

Understanding Diabetes and the Importance of Blood Sugar Management

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1. Introduction

Diabetes is a medical condition that affects how the body processes sugar in the blood. Sugar/glucose is the body's main source of energy, and we get it from food, such as carbohydrates. The hormone insulin normally helps move glucose from the bloodstream into the cells of the body, where it can be used for energy. But in the case of people with diabetes, this process does not work the normal way, causing blood glucose levels to become too high. (World Health Organisation, 2024)

There are several types of diabetes. The most common types are type 1, type 2, and gestational diabetes. Firstly, type 1 occurs when the body's immune system attacks the insulin-producing cells that are in the pancreas, meaning the body produces less insulin, sometimes even going down to 0 insulin being produced. People with this condition usually need an insulin injection every day. Type 2 diabetes is the most common form of diabetes and starts when the body does not respond well to insulin or does not produce enough insulin to keep stable. Lastly, there is gestational diabetes, which occurs during pregnancy and usually disappears after the baby is born, although sometimes it can develop into type 2 diabetes later in life. (Diabetes UK, 2017)

There are several risk factors linked with increasing the likelihood of developing type 2 diabetes. These include lack of physical activity, poor diet, smoking, ageing and family history. Having high blood pressure and high cholesterol levels can also increase the risk. Eating unhealthily and sedentary behaviour play a major role in the development of the condition.

Diabetes is closely related to the endocrine system, which is responsible for making hormones that regulate body processes. The pancreas, which is an important organ in the endocrine system that produces glucagon and insulin. These hormones help in the regulation of blood and sugar/glucose levels, which allow for balance maintenance in the body.

This report will explain how blood sugar levels are regulated in the body, how glucose and oxygen are used to produce energy in the cells, why tracking and recording blood sugar levels is important for people with type 2 diabetes and how changes in lifestyle can help improve the situation.

2. Blood Sugar Regulation

Blood sugar levels must be carefully managed to maintain normal body functioning. The body maintains its balance through a process called homeostasis, which helps the internal conditions remain stable.

The pancreas plays an important role in regulating blood sugar levels by producing insulin and glucagon, two important hormones. When blood glucose levels rise high after eating, the pancreas releases insulin into the bloodstream. Insulin allows glucose to enter the body's cells, where it might be used for energy. The process also allows for excess glucose in the liver and muscles in the form of glycogen to be stored there.

When the blood sugar levels fall, such as between meals or during physical exercise, the pancreas releases another hormone called glucagon. In the liver, glucagon signals the conversion of stored glycogen back into glucose and its release into the bloodstream. This process helps maintain a stable supply of energy throughout the whole body.

In the body of people with diabetes, this system does not function properly. In type 2 diabetes, the body's cells become resistant to insulin and reject it, meaning glucose is unable to easily enter the cells. As a result of that, glucose builds up in the bloodstream, leading to high blood sugar levels, also known as hyperglycaemia. Over time, the high blood sugar levels can damage blood vessels, nerves and certain organs such as the heart, kidneys and eyes.

Maintaining blood sugar levels at a safe limit is essential for preventing complications and ensuring that the body's cells receive the energy they need to properly function. (NHS, 2023)

3. Cellular Metabolism

Cells need energy to perform functions such as repair, growth and basic movement. This energy is produced through a process known as cellular respiration, where glucose and oxygen are used to produce energy.

The energy that is produced during cellular respiration is stored in molecules called adenosine triphosphate (ATP), which can be used by the body's energy balance. This process takes place in the mitochondria of the cells.

The overall chemical process can be represented as:

Glucose + Oxygen → Carbon dioxide + Water + Energy (ATP)

During this process, glucose from food is broken down in the presence of oxygen to release energy. The energy generated is used by cells to carry out important biological functions. Carbon dioxide and water are products and the waste products of the process, and are removed from the body through breathing and bodily excretions.

Oxygen is transported around the body by the red blood cells, which carry oxygen from the lungs to the body tissues and organs. Glucose gets transported in the blood after being absorbed from the digestive system of the body.

People with diabetes have struggles with glucose transportation as their cells have insufficient insulin or weak insulin resistance. As a result, the cells may not receive enough energy even though there is excess glucose in the bloodstream. This imbalance contributes to weakness, fatigue and other symptoms associated with diabetes.

4. Recording and Tracking Blood Sugar Levels in Type 2 Diabetes

Keeping track of blood glucose levels is an important part of managing type 2 diabetes. Regularly keeping track allows family, friends and healthcare professionals to understand how well blood sugar is being controlled and whether treatment plans are effective.

Keeping track and recording blood sugar levels helps identify trends and patterns. For example, people may notice that certain stuff affect their glucose levels, such as certain foods, exercise, stress or medications. This information helps them make better decisions about the food they eat, their physical activity and medication use. This is a form of diabetes that is characterised by high blood sugar and insulin resistance.

Tracking blood sugar levels also helps detect dangerous changes, such as high blood sugar and low blood sugar. Early detection of these conditions will allow individuals to take proper action, such as making changes in the food they eat and the medication they take to help prevent further complications.

