

# Prevalence of Complementary and Alternative Medicine in Immigrants

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**Abstract** Immigrants face barriers to accessing conventional health care systems. Hence, they are expected to have comparatively greater use of complementary and alternative medicine (CAM). This study examines the prevalence of and reason for CAM use in the U.S. population by citizenship status. Data on 34,483 U.S.-born, naturalized, and non-U.S. citizens from the 2012 National Health Interview Survey was used. CAM was categorized into four domains. Analyses controlling for socioeconomic variables were identified patterns of utilization and reasons for use. The prevalence of all CAM domains was lowest among non-U.S. citizens followed by naturalized citizens. The odds of using CAM were also higher for the immigrants who attained citizenship than for non-citizens. Individuals in all groups reported using more CAM for prevention. Factors related to cost, accessibility, or knowledge of CAM use may contribute to lower use of CAM by naturalized and non-U.S. citizens.

**Keywords** Complementary and alternative medicine prevalence · Immigrant healthcare access · Immigrant health disparities · Uses of complementary and alternative medicine

## Introduction

Over the past four decades, complementary and alternative medicine (CAM) utilization in the U.S. population has increased [1–3]. The most recent study describing national trends in CAM analyzed data from the 2007 National Health Interview Survey (NHIS) [1]. This analysis revealed that 38 % of U.S. adults had used at least one type of CAM over the past 12 months [1], up from 36 % when Barnes et al. (2004) similarly used data from the 2002 NHIS [2]. Individuals who frequently used CAM were more likely to see conventional health care providers compared to those who did not use CAM [4]. In 2005, the National Institutes of Health reported that the annual number of visits to CAM providers exceeded the number of visits to conventional clinicians [4].

Complementary and alternative medicine use has been well documented among the general population, but little is known about the relationship between citizenship status and CAM use. Adults are more likely to use CAM when conventional medicine was delayed due to cost and those who were unable to afford conventional medicine were more likely to use CAM compared to instances when they could afford conventional medicine [1]. Compared to the general population, immigrants in the U.S. were less likely to have access to conventional health care and were more likely to be in a lower socioeconomic class; additionally, they were more likely to earn lower incomes and lack health insurance [5, 6]. Language barriers may also hinder their abilities to access health services or prevent them from seeking conventional medicines [7]. These circumstances were more pronounced among immigrants without U.S. citizenship [8].

As a result of barriers to using conventional medicine in the U.S., immigrants might be more likely to use CAM [9]

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compared to their U.S.-born counterparts. Moreover, many complementary and alternative medicines are part of indigenous systems of healing from the Asian, African, and American continent [10]. Even in countries with well-established health care systems such as India, medical pluralism [11–13] is common. Immigrants will likely bring these traditional beliefs with them [9] and may be more likely to use CAM before conventional medicine [10] or in the absence of any other means of health care. For example, in some Haitian communities, Haitian immigrants seek traditional medical care from *picurites*, who provide intravenous injections for various health issues [14]. *Picurites* are perceived to be more accessible, affordable, convenient, and culturally compatible than conventional health care providers [14, 15]. Jaing and Quave [16] found that Chinese and Taiwanese immigrants differed in their beliefs about Eastern medicine; however, both groups desired to use both Eastern and Western medicine. Similarly, Kiefer and colleagues found that among a community of Latino immigrants, a variety of herbal products were used and available in local Latino stores [17]. Given the importance of health-seeking norms and preferences to cultural identity and the use of both traditional and conventional medicine, CAM use in immigrant populations must be fully understood in order to inform the delivery of culturally grounded care.

Previous studies of CAM use have frequently examined length of stay as a measure for studying immigrants [18–20], but the specific mechanisms that could influence the association between immigrant status and CAM use have not been carefully investigated. Legislation, such as the Illegal Immigration Reform and Immigrant Responsibility Act, the Antiterrorism and Effective Death Penalty Act and the Personal Responsibility and Work Opportunity Reconciliation Act, mandate differential access to health-related resources and services depending on U.S. citizenship status [21]. Citizenship status is known to be associated with insurance status and access to conventional care [22] and has also been analyzed in studies of other health outcomes in immigrant population [8, 23, 24]. Immigrant status has been shown to be protective in relation to some positive health behaviors, such as lower consumption of high-fat foods [25, 26]; however, immigrant status has also perpetuated poor health care access through structural constraints such as residential segregation [26, 27]. Few have studied CAM use among immigrants using a nationally representative sample.

