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Use of complementary therapies by individuals with or at risk for cardiovascular disease: Results of the 2007 National Health Interview Survey

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Abstract

Background—Complementary and alternative medicine (CAM) therapies are often used as adjuvants to conventional treatment by individuals with cardiovascular disease (CVD) or CVD risk factors, such as hypertension and high cholesterol. Patterns of use of CAM practices and products represent important data for healthcare providers in delivering adequate patient care.

Objective—This study compared CAM use among the U.S. CVD and general population, as well as individuals with CVD risk factors (hypertension and/or high cholesterol), through secondary analyses of the 2007 National Health Interview Survey data.

Methods—The analysis compared use of CAM by individuals with CVD (those individuals self-reporting a diagnosis of coronary heart disease; $n = 1055$), individuals with CVD risk factors [those individuals self-reporting a diagnosis of hypertension ($n = 6849$) or high cholesterol ($n = 5808$)], and individuals who self-report as not having CVD or CVD risk factors ($n = 22,290$).

Results—Use of complementary practices and products by patients with CVD and CVD risk factors is common and significantly greater than individuals without CVD in the general population. The most common categories of complementary modalities used by individuals with a self-reported diagnosis of CVD or CVD risk factors were natural products and mind-body practices.

Conclusions—The diagnosis of CVD or CVD risk factors may be associated with the use of complementary practices and products.

Keywords

complementary therapies; mind-body; natural products; hypertension

Introduction

Despite advances in therapeutic approaches over the last several decades, cardiovascular disease (CVD), including heart disease and stroke, remains the leading cause of mortality and morbidity worldwide.^{1,2} One in three American adults is affected by CVD, with

mortality related to heart disease and stroke accounting for more than one-third of all deaths in the U.S.³⁻⁶ Though there has been a steady decline in the incidence of CVD in recent years, the prevalence of CVD risk factors, such as hypertension,⁵ high cholesterol, and obesity,⁷ has been increasing. Smoking, high blood pressure, high total cholesterol and LDL, low HDL, diabetes, and advanced age are the main risk factors for CVD.^{3,5,8-11}

Pharmacological therapies for CVD are associated with a number of side effects and many have limited efficacy and, subsequently, patients often seek adjuvant treatments to complement standard care.^{1,12} These complementary therapies, often referred to as complementary and alternative medicine (CAM), consist of a heterogeneous group of non-pharmacological treatments and modalities used as a complement to conventional healthcare.¹³ There is an increasing interest in the use of CAM therapies for cardiovascular health,¹⁴ and patients with CVD are very likely to incorporate CAM modalities in an effort to improve health and health-related quality of life (HQoL), as well as to prevent further illness.¹⁵ Many individuals are attracted to the use of complementary therapies given the holistic approach to health and wellness that these practices and products provide.¹⁶ Patients also cite the desire to take an active role and have a sense of control in their treatment or healthcare, as well as a belief that natural therapies have fewer side effects in comparison to conventional medications.^{16,17}

Individuals with chronic disease are more likely to use CAM.¹⁸ A random household telephone survey in 1997 found 9% of people over the age of 65 years of age use CAM to treat CVD.¹⁹ Of those individuals, 12% with hypertension used CAM, with dietary supplements and relaxation techniques the most frequently used modalities to ameliorate hypertension,²⁰ a leading cause of CVD.⁵ A study by Zick and colleagues reported that of patients with congestive heart failure who used complementary modalities, 6% used these practices and products to treat hypertension.²¹ An analysis of the earlier 2002 NHIS data revealed that 36% of self-identified CVD patients use some type of CAM therapy, with this percentage increasing to 68% when including prayer.¹⁴ Other cross-sectional studies have identified the level of use of complementary therapies among cardiac patients ranging from 33% to 81%.^{17,21,22} Types of CAM therapies sought and used by individuals with CVD include mind-body modalities, natural products, manual therapies, and other complementary therapies, such as energy healing therapies and alternative medical systems, with biologically-based and mind-body therapies most commonly used.¹⁴

According to the population based 2007 National Health Interview Survey (NHIS), 38.3% of the U.S. population reported use of at least one CAM therapy in the last 12 months.¹³ U.S. adults made an estimated 354.2 million visits to CAM providers.²³ In that same year, adults' out-of-pocket (OOP) expenditures on use of CAM providers, CAM products, and CAM practices totaled \$33.9 billion; the majority (\$22 billion) was spent on CAM products and classes compared to \$11.9 billion spent on CAM providers.²³ However, it is unknown how many of these individuals had CVD or were at risk for developing CVD. Thus, the goals of the present study were to examine and describe the national patterns of CAM use with regard to services, practices and products among individuals with CVD, as well those with CVD risk factors.

