Health Behaviors and Utilization among Users of Complementary and Alternative Medicine for Treatment versus Health Promotion

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Objective. To compare the characteristics, health behaviors, and health services utilization of U.S. adults who use complementary and alternative medicine (CAM) to treat illness to those who use CAM for health promotion.

Data Source. The 2007 National Health Interview Survey (NHIS).

Study Design. We compared adult (age ≥ 18 years) NHIS respondents based on whether they used CAM in the prior year to treat an illness ($n = 973$), for health promotion ($n = 3,281$), or for both purposes ($n = 3,031$). We used complex survey design methods to make national estimates and examine respondents' self-reported health status, health behaviors, and conventional health services utilization.

Principal Findings. Adults who used CAM for health promotion reported significantly better health status and healthier behaviors overall (higher rates of physical activity and lower rates of obesity) than those who used CAM as treatment. While CAM Users in general had higher rates of conventional health services utilization than those who did not use CAM; adults who used CAM as treatment consumed considerably more conventional health services than those who used it for health promotion.

Conclusion. This study suggests that there are two distinct types of CAM User that must be considered in future health services research and policy decisions.

Key Words. Complementary and alternative medicine, health services, preventive health services

Complementary and alternative medicine (CAM) is a diverse array of health services (such as acupuncture, massage therapy, and chiropractic care), natural products, and self-care therapies that is used by a substantial number of Americans. Nearly 4 out of 10 U.S. adults report recently using CAM (Barnes, Bloom, and Nahin 2008) and in 2007 alone, U.S.\$34 billion was spent out of pocket on CAM services and products (Nahin et al. 2009).

Nationally representative studies suggest that people who use CAM in general are more likely to be middle-aged, female, affluent, and of poorer health status (Eisenberg et al. 1993, 1998; Astin 1998; Bishop and Lewith 2008), and CAM utilization is associated with a holistic and natural orientation to health (Astin 1998). Qualitative studies suggest reasons for CAM use vary, but generally it is used to complement medical care as a modality to treat illness or for general health and wellness purposes (Astin 1998; Bishop, Yardley, and Lewith 2008). This implies there may be two distinct types of CAM User: those who use it to treat an illness and those who use it to promote health.

Typically studies on CAM do not distinguish those who use it to treat an illness from those who use it for health promotion. Assuming that the substantial use of CAM will continue to grow, potential impacts of these two different CAM uses could have profound public health and economic consequences. For instance, differences among CAM User types in the use of conventional health care services could either consume or liberate scarce medical resources. Furthermore, a deeper understanding of these two different types of CAM use would inform future policy decisions regarding CAM's potential involvement in national health care reform efforts.

In this study, we sought to estimate the national use of CAM to treat illness versus for health promotion and examine these different CAM Users' sociodemographic characteristics, health behaviors, and use of conventional health services.

METHODS

Study Design and Data Source

We used data from the 2007 National Health Interview Survey (NHIS), a nationally representative survey of the civilian, noninstitutionalized U.S.

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population. In 2007, the NHIS included a supplemental questionnaire about adult respondents' use of 18 different CAM modalities. Data for our study were acquired from the NHIS Adult Core, Family Core, and CAM questionnaire. An exemption of institutional board review was obtained from Dartmouth College's Committee for the Protection of Human Subjects because this study used publicly available and deidentified data.

Study Sample

We examined the 23,393 adult (age ≥ 18 years) respondents to the Adult Core questionnaire in 2007 (response rate 78 percent), of whom 22,783 (97 percent) answered at least one question on the CAM questionnaire. According to the CAM domains classified by the National Center for Complementary and Alternative Medicine (Barnes, Bloom, and Nahin 2008) (Table 1), the NHIS inquired about the use of 18 different CAM modalities. For each CAM

Table 1: Percent of National Health Interview Survey Adult Respondents That Used Specific Complementary and Alternative Medicine Modalities to Treat an Illness or for Health Promotion in the Previous 12 Months by Domain

