

Diabetes

Obesity and Type 2 Diabetes

By Joanne Z. Rogers, MSN, RN, CNSN, APRN, BC-AD, and Christopher D. Still, DO, FACN, FACP

Obesity and type 2 diabetes are diseases that can substantially decrease life expectancy, diminish quality of life and increase healthcare costs. The incidence of obesity and diabetes continues to rise by epidemic proportions. The term “diabesity” has been coined to describe obesity-dependent diabetes.

According to the American Diabetes Association, in 2002 18.2 million people, or 6.3 percent of the population, had diabetes. Diabetes was the sixth leading cause of death listed on U.S. death certificates in 2000. The direct and indirect cost of diabetes in the U.S. in 2002 was estimated at \$132 billion. It has been estimated that the annual cost of overweight and obesity in the U.S. is \$122.9 billion. This estimate accounts for \$64.1 billion in direct costs and \$58.8 billion in indirect costs.

What is Diabetes?

Diabetes is a disease characterized by high levels of blood glucose resulting from defects in insulin production, insulin action or both. Type 1 diabetes develops when the body's immune system destroys pancreatic beta cells, the only cells in the body that make the hormone insulin that regulates blood glucose. This form of diabetes usually strikes children and young adults, although disease onset can occur at any age.

Type 1 diabetes accounts for only five to 10 percent of all diagnosed cases of diabetes. Risk factors for type 1 diabetes include autoimmune, genetic and environmental factors.

Type 2 diabetes accounts for some 90 to 95 percent of all diagnosed cases of diabetes. It usually begins as insulin resistance, a disorder in which the cells do not use insulin properly. As the need for insulin rises, the pancreas gradually loses its

ability to produce insulin.

Risk of Type 2 Diabetes

The risk of developing type 2 diabetes is determined by some factors that can be modified and others that cannot. Some people are at higher risk for developing type 2 diabetes because of their genes. A first-degree relative of a person with types 2 diabetes has a risk five to 10 times higher than a person without a family history.

Another factor that may increase the risk of type 2 diabetes is low birth weight. Intrauterine growth restriction leading to low birth weight seems to be associated with increased risk in adulthood of insulin resistance, glucose intolerance and type 2 diabetes. However, encouraging research studies in the U.S. and abroad have found that lifestyle changes, such as changes in diet and exercise, can prevent or delay the onset of type 2 diabetes among high-risk adults.

At all ages, the risk of type 2 diabetes rises with increasing body weight. The prevalence of type 2 diabetes is three to seven times higher in those who are obese than in normal weight adults, and is 20 times more likely in those with a body mass index (BMI) greater than 35 kg/m².

Obesity's Role in the Development of Type 2 Diabetes

It is not known for sure why some people develop insulin resistance, but it is

Obesity-Related Diseases

Diabetes

known that obesity and lack of physical activity make it worse. The development of insulin resistance is an important component in the development of type 2 diabetes. The connection is also seen in the fact that weight-loss can improve control or cure type 2 diabetes. In addition to the degree of obesity, where the excess body fat is deposited is important in determining the risk of type 2 diabetes.

The degree of insulin resistance and the incidence of type 2 diabetes is highest in a person with an “apple” shape. These persons carry the majority of their excess body weight around their abdomen. In contrast, the “pear” shaped person carries most of their weight in the hips and thighs and this is not as likely to be associated with insulin resistance.

Treating Obesity Will Treat Type 2 Diabetes

Weight-loss is an important goal for overweight or obese persons, particularly those with type 2 diabetes. Moderate and sustained weight-loss (five percent to 10 percent of body weight) can improve insulin action, decrease fasting glucose concentrations and reduce the need for some diabetes medications. A program of diet, exercise and behavior modification can successfully treat obesity, but pharmacotherapy and/or surgery may be warranted.

Diet

Weight-loss occurs when energy expenditure exceeds energy intake. Creating an energy deficit of 500-1,000 calories per day will result in a one to two pound weight-loss per week. Writing down the food, portion size and calorie amount has been found to increase awareness and will provide objective evidence of calorie intake.



For effective weight-loss, it is the calories that count, not the proportion of fat, carbohydrates or protein. However, when individuals are losing weight they should follow a diet similar to that recommended in the U.S. Dietary

Guidelines for 2005: fat 20-35 percent of calories; carbohydrates 45-65 percent; protein 10-35 percent.

For the obese patient with diabetes or insulin resistance, limiting servings of complex carbohydrates may be beneficial. These foods include bread, rice, pasta, potatoes, cereal, peas and sweet potatoes. Complex carbohydrates tend to raise blood sugar more than other foods and will cause the body to produce more insulin. With insulin resistance, these increased amounts of insulin can promote

<i>Calorie Requirements</i>				
	Age	Sedentary	Moderate Active	Active
Female	19-30	2000	2000-2200	2400
	31-50	1800	2000	2200
	51+	1600	1800	2200
Male	19-30	2400	2600-2800	3000
	31-50	2200	2400-2600	2800-3000
	51+	2000	2000-2400	2400-2800

weight gain.

Increasing the amount of fiber in ones diet may be beneficial for both diabetes and obesity. A high intake of dietary fiber, particularly of the soluble type, may improve glycemic control, decreases hyperinsulinemia and lower plasma lipid concentrations in patients with type 2 diabetes. Additionally, high fiber foods assist in weight-loss and long-term weight maintenance by: requiring more chewing and taking longer to eat, providing fewer calories per serving, creating a sense of abdominal fullness and enhancing fullness between meals.