If blood sugar levels are not regularly checked and monitored, it could cause serious health problems to develop without warning. Long-term diabetes can lead to multiple complications, including heart disease, nerve damage, kidney damage, loss of vision and poor wound healing. Moreover, keeping records of blood sugar levels allows healthcare professionals such as nurses and doctors to evaluate the data and adjust treatment plans accordingly to prevent complications. This might also include any changes in medication, exercise routines and diet.

Keeping track also helps empower patients to take an active role in managing their own health, which improves taking care of oneself and increases one's confidence in managing their condition. Also, to decrease the risk of stroke by 3 to 2 times.

5. Recommendations

There are a multitude of evidence-based lifestyle changes that can help individuals manage type 2 diabetes effectively. These strategies aim to improve the overall health of one as well as maintain a healthy weight and blood sugar levels while reducing the risk of complications. The CDC states that physical activity can reduce the risk of heart disease, cancer, high blood pressure, obesity, depression, anxiety and type 2 diabetes.

Healthy Diet

A balanced diet plays an important role in managing diabetes. People should focus on eating whole grains, fruits, proteins, vegetables and healthy fats. Reducing the amount of sugary foods, one consumes, as well as processed foods and refined carbohydrates, can help prevent massive rises in blood sugar levels.

Practising portion control is also very important in keeping a healthy diet. Eating smaller, more balanced meals throughout the day helps maintain stable glucose levels. Moreover, it is called a healthy lifestyle.

Regular Physical Activity

Engaging in regular physical activity helps the body use insulin more effectively and improves blood sugar level control. Exercise also supports management and reduces the risk of developing cardiovascular diseases.

Health guidelines often recommend at least a hundred and fifty minutes of moderate physical activity per week, such as walking, swimming and cycling.

Weight Management

Keeping a healthy weight can significantly improve insulin sensitivity. Even minimal/modest weight loss can lead to decreased sodium and to better blood sugar control and reduce the risk of developing complications and obesity.

Smoking Cessation

Actively smoking increases the risk of diabetes and digital health complications, including heart disease and poor blood circulation. Quitting active smoking improves nutrition and weight loss. Overall health reduces the risk of even more health problems popping up in the future.

Medication Adherence

Individuals with diabetes may be prescribed medication such as insulin therapy or oral hypoglycaemic drugs. It is also very important that they take their medications as intended and prescribed and attend their regular medical appointments.

Education and Support

Education programs and courses can help people with their understanding of their condition and develop better confidence and the skills needed to manage diabetes.

Healthcare professionals such as nurses, physiotherapists, dietitians and medical educators can provide guidance on diet, exercise and blood sugar level monitoring. Diabetic retinopathy is an eye condition caused by diabetes. It can lead to sight loss, but finding and treating it early reduces the risk.

Support from family members and healthcare providers can also encourage positive lifestyle changes and steadily improve long-term health outcomes.

Lifestyle changes to help with type 2 diabetes

If you have type 2 diabetes or have been told that you may get it in the future, e.g. prediabetes, lifestyle changes can help lower your blood glucose/sugar levels. This can help to manage diabetes and possibly avoid having to take medication. Lifestyle changes can sometimes lower your blood glucose to a normal level and stop diabetes by eating a healthy diet, talking to a GP or diabetes nurse for more awareness. (Diabetes UK, 2023)

6. Conclusion

Diabetes is a long-term chronic condition that affects the body's ability to control, manage and regulate blood sugar levels. The projection for the people with diabetes, as by 2050, projections show that 1 in 8 adults, approximately 853 million, will be living with diabetes, an increase of 46% from now. And 90% of them will have type 2 diabetes. As the biggest potential causes are urbanisation, which is the rapid movement of society migrating to towns and cities, where traditional cooked home foods are less available than processed foods and fast food, which increases the risk of developing high blood sugar due to being far less healthy for the body. Another reason was also that the population was ageing, and ageing people have a higher risk of getting diabetes. (International Diabetes Federation, 2025)

Diabetes is tightly linked with the endocrine system and involves problems with insulin resistance and insulin production. Having proper regulation of blood sugar is important for maintaining energy production and supporting normal body functions. (ElSayed et al., 2022)

Glucose and oxygen play an essential role in cellular metabolism, providing energy for cells through cellular respiration.

However, in individual with diabetes, glucose cannot be used to it highest potential to complications with insulin, leading to high blood sugar levels. Proper tracking and recording of blood sugar levels is an important part of managing type 2 diabetes. It helps people identify certain patterns, which can lead to the prevention of very dangerous changes in one's blood sugar levels, and it can also support healthcare professionals in improving the best and most appropriate medical treatment.

Lifestyle changes such as participation in healthy eating habits, which could include having a balanced diet, participating in regular exercise and maintaining a healthy weight, which consists of making sure the body fat percentage and BMI are at a healthy level. Also, quitting smoking is an important strategy for improving the management of diabetes. Contributing to proper tracking/recording, education and support, people with type 2 diabetes can methodically and effectively manage their condition on all levels while reducing the risks of long-term problems popping up in the future.

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