As the nation becomes increasingly diverse, [28] a clear understanding the health care practices in these populations will enable clinicians to provide more culturally sensitive care and perhaps start the process to eliminate health disparities. This study examines the prevalence, type, and purpose of CAM use in the U.S. population by citizenship status. Due to relatively less access to allopathic medicine, we hypothesize that CAM use will be more prevalent

among those not born in the U.S. compared to their U.S. born counterparts. In addition, among those foreign-born, those who have yet to attain citizenship will have higher prevalence of CAM use compared to those who have attained citizenship. Type and reasons for CAM use have rarely been studied using national representative samples of minorities [29, 30], and identifying what motivates individuals to use CAM may help explain observed patterns of CAM prevalence and provide clues about why CAM use was initiated.

## Methods

### Participants and Data Collection

Study data were drawn from the 2012 National Health Interview Survey Adult Complementary and Alternative Medicine supplement (NHIS-CAM). This survey is conducted in English or Spanish and oversamples black, Hispanic, and Asian populations to allow for a more precise estimation of health characteristics in these minority populations. The NHIS-CAM sample is representative of the U.S. population with a response rate of 61 %. This study sample consists of 34,483 non-institutionalized adults.

### Measures

The dependent variable is CAM use. The 2012 NHIS asked respondents to report their use of 38 CAM therapies within the past 12 months. Hence, immigrants who had been in the country <1 year (0.9 % of all immigrants) were excluded. As with previous studies [2, 32], the 38 CAM therapies were grouped into four domains (see Table 1), according to categories developed by the National Center for Complementary and Alternative Medicine (NCCAM) [31]: alternative medicine systems (AMS; e.g. acupuncture), biological-based therapies (BBT; e.g. herbal supplements), manipulative- and body-based therapies (MBBT; e.g. chiropractic care), and mind–body therapies (MBT; e.g. meditation). If a respondent used one CAM in any domain, then yes was reported for that individual for that domain.

Respondents were also asked which CAM was the most important to their health. The top three most important CAM choices and whether they were used for prevention or treatment of disease were collected for each respondent. Respondents answered yes or no to both of these questions. The results for ayurveda, chelation therapy, and vitamins/minerals were not available in the dataset because their prevalence was either very high or very low.

Citizenship status was the independent variable of interest. Two variables were used to determine citizenship

**Table 1** List of CAM included in the 2012 National Health Interview Survey

Alternative medical systems (AMS)	Biologically based therapies (BBT)	Manipulative and body based therapies (MBBT)	Mind–Body therapies (MBT)
Acupuncture	Chelation therapy	Chiropractic manipulation or osteopathic manipulation	Yoga
Naturopathy	Vitamin		Qi Gong
Homeopathic Treatment	Herbal supplements	Craniosacral therapy	Tai Chi
Ayurveda	Bio Feedback	Massage	Energy healing therapy
Traditional healers:	Special Diet:	Movement technique:	Hypnosis
Curandero, Machi or Parchero	Vegetarian	Feldenkreis	Relaxation technique:
Native American Healer	Macrobiotic diet	Pilates	Progressive relaxation
Medicine Shaman	Atkins diet	Trager psychophysical integration	Guided imagery
Sobador	Pritikin diet	Alexander technique	Mantra mediation
Hierbero or Yerbera	Ornish diet		Spiritual mediation
Huesero			Mindfulness mediation

Source: National Health Interview Survey, 2012

status: place of birth and U.S. citizenship. Subsequently, the sample was divided into three groups: (a) U.S.-born citizens (reference group), (b) naturalized citizens, and (c) foreign-born non-U.S. citizens (referred to as “non-citizens”). Naturalized citizens are those who were not born in the United States but have since attained citizenship. Eighty-five percent of naturalized citizens had been residing in the U.S. for 15 or more years, while only 40 % of non-citizens had been residents for the same duration.

