A Review of the Incorporation of Complementary and Alternative Medicine by Mainstream Physicians

John A. Astin, PhD; Ariane Marie, BA; Kenneth R. Pelletier, PhD; Erik Hansen; William L. Haskell, PhD

Background: Studies suggest that between 30% and 50% of the adult population in industrialized nations use some form of complementary and/or alternative medicine (CAM) to prevent or treat a variety of health-related problems.

Method: A comprehensive literature search identified 25 surveys conducted between 1982 and 1995 that examined the practices and beliefs of conventional physicians with regard to 5 of the more prominent CAM therapies: acupuncture, chiropractic, homeopathy, herbal medicine, and massage. Six studies were excluded owing to their methodological limitations.

Results: Across surveys, acupuncture had the highest rate of physician referral (43%) among the 5 CAM therapies, followed by chiropractic (40%) and massage (21%). Rates of CAM practice by conventional physicians varied from a low of 9% for homeopathy to a high of 19% for chiropractic and massage therapy. Approximately half of the surveyed physicians believed in the efficacy of acupuncture (51%), chiropractic (53%), and massage (48%), while fewer believed in the value of homeopathy (26%) and herbal approaches (13%).

Conclusions: This review suggests that large numbers of physicians are either referring to or practicing some of the more prominent and well-known forms of CAM and that many physicians believe that these therapies are useful or efficacious. These data vary considerably across surveys, most likely because of regional differences and sampling methods, suggesting the need for more rigorous surveys using national, representative samples. Finally, outcomes studies are needed so that physicians can make decisions about the use of CAM based on scientific evidence of efficacy rather than on regional economies and cultural norms.

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COMPLEMENTARY and alternative medicine (CAM), a subject that was covered extensively in the last issue of the ARCHIVES, includes a variety of medical interventions that are not taught extensively at US medical schools or generally provided at US hospitals. In 1990, an estimated 33% of the general public in the United States reported using 1 or more types of CAM, and the number of visits to CAM providers was greater than the number of visits to all primary care physicians. A national survey conducted in 1994 found 40% of the general public reporting the use of CAM within the previous year. Surveys in Europe and Australia have reported similar uses of CAM (range, 20% to 49%). The popularity of particular types of CAM varies geographically, but generally includes chiropractic, relaxation techniques, massage, herbal medicine, and homeopathy. The demographic characteristics of frequent CAM users do not vary regionally. Different international surveys consistently report that users of CAM tend to be more educated, have higher incomes, and are more likely to be between the ages of 30 and 49 years. However, Astin found that among demographic variables only educational level predicted use of CAM.

The most frequently cited reason for consumer use of CAM is dissatisfaction with the ability of conventional medicine to adequately treat chronic illnesses. However, in a recent multivariate analysis, dissatisfaction failed to predict use of CAM in a national sample. This study found that having more education, poorer health status, and a holistic philosophical orientation to health and life (ie, belief in the importance of mind, body, and spirit) were all predictive of alternative health care use. Use of CAM has been found to be especially high in patients with Alzheimer disease, multiple sclerosis, rheumatic diseases, cancer, acquired immunodeficiency syndrome, back problems, anxiety, headaches, and chronic pain.
of alternative treatments by both the public and practitioners is likely to escalate with the growing incidence of chronic illnesses as populations age. Additional reasons for consumer use of CAM include (1) a dislike of the reductionist, mechanical model of medicine and/or preference for a holistic, integrative model of medicine; (2) a desire to avoid treatments with adverse effects and to reduce iatrogenic conditions; (3) a greater knowledge of how nutritional, emotional, and lifestyle factors affect health.

Physicians have had a range of responses to patient interest in CAM. Three of the most common arguments used by opponents are as follows: (1) alternative therapists do not have the extensive knowledge that is required to diagnose an illness properly; (2) there is a lack of evidence of the efficacy of CAM; and (3) CAM is potentially harmful owing to its adverse effects or indirectly through the failure of patients to seek appropriate medical care. By contrast, clinicians have become strong proponents of particular types of CAM, regardless of whether or not there is scientific evidence of efficacy. Somewhere between over-enthusiastic belief and stubborn disbelief is a balanced perspective that will help patients and advance medical science.

