

# Diabetes and Complementary Therapies

## Research Review and Clinical Applications

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**D**iabetes is a serious condition that can significantly affect a person's quality of life and lifespan. The long-term effects of impaired glucose regulation can lead to permanent organ damage and comorbid conditions, such as cardiovascular disease, and disabilities. Specifically, a patient with diabetes may battle with fatigue, infections, chronic pain, blindness, kidney disease, amputations, and other serious problems.

In addition to struggling with disease-related problems, patients with diabetes must often engage in rigorous self-care in order to optimize their health. Optimal management of diabetes requires a high degree of monitoring and compliance, as tight glucose control has been shown to reduce complications and improve mortality.<sup>1</sup>

Working on adherence to preventive and treatment regimens can be demanding for both patients and their primary health care givers. When a patient or provider's interest in complementary and alternative medicine (CAM) therapies is added to the mix, the challenges increase as additional education and monitoring will be required.

Unfortunately, both parties often fail to keep pace with the demands of diabetic care because of a variety of factors, and optimal care falls short.<sup>2</sup>

Frequent glucose monitoring, finger sticks, frequent doctor visits and blood draws, and medication compliance are just some of the challenges faced by the patient.

The health care provider needs to remain committed to adhering to recommended monitoring and treatment guidelines in order to meet goal indices, and needs to be aggressive about making clinical changes when necessary to meet those goals. In addition to adhering to conventional regimens, active attention to, and implementation of, exercise and dietary counseling is imperative.

The bottom line is that patients with diabetes and their clinicians must work in partnership to ensure the best outcomes and to ensure the safety of patients. Strategies for diabetes prevention, management, and treatment must be individualized and the challenges must be taken into consideration. Diabetes is a hetero-

geneous illness, and patients with diabetes come from a variety of social, ethnic, and cultural backgrounds. A "one-size-fits-all" plan will not work.

### Background

The number of people with diabetes in the United States in 2005 was estimated to be approximately 21 million people. This estimate includes 14.6 million who have been diagnosed and another 6.2 million who do not know they have the disease, according to the American Diabetes Association (ADA).<sup>3</sup> According to the ADA, 90–95 percent of all persons diagnosed have type 2 diabetes.<sup>3</sup> There is a higher prevalence of diabetes among Native Americans and people who are native to Alaska (15.1 percent), non-Hispanic blacks (13.3 percent), and Hispanic/Latino and Latina Americans (9.5 percent), compared with non-Hispanic whites (8.7 percent) in the United States, according to the ADA.<sup>3</sup>

Based on the most recent Centers for Disease Control and Prevention (CDC) data, diabetes is the sixth leading cause of death in the United States.<sup>4</sup> According to the ADA, 65 percent of patients with diabetes die of heart disease and stroke.<sup>3</sup> Diabetes is the leading cause of kidney failure, diabetic retinopathy causes 12,000–24,000 new cases of blindness each year, and as much as 70 percent of people with diabetes have neuropathies that contribute to the need for amputations.<sup>3</sup>

Current health care challenges in diabetes, according to scientific proceedings from the ADA, include<sup>2</sup>:

- A greater emphasis on prevention
- More aggressive therapy to achieve hemoglobin A1c values of less than 7 percent, blood pressure less than 130/80 mm Hg, and stabilization of body-mass index
- Using baby aspirin to prevent heart problems
- Using statin drugs to normalize cholesterol
- Emphasizing smoking cessation.