Methods

Design and Sample

Data from 23,345 adult respondents (aged 18 years and older) included in the 2007 NHIS were analyzed. Of the total sample, three subsets of survey respondents were created based on their report of CVD ($n = 1055$) or CVD risk factors [hypertension ($n = 6849$) and/or high cholesterol ($n = 5808$)].

The NHIS is an annual nationally representative survey designed by the National Center for Health Statistics of the Centers for Disease Control & Prevention to provide data on health and healthcare use in the U.S. Two CAM supplement surveys added in 2002 and 2007 provide extensive data on the use of and expenditures for CAM providers, practices, and products. Compared to the NHIS 2002 CAM supplement, the NHIS 2007 supplement expanded the number of CAM therapies (from 27 to 35), the number of diseases treated with CAM (from 73 to 81), and the list of CAM products (from 35 to 45), while a use of CAM products within the last 30 days was included in addition to the existing 12 month reference period.¹³ The NHIS methodology uses a multistage sampling design that is representative of the U.S. “civilian non-institutionalized population,” and has been described elsewhere.^{13,24,25} Protection of human subject confidentiality was assured through federal rules governing public use files and the oversight of the University of Virginia Health Sciences Research Institutional Review Board.

Data Analyses

Data files from the 2007 NHIS were merged and statistical analyses completed using SAS v. 9.1 (SAS Institute, Cary NC). These files included the household, sample adult, and adult alternative medicine files. Data were merged and sorted by the household, sample, and person level variables. Subsets of individuals were created based upon a response of “yes” or “no” to the question of ever being diagnosed with coronary heart disease, hypertension, or high cholesterol, and only those individuals responding either “yes” or “no” to these variables were included in the analysis. Statistical analyses of the NHIS data requires appropriate weighting of variables in order to insure that the resulting statistics are representative of the national population. Frequency distributions of demographic variables were calculated using the final sample weighting variables provided in the sample adult file. Chi-square tests were performed to analyze differences between those individuals with and without CVD or CVD risk factors (hypertension or high cholesterol).

Results

Sociodemographic characteristics of respondents

The sociodemographic characteristics of the respondents are reported by group in Table 1. Individuals with CHD, hypertension, and high cholesterol are significantly older than those individuals not reporting CHD ($p < 0.001$). A greater percentage of men than women report a diagnosis of CHD; however, a greater percentage of women report diagnoses of hypertension and/or high cholesterol ($p < 0.001$). A greater percentage of non-Hispanic Caucasians report CHD, while a significantly greater percentage of African Americans report having hypertension ($p < 0.001$). Those individuals who report CHD are more likely to be unemployed, while individuals with hypertension and/or high cholesterol are more likely to be employed ($p < 0.001$). A greater percentage of partnered individuals report CHD, hypertension, and high cholesterol ($p < 0.001$) than those who are single. Individuals in the southeastern portion of the U.S. are more likely to report hypertension ($p < 0.001$). Fewer individuals in western states report CHD, hypertension, and high cholesterol versus individuals in other regions ($p < 0.001$).

Complementary therapy usage

The prevalence of ever having used a complementary therapy is reported by group in Table 2. The use of the most prevalent vitamins and minerals in the past 12 months is reported by group in Table 3, with the most commonly used herbs given in Table 4. Overall, individuals with high cholesterol report a greater usage of CAM therapies than those with CHD, hypertension, or controls. Additionally, individuals with high cholesterol have the largest prevalence of mind-body therapy practice compared to individuals with CHD, hypertension,

or individuals in the general population (Table 2). Those with high cholesterol consume more flaxseed oil supplements compared to those with hypertension or the general population (Table 4). Individuals with hypertension use manual therapies to a lesser extent than those with CHD or high cholesterol, but engage in more mind-body practices than those with CHD (Table 2). Individuals with CHD consume the most natural products compared with those with high cholesterol, hypertension, or individuals in the general population.

