Nutrition Related Diseases Module Script

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Nutrition Related Disease

Welcome module four, Nutrition Related Diseases. This module will describe three nutrition related diseases, obesity, diabetes, and hypertension.

Obesity

We will be starting with obesity.

Obesity Rates

Over two-thirds of adults in the United States are overweight or obese, and over one-third are obese, according to data from the National Health and Nutrition Examination Survey (NHANES) 2003-2006 and 2007-2008. This means that less than 1/3 of U.S. adults are at a healthy weight. In addition, almost 12% of children ages two to five are considered overweight. Overweight in children is defined by the 85th to 95th percentile and obesity in children is above the 95th percentile of the 2000 CDC BMI for-age and sex growth charts.

Defining Obesity

Obesity is generally defined based on the body mass index, or BMI. The BMI is a measurement that takes into account both height and weight, which is more useful than just looking at weight. The BMI calculation is weight in kilograms divided by height in meters squared. For example, a 6-foot person who weigh 165 pounds is normal weight, while a 5-foot-tall person the same weight is obese. For adults, normal weight is considered a BMI of 18.5-24.9. Obesity is a BMI greater than 30 kg/m squared. For children, the numbers are different, and a growth chart is needed to determine weight status based on BMI.

Determining BMI

There are other ways to calculate BMI in addition to the equation mentioned in the previous slide. For those who are less comfortable with the metric system, you can divide weight in pounds by height in inches squared, and multiply by 703 to get the same result. A BMI chart, like the one seen here, or a BMI wheel can also be used.

Limitations of BMI

One of the limitations of BMI is that it does not directly measure body fat. Therefore, someone can be classified as overweight or obese, but they may not be overfat. This would be the case

for someone who is very muscular, such as an athlete. However, for most adults, BMI is a fairly reliable indication of general weight status. Another issue is that BMI doesn't look at the distribution of body fat. Fat that accumulates in the abdominal area has been linked to more health risks such as heart disease and type 2 diabetes. To assess if a person has more fat in the abdominal area, a waist circumference measurement is taken. A measurement greater than 40 inches for men and 35 inches for women indicates an increased health risk.

Risk Factors for Obesity

The cause of obesity can be complex because it is influenced by a variety of factors. Genetics do play some role in obesity, although behavior and environmental factors are needed to express those genes. Certain ethnicities have higher rates of obesity, including Native Americans, Hispanic Americans, and African Americans. People of lower socioeconomic status are at greater risk for being obese. Because of the importance of maintaining energy balance, anyone who is physically inactive is at greater risk for obesity. There are also some medications such as ADHD and anti-depressant medications that may alter hunger regulation and make people who take them more likely to gain weight.

Complications Related to Obesity

People who are obese are more likely to have related health problems, including high blood cholesterol levels, certain cancers such as breast, colon and prostate, infertility problems, heart disease, high blood pressure, fatty liver disease and sleep apnea. Obese people are also more likely to develop Type 2 diabetes or suffer heart attacks or strokes. Metabolic syndrome is a term for a group of problems including high cholesterol, high blood pressure and insulin resistance which, when combined, increase a person's risk for coronary heart disease, stroke, heart attack and type 2 diabetes. In addition to the health problems associated with obesity, many obese people report having a lower quality of life, including issues with shame, depression, social isolation, sexual problems, and disability.

Treatment of Obesity

In treating obesity, the goal is to reach and stay at a healthier weight. Although the ideal goal is to reach a normal BMI, health improvements and a decrease in the complications just mentioned can be seen with weight loss of 5-10% of total body weight. If a person weighs 200 pounds, they could lower their risk for type 2 diabetes by losing just 10-20 pounds.

The general treatment for obesity works to alter the energy balance equation so that calories out are greater than calories in. This is most successful for people who both decrease their caloric intake and increase their energy expenditure through increased physical activity. Because this is not always easy for people to do, a variety of counseling techniques to help motivate a person to make the behavior changes necessary to lose weight may be used. In cases of extreme obesity, a doctor may prescribe medications or surgery such as gastric bypass to aid in weight loss.

Diabetes

The second nutrition related disease we will be discussing is diabetes.

Diabetes Mellitus

Diabetes Mellitus is a group of diseases that result in high blood sugar due to problems with insulin. Depending on the type, the problem may be that the body doesn't make insulin, or that the body doesn't respond to insulin. There are 2 main types: Type 1 and Type 2.

