (1.00-1.01) |
| Region | | |
| West | 1.00 | 1.00 |
| Northeast | .66 (.53-.82) | .65 (.52-.81) |
| Midwest | .74 (.60-.93) | .76 (.61-.95) |
| South | .68 (.57-.81) | .68 (.57-.81) |
| Health Status | .82 (.76-.89) | .75 (.69-.82) |
| Education | | |
| Less than high school | | 1.00 |
| High school graduate | | 1.17 (.96-1.42) |
| Some college | | 1.59 (1.28-1.97) |
| College graduate | | 2.05 (1.63-2.58) |
| Income | | |
| <\$20,000 | | 1.00 |
| \$20,000-\$40,000 | | 1.17 (.98-1.38) |
| \$40,000-\$60,000 | | 1.14 (.92-1.41) |
| ≥\$60,000 | | 1.58 (1.28-1.95) |

Statistically significant odds ratios are in **boldface** type.

among those with higher levels of education and income.^{3,4} Our findings suggest that SES effects on CAM use are not uniform across racial/ethnic populations. Income was not associated with CAM use among Black or Chinese American women. Education was more predictive of CAM use among non-Hispanic White women than among minority women. Although education had similar effects on CAM use among Mexican American women, the effect magnitude was stronger among White women. Other factors, such as immigration, insurance and health status, social networks, culture, and worldview

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may interact with SES to influence CAM use in minority populations.

Study findings indicate that socioeconomic factors do not entirely account for racial/ethnic differences in women's CAM use and that socioeconomic factors interact with race/ethnicity, which produces distinct effects in each group. Variation in socioeconomic effects on CAM use among subpopulations points to the importance of considering the discrete conditions of each group when interpreting the influence of social factors on health behaviors. Socioeconomic effects on CAM use among Chinese American women, for example, may be minimized by broad access to traditional Chinese medicine (TCM) in the United States, both in Chinese communities²² and through the American TCM profession, which has licensed practitioners in 41 of 50 states.²³ Mexican American immigrants have used traditional medicine in their countries of origin but may not have

similar CAM resources available to them once they migrate.²⁴ Socioeconomic effects on healthcare use may wax or wane with community structures and local economies. The cost of CAM varies by geographic locale, corresponding with neighborhood income levels.²⁵ Thus, CAM resources available in some low-income neighborhoods may be more financially accessible relative to CAM in high-income neighborhoods.

We found three distinct patterns of SES effects on CAM use among four racial/ethnic groups. Each of the minority groups had an effect pattern distinct from the others. In both a low-income group (Mexican American) and high-income group (non-Hispanic Whites) gradient effects on CAM use were found for income and education. In both a low-income group (African American) and a high-income group (Chinese American) no income effects were found. The variety of these findings points to the complexity of understanding the healthcare choices of Americans.

Future Research

Questions provoked by these analyses indicate the kinds of information needed to adequately interpret health behaviors. In communities with informal systems of culture-bound health practices, documentation of medical pluralism and alternative forms of care may require sequences of qualitative and quantitative studies that use ethnicity-specific measures²⁶ to adequately inform cultural sensitivity in health services.

SES effects on minority health are "conditioned" by migration, the role of culture, acculturation, medical care, and geographic location.²⁷ Future research on the role of immigration on the use of CAM and traditional medicine from countries of origin would further our understanding of CAM use among minority populations.²⁸ In our study, SES had vastly different effects on CAM use among Mexican American and

Table 3. Adjusted odds ratios (AOR) and 95% confidence intervals (CI) of use of complementary and alternative medicine in four racial/ethnic groups of women

| | Non-Hispanic White AOR (95% CI) | African American AOR (95% CI) | Mexican American AOR (95% CI) | Chinese American AOR (95% CI) |
|-----------------------|------------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Age | .99 (.98–1.00) | 1.00 (.99–1.01) | 1.02 (1.01–1.03) | 1.00 (.99–1.01) |
| Region | | | | |
| West | 1.00 | 1.00 | 1.00 | 1.00 |
| Northeast | .58 (.36–.92) | .69 (.34–1.37) | 1.45 (.42–4.95) | .62 (.44–.87) |
| Midwest | .75 (.48–1.17) | 1.03 (.52–2.06) | .56 (.31–.98) | .79 (.52–1.21) |
| South | .74 (.48–1.14) | .69 (.36–1.32) | .70 (.53–.94) | .75 (.52–1.08) |
| Health Status | .71 (.57–.87) | .78 (.65–.94) | .83 (.71–.98) | .59 (.50–.70) |
| Education | | | | |
| Less than high school | 1.00 | 1.00 | 1.00 | 1.00 |
| High school graduate | 2.51 (1.39–4.55) | .81 (.54–1.22) | 1.44 (1.04–1.99) | .88 (.57–1.37) |
| Some college | 2.78 (1.53–5.07) | 1.62 (1.07–2.46) | 1.50 (1.01–2.21) | .87 (.49–1.54) |
| College graduate | 4.25 (2.23–8.11) | 3.03 (1.86–4.92) | 2.15 (1.24–3.75) | 1.20 (.80–1.81) |
| Income | | | | |
| <\$20,000 | 1.00 | 1.00 | 1.00 | 1.00 |
| \$20,000–\$40,000 | 1.36 (.88–2.11) | .91 (.65–1.27) | 1.34 (1.00–1.80) | 1.10 (.75–1.61) |
| \$40,000–\$60,000 | 1.23 (.77–1.99) | .91 (.59–1.38) | 1.64 (1.04–2.61) | .92 (.62–1.37) |
| ≥\$60,000 | 1.99 (1.24–3.17) | .97 (.63–1.50) | 2.61 (1.54–4.40) | 1.31 (.90–1.91) |

Statistically significant odds ratios are in **boldface** type.

