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Introduction to Physiology - BMHP5003_LON
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Assessment 1



DIABETES



"Diabetes is a lifelong condition that causes a person's blood sugar level to become too high." (NHS, 2019)

There are two types of diabetes, Type 1 and Type 2.

Type 1: Where your own immune system attacks the necessary cells which produce insulin.

Type 2: Where your body is incapable of producing enough insulin or your cells do not react to it.

Unfortunately, "There's no cure for diabetes. But with treatment and lifestyle changes, you can live a long, healthy life." (Taylor, 2019)

The physiology of diabetes "is related to the levels of insulin within the body, and the body's ability to utilize insulin." (Moini, 2019)

Type 1 diabetes occurs when your own immune system attacks the beta cells which produce insulin, therefore patients with this type of diabetes have no insulin present in their bodies and require daily injections.

Type 2 diabetes involves patients having insulin resistant tissue which does not respond effectively to the levels of insulin. The pancreas will eventually stop producing that much insulin so the levels of insulin your body will decrease.



The patient I interviewed is 45 years old with a height of 170cm and a weight of 70kg. They are an every-day smoker who drinks 3-6 units of alcohol daily and who also suffers from high blood pressure (140/90). High blood pressure is not uncommon with people who are diagnosed and suffer from diabetes. The patient has not experienced heart attack or angina or any type of stroke or weakness.

They do not have a family history where anyone has experienced heart attacks above or below 60 years of age or have experienced any strokes. The patient does have sisters who have high cholesterol. The patient has informed me that their diet includes frozen food and eating sugary foods such as chocolate and fatty foods such as chips.

Having high glucose level and cholesterol as a diabetic will slow down your blood flow which could have negative effects, and eating sugary and fatty foods will only worsen the situation.

"If you have diabetes, being active makes your body more sensitive to insulin." (CDC, 2018)
Exercise is especially important for obese people who can develop type 2 diabetes and for people who already have been diagnosed with type 2 diabetes. Exercise can also refer to any sort of activity you do, for example simply walking could help with managing your diabetes.

It is also vital to keep an eye on your diet as eating sugary or fatty foods will have a negative effect on your blood circulation. It is of extreme importance to keep your blood sugar levels steady as a diabetic.



References

- Cdc.gov. 2018. *Get Active! | Living with Diabetes | Diabetes | CDC*. [online] Available at: <<https://www.cdc.gov/diabetes/managing/active.html>>.
- Moini, J., 2019. *Epidemiology of Diabetes*. Elsevier, p.25.
- nhs.uk. 2019. *Diabetes*. [online] Available at: <<https://www.nhs.uk/conditions/diabetes/>>.
- Taylor, R., 2019. *Types of Diabetes Mellitus*. [online] WebMD. Available at: <<https://www.webmd.com/diabetes/guide/types-of-diabetes-mellitus>>.

Speaker Notes

Hello everybody, my name is Teodora, today I will be talking about diabetes and the physiology that comes with it.

Diabetes can be defined as a lifelong condition that causes a person's blood sugar level to become too high. According to Diabetes UK, 13.6 million British people are at risk of developing type 2 diabetes whilst 4.9 million people in the UK already have a diagnosed case of diabetes.

First off, there are two main types of diabetes named: Type 1 and Type 2.

Type 1 diabetes is caused by an autoimmune response which targets and destroys the cells which produce insulin, these cells are called beta cells. People who are diagnosed with Type 1 diabetes lack the presence of insulin in their bodies.

Type 2 diabetes is the more common type of diabetes, and it is when the level of glucose in your blood is way too high. People with Type 2 diabetes do produce insulin but their bodies do not react to it as they should. Later on in the disease the pancreas starts to produce less insulin but since the body does not react to it as it should, that is not the most important part of Type 2 diabetes.

There are other types of diabetes which are rarer, with 2% of the people with diabetes being affected by them. These types can be for example: monogenic diabetes or cystic-fibrosis diabetes, etc.

The risks of diabetes are many, with some being out of your control for example your age or your ethnicity, with South Asian and Black African individuals being at double or even quadruple more risk. But the single most important risk factor is whether one is obese or not as obesity accounts for 80 to 85 percent of the type 2 diabetes in the UK.