Physicians need to be informed about CAM because their patients are using CAM and will continue to use CAM if they believe that these therapies are helpful to them. Approximately 7 of 10 patients using CAM for a serious health problem do not tell their physicians that they are using unconventional therapy. Hence, physicians need to know enough about CAM to provide information about possible interactions with pharmaceutical prescriptions and to provide reliable information to help patients sort through all the multilevel marketing of CAM products. Also, knowledge about CAM may help to expand and improve clinical care, as has been done in the past, such as by incorporating new approaches (eg, nutritional supplements) or by eliminating ineffective approaches (eg, bloodletting).

Providing information about the efficacy of CAM is not straightforward, in part because the general area of CAM refers to a variety of methods that may be more or less effective for different medical conditions and individuals. One way to direct future investigation of the efficacy of CAM, particularly given the hundreds of alternative therapies that are being practiced, is to examine which CAM therapies are considered most useful by physicians based on their clinical experience.

Several international surveys have asked about physicians’ practices and beliefs with regard to CAM. One meta-analysis published in 1995 assessed whether physicians believe that complementary medicine is useful and/or effective based on 12 of these surveys. The authors found that, on average, physicians judged CAM therapies to be moderately effective (the average rating across surveys was 48 on a 100-point scale). However, one of the difficulties in interpreting these data is that across surveys researchers have tended to define CAM quite distinctly. For example, the lists of possible CAM therapies can vary from as few as 3 modalities to as many as 25. Furthermore, numerous surveys examining physicians’ attitudes toward CAM have included such categories as diet and exercise and psychotherapy, which most conventional physicians would not consider to be alternative or unconventional. The meta-analysis by Ernst et al also did not include any analyses of physicians’ practice of, referrals for, or reasoning behind their use of or belief in such therapies.

The present study addresses the above limitations by (1) focusing on physicians’ attitudes toward specific CAM therapies rather than toward CAM in general, since it is difficult to interpret the precise meaning or significance of the latter; (2) including an analysis of physicians’ practice of, referrals for, and reasoning behind specific CAM use. This review focuses on conventional physicians’ attitudes toward the following 5 therapies: acupuncture, chiropractic, herbal medicine, homeopathy, and massage. Research suggests that these therapies are the ones most frequently used by consumers. Also, these therapies have tended to receive the most attention by the popular media and are the modalities that insurance companies and health maintenance organizations appear most interested in or willing to offer coverage for. The specific factors that were evaluated in this review include physicians’ (1) practice, training, and type of referrals in general, (2) belief in the efficacy or use of CAM, and (3) reasons for practice of, referrals for, and/or interest in CAM. The attitudes of conventional physicians toward these 5 alternative therapies may suggest which types of CAM show clinical potential and would merit further research based on the clinical experience of physicians.

METHODS

LITERATURE REVIEW

An international literature search using a multistage process was undertaken in February 1997. In the first stage, systematic searches were undertaken in several databases, including MEDLINE, MED90, MED85, ABI, SOCIOLOGICAL ABSTRACTS (SOCA), PSYCINFO, and BIOSIS. Search terms used were “attitudes, opinions, views” with “physicians, practitioners” and “alternative medicine, alternative therapies.” In the second stage, 2 reviewers examined the reference sections of the initial articles in order to identify additional surveys. Additional articles were retrieved, and their reference sections were examined until no more new surveys were identified. In the third stage, directors of the National Institutes of Health’s Office of Alternative Medicine national centers as well selected key authors were provided a list of physician surveys and asked to identify any other relevant surveys known to them.

SURVEYS: INCLUSION/EXCLUSION CRITERIA

All surveys evaluating physicians’ attitudes toward or use of CAM in general were considered. Only surveys of mainstream physicians (MDs with no known vested interest in CAM)
were included. From these, surveys were excluded if they (1) were not in English, (2) were based on previously published reports of an original survey,35 (3) were not mail or questionnaire surveys,36 and (4) did not have a response rate of at least 50%. Based on these criteria, we identified 19 studies that examined the practices and beliefs of mainstream physicians with regard to CAM. These studies are described in Table 1.