	<i>Any Use (%)</i>	<i>Treatment (%)</i>	<i>Health Promotion (%)</i>
Alternative medical systems	3.5	2.8	2.2
Acupuncture	1.5	1.3	0.7
Ayurveda	0.1	0.0	0.1
Homeopathy	1.7	1.4	1.2
Naturopathy	0.4	0.3	0.3
Traditional healers	0.4	0.3	0.3
Biologically based therapies	19.6	5.4	13.5
Chelation therapy	0.0	0.0	0.0
Herbals and nonvitamin supplements	17.5	4.9	11.7
Special diets	3.6	0.7	2.6
Manipulative and body-based therapies	14.5	8.9	8.5
Chiropractic or osteopathic manipulation	8.1	6.8	3.8
Massage therapy	8.0	3.3	4.9
Movement therapies	1.4	0.2	1.2
Mind-body therapies	19.8	5.4	14.8
Biofeedback	0.1	0.1	0.1
Energy healing therapy	0.6	0.3	0.5
Hypnosis	0.3	0.2	0.1
Relaxation techniques	16.8	4.3	11.8
Yoga, tai chi, or qi gong	6.5	1.0	5.7

Note. Not included: prayer therapy.

modality respondents were asked whether they had ever used it and, if so, whether they had done so in the previous 12 months. We defined a CAM User as a respondent who reported using any of the 18 different CAM modalities (excluding prayer) in the previous 12 months (Kaptchuk and Eisenberg 2001). Individuals who reported using a CAM modality were asked to respond to a series of questions offering specific reasons regarding why they used it.

From these questions we identified NHIS respondents who used CAM to treat an illness from those who used it for health promotion. The NHIS asked whether the respondent used it “for a specific health problem or condition.” We used this item (respondents that answered “yes”) to identify those who used CAM to treat an illness. Following this question the NHIS probed further to identify other reasons for CAM use. We used a combination of other items for each form of CAM to identify respondents that used CAM for health promotion reasons, that is, who answered “yes” to using a CAM modality either “to improve or enhance energy,” “for general wellness or general disease prevention,” or “to improve or enhance immune function.” For herbals and nonvitamin supplements we identified respondents who reported consuming supplements to promote general health, physical, sexual, or mental performance as users for health promotion.

We then aggregated adult respondents according to whether they used CAM or not (Non-Users) and further separated CAM Users into the following categories: Treatment Users (those who reported CAM use for treatment only), Health Promotion Users (those who reported CAM use for health promotion only), and Mixed Users (those who reported CAM use both as treatment and for health promotion).

Measures

Sociodemographic Data. We report sociodemographic characteristics (age, sex, race/ethnicity, marital status, U.S. region of residence, health care insurance type, education, and employment status) for all adult NHIS respondents according to our defined user categories. We did not include personal earnings due to the large number of missing values in the NHIS data. We aggregated race and ethnicity into the following categories: “Hispanic,” “Non-Hispanic white,” “Non-Hispanic black or African American,” and “Other or multiple races.”

Health Status and Health Behaviors. As self-reported health status has been shown to be a strong predictor of health and mortality (DeSalvo et al. 2006), we used this as our primary measure of respondent health status and collapsed this variable into “excellent or very good” and “good, fair, or poor.” We report the

percent of respondents with “any functional limitation,” which is based on a combination of both physical and cognitive limitations collected by the NHIS. We used body mass index (BMI) of NHIS respondents in kg/m^2 to characterize respondents as obese ($\text{BMI} \geq 30 \text{ kg/m}^2$) or nonobese.

We also report respondents’ alcohol consumption, smoking status, the number of physical activities per week, whether they had received the flu vaccine (injection or spray) in the previous 12 months, and whether they had ever been tested for HIV. We defined an “active” drinker or smoker as a respondent who reported any current use in the previous 12 months of the respective substances.

Health Services Utilization. To determine whether the various CAM Users differ in their respective use of conventional health services, we examined the percentage of respondents who had visited a general practitioner, medical specialist, mental health practitioner, or emergency department in the previous 12 months. The NHIS item that we used to identify respondents who visited a general practitioner asked respondents, “During the past 12 months, have you seen or talked to a general doctor that treats a variety of illnesses (a doctor in general practice, family medicine, or internal medicine)?” Therefore, this item identified visits to general practitioners for any reason whatsoever.

Analyses. To generate national estimates, we used complex survey design methods in *Stata* version 11.1 (College Station, TX, USA). Complex survey design methods account for a respondent’s probability of selection and for the NHIS sampling methodology by the application sampling strata, primary sampling units, and person weight variables. We used χ^2 for categorical variables and a *t*-test for continuous variables to compare sociodemographic, health status, health behavior, and health services utilization characteristics variables among Treatment Users to Health Promotion Users.

