Use of Complementary and Alternative Medicines by Ambulatory Patients

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Background: Complementary and alternative medicines (CAM) include a number of different modalities to improve health. The popularity of such healing methods has increased, although reports of problems and adverse effects have also increased. Difficulties have also been identified in communication between patients and their providers. Previous reports concerning CAM may have undersampled lower socioeconomic groups as a result of the telephone survey techniques used.

Methods: All patients with valid appointments for internal medicine resident teaching clinics at 2 publicly supported centers were considered for eligibility. Patients were surveyed about current medications and a variety of CAM modalities. Medical records were reviewed for demographic information and to confirm diagnoses, allergies, medications, and any documented adverse effects.

Results: Use of CAM was common by 85.4% of patients, including those using some form of diet, exercise, and prayer. A smaller number (32.3%) were currently using alternate health care providers and products. About 5% of the population used 6 products or more. Use by this primarily poor urban population appeared similar to that in previous reports, with some exceptions. Expensive modalities were less frequently used, whereas use of prayer appears more prevalent.

Conclusions: Complementary and alternate medical modalities are as commonly used by poor urban populations as by the general population. Quantification of use depends on the types of CAM used and the time frame asked. Although much of the use does not appear to be maladaptive, a small percentage of individuals have enthusiastically adapted CAM in ways that would not be endorsed by most allopathic physicians.

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UNCONVENTIONAL OR AL-
ternative medicine is de-
finite by Eisenberg et al1 as
“medical interventions not
taught widely at US medi-
cal schools or generally available at US hos-
hitals.” These interventions are currently termed complementary and alternative medi-
cines (CAMs). Complementary medicine and alternative medicine are not synonymous. Complementary medicine applies to non-
allopathic treatment used in conjunction with standard medical care, whereas alter-
native medicine applies to treatment used in place of standard medical care.2 The Na-
tional Institutes of Health groups CAM into the following 5 classes: alternative medi-
cine practices, mind-body interventions, bi-
ologic-based therapies, manipulative and body-based methods, and energy modal-
ities. Homeopathy, herbal supplements, massage, and chiropractic are various ex-
amples of these therapies.3

A recent survey has shown that the overall prevalence of CAM use has in-
creased in the US adult population from 33.8% in 1990 to 42.1% in 1997.4 Another
study has shown that the lifetime prevalence of CAM use has grown steadily dur-
ing the past 50 years, suggesting that more people start and continue to use CAM
throughout their lives.5 The recognition of CAM as an issue by the medical commu-
nity is relatively recent and may be due to this trend for increasing CAM use.6 In ad-
dition, a survey of physicians showed that 60% of the respondents wished to learn
more about CAM.7 Reasons offered in-
cluded possessing the knowledge to dis-
suade a patient from using a potentially
harmful method and being able to recom-
mand a safe or effective CAM method. Al-
ternative medicine appears to appeal to pa-
tients as being more natural or less harmful
than standard therapy.8 The average indi-
vidual using CAM tends to be older, have
more education, have a poorer health sta-
 tus (chronic health problems), be non-
African American, and have a higher in-
come and willingness to try other therapies.9

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A recent article in the lay press adds to the notion that CAM use is increasing in conventional settings. A news magazine has examples of several CAM modalities used in mainstream medical settings, such as hospitals, and taught in allopathic medical schools.10

The literature reports that physician involvement is fairly low for CAM overall; physician awareness of therapies has been shown to be only 19.7% for patients using complementary and conventional medicines and only 2.2% for patients using unconventional therapies.11 Patient disclosure to a physician also occurs at very low rates. One survey found that 63% of respondents did not disclose at least 1 CAM therapy to their providers.12 The reasons for nondisclosure varied and included belief by the patient that it was unimportant, fear of physician disapproval, or active discouragement by the physician.