All studies were conducted between 1982 and 1995. Ten studies used a random sampling method; 5 sampled all the physicians in a particular region or regions; 2 distributed surveys at conferences or clinical sites; and 2 combined a random sampling method with a sampling of all the physicians in a particular region. Six of the surveys compared mainstream physicians with other groups, and, when relevant to the purpose of this study, this information is mentioned in the “Results” section. None of the surveys tested the reliability of the survey questions. Nine of the surveys indicated that nonrespondents were demographically similar to respondents, and 1 of these also indicated that nonrespondents were similar in their attitude toward CAM.

Three of 19 surveys did not specify what types of therapies were meant by CAM but asked respondents to specify the types of therapies themselves.31-32 The other surveys defined the particular types of therapies meant by CAM and asked specific questions related to these therapies.

Two reviewers identified factors to be examined based on the purpose of the study. Both reviewers independently entered the data. Any discrepancies in the data entry were resolved by referring to the original articles. Differences between the 2 reviewers that could not be resolved were decided by a third reviewer.

### RESULTS

#### METHODOLOGICAL CRITIQUE

For this analysis, the 19 studies reviewed included 17 heterogeneous surveys. None of the studies tested the reliability of the survey questions. Hence, variation in how individual questions were asked probably confounds the validity of all of the studies reviewed. Samples sizes ranged from 40 to 594 physicians (mean ± SD, 201 ± 141). Although a few studies included physicians from different regions within a country, the small sample sizes and the regional specificity of the sampling undermine the generalizability of the results. Furthermore, the limited number of countries and the restriction to English-language publications also limit the generalizability of the findings.

### Participation Rates

Response rates ranged from 52% to 89% (mean ± SD, 72% ± 10.4%). In general, surveys with lower response rates are more likely to be influenced by participant self-selection. In evaluating physician practices and beliefs with regard to CAM, it is critical to determine whether nonresponders and responders are similar in their attitude toward CAM. Only 1 of the studies included in this review asked whether nonresponders had a similar attitude toward CAM. Thus, it is possible that many of the surveys with lower response rates are skewed toward participants who were eager to participate because of their highly favorable or highly unfavorable opinion of CAM. Along these lines, there was a nonsignificant negative association between sample size and belief in efficacy ($r = -0.79; P < .07$) and practice of CAM ($r = -0.70; P < .40$).

#### Analysis of Results

A meta-analysis of the studies was not possible because of the heterogeneity of the surveys and the corresponding lack of standardization with respect to methodology, sampling procedures, statistical analyses, and reporting of data. A minority of the studies conducted (7 of 19) did not examine the statistical effects of age and sex on physicians’ responses. None of the studies considered differential responses from racial and/or ethnic subpopulations of physicians. Only 1 study compared the responses of physicians based on their specialization.

Along with the 5 CAM therapies we focused on for the present review (acupuncture, chiropractic, homeopathy, herbal therapies, and massage), surveys examined physicians’ use of, and attitudes toward, a number of other health care approaches that have been considered alternative or complementary in previous research. Additional CAM therapies included various nutritional approaches, such as use of megavitamin therapy and fasting; mind-body modalities, such as meditation, relaxation, imagery, and hypnosis; spiritual or faith healing; and various body-based techniques, including osteopathy, polarity therapy, electromagnetic healing, chelation therapy, Alexander technique, acupressure, reflexology, and therapeutic touch.

#### PRACTICE OF CAM

Table 2 summarizes the rates of practice for the 5 specific CAM therapies we reviewed. Across surveys, practice rates varied from a high of 78% for herbal medicine to no reported practice of this modality. Reported rates of practice were quite varied across all CAM modalities. For example, for acupuncture, rates varied from a high of 24% to a low of 1%, while for chiropractic, practice rates varied from a high of 27% to a low of 6%. (The higher practice and referral rates reported by Goldstein et al, eg, 51% for acupuncture, are the result, in part, of their having combined practice and referral rates as 1 value.) Across surveys, mean practice rates for physicians varied from a high of 19% for massage and chiropractic to a low of 9% for homeopathy. On average, 17% of physicians reported practicing acupuncture, while 16% reported practicing herbal therapy. Table 2 also lists medians for practice rates, as the mean values in certain instances have been inflated by outlier values, such as the 78% practice rate for herbal medicine reported by Himmel et al in that study, the mean was 16% and the median was 5%.

