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Patient information: Lifestyle modifications for people with diabetes mellitus

INTRODUCTION – Diabetes mellitus is a chronic condition, but people with diabetes can lead a full life and still keep their diabetes under control. Lifestyle modifications (changes in day-to-day habits) are an essential component of any diabetes management plan.

Lifestyle modifications are not always easy, but they can be very effective for controlling diabetes. They can improve blood glucose control and prevent or slow the progression of long-term complications. In many cases, numerous small changes add up to surprising improvements in diabetes control, including a decreased need for medication.

Diabetes usually requires a lifelong management plan, and people with diabetes have a central role in this plan. In fact, lifestyle modifications are an opportunity for people with diabetes to take charge of their health. It is therefore very important to learn as much as you can about diabetes and to take an active role in your health care decisions and treatment.

CHANGING YOUR DIET – Doctors may recommend different kinds of dietary changes for people with diabetes, depending upon the type of diabetes and the individual goals of therapy. These changes can promote weight loss, improve blood glucose control, lower blood cholesterol levels, and, indirectly, blood pressure.

Watching calories – Weight loss is particularly beneficial for people with type 2 diabetes who are overweight. Weight loss can improve their blood glucose control by decreasing insulin resistance and partially restoring the normal insulin-producing function of the pancreas. Weight loss can also lower high blood pressure -- another risk factor for cardiovascular disease.

Watching the number of calories in your diet is one way of losing weight. Weight loss is important in diabetes because obesity increases the risk of cardiovascular disease. Although obesity is more commonly associated with type 2 diabetes, it can also be a side effect of treatment in people with both type 1 and type 2 diabetes.

Sometimes weight gain is a side effect of insulin treatment, especially intensive insulin treatment. This weight gain is best addressed by watching the number of calories in your diet and exercising. Skipping insulin doses is not a safe approach for addressing this type of weight gain.

A sensible and sustainable diet -- a reduction of the number of calories you eat each day -- will promote gradual weight loss over time. Your doctor or nutritionist can discuss an ideal weight goal with you and help you plan a safe and effective overall weight-loss program.

Decreasing post-meal increases in blood glucose – Sometimes, even with insulin therapy, blood glucose levels can rise sharply after meals. Increasing the amount of soluble fiber in a meal may slow and/or lessen this rise and may actually decrease the need for insulin. Soluble fiber is found in fruits, vegetables, and beans. This same high-fiber intake can have the added benefit of lowering levels of low-density lipoprotein (LDL) cholesterol (sometimes called "bad" cholesterol).

Eating foods with a low glycemic index is another approach for controlling post-meal blood glucose levels, and sticking to a diet with low-glycemic index foods may also decrease LDL cholesterol levels. The glycemic index of some foods is shown in Table 1 (show table 1).

Following general dietary guidelines – Although carbohydrates are often the central focus of the diet in diabetes, virtually all diets also include fat and protein. The ratio of these three nutrient groups is important to long-term health. In general, doctors recommend that 55 to 60 percent of total calories come from carbohydrates, 12 to 20 percent from protein, and less than 30 percent from fat. The fat should be mostly monounsaturated or polyunsaturated, not saturated fat. Doctors may recommend slightly different nutrient ratios for people with type 2 diabetes, people with diabetes who have other health conditions, pregnant women, and growing children.

Most doctors also recommend a moderate-salt or low-salt diet; a low-salt diet is especially useful for lowering high blood pressure. Your doctor may also recommend moderating your alcohol intake to lower high blood pressure.

Achieving consistent timing of food intake – Consistent timing of food intake is not necessary for all people with diabetes. However, people receiving intensive insulin treatment should try to eat the same amount of carbohydrates at the same time each day. This practice helps maintain good blood glucose control. The amount of carbohydrate in any given food can be determined using carbohydrate exchange lists or carbohydrate calculators. Your doctor or nutritionist can outline strategies for consistent carbohydrate intake, such as carrying sources of carbohydrate at all times.

Establishing and maintaining healthy dietary habits – Your doctor and medical team can help you get started with healthy dietary habits. This process often involves keeping a food record, discussing your current eating patterns, and attending dietary workshops for people with diabetes or meeting with a nutritionist. Your doctor or nutritionist will most likely recommend that you change your eating habits slowly so that you will be able to adapt to and stick with your new habits.