Physical Activity

Regular physical activity helps maintain weight-loss and prevent regain. It also improves insulin sensitivity and glycemic control, may decrease the risk of developing diabetes and reduces mortality in patients with diabetes.

A goal should be set for 30 to 45 minutes of moderate exercise five times per week. The exercise does not need to occur in a single session to be beneficial. Dividing the activity into multiple and short episodes produces similar benefits and can enhance compliance. Using a pedometer can help set objective exercise goals. Gradually increasing the number of steps per day, with a goal of 8,000 steps, is ideal. Any increase in activity over baseline will help in

balancing the equation of less calories in and more calories out to promote weight-loss.

Medication

There are several medications intended to treat diabetes, insulin resistance and obesity. A full review of these medications is beyond the scope of this article. However, metformin is one medication that has been found helpful in reducing the risk of type 2 diabetes in patients with insulin resistance. Metformin reduced the rate of progression to diabetes in obese persons with impaired glucose tolerance.

Men treated with metformin who had central obesity and other features of metabolic syndrome (insulin resistance, hypertension, hyperlipidemia) had slightly more weight-loss and slightly lower fasting blood glucoses than those given a placebo.

Bariatric Surgery

According to the National Institute of Health (NIH), bariatric surgery should be considered by those who have a BMI greater than 40, or have a BMI of 35-39.9 and medical problems such as diabetes, heart disease or sleep apnea.

Bariatric surgery changes the normal digestive process. There are three types of surgery: restrictive, malabsorptive and combined restrictive/malabsorptive. The NIH Web site provides an overview of the procedures and how they produce weight-loss.

Studies continue to show that diabetes can be cured in many patients using bariatric surgery. These clinical improvements occur not only because of the significant weight-loss, but because of hormonal changes that occur when foods bypass the stomach.

Patients and their doctors need to consider the risk of bariatric surgery compared to the risk of obesity and the associated medical problems. When other methods of weight-loss have failed, bariatric surgery may be the best chance for significant and sustained weight-loss.

Prevention

Preventing and treating obesity will help in the prevention and treatment of diabetes. Promoting a healthy lifestyle in children and adolescents will put them on a path that will decrease their risk of diabetes and its complications. Helping adults at high risk for diabetes to change their diet and lifestyle may

Complications of Diabetes

- Heart Disease
- Stroke
- Kidney Disease
- Dental Disease
- High Blood Pressure
- Nervous System Disease
- Blindness
- Amputations
- Pregnancy Complications

prevent them from developing diabetes and its consequences.

About the Authors:

Joanne Rogers, MSN, RN, CNSN, APRN, BC-AD, is a Clinical Nurse Specialist in the Geisinger Health System. She has worked within the Center for Nutrition and Weight Management for the last 11 years. She is part of a multidisciplinary team that provides care to those with morbid obesity and co-morbid medical problems through the use of diet, exercise, behavior modification and/or pharmacotherapy and bariatric surgery.

Christopher Still, DO, FACN, FACP, has been studying developments in nutrition support and obesity for nearly a decade. He serves as principal investigator on a rural elderly nutrition and aging study of some 22,000 individuals. Dr. Still's interest in weight-loss comes from his personal experiences with obesity. Dr. Still once weighed 365 pounds, and losing the weight was a life and career changing experience. He is also a founding member of the OAC National Board of Directors.

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The mission of the Obesity Action Coalition is to elevate and empower those affected by obesity through education, advocacy and support.



About the OAC

The Obesity Action Coalition is a non profit patient organization dedicated to educating and advocating on behalf of the millions of Americans affected by obesity. By strictly representing the interests and concerns of obese patients, the OAC is a unique organization with a patient-focused approach to obesity. To learn more about the OAC, visit www.obesityaction.org or contact the National Office at (800) 717-3117.

OAC Resources

Through education and advocacy, patients need to get involved to help drive change in the obesity community. The OAC provides several beneficial resources for patients, as well as professionals.

- OAC Introductory Brochure
- Obesity Action Alert
- OAC News
- State-specific Guides to Advocating for Improved Access to Obesity Treatments
- *Your Voice Makes a Difference. A Guide on How You Can Help Fellow Patients Affected by Obesity*
- Weight-loss Surgery Coverage Fact Sheet
- The OAC Web site: www.obesityaction.org

All OAC resources are complimentary and may be ordered in bulk. To request materials or an order form, please contact the OAC National Office at (800) 717-3117 or send an email to info@obesityaction.org.

OAC membership

Membership in the Obesity Action Coalition allows the patient voice to be heard in the fight against obesity. By building a coalition of members, consisting of patients, family members and professionals, the OAC strives to educate and advocate on behalf of the millions who are affected by obesity. Membership benefits include:

- Official charter membership card/certificate
- OAC News - the OAC's quarterly newsletter
- Subscription to *Obesity Action Alert* - a monthly e-newsletter
- Representation through advocacy in addition to information on advocacy issues concerning patients

Membership Application

Name: _____
Company Name: _____
Address: _____
City: _____ State: _____ Zip: _____
Phone: _____
E-mail: _____

- Patient/Family Member: \$20
- Allied Health Professional Member: \$50
- Physician Member: \$100
- Surgeon Member: \$150
- Institutional Member: \$500 (Bariatric surgery centers, weight-loss management centers, etc.)*
- Chairman's Council: \$1,000 and up*

* Different benefits apply. Contact the OAC National Office for more info.

Payment Information

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Please charge my credit card for my membership fee of \$_____.

Discover® Mastercard® Visa® American Express®

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Please mail to: Obesity Action Coalition
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Tampa, FL 33614

Or fax to: (813) 873-7838

If you have questions about OAC membership, please contact the National Office at (800) 717-3117.