Prediabetes is the precursor to type 2 diabetes and is becoming very common in the US.

How Does Insulin Work?

In order to understand diabetes, it is important to understand how insulin works. When we eat food, we digest much of it down to the molecule called glucose, which is then absorbed into the bloodstream. This glucose floating around in our blood is known as blood glucose or blood sugar. The cells of our body are what really need the glucose for energy, so we need a way to transport glucose from the blood to the cells. That is the job of insulin. It works like a key to allow glucose to cross into the cells. With diabetes, something is missing in this process, which causes glucose to build up in the blood, which can cause damage, and also the cells do not get enough energy.

Type 1 Diabetes

Type 1 diabetes used to be called juvenile diabetes because it is usually diagnosed in childhood. More recently the name was changed because children began to develop type 2 diabetes, which was previously known as adult onset. In type 1 diabetes the pancreas no longer makes insulin, so glucose builds up in the blood and cells don't get enough energy. Signs prior to diagnosis include thirst and frequent urination because the body responds to the buildup of blood glucose by flushing it out through the kidneys. Since the cells are not getting energy from glucose, they break down stores for energy, which results in weight loss. However, this is not healthy weight loss; muscle mass is lost more than fat.

Type 1 diabetes is treated by keeping blood sugar levels in good control by injecting insulin with either a shot or an insulin pump. Careful counting of carbohydrates is needed to know how much insulin to take. Eating takes more thought and effort than it does for people without diabetes, you can't just pick up a bag of chips and start snacking.

Diabetic ketoacidosis is the result of breakdown of muscle and fat for energy when glucose isn't getting into the cells. The byproduct of the breakdown are toxic acids called ketones, which are dangerous to have in the blood. It can result in a loss of consciousness."

Type 1 Diabetes

The exact cause of type 1 diabetes is not known. It is an autoimmune disease in which the body recognizes the cells of the pancreas as a foreign substance and attacks them, destroying the

ability to make insulin. There is some genetic role in developing diabetes, it commonly runs in families, but genetics is not the sole factor. Type 1 diabetes can be diagnosed at any age but is more commonly diagnosed in children and adolescents. The average age of diagnosis is 14 years.

Hypoglycemia

It is important to keep blood sugar within a certain level. In hypoglycemia, blood sugar drops too low and the body reacts to conserve blood sugar and protect the brain. Signs of low blood sugar include sweating, pale skin, shaking, dizziness, irritability, and passing out or seizures in severe cases. Low blood sugar needs to be treated immediately to bring sugar levels back to normal. Treatment means giving the person a concentrated source of sugar such as juice, glucose tablets or hard candy.

Type 2 Diabetes

Approximately 23.5 million Americans have type 2 diabetes, although about one fourth of them don't know it because they haven't been diagnosed. In type 2 diabetes, the pancreas still makes insulin, but the cells in the body do not respond to it, known as insulin resistance. Going back to the analogy of insulin acting like a key to let glucose into the cells, in type 2 diabetes the locks have been changed so the key doesn't work anymore. This results in high blood sugar levels since there is nowhere else for the glucose to go.

Initially, the body will respond to the high blood glucose levels by making more insulin, but for some people the pancreas eventually gets exhausted and stops making insulin. Type 2 diabetes is becoming more common in children, with about 3,700 youth diagnosed each year. Prior to diagnosis, the symptoms of type 2 diabetes are very similar to type 1, including thirst, excessive urination, and weight loss.

For US trends in Diabetes, click here: https://www.cdc.gov/diabetes/data/index.html

Risk Factors for Type 2 Diabetes

Obesity is the largest risk factor for type 2 diabetes; about 90% of people with type 2 diabetes are overweight or obese. In addition, having an immediate family member with type 2 diabetes makes you more likely to develop the disease. High blood pressure and high cholesterol are also linked to increased risk of diabetes. Physical activity helps our bodies use glucose more efficiently, so being inactive is a risk factor for type 2 diabetes as well.

A common misconception is that if you eat too much sugar you will get diabetes. No studies have linked sugar consumption directly to development of diabetes, but excessive sugar consumption can lead to weight gain, which could then lead to developing diabetes.

Treatment of Type 2 Diabetes

The primary goal in treating type 2 diabetes is to keep blood sugar levels in good control to prevent complications. Following a healthy diet is one of the most important factors in glucose control. People with diabetes are advised to eat moderate amounts of carbohydrates at meals to prevent a large spike in blood sugar. Choosing foods higher in fiber also help control blood sugars because they are digested slower. Since activity helps us use glucose more efficiently, exercise is helpful in controlling blood sugar, especially when done after a meal.