QUITTING SMOKING – Over 25 percent of people newly diagnosed with diabetes are smokers. Quitting smoking is one of the most important things you can do to improve your health. Diabetics who smoke suffer the following consequences:

- Smoking increases mortality in diabetics
- Smoking increases total cholesterol levels
- Smokers have worse blood sugar control than non-smokers
- Smokers are at increased risk of neurologic complications from diabetes
- Smokers are at increased risk for kidney disease leading to dialysis and have reduced survival compared with non-smokers once they are on dialysis.

The good news is that quitting smoking can decrease all of these risks.

Most people who have a smoking habit find it difficult to quit, so be certain to ask your doctor for assistance. He or she can provide self-help materials, help you select a quit date, provide contact information for local support groups, and prescribe nicotine replacement treatment, when needed.

EXERCISE – Exercise offers numerous benefits for people with diabetes. It promotes cardiovascular fitness and weight loss, lowers high blood pressure, improves blood glucose control in some cases, and leads to an overall sense of well-being. It may even help prevent type 2 diabetes in people with risk factors for this type of diabetes (obesity, impaired glucose tolerance, or a family history of type 2 diabetes). Most people with diabetes can benefit from exercise, even people who have longstanding diabetes or diabetic complications.

Exercise effects – The beneficial effects of exercise can be divided into short-term effects (those that occur during exercise and within 24 hours of exercise) and long-term effects (those occurring days, weeks, and months after exercise).

Short-term effects – In people with well-controlled diabetes treated with insulin, exercise triggers a fall in blood glucose levels during the exercise session. Blood glucose may also fall a second time, hours later, as the body rebuilds its glucose stores. These exercise-induced decreases of blood glucose may decrease the amount of insulin a person needs. In contrast, if

diabetes is poorly controlled, exercise can paradoxically trigger a temporary rise in blood glucose levels. Most doctors therefore recommend postponing exercise when blood glucose levels are 250 mg/dL or higher.

Long-term effects – The long-term effects of exercise differ for people with type 1 and type 2 diabetes. People who have type 1 diabetes and exercise may require smaller daily doses of insulin for the same glucose-controlling effect. Exercise also promotes a sense of well-being and counteracts high blood pressure and other risk factors for cardiovascular disease.

In type 2 diabetes, exercise promotes weight loss, triggers enzymatic changes in muscle tissue, and decreases insulin resistance in cells throughout the body. The overall effect is improved glucose control, and this improved control may decrease the need for medication or even make medication unnecessary. Similar to its effects on patients with type 1 diabetes, exercise also promotes a sense of well-being and counteracts high blood pressure and other risk factors for cardiovascular disease.

The pre-exercise examination – People with diabetes who want to start an exercise program should consult with their doctor first. A pre-exercise examination is essential for detecting any diabetic complications or other health conditions that might restrict exercise. Doctors recommend an examination for anyone over the age of 35 or anyone who has had diabetes for more than 10 years. Your doctor can also provide you with guidelines for exercise safety. It is very important to balance enthusiasm and common sense when embarking on your exercise program.

General exercise precautions – Other precautions can ensure that exercise is safe and productive for people with diabetes. These precautions include wearing well-fitting, protective footwear or comfortable shoes. People with diabetes should also drink adequate liquids before, during, and after exercise to prevent dehydration, which can upset blood glucose levels.

People with diabetes who take insulin should measure their blood glucose before, during, and after exercise to establish their body's typical response to exercise. If a pre-exercise blood glucose reading is 250 mg/dL or higher, exercise should be postponed until the level is under control. Your doctor may also recommend that you decrease your insulin dose for that time of day by about 30 percent and that you choose a site other than one near the exercising muscles for your insulin injection. Another safety measure is keeping rapidly absorbed carbohydrates on hand (glucose tablets, hard candies, or juice) and consuming some of these carbohydrates 15 to 30 minutes before exercise and approximately every 30 minutes during exercise. Finally, eating a source of slowly absorbed carbohydrates (dried fruit, fruit jerky, granola bars, or trail mix) immediately after exercise will counter any late, postexercise drops of blood glucose levels.

Type of exercise – The type of exercise your doctor recommends will depend upon the degree of diabetic control and the presence of any diabetic complications and/or other health conditions. Gentle aerobic exercises -- the type of exercise that increases your heart rate for a sustained period of time -- are often the best choices for people with diabetes. Examples of these include walking, cycling, swimming, or rowing. However, people with well-controlled diabetes who have no complications or other health conditions can usually participate in even the most vigorous types of exercise if they prefer.