Disclosure of CAM use by patients to their primary care providers becomes important when discussing the adverse effects of various modalities and potential interactions with conventional treatment. Many herbal products have been shown to have toxic effects and drug-drug interactions with conventional pharmaceuticals.13 A recent example of adverse effects of CAM is the linkage of dietary supplements containing Ephedra alkaloids to hypertension, stroke, tachycardia, and other cardiovascular symptoms.14 Certain CAM treatments may not be effective in treating the patient’s ailment; 1 study showed that traditional Chinese acupuncture was the least helpful modality in treating chronic lower back pain when comparing various CAMs with standard treatment.15 With the increasing use of CAM, the likelihood of adverse effects and interactions with traditional medical practice becomes more important to primary care physicians as they treat patients who also use CAM.

Most previous studies of CAM use have used telephone or mail surveys.1,4,5,7,9,12,16-18 One survey used interview data; however, the data were derived from a Medical Expenditure Panel survey, did not focus on CAM, and included unconventional treatment as part of the various types of medical services offered.11 Our study was designed to assess the types of nontraditional medical practices that have been used in the present or in the past by an urban outpatient population. Special attention was paid to whether the patients had ever experienced any adverse effects or possible interactions of CAM with their conventional therapies.

METHODS

SETTING
The internal medicine clinics at the Erie County Medical Center and the Matthew J. Gajewski Center provide primary care for residents of the city of Buffalo and Erie County in western New York. The study was approved by the Social and Behavioral Sciences Investigational Review Board at the State University of New York at Buffalo.

PATIENT POPULATION
The patients were primarily poor, urban individuals attending 1 of the clinics for health reasons.

DESIGN
Patients were identified for interview in a prospective random manner. One interviewer (S.M.R.) alternated between the 2 sites. Which sessions were at which site were determined by convenience and the likelihood of the largest number of interviews. When more than 20 patients were scheduled, a random-numbers table was used to identify patients for the study. When fewer than 20 patients were on the schedule, the interviewer attempted to survey all who attended the clinic session.

When a designated patient presented for an appointment, the treating physician was asked whether the patient was eligible for the study. Patients were excluded if they were minors, prisoners, pregnant women, institutionalized, or unable to give consent for any reason, including a language barrier or a neurological or psychiatric disability. Consent was then obtained, and the patient was interviewed before or after the encounter with his or her physician. The interviews were conducted during an 8-week period beginning June 3 and ending July 31, 2002. After the interview, the medical record was reviewed for demographic information, diagnoses, medications, and any adverse events due to medications or CAM within the previous year.

SURVEY INSTRUMENT
The first 2 questions dealt with the medications prescribed by the primary care physician and any other provider. The third question asked whether the patient was taking any vitamins, herbal products, home or folk remedies (purchased or created from home ingredients), or homeopathic remedies or had used stones, amulets, bracelets, or other items for therapeutic reasons. These were further broken down by whether they were being used at present, were used within the past year, or had ever been used. The fourth question asked whether a diet was being followed for health reasons. A positive response was clarified by asking whether the diet was recommended by a physician or dietitian, was a commercial diet program, was found in a book or magazine, or other. The patients who were not currently dieting were also asked whether they believed they should be on a diet. The fifth question addressed the use of prayer. It was phrased specifically to determine whether prayer was directed at the patient’s health and medical concerns. The sixth question addressed whether an exercise program was being used at present by the patient for health purposes. The seventh question inquired whether other techniques or healers mentioned were being used now or had been used in the past. Specific providers included chiropractors, osteopaths, massage therapists, spiritual healers, acupuncturists, hypnotists, relaxation therapists, or other.

Questions were also asked concerning the level of education and whether any adverse events had been experienced with prescribed medications or other therapies. The level of education was assigned the following 4 levels: less than 12th grade, high school graduate, some college, and college graduate. The adverse effects question was open-ended and the patient’s response noted. The research assistant was to ask to what agent the patient had a reaction, what were the symptoms, and whether the agent was prescribed, an over-the-counter drug, or an herbal product or supplement.

ANALYSIS
Data were entered into a computerized database (dBase V; Borland Software Corporation, Scotts Valley, Calif). Statistical analysis was performed using SPSS software, Version 11 (SPSS Inc, Chicago, Ill). Categorical variables were compared with the χ2 test; linear variables were compared with the t test. All com-
The responses were for vitamins, but other products were common as well (Table 2). Of the 174 patients currently using vitamin supplements, 30 (17.2%) were doing so with a physician’s prescription; 126 (72.4%) were doing so on their own; and 18 (10.3%) were using some combination of prescribed supplements and on their own. Fewer patients were using herbal products, including 61 (16.4%) currently, 68 (18.3%) within the past year, and 83 (22.3%) ever.