Chinese American women. Conditions of immigration vary from group to group. Diverse histories, cultures, and circumstances of immigrant populations in the United States shape healthcare utilization patterns. Future studies should measure acculturation to mainstream practices and also adherence to traditional practices.

The heterogeneity of CAM domains subsumed in the overall category of any CAM use may obscure SES effects in some populations. Among African Americans, for instance, lower SES is associated with greater likelihood of home remedy use.⁹ Some CAM, particularly those that are practitioner-based, may be more sensitive to variations in socioeconomic factors.²⁹ Grouping all types of CAM together may negate socioeconomic effects. More theoretically driven measures of CAM use are needed. Socioeconomic status (SES) may have varying effects on health behaviors across types of CAM, types of conventional medicine, and classification of health practices (self-care vs professional care, insured vs uninsured treatments, hospital vs ambulatory care). In addition, racial/ethnic groups use different types of

CAM at different rates. Racial/ethnic specific models need to be developed so that measures have meaning.²⁶

Variation in socioeconomic effects on health outcomes across diverse groups underscores the need to analyze specific social factors and plausible pathways of effect separately and to examine other unmeasured factors related to race/ethnicity.³⁰ Income and education may not be as colinear in minority or immigrant women as it is for non-Hispanic White women. Quality of education, median earnings by education, and purchasing power by income all vary according to race/ethnicity.³¹ Despite higher levels of education, increased income does not unequivocally equate to increased access to a range of medical choices for minority women. Our geo-targeted sampling of Mexican Americans and African Americans may include more respondents from ethnically homogeneous areas with limited access to some types of CAM practitioners for some groups and more community-based healers in others.

In the current study, it was not possible to determine whether racial/

ethnic differences in the SES-CAM association were a function of the interaction between race/ethnicity and SES or a function of differing cultural exposure to CAM. For instance, the mainstreaming of yoga in the United States has created a marketplace where yoga instruction is an increasingly costly practice. Despite its secular orientation in this country, yoga, along with meditation, is thought to be associated with religion, a belief that may be more prevalent among racial/ethnic minorities than among Whites. Are non-Hispanic White women more likely than minority women to use yoga because of a socioeconomic advantage, including information about CAM and the financial means of seeking out CAM treatments, or because of differences in cultural beliefs about CAM? Education and income were not associated with CAM use among Chinese American women. Is this a function of a history of cultural exposure to CAM or the availability of TCM with few socio-structural barriers (eg, pervasive and affordable Chinese pharmacies and TCM practitioners)? Our understanding of racial/ethnic differences in CAM

use would benefit from the development and assessment of cultural measures, including beliefs about and exposure to various CAM modalities, and socio-structural factors of health seeking behaviors (eg, cost, time, geographic barriers, and perceived racial discrimination in healthcare.).

Limitations

Telephone interviews for this study were conducted in four languages; however, we do not know if rates of disclosure differed among groups. Questions about income and healthcare practices, especially CAM, may induce different levels of cultural sensitivity in each racial/ethnic group, which could result in underreporting of CAM use among minority women. Missing income data may limit the generalizability of study findings. As noted by other survey researchers,³² income data were the most common type of missing data relative to all other demographic measures combined. Imputation resulted in income distributions within each racial/ethnic group that were largely comparable to income distributions based on US Census figures. Nonetheless, the effects of imputed income data on study results are difficult to determine. In particular, the null finding of socioeconomic effect on CAM use among Chinese American women may have resulted from respondents' unwillingness to disclose income data. Tests of association indicated no significant differences between those who reported income and those that did not report income on all study variables, suggesting the validity of imputation.

Conclusion

Higher SES is a relevant factor of CAM use in the general population. Our findings of various socioeconomic effects in minority groups emphasize the importance of including SES in CAM use models and understanding healthcare access specific to each group. Potential dangers of creating a two-

tiered system of CAM in which evidence-based and safe CAM treatments are accessible to those with greater disposable income, while CAM treatments with uncertain efficacy are readily available to all, are real. This finding underscores the importance of continuing to assess SES and CAM use. If SES and race/ethnicity are shown to be independent in their influence on the use of CAM, women's access to a variety of healthcare must not be limited because of race/ethnicity or low income.

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AUTHOR CONTRIBUTIONS

Design concept of study: Chao
Acquisition of data: Chao, Wade
Data analysis and interpretation: Chao, Wade
Manuscript draft: Chao, Wade
Statistical expertise: Chao
Acquisition of funding: Chao, Wade
Administrative, technical, or material assistance: Chao, Wade
Supervision: Chao, Wade