### Patterns of CAM Usage Among Patients with Diabetes

Previous studies have indicated that people with chronic medical conditions are more likely to use CAM than those without chronic medical conditions.<sup>5</sup> Reports on the degree of

CAM use among patients with diabetes vary widely in their projections, ranging from 8 percent to more than 60 percent.<sup>5,6</sup>

Use may increase in specific populations such as Mexican-Americans, Hispanics, or Native Americans.<sup>7</sup> An analysis by Egede et al. reviewed the prevalence and patterns of CAM usage among patients with diabetes and found that patients with diabetes were slightly more likely to use CAM than those without diabetes. The findings regarding patients with diabetes and their use of CAM were similar to findings regarding patients with cancer and hypertension compared with people who do not have these conditions.<sup>5</sup>

People with diabetes who were over 65 were more likely to use CAM therapies than those under 65, and those with a high-school education or higher were more likely to use CAM therapies.<sup>5</sup> Diabetes was an independent predictor of CAM use in this review.<sup>5</sup>

Another analysis of CAM usage among patients with diabetes revealed that just less than 50 percent (7 million patients with diabetes) reported using CAM in 2002, according to National Health Interview Survey data.<sup>6</sup> Based on this analysis, approximately 67 percent used prayer, 67 percent used vitamins, 22 percent used herbal remedies, and 17 percent used relaxation therapies.<sup>6</sup>

The major finding in the report, however, was that patients with diabetes who use CAM were more likely to get a pneumonia vaccine, use the emergency room, and have multiple primary care visits, compared with patients with diabetes who do not use CAM.<sup>6</sup> The authors note that this finding is pertinent for a number of reasons including the fact that physicians' fears about CAM therapies interfering with these patients' medications and/or compliance to conventional regimens may be unfounded.<sup>6</sup>

Further research is needed to understand the relationship between diabetes and CAM users and use of conventional and preventive services. The survey did not examine how CAM use affected health behaviors or quality of care. Patients with diabetes in this analysis were most likely to use the five following CAM therapies in ranked order: (1) nutritional advice and lifestyle diets; (2) spiritual healing; (3) herbal remedies; (4) massage therapy; and (5) and meditation training.<sup>6</sup>

### Talking with Patients About CAM

Proper nutrition and the need for exercise should be at the forefront of standard diabetic care in addition to conventional therapies.<sup>7</sup> Unfortunately, not all physicians or nurses refer their patients to diabetes educators so that these patients can learn how to integrate these aspects of care into their lives. Patients who are referred to educators may fail to utilize the services. Therefore, people with diabetes may be undereducated about such issues and may look for special diets, exercise programs, supplements, or other CAM therapies on their own without the guidance of health care professionals.

### Review of Lifestyle Behaviors and CAM

The following is a brief discussion of lifestyle behaviors and CAM therapies that are pertinent to patients who have diabetes. Because type 2 diabetes is the most prevalent type of diabetes, this article focuses on studies that are largely geared for that population, but some studies included specifically refer to type 1 diabetes and are cited.

These summaries do not comprise a comprehensive review of the literature about all specific medical outcomes related to

CAM use but rather form a discussion about the reasons that patients may seek these particular therapies for symptom control and improving quality of life, and things to consider when discussing these complementary therapies with patients.

For further detailed information about these therapies and their purported benefits and risks, please refer to the references and

resources listed at the end of this article. In addition, this discussion is focused on complementary rather than alternative therapies.

#### *Nutrition and Exercise*

Diabetes is a heterogeneous illness, thus, nutrition and exercise programs must be tailored for each patient. The fact remains that strict attention to proper nutrition and an exercise program is imperative for optimizing the health of a patient who has diabetes.<sup>7</sup>

Implementing healthy lifestyle behaviors in these areas can be a challenge, however. Ongoing, consistent discussions between clinicians and patients are imperative with frequent follow-ups to monitor progress in these areas. Clinicians and patients may resist these efforts. Discussions about nutrition and exercise may eventually be dropped if one or the other party is failing in attempts to integrate these areas into care. It is important that both clinicians and patients stay motivated to have consistent tracking and monitoring of the progress in making lifestyle behavior modifications.

A new position statement by the ADA, entitled "Nutrition Recommendations and Interventions for Diabetes—2006," was recently published.<sup>7</sup> This position statement includes evidence-based medical nutrition therapy recommendations for preventing and treating type 1 and type 2 diabetes. This statement also emphasizes the importance of nutritional education for self-management, achieving optimal glucose control, and reducing or avoiding complications.