Univariate analysis showed that current use of any of these products correlated positively with age (mean ages for users vs nonusers, 55.9 vs 47.3 years; \( P \lt .001 \), \( t \) test) and race (\( P = .02 \), \( \chi^2 \) test), with 53.4% of white patients and 40.0% of African American patients taking supplements. Multivariate analysis with logistic regression, however, showed only age to be statistically significant (Table 3).

When we totaled all of the products currently used, the maximum number per person was 16 products or modalities. Seventeen patients (4.6%) were using 6 or more products. The hyperuser was more likely to have a higher education (\( P = .004 \), \( \chi^2 \) test), but there were no correlations with age, sex, or race.

**DIET, PRAYER, AND EXERCISE**

Use of a diet for health purposes was claimed by 135 (36.4%) of the study population. Of these, 103 (76.3%) used diets recommended by a physician; 5, recommended by a dietician; 6, from commercially available programs; 5, from a book or magazine; and 21, from other sources. Two hundred thirty-six patients were not following a diet; of these, 125 (53.0%) said that they probably should follow a diet. The use of a diet correlated positively with age (\( P = .02 \), \( t \) test) and number of diagnoses (\( P = .003 \), \( t \) test), but not with sex, race, or level of education. With logistic regression, the number of diagnoses and level of education correlated, but age did not.

Prayer was used for health purposes by 59.8% of the study group. Women were more likely to use prayer than men (64.0% vs 51.6%; \( P = .02 \), \( \chi^2 \) test), and African American patients were more likely to use prayer than white patients (68.6% vs 55.3%; \( P = .02 \), \( \chi^2 \) test). Age (\( P < .001 \), \( t \) test) and the number of diagnoses (\( P < .001 \), \( t \) test) correlated with the use of prayer. Level of education did not

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**RESULTS**

**DEMOGRAPHICS**

We randomized 983 scheduled appointments during the 2 months of the study, and 576 patients showed. Of these patients, 85 were excluded, 81 declined, and 39 were not approached for logistical reasons (ie, the patient left before the interviewer could talk to him or her). Thus, 371 (75.6%) of 491 eligible patients or 371 (82.1%) of 452 patients asked agreed to be interviewed.

The demographics of the study population are shown in Table 1. Two thirds of the patients were women, 59.0% were white, and 37.7% were African American. The mean age was 51.4 years. The population was moderately ill, with mean numbers of active diagnoses of 3.26 and active prescriptions (written by the physician) of 3.82. The numbers of active illnesses and categories are shown in Table 1.

**USE OF VITAMINS AND HERBAL PRODUCTS**

Almost half of the patients (179 [48.2%]) answered yes to the question about using any vitamins, herbs, etc. The number increased to 215 (58.0%) for use within the past year and 304 (81.9%) for use in their lifetime. Most of the responses were for vitamins, but other products were
correlate. With logistic regression, age and race correlated, but not sex or number of diagnoses.

Use of exercise was claimed by 112 (30.2%) of the patients. Exercise correlated positively with level of education ($P = .002$, $\chi^2$ test), but not with age, sex, or race. This correlation was supported by the logistic regression analysis.

### ALTERNATE PROVIDERS

Almost one third of the patients (109 [29.4%]) had consulted an alternate provider at some time. However, only 26 (7.0%) had seen an alternate provider within the past year. Most of the experiences were with a chiropractor ($n=85$ [78.0%]). Other types of providers are listed in the following tabulation:

<table>
<thead>
<tr>
<th>Provider</th>
<th>No. (%) of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osteopath</td>
<td>2 (1.8)</td>
</tr>
<tr>
<td>Massage therapist</td>
<td>18 (16.5)</td>
</tr>
<tr>
<td>Spiritual healer</td>
<td>5 (4.6)</td>
</tr>
<tr>
<td>Acupuncturist</td>
<td>9 (8.2)</td>
</tr>
<tr>
<td>Hypnotist</td>
<td>6 (5.5)</td>
</tr>
<tr>
<td>Relaxation therapist</td>
<td>12 (11.0)</td>
</tr>
<tr>
<td>Other</td>
<td>13 (11.9)</td>
</tr>
</tbody>
</table>