The analysis incorporated the following demographic measures: age (18–24, 25–34, 35–44, 45–54, 55–64, and 65 and older), sex (male or female), income (less than \$20,000, \$20,000–54,999, \$55,000–74,999, and \$75,000 or over), and level of education (less than high school, GED/high school graduate, some college, and college graduate or higher). These variables were entered as covariates to analyze the relationship between citizenship status and CAM use.

## Analysis

Chi square test was used to assess the relationship between citizenship status and the four CAM domains. Logistic regression models were estimated to examine the relationship between citizenship status and various dimensions of CAM, controlling for demographic variables. The frequencies for the three most important CAM choices for the three sample groups are also presented. Frequencies examining the relationship between the reason for CAM use (prevention versus treatment) and citizenship status of the respondent’s three most important CAM choices were also carried out. All analyses were conducted using SAS v9.1.3 (SAS Institute, Cary, NC) software using weighted data that accounted for stratification, clustering, and oversampling in the multi-stage survey design of the 2012 NHIS.

## Results

### Descriptive Statistics

Table 2 displays summary statistics for the analytic sample. Approximately 83 % of adults in the sample were U.S. citizens, 9 % were naturalized citizens, and 8 % were non-citizens. Slightly more than 64 % of the total sample population reported using at least one type of CAM. Sixty-six percent of U.S.-born individuals reported using at least one type of CAM, while about 63 and 49 % of naturalized and non-citizens reported using one type of CAM ( $p < 0.001$ ) respectively.

Table 2 also shows the prevalence of types of CAM use in each sample group, with BBT being the most commonly used. About 62 % of all respondents reported using BBT. The prevalence of BBT use for U.S.-born, naturalized citizens, and non-citizens were 64, 61, and 46 %, respectively. MBT was used by 11 % of the total population (U.S.-born: 13 %; naturalized: 11 %; and non-citizens: 6 %). MBBT was used by 2.9 % of the total population (U.S.-born: 3.2 %; naturalized: 2.3 %; and non-citizens: 1.6 %). AMS was the only domain that non-citizens individuals used more than U.S.-born individuals or naturalized citizens. AMS was used by 2.8 % of the total population and by 2.7 % of U.S.-born individuals, 2.8 % of naturalized citizens, and 3.5 % of non-citizens.

### Citizenship Status and CAM Use

Table 3 shows the results of logistic regression of CAM use by citizenship status. The adjusted odds ratios (OR) estimated the effects of citizenship status on the odds of using CAM. The findings were reached after controlling for the effects of age, sex, level of education, and income. The

**Table 2** Descriptive statistics for variables used in the analysis by immigration status (n = 34,483)

Variables	All: mean% (SE)	U.S.-born citizens: mean% (SE)	Naturalized citizens: mean% (SE)	Non-citizens: mean% (SE)
Sample population		82.7 (0.33)	9.1 (0.24)	8.2 (0.24)
Used at least one CAM over past 12 months	64.2 (0.43)	65.9 (0.45)***	62.7 (1.12)***	48.6 (1.37)***
Type of CAM				
Alternative medicine systems (AMS)	2.8 (0.11)	2.7 (0.12)	2.8 (0.36)	3.5 (0.49)
Biological-based therapies (BBT)	62.0 (0.42)	63.8 (0.44)***	60.5 (1.15)***	46.0 (1.15)***
Mind–body therapies (MBT)	11.9 (0.27)	12.6 (0.30)***	11.0 (0.75)***	6.4 (0.60)***
Manipulative- and body-based therapies (MBBT)	2.9 (0.13)	3.2 (0.14)***	2.3 (0.32)***	1.6 (0.27)***
Sex				
Male	48.1 (0.37)	48.0 (0.41)	46.7 (1.06)	51.0 (1.11)
Female	51.9 (0.37)	52.0 (0.41)	53.3 (1.06)	49.0 (1.11)
Age (years)				
18–24	12.9 (0.32)	13.6 (0.36)***	7.4 (0.78)***	12.0 (0.85)***
25–34	17.5 (0.29)	16.7 (0.32)***	13.4 (0.79)***	29.9 (1.03)***
35–44	16.9 (0.28)	15.6 (0.31)***	19.1 (0.83)***	27.1 (0.95)***
45–54	18.7 (0.28)	18.4 (0.31)***	22.2 (0.93)***	17.7 (0.92)***
55–64	16.3 (0.26)	16.8 (0.29)***	18.4 (0.92)***	8.3 (0.61)***
65 or older	17.8 (0.29)	18.9 (0.32)***	19.5 (0.96)***	5.1 (0.45)***
Educational attainment				
Less than high school	14.0 (0.28)	10.1 (0.24)***	17.8 (0.88)***	40.5 (1.18)***
GED/high school graduate	26.3 (0.35)	27.1 (0.40)***	21.5 (0.81)***	23.7 (1.02)***
Some college	20.5 (0.33)	22.0 (0.37)***	16.7 (0.84)***	9.9 (0.73)***
College graduate or higher	39.2 (0.41)	39.9 (0.43)***	44.1 (1.13)***	25.9 (1.06)***
Income				
Less than \$20,000	50.7 (0.41)	50.4 (0.45)***	47.2 (1.11)***	57.4 (1.19)***
\$20,000–54,999	24.0 (0.31)	23.9 (0.34)***	26.3 (1.00)***	22.1 (0.99)***
\$55,000–74,999	6.4 (0.18)	6.6 (0.20)***	6.7 (0.57)***	3.4 (0.44)***
\$75,000 or over	19.0 (0.31)	19.1 (0.34)***	19.5 (0.84)***	17.1 (0.97)***