The practice of CAM in general is greater among younger physicians according to 1 survey. However, 2 studies found no difference in...
the practice of CAM by age.40,41 Two surveys40,44 found that the practice of CAM is more common among male physicians, and 2 studies found no difference in practice rates by sex.41,49

Four surveys also inquired about training in, and practice of, CAM.40,48-50 Among these surveys, an equal or higher number of physicians reported training in various types of CAM compared with the number of physicians who reported practice of those types of CAM. The only exceptions in which more physicians claimed to practice than claimed training were acupuncture (2 of 4 surveys), chiropractic (3 of 3 surveys), naturopathy (1 of 1 survey), osteopathy (1 of 1 survey), and spiritual or faith healing (2 of 2 surveys).

REFERRALS FOR CAM

Table 3 summarizes referral rates for the 5 CAM therapies. As with the practice of CAM, reported referral rates were quite varied, ranging from highs of 83% for chiropractic44 and 71% for acupuncture,49 to lows of 2% for chiropractic41 and 1% for herbal medicine40 and homeopathy,47 to no reported referrals for herbal medicine.46 Mean referral rates ranged from a high of 43% for acupuncture to a low of 4% for herbal medicine. As shown in Table 3, across surveys, the mean rates of referral for chiropractic were 40%. CAM indicates complementary and alternative medicine; ellipses, practice of this modality not assessed.

Table 2. Physician Practice of CAM Therapiesa

<table>
<thead>
<tr>
<th>Source, y</th>
<th>Country</th>
<th>Acupuncture</th>
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<th>Homeopathy</th>
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<td>Mean ± SD</td>
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<td>16 ± 30</td>
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<td>0-78</td>
<td>0-34</td>
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CAM indicates complementary and alternative medicine; ellipses, practice of this modality not assessed.

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Table 3. Physician Referral for CAM Therapies*

<table>
<thead>
<tr>
<th>Source, y</th>
<th>Country</th>
<th>Acupuncture</th>
<th>Chiropractic</th>
<th>Homeopathy</th>
<th>Herbal Medicine</th>
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Mean ± SD 42 ± 22 40 ± 23 15 ± 14 4 ± 3 21 ± 14
Mean 47 50 10 4 24
Range 8-71 2-83 1-42 0-9 1-35

*CAM indicates complementary and alternative medicine; ellipses, referrals for this modality not assessed.

rates for homeopathy (15%) and massage (21%) were considerably lower. The highest referral rates reported for homeopathy were 42% and 35% and for massage 35% and 26%. The highest reported referral rates for herbal medicine were 9% (which includes practice as well) and 5%. Four surveys report that referral rates for CAM in general and for chiropractic in particular are higher among younger physicians. However, 3 studies found no difference in referral rates for CAM by age. One survey found that referral rates for CAM are higher among female physicians; however, 3 studies found no difference in referral rates by sex.

BELIEF IN THE USE OR EFFICACY OF CAM

Once again, the extent to which physicians believing in the value of CAM therapies varied considerably across both surveys and modalities. As shown in Table 4, belief in the usefulness of CAM ranged from as high as 91% and 89% for chiropractic, 88% for acupuncture, and 80% for massage to as low as 1% for homeopathy, 1% to 2% for herbal medicine, and 6% for massage. Also, while belief in efficacy tended to be higher for acupuncture and chiropractic, and to a slightly lesser extent massage, several surveys identified fairly high rates of belief for homeopathy and herbal medicine. For example, belief in the value of homeopathy ran as high as 52% and 47%, while 2 surveys found 23% of physicians believing in the efficacy or clinical usefulness of herbal medicine.

The results of this analysis suggest that, on average, physicians perceive chiropractic to be more useful or effective than acupuncture and acupuncture to be more useful or effective than homeopathy, findings that are consistent with the meta-analysis by Ernst et al. Belief in CAM is greater among younger physicians according to a survey by Perkin et al and the meta-analysis by Ernst et al. However, 5 studies found no difference in beliefs by age, and 1 study found belief in hypnosis to be greater among older physicians. Belief in CAM is greater among female physicians according to 1 survey, although 4 studies found no difference in belief by sex. Examination of practice of, referrals for, and belief in the efficacy of specific types of CAM revealed a tremendous variation across surveys. However, this variation did not appear to correlate with the year or the country in which the study was conducted. This observation is consistent with that of Ernst et al, who did not identify a change in belief in the efficacy or use of CAM over time or