The statement also notes that, while health care providers and patients must be aware of the importance of medical nutrition therapy and current recommendations, it is important that patients with diabetes work directly with registered dietitians who are up-to-date on current medical nutrition therapies and who use this information to guide patients.

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The ADA position statement is comprehensive and addresses the literature on weight management, specific foods and food groups, macro- and micronutrients, specifics of carbohydrate and fat intake, benefits of a high-fiber diet, fad diets, the critical need to combine physical activity with dietary interventions, and nutritional interventions for controlling acute and long-term diabetes complications.

It would behoove health care practitioners and CAM practitioners who work with patients with diabetes to read the ADA statement in its entirety.

#### *Dietary Supplementation and Herbs*

Patients with diabetes and their clinicians may be interested in dietary supplements and herbs that have the potential to make a positive impact on health outcomes. Unfortunately, there are a lack of quality scientific data at this time about the effects of dietary supplements and herbs on diabetic prevention, treatment and management.<sup>7,8</sup>

There is, however, emerging research on the potential for nutritional and supplemental interventions to make a favorable impact on people with chronic diseases including patients with diabetes. But large, well-conducted, high-quality trials are needed to draw definitive conclusions. Therefore, one should not assume that current research outcomes on supplements in diabetes are definitive.

The ADA's position paper on nutrition recommendations does not recommend routine supplementation using vitamins and minerals for patients with diabetes who do not have demonstrated deficiencies.<sup>7</sup> The ADA does, however, acknowledge that "uncontrolled diabetes is often associated with micronutrient deficiencies" and emphasizes the importance of obtaining a full complement of nutrients in the diet and multi-vitamin supplementation for certain groups, such as elderly patients or pregnant women and as recommended by a health care provider.<sup>7</sup>

Another area of interest in the management and treatment of diabetes pertains to the role of antioxidant therapy. Because diabetes has been linked to a state of high oxidative stress the role of antioxidant therapy must be considered. Current clinical trials do not show adequate support to recommend strongly for antioxidant therapy in diabetes, but most studies have not been designed to study the diabetic population specifically and others have significant flaws in their methodologies. For these reasons, caution is needed in interpretation of results and further research is warranted.<sup>7,9</sup>

A review by Yeh et al. also concluded that there are insufficient data to draw definitive conclusions about the efficacy of specific supplements and herbs, but this review also noted that there are emerging data to suggest potential benefits of some supplements and herbs for patients with diabetes, and these supplements and herbs warrant further research.<sup>8</sup> This same review suggested that

certain vitamins and minerals can, and do, have an effect on glycemic control, which is critical to remember when monitoring patients who are taking such products.<sup>8</sup>

According to the review by Yeh et al., the data for supplements such as chromium, magnesium, vitamin E, L-carnitine, and  $\alpha$ -lipoic acid are mixed, inconclusive, and limited in regarding the treatment of impaired glucose regulation in patients with diabetes.<sup>8</sup>

The U.S. Food and Drug Administration released a statement in 2005 about chromium stating:

One small study suggests that chromium picolinate may reduce the risk of insulin resistance, and therefore possibly may reduce the risk of type 2 diabetes. FDA concludes, however, that the existence of such a relationship between chromium picolinate and either insulin resistance or type 2 diabetes is highly uncertain.<sup>10</sup>

According to the Yeh review,<sup>8</sup> *Coccinia indica* (coccinia), *Panax quinquefolius* (American ginseng), and L-carnitine earned an "A" rating when using the ADA criteria for clinical guidelines. How-

ever, even so, according to the criteria, none of these has sufficient evidence to recommend for or against using these products.<sup>8</sup> The review by Yeh et al. included a more detailed discussion of a number of other herbs and supplements.