Source: National Health Interview Survey, 2012

\*  $p < 0.05$ ; \*\*  $p < 0.005$ ; \*\*\*  $p < 0.0001$

results from Model 1 show that naturalized citizens and non-citizens had adjusted odds of using BBT, MBT, and MBBT that were significantly lower than the odds for the U.S.-born. Naturalized citizens were 16 % significantly less likely to use biological-based therapies compared to those U.S.-born (OR 0.84; CI 0.75, 0.95). Non-citizens were 46 % significantly less likely to use these therapies than the U.S.-born (OR 0.54, CI 0.47, 0.64). Compared to U.S.-born, naturalized citizens and non-citizens were both less likely to use MBT (naturalized citizens OR 0.85, CI 0.71, 1.01; non-citizens OR 0.42, CI 0.32, 0.54) and MBBT (naturalized citizens OR 0.69, CI 0.48, 0.98; non-citizens OR: 0.53, CI 0.35, 0.81). Finally, no significant differences existed between U.S.-born individuals and those naturalized citizens or non-citizens in their use of AMS. Model 2 shows the effects of citizenship status on CAM use among immigrants only. Compared to naturalized citizens, non-

citizens were significantly less likely to use BBT (OR 0.64, CI 0.54, 0.76) and MBT (OR 0.49, CI 0.36, 0.67). Non-citizens were less likely to use MBBT (OR 0.77, CI 0.45, 1.32).

### Reasons for CAM Use

Table 4 shows the results of respondents' self-reported three most important types of CAM to their health, shown separately by citizenship status. Across all three groups, herbal treatment was most often reported as the most important CAM to health (U.S.-born: 29 %; naturalized: 27 %; and non-citizens: 21 %). About 25 % of U.S.-born individuals and 22 % of naturalized citizens reported the use of a second herbal treatment as being the second most important CAM to their health. Non-citizens reported yoga, tai chi, or qi gong (24 %) as being the second most

**Table 3** Adjusted odds ratio of CAM use by citizenship status in the U.S., 2012 NHIS

Type of CAM	Model 1		Model 2
	Naturalized citizens: Odds ratio (CI)	Non-citizens: Odds ratio (CI)	Non-citizens: Odds ratio (CI)
AMS	1.02 (0.744 1.398)	1.28 (0.881 1.855)	1.25 (0.766 2.052)
BBT	0.84** (0.75 0.948)	0.54*** (0.468 0.642)	0.64*** (0.538 0.764)
MBT	0.85 (0.71 1.013)	0.42*** (0.323 0.541)	0.49*** (0.361 0.674)
MBBT	0.69* (0.483 0.982)	0.53** (0.349 0.812)	0.77 (0.454 1.319)

*Source:* National Health Interview Survey, 2012. In model 1, U.S.-born citizens are the reference group. In model 2, naturalized citizens are the reference group. Odds ratio were estimated after controlling for the effects of age, sex, level of education and income