The way to test for diabetes is by having a blood test that will say if your blood glucose level is too high or not. People with unordinary results/readings may be asked to do further testing such as oral glucose tolerance level test, fasting tests or others.

Moving on, diabetes can have many effects on your body as a whole. For example, it can have negative macrovascular effects on organs such as the heart and brain but could also have negative microvascular effects on parts such as the eyes and nerves.

Because people with diabetes have increased cholesterol and blood pressure levels, cardiovascular diseases are more common for them. If you are diabetic and a smoker or you are being inactive, this boosts the risks of developing cardiovascular diseases. People who suffer from diabetes can face an eye problem called retinopathy, which is when blood vessels in the retina get damaged and start affecting your vision. To get tested for diabetic retinopathy, you can do yearly eye screening which is a way of checking the condition of your eyes for diabetic people. Diabetes can also lead to nerve damage also known as neuropathy. This is mainly caused by the high blood glucose levels that diabetics suffer from. This damage can occur to the sensory and the motor nerves. In other words, it can harm your sense of feeling and movement in areas such as the legs and feet, arms and hands and others. Diabetes can also damage your oral health as the blood vessel which aid with nourishing your gum and your teeth can become more easily damaged especially if you do not take care.

Another effect which tends to go unnoticed is the mental impact diabetes can have on an individual, especially a young child. Children may experience anxiety or high stress due to the fact they are different and that they have many limitations their peers do not, that is why it is important to always check on how your children are feeling and whether or not you can help them with something.

The pathophysiology of diabetes looks at different hormones (insulin, glucagon, etc.) and their interaction with organs such as the liver and pancreas. Glucagon is a counterregulatory hormone to insulin and is produced by the alpha cells in the pancreas, its main role is to increase the glucose levels in the blood. Patients who suffer from type 1 diabetes can experience hypoglycaemia (low blood sugar) which will fail to initiate a

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normal and proper glucagon response which can in turn increase the severity of the hypoglycaemia. Insulin also has an effect on the liver by stimulating it to store glucose in the form of glycogen, with diabetics, the breakdown of glycogen may not occur which will also increase the risk and severity of hypoglycaemia.

From the patient that I interviewed, we can see that she is forty-five years old, weighs seventy kilograms and is a hundred and seventy centimetres tall (which falls in the healthy weight category on the BMI test). Because the patient is in her middle adulthood ages, she is more likely to develop diabetes as there is increased insulin resistance in older people. From the data we can also see that she smokes one to nine cigarettes every day, drinks three to six units of alcohol per day and suffers from high blood pressure which is common with people who are diagnosed with diabetes. The patient has not experienced a heart attack or angina or any type of stroke or weakness before which is a good sign. Patients who are smokers are more likely to develop type 2 diabetes as nicotine lowers the effectiveness of insulin meaning more will be needed to properly regulate your blood glucose levels. Diabetes can also cause or worsen what is called, non-alcoholic fatty liver disease (NAFLD) which is when there is too much fat in your liver. Knowing that the patient drinks alcohol, that would make this disease even worse.

The patient does not have a family history where anyone has experienced heart attacks above or below sixty years of age or have experienced any kind of strokes. The patient does have sisters who have high cholesterol. She has informed me that she eats a lot of frozen food and sugary food which is bad as it could lead to diabetes or if you already have diabetes, it could worsen it.

There are ways to decrease the negative effects of diabetes. For example it is very important to exercise regularly and appropriately. It is true that diabetics experience more fatigue than people without diabetes but in order for them to feel better, activity is important. You can start by doing little activity, like simply walking or a short jog. Exercise helps with lowering your fat level and also boosts your body's sensitivity to insulin. It is important to always consult a doctor about your workout routine as they can tell you if it will be appropriate for you or not. Another thing which is really important for people with diabetes is eating healthy. You need to have a strict diet that you follow. It is crucial to not be obese or overweight if you have diabetes because it makes your blood sugar levels even harder to control. Foods that you need to avoid are sugary foods such as chocolate or even a lot of fruit and also fatty food such as cheese or fries. You can always speak to a dietitian who can inform you on what to eat and how often to eat it. As reported by Diabetes UK, exercising alongside with following a healthy and appropriate diet can help reduce the risk of developing type 2 diabetes by a whole 50% which could therefore start decreasing the cases.

Thank you for listening.