Additional high-quality research is needed to understand the potential benefits and risks in the treat-

ment of diabetes. (For further details about the potential for benefit or harm and the purported mechanisms of action in glycemic control see the ADA position paper<sup>7</sup> and the review by Yeh et al.<sup>8</sup>)

In another position statement entitled "Unproven Therapies," the ADA stated:

Use of alternative therapies, some of which may impact blood glucose, is wide-spread and growing in the U.S. Most patients do not openly share use of alternative therapies with their health care provider[s]; therefore, it is recommended that patients be asked specifically about their alternative therapy practices.<sup>11</sup>

While that sounds like a statement that has been heard before, it is a message that bears repeating. Patients with diabetes and CAM practitioners often lack understanding that these therapies can, and do, have an impact on blood glucose. This impact is critical to assess because, whether the effect is short- or long-term, it may necessitate a change in the frequency of monitoring patients' glucose levels and/or a change in conventional treatments. Episodes of hypo- or hyperglycemia can be life-threatening.

The potential for drug-supplement and drug-herb interactions is high in patients with diabetes who may be taking medicine for their diabetes as well as for comorbid conditions such as cardiovascular disease or hypertension. These interactions must be understood and evaluated when such patients present with new signs or symptoms after beginning to take a new product.

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## Resources

### Organizations

#### American Diabetes Association (ADA)

1701 North Beauregard Street  
Alexandria, VA 22311

Phone: (800) DIABETES (800-342-2383)

Website: [www.diabetes.org/aboutus.jsp?WTLPromo=HEADER\\_aboutus&vms=216951515227](http://www.diabetes.org/aboutus.jsp?WTLPromo=HEADER_aboutus&vms=216951515227)

The ADA, a nonprofit health organization, provides information, research, and advocacy on diabetes prevention and treatment. The Association's website includes information on nutrition (such as recipes), weight loss, and exercise as well as programs across the United States.

#### National Diabetes Information Clearinghouse

1 Information Way

Bethesda, MD 20892-3560

Phone: (800) 860-8747 (toll-free in the United States)

Fax: (703) 738-4929

E-mail: [ndic@info.niddk.nih.gov](mailto:ndic@info.niddk.nih.gov)

Website: [www.diabetes.niddk.nih.gov](http://www.diabetes.niddk.nih.gov)

The Clearinghouse, which is a service of the National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health (NIH), responds to inquiries, offers publications about diabetes, and makes referrals.

#### National Diabetes Education Program

One Diabetes Way

Bethesda, MD 20814-9692

Phone: (301) 496-3583

E-mail: [ndep@mail.nih.gov](mailto:ndep@mail.nih.gov)

Website: [www.ndep.nih.gov](http://www.ndep.nih.gov)

For education materials, call: (800) 438-5383

The National Diabetes Education Program, sponsored by the NIH and the Centers for Disease Control and Prevention (with federal, state, and local partners) provides information and publications for both practitioners and their patients.

### Special report

To access the National Center for Complementary and Alternative Medicine of the NIH **Report on Treating Type 2 Diabetes with Dietary Supplements**, visit:

<http://nccam.nih.gov/health/diabetes/>

### Exercise

Much has been written about the benefits of weight loss and exercise in the primary prevention of type 2 diabetes.<sup>12</sup> However, still more research is needed to understand how information about the need for exercise gets transmitted to patients, and to understand what types of exercise for what durations are most beneficial.<sup>13</sup>

This concern is similar when working to achieve secondary prevention of type 2 diabetes.<sup>13</sup> Exercise, in any event, has been shown to be an extremely helpful intervention for managing diabetes, and is important for reducing and/or maintaining weight, improving glucose control, and lessening the need for medication.<sup>13,14</sup>

A recent Cochrane review on exercise for type 2 diabetes suggests that current available studies about exercise in this population limited their methodology by not differentiating between the

effects of diet and exercise, and by using low numbers of study participants.<sup>14</sup> In the studies that do exist, the review reports that statistically significant findings were found in the following areas with regard to people who have diabetes and exercise compared to those who do not exercise:

- Improved glucose control as measured by hemoglobin A1c levels, even without weight loss
- Decreased body-fat content
- Increased body response to insulin
- Decreased triglyceride levels.