AMS alternative medicine systems, BBT biological-based therapies, MBT manipulative- and body-based therapies, MBBT mind-body therapies

\*  $p < 0.05$ ; \*\*  $p < 0.005$ ; \*\*\*  $p < 0.0001$

**Table 4** Frequencies of top three most important CAM to health by citizenship status

Choice by importance of CAM	Type of CAM	U.S.-born citizens: mean% (SE)	Naturalized citizens: mean% (SE)	Non-citizens: mean% (SE)
First choice <sup>a</sup>	First herb supplement taken the most often	29.3 (0.59)	27.2 (1.52)	21.2 (2.06)
Second choice <sup>a</sup>	Second herb supplement taken the most often	24.8 (0.82)	21.9 (2.34)	Not top choice
	Yoga, tai chi or qi gong	Not top choice	Not top choice	24.2 (3.44)
Third choice	Yoga, tai chi or qi gong	23.9 (1.12)	30.0 (4.1)	Not top choice
	Special diets	Not top choice	Not top choice	20.4 (5.14)

*Source:* National Health Interview Survey, 2012

<sup>a</sup> Respondents were asked for the three herbal supplements they took the most. Each supplemented was coded as a different type of CAM

important CAM to health. Twenty-four percent of U.S.-born individuals and 30 % of naturalized citizens reported yoga, tai chi, or qi gong as the third most important CAM to their health. Twenty percent of non-citizens reported special diets as the third most important CAM to their health. Table 5 shows the frequencies of CAM use by importance of CAM across all three citizenship groups. In all groups, a higher proportion of individuals use their top three choices for general wellness and prevention compared to treatment.

## Discussion

Because immigrants have less access to conventional health care services in the U.S. [5], the prevalence of CAM use among immigrants might be expected to be higher than among U.S. citizens. Our findings did not support this hypothesis. U.S.-born citizens had higher CAM utilization

compared to naturalized citizens and non-citizens. The prevalence of all CAM domains was lowest among non-citizens followed by naturalized citizens. The odds of using CAM were also higher for those who were foreign-born but attained citizenship (naturalized citizens) than for non-citizens. The greatest utilization of CAM was seen in biological-based therapies, and the least was seen in alternative medicine systems. These patterns are consistent, even after controlling for age, sex, income, and education. Similar reasons for CAM use were found in each group. These patterns support the findings of previous studies of CAM use among immigrants [18, 19]. A 2007 study by Su et al. used data from the 2002 NHIS to examine the relationship between length of stay and the use of CAM with results showing that native-born Americans are more likely to use CAM compared to those who are foreign born.

Lack of support for our hypothesis in this paper and the Su et al. study suggest underlying factors are likely related to the lower use of CAM by immigrants. These factors may

**Table 5** Percentage frequencies of reason for CAM use (prevention and treatment) by citizenship status and importance of CAM

Choice by importance of CAM	Reason for use	U.S.-born citizens: mean% (SE)	Naturalized citizens: mean% (SE)	Non-citizens: mean% (SE)
First choice	Prevention	65.0 (0.62)	64.0 (1.84)	60.4 (2.30)
	Treatment	44.1 (0.57)	39.0 (1.70)	32.3 (2.12)
Second choice	Prevention	71.2 (0.86)	68.3 (2.55)	74.3 (3.39)
	Treatment	36.8 (0.82)	33.2 (2.85)	38.1 (3.83)
Third choice	Prevention	75.3 (1.04)	73.4 (3.85)	78.8 (4.6)
	Treatment	35.2 (1.12)	39.2 (4.55)	26.6 (5.01)

Source: National Health Interview Survey, 2012

**Table 6** Percentage distribution of the prevalence complementary and alternative medicine domains among immigrants by region of birth

Region of birth (%)	Alternative medical systems (AMS)	Biologically based therapies (BBT)	Mind–body therapies (MBT)	Manipulative and body based therapies (MBBT)
Mexico, central America, Caribbean Islands	43.7	42.4	21.9	29.2
South America	4.3	6.9	7.2	4.9
Europe	11.1	14.1	18.2	15.8
Russia	3.3	1.4	1.8	5.4
Africa	1.7	3.8	2.9	4.8
Middle East	3.0	3.2	2.9	1.8
Indian subcontinent	14.9	4.9	14.1	3.3
Asia	6.9	8.7	13.7	12.5
South East Asia	6.2	10.4	9.9	15.9
Other	5.0	4.2	7.4	6.4
Total	100	100	100	100

