



Diabetes and Physical Activity American Association of Diabetes Educators (AADE) Position Statement

Introduction

A growing body of evidence affirms regular physical activity leads to multiple physiological and psychological benefits that can improve glycemic control, overall health, and quality of life.^{1, 2, 3, 4, 5} Furthermore, recent evidence points to the crucial role of physical activity in the prevention of type 2 diabetes.^{6, 7} Despite these benefits, many individuals are not active; they do not engage in enough regular activity to achieve general and diabetes specific health benefits. The U.S. Surgeon General has reported that more than 50% of American adults do not get the recommended 30 minutes per day of physical activity. Additionally, 25% have no leisure time physical activity.^{8, 9} The National Health and Nutrition Examination Survey found that among individuals with type 2 diabetes, more than 36% report no regular physical activity participation and another 38% reported performing less than recommended levels of physical activity.^{9, 10}

It is the position of the American Association of Diabetes Educators that diabetes educators play a unique and influential role in advising and motivating individuals with diabetes to integrate physical activity into a lifestyle that supports optimal diabetes management and health.

Background

Physical activity, which is an essential element of being active, is defined as bodily movement produced by skeletal muscles that requires energy expenditure and produces overall health benefits.^{11, 12} Planned, structured, and repetitive physical activity can improve or maintain one or more components of overall physical fitness.¹¹ Regular physical activity can offer general as well as diabetes-specific health benefits. Habitual participation in physical activity can reduce the risk of cardiovascular disease by lowering blood pressure, improving lipid profile, reducing body weight and percentage of body fat, and favorably affecting the prothrombic state.^{2, 3, 13, 14} The risk of cardiovascular disease can be reduced by an estimated 35% to 55% through adoption and maintenance of an active lifestyle.¹⁵ This is an important consideration given the two- to four-fold increased risk of mortality resulting from cardiovascular complications associated with diabetes.¹⁶ In addition, physical activity can reduce feelings of stress and anxiety, heighten a sense of well-being, reduce the risk of other chronic diseases such as certain forms of cancer and osteoporosis, and decrease functional declines that occur with aging.^{1, 17, 18}

Regular physical activity affects overall glycemic control through improved insulin sensitivity, lowered insulin requirements, and improved glucose tolerance.^{19, 20} Collectively, these health benefits may contribute to a reduction in the risk for long-term diabetes complications, slow the progression of existing complications, and enhance quality of life.^{19, 21} Multiple metabolic adaptations that occur in response to physical activity participation can improve glycemic control for individuals with type 2 diabetes.¹⁹ However, these same adaptations have not been consistently shown to improve glycemic control in people with type 1 diabetes.⁸

Exercise can lead to significant blood glucose variability and a resultant management challenge for those who require insulin. Given the many health benefits of physical activity, participation in a regular activity routine is of primary importance and is encouraged for individuals with type 1 and type 2 diabetes as well as for those with prediabetes.

In the United States, diabetes imposes direct and indirect costs of \$174 billion.²² The burden of diabetes in the U.S. has risen exponentially as the prevalence of the disease has reached epidemic proportions.²² Individuals with prediabetes, defined by the presence of either impaired glucose tolerance or impaired fasting glucose, have a significantly increased risk for developing type 2 diabetes and are at high risk for developing cardiovascular disease.^{17,20} Lifestyle interventions, specifically weight loss produced by calorie control via reduced dietary fat intake and increased physical activity, have been shown to significantly delay or prevent the onset of type 2 diabetes among persons with prediabetes.^{6,7} These same interventions may provide other important health benefits, notably, a reduction in cardiovascular risk factors.^{6,7,17,20,21,22} Being active is an essential component of the AADE7 Self-Care Behaviors™.²³ Therefore, interventions that promote adoption of a healthy lifestyle that includes physical activity, dietary modification, and a focus on maintenance of a healthy weight is important for populations at risk for type 2 diabetes.²¹ Measurement of outcomes of physical activity interventions provides information about the effectiveness to these interventions and can help fine-tune future exercise interventions that will more likely support individual and program success.

Although physical activity offers numerous health benefits, it also carries potential risks for individuals with diabetes. Acute complications, hyperglycemia and hypoglycemia, and severe microvascular and macrovascular complications can be exacerbated by physical activity.²¹ To minimize risk, a thorough medical evaluation should be performed before a physical activity program is initiated.²⁴

The important role that both lifestyle physical activity and structured exercise play in the management of type 1 and type 2 diabetes and in the prevention of type 2 diabetes is vital. Although exercise carries potential risks for individuals with diabetes, with careful planning, its numerous health benefits far outweigh these risks.