Another review reported that exercise may be associated with a reduced risk of premature death in patients who have diabetes, and that both aerobic and resistance training can have an effect on glycemic control.<sup>13</sup> This review also suggested that exercise can have a small but positive impact on hemoglobin A1c levels but that, in many of the studies, participants were also taking hypoglycemic agents.<sup>13</sup> Again, further research is needed to understand what types, durations, and frequencies of exercise are most beneficial for patients with diabetes.

Exercise can induce fluctuations in glucose levels—increasing or decreasing those levels—so it is necessary to monitor glucose levels closely when exercise regimens are changed as this can affect the doses and/or the need for medications.

### Stress Reduction

Patients with diabetes are certainly potential candidates for stress, as diabetes is a complex disease that requires a unique combination of demanding skills on the part of the patient in order to be successful in disease management. Stress can increase when a patient with diabetes is adherent to a health care provider's directives and still has poor glycemic control and complications as a result of the disease. Studies suggest that both the medical and psychosocial aspects of diabetes may have a negative impact on health-related quality of life, which, in turn, may affect self-care.<sup>15</sup>

Anxiety, depression, fear, and other psychological burdens are not uncommon in people who have chronic illness. Patients with diabetes, in particular, may feel "overwhelmed, frustrated and burned out by the daily hassles of disease management."<sup>15</sup>

Results from the DAWN (Diabetes Attitudes, Wishes and Needs) study also suggest that patients with type 1 and type 2 diabetes have diabetes-related worries—more than 40 percent of the patients surveyed reported poor psychologic well-being.<sup>16</sup> The patients' providers in this study also believed that these patients had psychologic problems that affected self-care.<sup>16</sup> But, while psychosocial problems are common among people who have diabetes worldwide, the DAWN study suggested that providers may lack skills or resources to help patients with these problems.<sup>16</sup>

Unfortunately, further research is needed to understand the best interventions for reducing stress in this population and how to make those interventions practical and accessible to patients who already have to engage in more encounters with health care providers than they often would prefer to have.

Research is lacking, and drawing firm conclusions from existing research is often inadequate because of small participant

numbers; lack of clarity regarding interventions; and lack of quality, randomized controlled trials. Further research is also needed to understand not only how stress management can improve quality of life but also how it may or may not affect glycemic control.

Optimal glycemic control most probably requires a combination of motivation, education, and support for patients to reduce the stress of the rigors of self-management.

A small study that reported on the perceived barriers and effective strategies for self-management of adults with type 2 diabetes suggested that effective strategies for patients may include a collaborative relationship with a provider, maintaining a positive attitude that prompts proactive learning, and a support person to provide encouragement and accountability.<sup>17</sup>

Complementary therapies that may reduce stress, such as meditation, yoga, biofeedback, and other relaxation techniques and tools, may have a variety of beneficial effects for patients with diabetes. Mind-body therapies have been shown to have an impact on a variety of symptoms—such as pain, insomnia, and anxiety—as well affecting chronic medical conditions such as heart disease.<sup>18</sup> Unfortunately, there are a lack of data regarding these therapies and their specific effects on stress, quality of life, and clinical outcomes in patients with diabetes. But important research is emerging, and more will be known in the future about how best to utilize these therapies.

At the very least it is important to query patients about what resources they have used in the past to gain support and reduce their stress, and remind these patients to draw on those resources as part of disease management. Using quality-of-life, stress, depression, and anxiety assessment tools may help identify patients with diabetes who would benefit from stress management.

## Conclusions

As the cumulative literature regarding CAM and diabetes is emerging, limited, and inconclusive in many areas, patients with diabetes and the clinicians who treat them may not be as informed as they need to be about CAM in order to make appropriate and safe health choices.

There are, however, important resources that should be utilized. The references and resources provided in this review are a good place to start. Physicians, nurses, and other health care professionals must be aware of the research on CAM therapies for diabetes, and educate themselves so they can offer guidance to their patients on ways to optimize benefits and minimize risks. □

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