Recent use of alternate providers correlated with education ($P = .02$, $\chi^2$ test). Use at any time correlated with race. Among African American patients, 15.0% had used an alternate provider at some time during their lifetime; among white patients, 38.8% had ($P < .001$, $\chi^2$ test). Recent use did not correlate with race. The correlation of recent use of alternate providers with the level of education was present in the logistic regression analysis.

Use of CAM was very common, with 85.4% of patients actively using some form of CAM. Counting supplements, diet, exercise, prayer, and alternate providers as modalities, the mean number of modalities was 2. The percentage of patients actively using 1 modality was 28.8%, 2 was 26.7%, 3 was 21.3%, 4 was 7.5%, and 5 was 1.1%. We expected that the use of one CAM modality would correlate with use of other CAM modalities. Using univariate analysis ($\chi^2$ test), we found multiple correlations between the uses of the different CAM modalities. Multivariate analysis with Spearman rank correlation coefficient confirmed the significances of the correlations; however, in all cases, $R < 0.20$. Therefore, the strength of these correlations in our sample is open to question, and we do not report them.

### ADVERSE REACTIONS

Almost a third of the patients ($n=114$ [30.7%]) claimed to have had a reaction to a prescribed medication or to an alternate therapy at some time in their life. In general, few adverse events were documented in the medical chart within the previous year, and many seemed to have occurred in the remote past. Of these adverse events, 93 (81.6%) were associated with prescribed medications and 21 (18.4%) with CAM therapies. The descriptions of the adverse effects of CAM were usually vague (nausea, fatigue, itch, excess mucus, etc). Only 1 effect, a change in the prothrombin time, was specific and easily associated with an herbal supplement. Although the patient was unable to identify the product, multiple interactions of herbal products with anticoagulant therapy have been well documented.

### COMMENT

Our findings confirm the wide use of health-promoting modalities outside conventional medicine by patients in lower socioeconomic groups.

We used a method based on the reports by Eisenberg et al, but there were some major differences. The differences include population (general sample vs underserved), interview (telephone vs direct), time, region (national vs regional), and some of the questions. Some of the data can be compared and are shown in Table 4. In our population, chiropractic therapies (and other provider-based therapies) were used less fre-

### Table 3. Logistic Regression of Demographic Variables With CAM*

<table>
<thead>
<tr>
<th></th>
<th><strong>Vitamins, Herbs, and Folk Remedies</strong></th>
<th><strong>Diet</strong></th>
<th><strong>Prayer</strong></th>
<th><strong>Exercise</strong></th>
<th><strong>Alternate Providers</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR (95% CI)</td>
<td>1.018 (1.006-1.031)</td>
<td>NS</td>
<td>1.028 (1.015-1.041)</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>P Value</td>
<td>.004</td>
<td></td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR (95% CI)</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR (95% CI)</td>
<td>NS</td>
<td>NS</td>
<td>2.075 (1.305-3.300)</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>P Value</td>
<td>NS</td>
<td></td>
<td>.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>No. of diagnoses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR (95% CI)</td>
<td>NS</td>
<td>1.185 (1.074-1.308)</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>P Value</td>
<td>NS</td>
<td></td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level of education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR (95% CI)</td>
<td>NS</td>
<td>1.339 (1.061-1.690)</td>
<td>NS</td>
<td>1.532 (1.211-1.938)</td>
<td>1.831 (1.226-2.733)</td>
</tr>
<tr>
<td>P Value</td>
<td>NS</td>
<td>.01</td>
<td>&lt;.001</td>
<td>.003</td>
<td></td>
</tr>
<tr>
<td><strong>Intercept</strong></td>
<td>−0.593</td>
<td>−1.751</td>
<td>−1.973</td>
<td>−1.756</td>
<td>−3.969</td>
</tr>
</tbody>
</table>

**Abbreviations:** CAM, complementary and alternative medicines; CI, confidence interval; NS, not significant; OR, odds ratio.