REASONS FOR PRACTICE OF, REFERRALS FOR, OR INTEREST IN CAM

Among the reasons listed by physicians for their practice of, referrals for, or interest in CAM are (in order of frequency) (1) patient’s lack of response to conventional treatment, (2) patient’s request or preference, (3) belief in efficacy, and (4) fewer adverse effects. Less frequently cited reasons include (1) the belief that the scientific world view that is espoused by conventional, academic medicine is limited, (2) the conception that there is a synergy between CAM and patients’ cultural beliefs, and (3) the perception that patients’ diseases are nonorganic or psychological in nature. Conditions for which physicians use CAM or refer for CAM include psychological problems, pain, back problems, musculoskeletal disorders, chronic illnesses, anxiety, headaches, smoking cessation, and weight problems.
a trend suggesting that 1 country has an increased belief in CAM. It is also consistent with the findings of Borkan et al,33 who did not identify a significant difference in practice, referrals, or belief in effectiveness among practice locations in the United States and southern Israel. Further corroboration is provided by Schacter et al,42 who found that a physician’s country of origin did not have a significant effect on his or her belief in CAM. However, in some instances, the extent to which certain CAM therapies are accepted and practiced as part of medical care can vary considerably depending on the country or culture one is observing. For example, in a survey of physicians in Kassel, Germany, Himmel et al found that 45% practiced homeopathy, while 78% reported practicing herbal medicine, which likely reflects the greater acceptance of these modalities in this European country.

Other possible explanations for the variation in data for specific types of CAM between surveys could be (1) differences in demographic characteristics of the samples (as well as in how the samples were selected); (2) wording of surveys (including how the various CAM therapies were defined); (3) differences in the ratio of general practitioners to specialists; and/or (4) local/regional differences in the familiarity or availability of particular types of CAM. Demographic variation is a less likely reason, since the mean age and sex ratios were fairly similar among surveys, in addition to the fact that the data are inconclusive with regard to the influence of age or sex on the use of or belief in CAM. One survey found practice of, referrals for, and belief in CAM to be greater among general practitioners than among hospital-based physicians.45 Unfortunately, too few of the other surveys reported data by specialty for us to be able to evaluate whether general practitioners do indeed use and believe in CAM more than specialists do and therefore to account for the variation in data between survey samples for specific types of CAM use or referral.

Regional differences in familiarity and availability of CAM are the most likely cause of the variation in data for particular types of CAM. For example, Himmel and colleagues4 examined both patients’ use and physicians’ practice of CAM and found that herbal medicine, chiropractic, homeopathy, and acupuncture are popular among both patients and physicians. By contrast, relaxation techniques, chiropractic, and massage are most often used by consumers in the United States.1,2 Studies suggest that physicians in the United States are more similar to consumers in the United States than to physicians in Germany in that relaxation techniques, chiropractic, and massage are more popular than herbal medicine or homeopathy.35,48 Thus, it appears that the incorporation of particular types of CAM by physicians is influenced by the regional popularity of those therapies. This hypothesis is supported by interviews with hospital CAM program directors, who stated that they most often decided what types of CAM to include in their programs based on the availability of licensed or certified practitioners in their area.39 It is a matter of concern that scientific evidence of efficacy is not the primary reason for the incorporation of CAM. However, it is not too surprising, since differences in conventional medical practices also correlate more strongly with regional economics, practitioner specialties, and cultural norms than with outcomes.37

Despite the variation in data for particular types of CAM, a review of the studies suggests that a number of such interventions may hold clinical promise and merit further research. Conditions for which physicians use or refer to CAM are similar to the conditions for which consumers use these therapies, with the most common being chronic