We also used logistic regression to determine whether the type of CAM use (Treatment Users versus Health Promotion Users) predicted dichotomized health status and health behaviors while controlling for sociodemographic characteristics; and whether the type of CAM use predicted use of conventional health services, while controlling for sociodemographic characteristics, health status, and health behavior covariates.

RESULTS

We estimate that 17.4 percent of all U.S. adults used CAM to treat an illness and 27.4 percent used CAM for health promotion in 2007. Using our

predefined mutually exclusive User categories, 10 million adults used CAM to treat an illness (4.4 percent of U.S. adults) only, 32 million adults (14.3 percent of U.S. adults) used CAM for health promotion only, and 29 million adults (13.0 percent of U.S. adults) used CAM for both purposes (Table 2). The NCCAM Manipulative and Body-Based Therapies domain was the most common form of CAM used as treatment for an illness (used by 8.9 percent of adult NHIS respondents) and the Mind–Body domain was the most common form of CAM used for health promotion (used by 14.8 percent of adult NHIS respondents) (Table 1). Among specific CAM modalities, Chiropractic or Osteopathic Manipulation was the most common modality used as treatment (used by 6.8 percent of the adult population for treatment) and the most common modalities used for health promotion were relaxation techniques and herbals and nonvitamin supplements (both of which were used by over 11 percent of the adult population for health promotion).

By U.S. region, Health Promotion Users were overrepresented in the West (accounting for 25 percent of Health Promotion Users compared with 20 percent of Non-Users) and were relatively underrepresented in the South. Treatment Users were more heavily represented in the Midwest than Health Promotion Users (accounting for 30 percent of Treatment Users and 24 percent of Health Promotion Users, $p = .01$).

Sociodemographic Characteristics

All CAM Users were more likely than Non-Users to be female (Table 2); women accounted for 48 percent of Non-Users but 52 percent of Treatment Users, 57 percent of Health Promotion Users, and 61 percent of Mixed Users. Across all CAM User categories, CAM use was also associated with higher educational level and higher likelihood of being Non-Hispanic white when compared with Non-Users.

Health Promotion Users were significantly more likely to be white, married, and educated than Treatment Users (e.g., 15 percent of Health Promotion Users had completed a graduate degree compared with only 8.8 percent of Treatment Users, $p < .001$).

Health Status and Health Behaviors

Health Promotion Users were significantly healthier than all other user types (72 percent of Health Promotion Users reported “excellent or very good health” compared with only 54 percent of Treatment Users, $p < .001$) and had lower obesity and functional limitation rates (Figure 1). On the other hand,

Table 2: The Sociodemographic Characteristics of Complementary and Alternative Medicine Users versus Non-Users

	Non-Users	CAM User Category			<i>p</i> -Value for Difference between Treatment and Health Promotion Users
		Treatment Users*	Health Promotion Users†	Mixed Users‡	
No. of NHIS respondents (sample)	15,498	973	3,281	3,031	
Projected national estimates					
No. of U.S. adults (millions)	134.0	9.9	31.8	29.0	
U.S. region (%)					
Northeast	17.1	16.3	17.7	16.3	.01
Midwest	22.9	30.4	23.7	26.3	
South	40.0	31.5	33.4	27.3	
West	20.0	21.8	25.1	30.1	
Sociodemographic characteristics					
Age (mean)	45.7	46.2	44.6	49.0	.03
% Female	48.0	51.6	56.7	61.2	.01
Race/ethnicity (%)					
Hispanic	16.6	8.9	7.8	7.2	<.001
Non-Hispanic white	63.6	79.5	74.4	81.3	
Non-Hispanic black or African American	13.7	6.2	9.5	5.0	
Other or multiple races	6.0	5.4	8.3	6.6	
Marital status (%)					
Married	55.3	61.5	56.2	58.7	<.001
Widowed	6.9	5.0	4.9	6.4	
Divorced/separated	10.2	11.3	10.2	13.9	
Never married	27.6	22.1	28.8	21.0	
Employment status (%)					
Working	62.8	67.4	70.6	63.2	.10
Not working	29.6	30.0	26.5	34.4	
Never worked	7.7	2.6	2.9	2.4	
Education (%)					
Less than high school graduate	20.2	14.1	6.6	7.7	<.001
High school graduate	32.9	27.6	20.1	22.4	
Some college or associate's degree	25.7	31.8	33.4	32.5	
Bachelor's degree	14.6	17.6	24.9	23.0	
Graduate degree	6.6	8.8	15.1	14.3	
Health insurance (%)					
Private	34.0	33.9	35.7	30.9	.60
Public	47.3	51.4	50.8	57.5	
Uninsured	18.7	14.7	13.5	11.6	

Note. *t*-test used in mean comparisons and χ^2 -statistic used in comparison of proportions.