Source: National Health Interview Survey, 2012

include cost, accessibility, and knowledge of CAM. CAM such as yoga and herbal supplements are expensive, as are those administered by certified professionals (e.g. chiropractic care). These types of CAM are cost prohibitive for lower income individuals [1] who are more likely to lack citizenship. Frequency of CAM use is also shown to be positively correlated to health insurance coverage [33]. This serves as another barrier to using CAM since non-citizen immigrants are less likely to have jobs that offer health insurance [8]. Furthermore, immigrants might have less incentive to use any type of health care services, including CAM, since they are more likely to view themselves as healthy and not in need of care [34].

Even though the reason for CAM use can change over time and might be different across ethnic groups, both immigrant groups used CAM more for prevention than treatment, which is consistent with reason for use in the general population reported since 1999 [1–3]. The use of CAM for prevention implies that CAM prevalence will only increase regardless of advancements in conventional medicines. Further research examining characteristics of

populations that seek CAM for prevention may be useful to highlight characteristics of the population that is more likely to engage in other healthy behaviors. Barnes et al. [1] found that individuals who visited CAM providers were more likely to have visited a primary care physician for recommended screenings and blood and cholesterol monitoring compared to those who did not visit CAM providers. This suggests CAM may play a role in promoting health, reducing risk, and preventing disease. Other reasons for CAM use in the dataset include: CAM can be practiced independent of a health care practitioner; CAM may be used when medical treatments did not work; CAM it may be thought to address the causes and not just symptoms of diseases; CAM focuses on whole body mind and spirit; CAM may be used when access to allopathic care is delayed or limited. These were not analyzed due to small sample numbers.

This study has several limitations. The NHIS is cross-sectional and recall bias may affect reporting of past CAM use. CAM therapies were aggregated into domains that obscured the influence of citizenship status on each specific



type of CAM. Even though this detailed information was lost, some of the CAM domains had very small sample sizes. Aggregating each CAM therapy allowed us to attain more substantial sample sizes and improve power. In addition, immigrants were also aggregated into those with and without U.S. citizenship. Numerous paths to citizenship exist, and within these groups, different socioeconomic status, length of U.S. residence, primary language, and culture may independently affect the type of CAM used. For example, people of Indian origin may be more likely to use ayurveda while those of Mexican origin maybe more likely to visit a curandero [35]. The total number of the foreign-born population was 17 % of the total sample; however, the sample is nationally representative of immigrants residing in the U.S.

The 2012 NHIS asked for the use of one of 38 CAM therapies; however, a standard definition for what is included in complementary and alternative medicine is not available. The dimensionality of the number of CAM modalities is collapsed into meaningful categories according to those used by the National Center for Complementary and Alternative Medicine. Table 6 shows preferred CAM domains by region of origin. The names of specific CAM therapies may differ by ethnicity and other demographic variables; hence, the prevalence of CAM may be underestimated in this study. Culturally sensitive or open-ended questions would be needed to accurately measure CAM use.

Women have been shown to have higher utilization rates of CAM compared to men [1, 3]. In this study, however, no significant gender differences were observed. Future studies should also stratify samples according to gender to examine if the same patterns exists. Our results indicate that the prevalence of CAM use by different socio-demographic categories varies by citizenship status. The highest prevalence of CAM use within each group were those 65 years and older among U.S.-born, those 45–55 years old among naturalized citizens, and those 25–34 years old among non-citizens. Those with a college degree had the highest CAM prevalence among U.S. born and naturalized citizens, but those with less than a high school degree had the highest prevalence among non-citizens. Future studies should also examine the relationships among these socio-demographic variables across immigrant groups.

As immigrants gain citizenship, their health care utilization behaviors become similar to those U.S. born [36]. Information on other factors related to CAM use among immigrants and how healthcare providers can work with various immigrant populations to ensure proper management of conventional medicine and CAM use would aid in safe administration of this type of treatment to one of America's most underserved populations.

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