If diet and exercise changes are not enough to keep glucose levels in control, medications can be taken that increase the effectiveness of insulin. For people who stop making insulin, or don't make enough, they may need to take insulin injections similar to a person with type 1 diabetes. Weight loss has been found to improve insulin resistance, a 5-10% reduction in body weight may be enough to improve blood sugar levels to the point that a person can stop taking their medication.

Complications of Diabetes

People who do not keep their blood sugar levels in control are at an increased risk for complications. Some of the issues related to diabetes include an increased risk of heart disease and high blood pressure. Also, high blood sugar levels can lead to vision loss or blindness, kidney disease, nerve problems which may lead to amputations of the hands or feet, and dental disease. Women with uncontrolled diabetes may have a harder time getting pregnant, and the pregnancy is more likely to have complications.

Pre-Diabetes

Pre-diabetes occurs when the cells start to become resistant to insulin. In people with prediabetes, blood sugar levels are higher than what is considered normal but are not high enough to be diagnosed as type 2 diabetes. In 2007, an estimated 57 million adults had pre-diabetes, either diagnosed or undiagnosed. Most people with pre-diabetes will develop type 2 diabetes within 10 years, although it can be prevented with weight loss and dietary and physical activity changes.

Hypertension

The final nutrition related disease we will be discussing is hypertension.

Hypertension

Hypertension is also known as high blood pressure. Blood pressure is a measurement of the amount of blood your heart pumps and the amount of resistance to blood flow in your arteries. The more blood your heart pumps and the narrower your arteries are, the more resistance and the higher your blood pressure is. Hypertension usually develops gradually over many years and doesn't really have any symptoms until the blood pressure reaches severely high levels.

Risk Factors for Hypertension

There are many risk factors for hypertension, some which can be controlled, and some which can't. The risk of high blood pressure tends to increase with age. Race also is a factor; hypertension is more common in African Americans. High blood pressure tends to run in families as well. Risk factors that can be controlled include obesity, physical inactivity, smoking, excessive alcohol intake, eating too much sodium, not eating enough potassium or vitamin D, and stress. Having medical conditions such as diabetes, kidney disease or high cholesterol also put you at higher risk for hypertension.

Treatment of Hypertension

Some people are able to control their blood pressure through diet and exercise changes. Reducing sodium intake, increasing potassium and vitamin D intake and being more physically active may help lower blood pressure. Stress reduction may help decrease high blood pressure. For many people however, this is not enough, and they need to take medications to help.

Complications of Hypertension

The majority of complications of hypertension stem from the damage caused to blood vessels from the extra pressure put on them. Because the heart has to pump harder to push blood through the extra pressure, the muscles of the heart can thicken, which eventually can lead to heart failure. Damaged blood vessels leading to the brain may become blocked or rupture, leading to a stroke. Damage to blood vessels in the kidneys makes it harder for them to do their job. Damage to blood vessels in the eyes can lead to vision loss or blindness. For people who do not get their blood pressure checked regularly, these complications may be the first indication that they have a problem with hypertension.

Test Your Knowledge

Now is time to test your knowledge!

Question 1

Question 1: A BMI greater than 30 indicates overweight?

A. True B. False

Answer: B. False. A BMI greater than 30 indicates obesity. A BMI between 25 and 30 indicates overweight

Question 2

Question 2: Which of the following are complications of obesity?

A. Metabolic syndrome B. Hypertension C. Cancer D. Type 2 Diabetes E. All of the above.

Answer: E. All of these are complications of obesity.

Question 3

Question 3: Which of the following is true about insulin?

A. Increases blood glucose so that energy is available for cells. B. Transports blood glucose into cells. C. Breaks down carbohydrates into glucose D. Causes buildup of glucose in the blood.

Answer: B. The role of insulin is to transport blood glucose into cells for energy use and preventing the buildup of glucose in the blood stream

Question 4

Question 4: Which of the following is not a risk of hypertension?

A. Obesity B. Excessive Potassium C. Excessive Sodium D. Age

Answer: B. Excessive Potassium is not a a risk factor, however, inadequate potassium is a risk for hypertension.

Quiz Result

Results shown.

End Slide

This completes the module Nutrition Related Diseases, presented by the Minnesota Department of Health, WIC Program.