Discussion

The use of complementary practices and products by patients with or at risk for CVD is common and more prevalent than by individuals in the general population without CVD. These results may indicate a potential association between the diagnosis of CVD or CVD risk and the use of CAM. Overall, individuals make considerable use of mind-body modalities, such as meditation and deep breathing exercises (Table 2). Additionally, the use of natural products is very high among respondents, as is prayer for health, both self- and intercessory prayer (Table 2). Practices such as some mind-body modalities and prayer may be easier to adopt for self-care and disease management, in some instances requiring less expense than utilizing the services of a practitioner. While the results of the current study are consistent with findings reported by others using similar survey data,¹⁴ direct comparison of numbers with previous surveys should be done cautiously given the differences in the sample population, the phrasing of questions, and the definition and types of CAM therapies included. Given the differences between the 2002 and 2007 NHIS CAM supplement surveys and regional surveys conducted by others, direct comparisons are difficult. What is unique about the current study is the way in which the data were analyzed by creating subsets of those with CVD and those at risk of developing CVD to examine potential differences between these groups. To our knowledge, this is the first study using a nationally representative data set to do so.

Given the epidemiology of chronic disease, it is not surprising that those individuals with CVD and CVD risk factors are significantly older than those in the general population (Table 1). Around half of older adults use complementary therapies in an effort to improve HQoL or for pain relief.²⁶ This increased age may account for a portion of the usage of complementary therapies given that older adults often include these modalities in the self-management of health.²⁷ Survey data indicate that 27 to 88% of older adults use CAM, with higher rates reported when prayer is included,^{28–30} as the majority of older adults include prayer as a regular health behavior.^{27,31} The increased age of those using CAM therapies in the present study may account for some of the more commonly used herbal supplements such as glucosamine, chondroitin, and ginkgo biloba, given that these products are popularly consumed to treat joint problems or to enhance memory, respectively.

The most common categories of complementary modalities used by individuals with a self-reported diagnosis of CVD or CVD risk factors were natural products and mind-body practices (Table 2), which is consistent with previous findings.³² More than 50% percent of U.S. adults report taking dietary supplements regularly.^{8,33} Concerns about potential interactions of complementary modalities with biomedical and pharmacologic treatment, safety, efficacy, cost, and establishment of scientific evidence are rising.³⁴ Given that many botanical supplements lack basic and clinical research documentation and are not closely regulated, many supplements may be contaminated.⁸ Toxicity may result from high concentrations of active ingredients in a supplement versus the native form of the natural product. Moreover, there remains a lack of reliable dosage guidelines and labeling, and supplements may be sold without proof of efficacy or safety.³³ Nearly two-thirds of individuals reporting use of natural supplements are unaware of drug interactions and information concerning adverse effects, making the assumption that a lack of such

information implies safety.¹⁵ Moreover, findings from the current study reveal that some of the most commonly used natural products by individuals with CVD and CVD risk factors (Tables 3 and 4) may have serious adverse interactions with medications commonly prescribed for these patients. For example, statins are known to reduce CoQ10 plasma concentrations and may promote the myopathy that has been associated with statin therapy² resulting from a lack of CoQ10 to maintain cardiac mitochondrial membrane integrity.¹⁰ Additionally, CoQ10 is structurally related to vitamin K³³ and may have pro-coagulant effects. Concomitant use of warfarin and CoQ10 has been reported to decrease the anticoagulant effects of warfarin.²

The questions of the adult alternative health survey and the NHIS do have several limitations. Data are dependent upon a respondent's knowledge of complementary and alternative practices and products as well as a willingness to report use. The survey does not accurately capture information about culturally relevant CAM therapies or home remedies, which may be more prevalent in ethnic minority and rural populations.³⁵ For example, the use and preference of herbs, teas, and other oral remedies, along with the use of healers, has been documented among Hispanic and Latino individuals, while Asian Americans are more prone to incorporate traditional Eastern practices reflecting their heritage.¹⁸ African Americans are three times more likely to use home remedies in comparison to Caucasians, with religion, spirituality, and prayer playing a major role in decision-making concerning healthcare choices and practices among African Americans as well.^{18,36} The cross-sectional nature of the data collection does not allow for the calculation of annual estimates of CAM usage, limiting the ability to track changes in use over time, or to examine causal relationships between CAM use and diagnosis of disease. Moreover, it is not possible to know whether or not a respondent began using CAM before or after his or her diagnosis. Additionally, the number of therapies included in the survey is limited and does not include all practices and products that may be commonly used by patients with CVD or CVD risk factors, such as aromatherapy or creative therapies like art therapy, music therapy, and journaling.³⁷ The random digit dialing used in the sampling strategy of the NHIS may not accurately reflect the U.S. population given that such a technique requires a landline telephone.