*Adults that used CAM only to treat an illness in the previous 12 months.

†Adults that used CAM only for health promotion in the previous 12 months.

‡Adults that used CAM both to treat an illness and for health promotion in the previous 12 months.
CAM, complementary and alternative medicine; NHIS, National Health Interview Survey.

Figure 1: The Health Status and Health Behaviors of Complementary and Alternative Medicine Users versus Non-Users

Treatment Users had significantly higher rates of functional limitation (47 percent of Treatment Users reported a functional limitation compared with 27 percent among Health Promotion Users, $p < .001$) and the functional limitation rate among Health Promotion Users approximated that of Non-Users.

CAM Users in general were more active than Non-Users; CAM use was associated with greater levels of physical activity in all three categories examined. Among CAM User types, Health Promotion Users had the highest reported physical activity rates.

Health Services Utilization

All CAM Users were more likely to have visited a general practitioner, a medical specialist, and a mental health practitioner in the previous 12 months than Non-Users (Figure 2). Treatment Users had significantly higher rates of use of all conventional health utilization measures when compared with Health Promotion Users ($p < .001$ for all measures), whose use of health services approximated that of Non-Users.

Logistic Regression Analyses

Each of the dichotomized health status and health behavior measures in Figure 1 was submitted to logistic regression to assess the effect of the type of CAM use (Treatment Users versus Health Promotion Users) while controlling for the regional and sociodemographic characteristics in Table 2. The type of CAM use was strongly predictive, $p < .001$, of health status, obesity, and functional limitations. On the other hand, the type of CAM use was not

Figure 2: Utilization of Conventional Health Services among Complementary and Alternative Medicine Users versus Non-Users

significantly predictive ($p > .05$) of smoking status, alcohol status, having been tested for HIV, or for having received the flu vaccination.

For the dichotomized physical activity measures in Figure 1 and the health service utilization measures in Figure 2 submitted to logistic regression to assess the effect of the type of CAM use while controlling for the regional and sociodemographic characteristics, health status, and health behaviors, the type of CAM use was predictive, $p < .01$, of greater physical activity on all physical activity measures and of greater use of all health services utilization measures.

DISCUSSION

We found that in 2007, over one-quarter of the U.S. adult population used at least one form of CAM for health promotion while 17 percent used CAM to treat an illness, which implies the predominant use of CAM is for health promotion. To our knowledge this is the first quantitative report of the sociodemographic characteristics, health behaviors, and health services utilization of the sizeable group of American adults and our findings support that there are two distinct types of CAM User.

Health Promotion Users have significantly better self-reported health status and have healthier behaviors overall (high rates of physical activity and lower rates of obesity) when compared with Treatment Users. And while all CAM Users had higher rates of conventional health services use when compared with Non-Users, Health Promotion Users have rates of conventional health services use comparable to those of Non-Users. Mixed Users exhibit characteristics of both Treatment and Health Promotion Users dependent on the measure (similar rates of self-reported health status and conventional health services use to Treatment Users and more closely approximated the physical activity level of Health Promotion Users).

Comparison to Prior Studies

Previous studies that have investigated the characteristics of CAM Users have reported somewhat conflicting results: perhaps due to differences in the relative proportion of these two types of CAM User. Some have even found that CAM Users have similar sociodemographic characteristics to Non-Users (Bair et al. 2002; Cheung, Wyman, and Halcon 2007; Nahin et al. 2007), but lower smoking rates (Bair et al. 2002; Cheung, Wyman, and Halcon 2007), higher rates of alcohol consumption (Nahin et al. 2007), and higher physical activity

rates (Bair et al. 2002; Gray et al. 2002; Cheung, Wyman, and Halcon 2007; Nahin et al. 2007). Inconsistent associations between CAM use and preventive immunizations have been reported (Nahin et al. 2007; Stokley et al. 2008; Jones, Sciamanna, and Lehman 2010).