People with diabetic eye complications are usually advised to avoid exercises such as strenuous weight-lifting, which can increase blood pressure and promote bleeding within the eye. People with neurologic complications are usually advised to avoid traumatic weight-bearing exercises such as running, which can lead to foot ulcers and stress fractures.

Intensity of exercise – Doctors usually prefer aerobic exercise for people with diabetes. However, exercise does not have to be unpleasantly intense to produce benefits. A study has shown, for example, that walking by itself helps control blood glucose levels in people with type 2 diabetes. Over time, you may wish to increase the intensity of your exercise sessions. You should increase the intensity of exercise gradually and should not increase the intensity further if you notice any symptoms.

Duration of exercise – A reasonable exercise session consists of 10 minutes of stretching and warm-up, followed by 20 minutes of gentle aerobic exercise. Eventually, you may wish to exercise for more than 30 minutes at a time. You should increase the duration of exercise gradually and should not increase the duration further if you notice any symptoms.

Timing of exercise – People who take insulin should try to exercise at the same time of the day in relation to meals and insulin injections. This practice usually ensures that blood glucose changes are very predictable.

Frequency of exercise – Most of the benefits of exercise for people with diabetes require frequent exercise and a long-term exercise program. You should commit to exercising at least three times per week. Choose a type of exercise that you enjoy and can perform comfortably, so that you will be motivated to stick with the program over time. Talk with your doctor about any barriers that may stand in the way of exercise; he or she may be able to suggest solutions. People who are accustomed to a sedentary lifestyle may find it particularly challenging to sustain a new exercise program. Your doctor and medical team can help you stay motivated by providing tips and helping you monitor your progress.

TAKING MEDICATIONS AND MONITORING BLOOD GLUCOSE – The day-

to-day management of blood glucose levels can be complicated. Management may require a schedule of oral medications and/or insulin, frequent blood glucose monitoring, and carefully planned carbohydrate intake. However, the successful management of blood glucose levels does not have to take the enjoyment out of life. Although it may initially be difficult to establish a routine that incorporates all of these tasks, many people find that their routine becomes second nature once established. Written schedules may help you follow all of the details of your routine until you have committed them to memory. It is also important to anticipate unexpected situations that can make blood glucose control difficult.

People with diabetes may need to take several medications throughout the day, especially if they have diabetic complications or other health conditions. A doctor may prescribe medications to lower high blood pressure, medications to lower cholesterol levels, and even daily aspirin to protect against heart disease. All of these medications are important for long-term health in people with diabetes. It is important to incorporate these medications into your daily schedule and to follow each prescription closely. If your medication schedule is complex, a pill organizer or a written schedule can help you remember to take specific medications at specific times.

FORMING THE FOOT EXAM HABIT – Diabetes can lead to foot complications that may escape notice until they become serious. People with diabetes should therefore form the habit of examining their feet for changes every day. This examination only takes a minute or two. It is important to examine all parts of the feet, especially the area between the toes. Look for any broken skin, ulcers, bunions, or blisters, and notify your doctor if you find any of these changes. It may be easiest to remember to check your feet if you do it at the same point in your routine every day.

THE IMPORTANCE OF ROUTINE MEDICAL CARE – Making beneficial lifestyle changes is an excellent step toward controlling your diabetes. However, successful lifestyle changes do not remove the need for routine medical care**.** It is important for all people with diabetes to continue to keep medical appointments and to follow through with screening tests, even if they have succeeded in modifying their lifestyle and even if they feel fine. Your doctor can reevaluate your diabetes management plan and can detect those health problems that don't produce symptoms in their early stages. It is also important to listen to your body and to promptly bring any changes in your health to your doctor's attention, even if this means calling your doctor between scheduled appointments.

A number of other sites on the internet have information about diabetes. Information provided by the National Institutes of Health, national medical societies, and some other well-established organizations are often reliable

sources of information, although the frequency with which their information is updated is variable.

- National Library of Medicine
  (http://www.nlm.nih.gov/medlineplus/)

- National Institue of Diabetes and Digestive and Kidney Diseases
  (http://www.niddk.nih.gov/)

- American Diabetes Association (ADA)
  (800)-DIABETES (800-342-2383)
  (http://www.diabetes.org/)