The subsets of data were created based on the respondents answers to ever having been diagnosed with CVD or CVD risk factors (hypertension and/or high cholesterol). The presence or absence of other co-morbidities was not examined. It is quite possible that individuals in the given subsets have one or more co-morbidities, especially because of the increased age of those with CVD or CVD risk factors. While it is possible to remove individuals with any co-morbidities from the subsets, this would not reflect accurately the real-world situation in which patients with CVD or CVD risk factors very often have co-morbidities, such as in the case of metabolic syndrome. Also, the number of comparisons made in the data analyses may have led to the appearance of statistical difference that might not otherwise exist. Given the cross-sectional nature of the NHIS as well as the reliance on self-report, it is difficult to determine the direct clinical impact of these therapies and modalities from these data. Thus, statistically significant differences are what can be reported based on the data available. What is clinically significant about the current study findings is that these data provide a snapshot of CAM usage in this population and how such practices and products might affect the conventional healthcare and treatment received by individuals with or at risk for developing CVD.

A strength of the NHIS data concerning complementary modalities is the collection of data from a nationally representative sample of U.S. adults. These data allow for the estimation of use of complementary modalities across a variety of subgroups within the general population, such as patients with or at risk of developing CVD. The large sample size

facilitates investigation of the associations between use of complementary therapies and a range of self-reported health characteristics. The results of the current study could potentially guide researchers in conducting future CAM intervention studies of those therapies most commonly used by patients with CVD, as well as more directed descriptive studies evaluating the use of complementary modalities in populations of patients with specific conditions. Current clinical practice guidelines indicate lifestyle modifications as the sole therapy for pre-hypertension.³⁸ However, clinical practice guidelines do not include specific recommendations for stress reduction even though psychosocial stress is a risk factor shown to contribute significantly to hypertension and CVD. Recent reviews have found that mind-body therapies used by individuals in the current study (Table 2) improve specific metabolic risk factors for cardiovascular disease, including blood pressure and high cholesterol.^{6,38,39} Findings from the current analysis may inform healthcare providers about the use of complementary and integrative practices and products by patients with CVD and CVD risk factors in an effort to manage the disease as well as other comorbidities.

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Summary and Implications

What's new?

- The use of complementary practices and products among patients with CVD or CVD risk factors (i.e., hypertension and/or high cholesterol) is common and more prevalent than in the general population.
- Natural products and mind-body practices are the most commonly used complementary modalities by individuals with CVD.
- Healthcare providers need to assess patient use of complementary practices and products routinely, while increasing their own knowledge of CAM to maximize positive patient outcomes.

Table 1

Sociodemographic characteristics of respondents

Characteristic	Prevalence <i>n</i> (weighted %)			
	Respondents at Risk for Coronary Heart Disease			
	Respondents With Coronary Heart Disease (<i>n</i> = 1055)	Respondents With Hypertension (<i>n</i> = 6849)	Respondents With High Cholesterol (<i>n</i> = 5808)	Respondents Without Coronary Heart Disease (<i>n</i> = 22,290)
Age (yrs) (<i>p</i> <0.001)				
<30	8 (0.70)	287 (5.30)	156 (3.47)	4534 (23.08)
30–39	15 (2.04)	508 (7.72)	448 (7.73)	4302 (18.62)
40–49	75 (7.59)	1024 (16.41)	977 (18.68)	4346 (20.41)
50–64	325 (34.23)	2282 (35.67)	2075 (38.08)	5184 (23.48)
≥65	632 (55.44)	2748 (34.90)	2152 (32.04)	3924 (14.41)
Gender (<i>p</i> <0.001)				
Men	589 (61.25)	2975 (47.82)	2642 (49.72)	9764 (47.70)
Women	466 (38.75)	3874 (52.18)	3166 (50.28)	12,256 (52.30)
Race (<i>p</i> <0.001)				
Caucasian	844 (84.73)	4970 (79.60)	4582 (83.86)	16,894 (80.84)
African American	143 (9.40)	1424 (14.59)	847 (9.94)	3597 (11.92)
Native American	6 (0.60)	68 (0.96)	44 (0.77)	224 (1.02)
Asian	38 (3.24)	272 (3.30)	250 (4.04)	1216 (4.75)
Multiple race	24 (2.03)	107 (1.39)	79 (1.20)	328 (1.32)
Ethnicity (<i>p</i> <0.001)				
Hispanic	104 (7.06)	823 (8.95)	758 (9.43)	4090 (13.68)
Non-Hispanic	951 (92.94)	6026 (91.05)	5050 (90.57)	18,200 (86.32)
Employment status (<i>p</i> <0.001)				
Employed	255 (28.07)	2953 (47.15)	2721 (50.86)	14,185 (33.63)
Unemployed	800 (71.93)	3891 (52.80)	3084 (49.10)	8071 (66.19)
Partner status (<i>p</i> <0.001)				
Married/Partnered	559 (66.90)	3547 (64.90)	3321 (70.25)	12,215 (64.14)
Single	493 (33.10)	3266 (34.77)	2469 (29.58)	9948 (35.50)
Region (<i>p</i> <0.001)				
Northeast	173 (16.71)	1137 (16.60)	1016 (18.17)	3740 (17.14)
Midwest	284 (27.48)	1537 (24.27)	1346 (24.87)	4922 (23.94)
South	372 (36.18)	2705 (39.01)	2147 (36.37)	8328 (36.70)
West	226 (19.63)	1470 (20.12)	1299 (20.60)	5300 (22.21)