On one level, our findings align with previous studies that have found CAM Users are more likely to have a primary care practitioner (Gray et al. 2002) and to make office visits to physicians (Nahin et al. 2007). However, in our study the relative rates of conventional health services use varied considerably between the types of CAM User.

We are aware of only two studies that sought to differentiate CAM User types. One found that use of CAM modalities varied by age and ethnicity for either Treatment or Health Promotion (Grzywacz et al. 2005) and the other found higher rates of conventional health services among CAM Health Promotion Users when compared with Non-Health Promotion Users (Kannan et al. 2010). However, due to operational differences in the identification of CAM Users in the study by Kannan and colleagues (these authors included vitamin use in the definition of CAM which inflates the number of CAM Users to over half of the U.S. adult population) it is impossible to directly compare our results to this study.

Overall our results suggest that there are differences among CAM User types in health status, health behaviors, and use of conventional health services that should be considered in future CAM health services research.

Study Limitations

There are several limitations of this study, which must be acknowledged. First, the NHIS data are self-reported and collected retrospectively. Therefore, errors may exist, especially in cases where respondents were asked to recall their use of health care services up to 12 months ago. The health status measures were also self-reported and may be affected by medical or psychological conditions. These limitations are inherent to survey-based work. Second, nonresponse is a potential limitation of the data used for our study. However, in 2007 the adult response rate was excellent (78 percent for the Adult Core) and of these adult respondents, 97 percent completed the CAM supplemental questionnaire. Lastly, because our study was a cross-sectional design we cannot establish a cause–effect relationship between specific types of CAM use and health status and health behaviors. Future, prospective studies would be required to determine whether a cause–effect relationship truly exists.

Implications

It is important for health services researchers, policy makers, payers, and other stakeholders to consider the distinction between those who use CAM to treat an illness versus those who use it for health promotion (Long 2002; Schuster et al. 2004). Conceptually, CAM use for health promotion (which may represent the belief that CAM is beneficial in preventing illness or prolonging life) is different than using CAM to treat an illness. The latter behavior is not necessarily reflective of a philosophical alignment with CAM principles or beliefs, but rather due to symptom relief-seeking behaviors (Kasl and Cobb 1966). It is not surprising, therefore, that we found important differences between these two groups. Traditional lumping of the disparate groups of CAM Users (including the Mixed Users, who represent an amalgam), may undermine the ability to analyze future utilization patterns and assess policy considerations. Specifically, growth trends in CAM utilization could represent a further phase of adoption of general health promotion (Rogers 2003)—with a nearly limitless reservoir of patients—or growth in illness treatment, which might mirror rises in the prevalence of health conditions (Martin et al. 2008; Martin et al. 2009) or represent replacement of traditional health care services for treating illness and pain (Cherkin et al. 2002).

In the United States today, most CAM remains a “cottage industry,” and services are typically delivered in small, privately owned offices. The recent growth in both the total number of CAM practitioners and diversity of services (Cooper, Laud, and Dietrich 1998; Cooper 2001) could perpetuate supplier-driven consumption as observed in medical services (Fisher et al. 2003a, b). Examining trends in the specific types of CAM use may be more sensitive to uncovering market changes over time. For instance, enhanced competition both intra- and interprofessionally among CAM services could encourage more direct-to-consumer advertising, which, in turn, may increase use of CAM for health promotion. As most CAM practitioners are also small business owners, advocating the use of CAM for health promotion could be more lucrative than relying only on use for illness management. In addition, CAM use for health promotion is a substantially larger market (i.e., all adults) as opposed to only those adults that have an active health condition or illness.

As U.S. health care reform proceeds, there are important decisions on the horizon. Whether all of CAM or specific forms of CAM are included in future health care delivery systems such as Accountable Care Organizations must be informed by how services are used by Americans. Considering that 38 percent of adults report any CAM use (Barnes, Bloom, and Nahin 2008) and

that, based on our analyses, 27 percent of adults used at least one form of CAM for health promotion implies that a significant amount of CAM does not fit into the current illness-based payment paradigm. If use of CAM for health promotion is to be considered as a reimbursable health service by public and private payers, future studies should investigate the long-term effects of such use on public health and consumption of conventional health services.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.

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