*The analysis includes only white and African American patients ($n = 359$).
frequently. Purchased folk remedies were used by 8.6%; however, home remedies that may not have been assessed by the previous surveys were very commonly used. These could be as simple as honey in tea for a cough or chicken soup for a flu-like illness.

Herbal products were used 18.3% of the time. This is a higher number than previously reported. Use of homeopathy did not appear much different from the earlier numbers. For this comparison, when calculating the number of patients using more than 1 therapy, we excluded use of vitamin supplements. Vitamin supplements were commonly used, but not in the megadose regimens reported in the earlier work. When we included commercial and other diets but not diets recommended by physicians or nutritionists, we found 32.3% of our patients used alternate therapies in manners comparable to those reported by Eisenberg et al.\textsuperscript{1,4} Exercise was used in comparable amounts, and use of diet was very common, although usually as part of a physician-recommended regimen. Prayer was used much more commonly.

Some of the differences are not surprising. Patients from lower socioeconomic groups with less discretionary income would not be expected to use more costly services like alternate providers or commercial diets as frequently, and would be expected to use free or inexpensive remedies and prayer more. Although the comparisons shown in Table 4 may be attributable to different socioeconomic status, we cannot exclude differences due to a secular change with time, due to regional differences, or due to different methods. In a study of underserved patients in Colorado, Wolsko et al\textsuperscript{19} found no differences with income level.

Our experience with this study leads us to believe that most of these practices were not maladaptive or harmful, and that some should be encouraged. Many of the vitamins were of the standard sort and not used as megavitamin therapy. Calcium supplementation has been recommended by a National Institutes of Health Consensus Conference, and calcium was one of the common supplements.\textsuperscript{20} Patients seem to partition their problems. Musculoskeletal problems were taken to a chiropractor, and medical problems were taken to a physician. Given that this sample was a group treated in a medical clinic, we expected many would have a prescribed diet (or should have a diet) for hypertension, diabetes, cholesterol, and/or obesity.

Prayer was used by a high percentage of the patients, and exercise programs were claimed in about one third. Diet, exercise, and prayer are lifestyle issues that can be very helpful and are frequently recommended or at least not opposed by physicians.

One confounding aspect is that physicians may prescribe, encourage, or be neutral in various forms of CAM. Physicians often prescribe vitamins or a diet and recommend exercise for general well-being and specific diagnoses. Common sense advice of simple home remedies to address minor complaints (eg, tea for cough, chicken soup for a cold) are not unheard of and avoid potentially expensive or unnecessary medications. Although a few physicians prescribe prayer, most will accept it as an adjunct to conventional therapy. Thus, many activities are endorsed or supported by individual physicians, and the lines between allopathic medicine and CAM are becoming blurred.\textsuperscript{21,22}

Many of the patients had tried various practices in the past but were not using them at the time of the survey. In many instances, patients described remedies given to them as children. Some use of CAM may be of a trial nature, given the increased visibility and promotion of the modalities. Some use was for acute self-limited diseases. This finding causes some difficulties with the type of analysis that we used. Complementary and alternative medicines, like conventional medicine, can be used for a short time to treat a self-limited illness, for a long time to treat chronic medical problems, or for health promotion in the absence of disease. Future studies may have to differentiate between these purposes to better compare and understand CAM use.

A small but significant number of patients would appear to have enthusiastically endorsed CAM; almost 5% used 6 or more supplements or modalities. This group may merit more detailed study.

Two of the strengths of this study are that we were able to survey a population of individuals from lower socioeconomic strata, a population that may have been undersampled in earlier studies, and we were able to interview them directly rather than by telephone. Reservations on our data are that the individuals were by definition patients attending internal medicine clinics and from a specific geographic region, and that we cannot exclude secular trends over time as an explanation for some of the differences. The possibility of patients underreporting their experience must also be considered.

**CONCLUSIONS**

The use of CAM is common among poor or underprivileged groups. There may be some differences in the type of modalities used, and although physicians may view...
some forms of CAM negatively, much appears to be reasonable or harmless.

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