Table 2

Prevalence of complementary therapy use

Modality	Prevalence <i>n</i> (weighted %)			
	Respondents at Risk for Coronary Heart Disease			
	Respondents With Coronary Heart Disease (<i>n</i> = 1055)	Respondents With Hypertension (<i>n</i> = 6849)	Respondents With High Cholesterol (<i>n</i> = 5808)	Respondents Without Coronary Heart Disease (<i>n</i> = 22,290)
Alternative medical systems^a	143 (14.07)	872 (12.88)	844 (14.19)	2718 (11.88)
Biologically-based therapy				
Herbal therapies	285 (27.74)	1775 (27.43)	1766 (30.86)	5309 (24.56)
Vitamins/minerals	730 (69.47)	4628 (68.69)	4175 (72.90)	14,260 (64.73)
Manipulation-based therapy				
Chiropractic/osteopathic	304 (30.43)	1743 (27.10)	1696 (30.31)	4812 (22.65)
Massage	153 (15.09)	977 (14.82)	1061 (18.48)	3586 (16.43)
Mind-body therapy				
Meditation	121 (11.64)	816 (11.97)	790 (13.35)	2649 (11.87)
Guided imagery	24 (2.34)	208 (3.52)	224 (4.15)	755 (3.53)
Progressive muscle relaxation	40 (3.78)	278 (4.33)	295 (5.37)	894 (4.17)
Deep-breathing exercises	171 (15.54)	1083 (15.76)	1060 (18.00)	3317 (14.89)
Support group meeting	58 (6.11)	298 (4.44)	297 (5.06)	772 (3.25)
Stress management class	32 (2.68)	200 (3.17)	179 (3.09)	480 (2.16)
Yoga/Tai chi/Qigong	68 (7.00)	639 (9.51)	698 (12.06)	2979 (13.32)
Biofeedback/Hypnosis	63 (6.75)	337 (5.48)	326 (6.04)	766 (3.60)
Energy healing	11 (1.01)	83 (1.30)	108 (1.81)	391 (1.62)
Prayer				
Prayer for self	735 (69.36)	4502 (64.05)	3824 (64.16)	12,416 (53.66)
Prayer by others	517 (47.75)	3077 (43.67)	2559 (42.73)	7868 (34.01)

^a Alternative medical systems include seeing a practitioner for acupuncture, ayurveda, naturopathy, or homeopathy

Table 3

Vitamins and minerals most commonly used within the past 12 months

Vitamin/mineral	Prevalence (weighted %)			
	Respondents at Risk for Coronary Heart Disease			
	Respondents With Coronary Heart Disease	Respondents With Hypertension	Respondents With High Cholesterol	Respondents Without Coronary Heart Disease
Calcium	26.79	26.53	29.58	23.50
Folate	6.26	4.86	5.47	3.78
Vitamin B complex	6.48	9.05	8.72	8.23
Vitamin C	19.89	18.20	18.61	17.87
Vitamin E	15.95	12.11	13.36	8.72
Multi-vitamin	78.31	80.03	81.75	84.28

Table 4

Herbs and supplements most commonly used within the last 12 months

Herb/supplement	Prevalence (weighted %)			
	Respondents at Risk for Coronary Heart Disease			
	Respondents With Coronary Heart Disease	Respondents With Hypertension	Respondents With High Cholesterol	Respondents Without Coronary Heart Disease
Chondroitin	14.51	14.73	13.53	11.96
Coenzyme Q-10	13.14	12.31	12.06	9.29
Echinacea	3.59	10.85	10.51	18.12
Fish oil	53.25	44.75	46.86	38.03
Flaxseed oil	16.35	14.11	16.37	15.62
Garlic (pills/gellcaps)	15.06	15.75	13.32	11.39
Ginkgo biloba	10.86	10.43	9.47	10.61
Ginseng	8.08	9.02	8.18	12.17
Glucosamine	25.63	28.19	26.06	21.67
Grape seed extract	5.00	4.52	3.47	4.18