A safe and effective exercise prescription for the individual with diabetes depends on the careful weighing of multiple factors and sound clinical judgment. An assessment of the individual's medical history and physical examination will help determine the degree of risk and identify the most appropriate physical activity/exercise interventions.^{25, 26, 27, 28} In addition, a psychosocial evaluation should be done to determine barriers that might prevent success with physical activity participation.²⁹

Exercise recommendations have shifted away from a rather narrow focus on structured aerobic exercise toward recommendations that incorporate a broader construct emphasizing the benefits of moderate, unstructured lifestyle physical activity.^{1, 4, 14, 30} This broad approach offers options for physical activity that are feasible for even the most deconditioned and sedentary population.

Role of the Diabetes Educator

Diabetes educators promote and support interventions that will substantiate the integral role that being active plays in diabetes self-management and play a vitally important role in overcoming barriers to regular physical activity. In this way they help people with diabetes to integrate regular physical activity as part of a healthy lifestyle. Diabetes educators use established, sound exercise guidelines and resources and tailor exercise recommendations based upon the exercise prescription and a thorough pre-exercise assessment.

Diabetes educators:

- Suggest safe and effective physical activity interventions that will enhance the health and well-being of all individuals with diabetes.
- Work with the person with diabetes to develop an appropriate activity plan that balances food and medication with the activity level.
- Follow physical activity prescriptions to develop individualized plans that focus on the general health benefits of an active lifestyle.
- Recognize that individual expectations of outcomes from physical activity participation significantly influence the motivation to adopt physical activity into lifestyle and diabetes self-management regimes.
- Collect and analyze outcomes data relating to physical activity. The measurement of outcomes associated with being active is vitally important to the long-term success and viability of physical activity programs.
- Use baseline information from the pre-exercise medical history, physical examination, and assessment of readiness to initiate exercise to establish individual-level as well as programmatic outcomes to track.
- Apply counseling strategies that enhance adoption and long-term maintenance of a physical activity habit. These include assisting in a plan to introduce exercise in a safe and progressive manner, emphasizing proper selection of goals, and progression toward attainment of these goals.

Recommendations and Guidelines for Being Active

- Regular activity is important for overall physical fitness, weight management and blood glucose control. People with or at risk for diabetes should be encouraged to engage in appropriate levels of exercise. Given the many health benefits of physical activity, participation in a regular activity routine is of primary importance and is encouraged for individuals with type 1 and type 2 diabetes as well as for those with prediabetes. Being active can also help improve body mass index, enhance weight loss, help control lipids and blood pressure, and reduce stress.
- People with diabetes should be referred to diabetes self-management education and training (DSME/T) for learning about how to adopt and maintain healthy lifestyles that include physical activity.
- Diabetes educators provide DSME/T to help previously inactive individuals attain significant health benefits by taking steps to incorporate unstructured lifestyle activities into their daily routine. Those who strive to participate in moderate-to-vigorous, structured physical activity routines can achieve even greater health benefits and higher levels of fitness.^{30, 31}
- Despite its many associated benefits, physical activity remains an underutilized therapeutic modality in diabetes self-management. Referral to DSME/T and the use of physical activity prescriptions are therefore essential. The “exercise” prescription should indicate the specific reasons that physical activity is being prescribed. People with diabetes should:
 - Walk or perform other moderate-intensity physical activity, three or more days a week, for a total of 150 minutes per week AND engage in weight lifting or other muscle-strengthening resistance exercise (weight machine, etc.) three days a week.²⁰
 - Engage in unstructured lifestyle activities such as walking (i.e. building more steps in their routine), doing household chores, gardening, and yard work, which can help those who have been inactive to make initial progress toward improving their health and level of fitness.^{1, 21}

- At both the individual and the community level, diabetes educators play an important role by teaching the following strategies for being active:
 - Encourage increasing physical activity and limiting sedentary activity among people of all ages.
 - Create safe communities that support physical activity.
 - Encourage communities to organize for change so as to mitigate barriers to physical activity.
 - Use outcomes data to inform policy makers and third party payors about the effectiveness of DSME/T in achieving improved health and to recognize the need for lifestyle interventions for the prevention and control of diabetes and related chronic illnesses.

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References

Criteria for rating evidence and grading recommendations*

Level-of- Study Design or Information Type

Evidence

- 1 Large randomized controlled trial (RCT); Multicenter trial; Large meta-analyses with quality rating
- 2 Randomized controlled trial that has some design or methodological flaws; Prospective cohort study; Meta-analyses of cohort study; Case-control study; Quasi-Experimental study (rigorous pre-post with a control group); Systematic review that is well designed
- 3 Methodologically flawed randomized controlled trial; Nonrandomized controlled trial; Observational study; Case series or case report; Review (note Cochrane reviews are systematic reviews that could qualify as Level 2 evidence)
- 4 Expert consensus; Expert opinion based on experience; Theory-driven conclusions; Unproven claims; Experience-based information; Opinion Piece

**This is not an exhaustive list – Reviewers will need to use their own judgment at times.*

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