Table 4. Physician Belief in the Efficacy of CAM Therapies*  

<table>
<thead>
<tr>
<th>Source, y</th>
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<th>Acupuncture</th>
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<th>Homeopathy</th>
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<td>Himmel et al,3 1993</td>
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<td>Hadley,31 1988</td>
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<td>Reilly,34 1983</td>
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<td>Lynoe and Svensson,35 1992</td>
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<td>Berman et al,36 1995</td>
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<td>Visser,3 1992</td>
<td>The Netherlands</td>
<td>37</td>
<td>49</td>
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<td>Knipschild et al,34 1990</td>
<td>The Netherlands</td>
<td>33</td>
<td>40</td>
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<tr>
<td>Mean ± SD</td>
<td>51 ± 26</td>
<td>52 ± 26</td>
<td>28 ± 19</td>
<td>12 ± 9</td>
<td>40 ± 38</td>
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<td>Median</td>
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<td>Range</td>
<td>15-88</td>
<td>13-91</td>
<td>1-52</td>
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*CAM indicates complementary and alternative medicine; ellipses, belief in the efficacy of this modality not assessed.
pain, back problems, psychological problems, headaches, and chronic illnesses in general.\textsuperscript{1,2} Physician and consumer use of CAM for these health-related problems suggests that conventional medicine may lack satisfactory interventions for the management of these conditions. However, further research is needed to determine whether particular types of CAM provide better outcomes for these conditions than does conventional medicine.

Comparison of information on the training and practice of CAM suggests that few physicians are practicing CAM without training. However, the fact that a few physicians are practicing modalities such as acupuncture and chiropractic (as well as naturopathy, osteopathy, and spiritual healing) without training suggests that physician education about the appropriate use of these therapies is needed.

Conclusions from this study are limited owing to the lack of large, representative national samples of physicians. It is difficult to interpret the variations in findings across surveys, since such differences could be the result of biased samples instead of reflecting true national or regional differences. It is also difficult to draw definitive conclusions from this review of physicians' attitudes toward CAM given (1) the failure to test the reliability of questions, (2) inconsistencies in the definition of CAM, and (3) a bias toward English-language publications. Therefore, future surveys of physicians' practices and beliefs with regard to CAM should consider the following recommendations in order to improve study quality and to allow comparison of different surveys:

- Keep the sample size minimum to 50 practitioners.
- Establish the reliability of questions.
- Use random (representative) samples from a defined region(s).
- Maintain a response rate of at least 75%.

Physicians' practice of and belief in different types of CAM may be influenced by personal experience. Thus, responses should be evaluated by region, sex, age, race and/or ethnic heritage, and medical specialty. Significant differences in responses should be reported (although such analyses will necessitate increasingly larger sample sizes).

Since CAM is largely a political term, the particular types of interventions considered to be alternative are likely to change over time and vary from region to region. Therefore, terms should be defined as precisely as possible, avoiding general terms that incorporate more than 1 intervention, such as healing, movement, or self-care. In general, data that do not distinguish between types of CAM are less useful. Nonresponders and responders should be similar demographically and have a similar attitude toward CAM.

The impact of physicians incorporating CAM therapies into their practice (or referring patients to CAM providers) may change the delivery of health care in more than one way. For example, the trend toward managed care, standardization of care, and shorter office visits is inconsistent with patients' and physicians' interest in more individualized treatments based on a more extensive understanding of each patient's history and current circumstances. There is also some evidence that incorporating CAM would more than double consultation time.\textsuperscript{19} However, a growing body of scientific literature in mind-body medicine suggests that incorporation of some types of CAM, in particular interventions that consider the psychological, social, and environmental aspects of a particular patient, would result in better clinical outcomes.\textsuperscript{18} Outcomes studies for both conventional and CAM therapies are needed to determine what diagnostic methods and medical treatments are in the best interests of the patient. Without this information, it is difficult to know how to set limitations on cost, length or number of office visits, and treatments.

CONCLUSIONS

This review of 19 international surveys suggests that large numbers of conventional physicians are either referring patients to or practicing some of the more prominent and well-known forms of CAM. Across studies, acupuncture had the highest rate of physician referral (43%) among the 5 CAM therapies we reviewed, followed by chiropractic (40%) and massage (21%). Rates of CAM practice by conventional physicians varied from a low of 9% for homeopathy to a high of 19% for chiropractic and massage therapy. Approximately half of the surveyed physicians believed in the efficacy of acupuncture (51%), chiropractic (53%), and massage (48%), while fewer believed in the value of homeopathy (26%) and herbal approaches (13%). Conditions for which physicians used or made referrals for these and other CAM therapies included chronic pain, back problems, psychological problems, headaches, and chronic illnesses.

These results vary considerably across surveys, most likely because of regional differences and sampling methods, suggesting the need for surveys using more national, representative samples. Finally, outcomes studies are needed so that physicians can make decisions about the use of CAM based on scientific evidence of efficacy rather than on regional economics and cultural norms.

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