Introduction

Do people have a lot of information about sugar in Ireland? In our study we are investigating this question. We wanted to find out how much information people had and improve their knowledge.

We decided to research sugar because lately there has been increased concern about sugar and its negative effects due to excess consumption. The aim of our project was to study the adverse effects of sugar on different parts of the body and to find out how much people know about sugar.

Sugar is a component of many carbohydrates. Carbohydrates consist of carbon, hydrogen and oxygen. There are many different types of sugar which depend on the ratio of carbon to hydrogen to oxygen. Glucose is used by the body during respiration to produce energy. This energy is used by many parts of the body such as the central nervous system, the digestive, endocrine and circulatory systems, eyes and the brain. Glucose is a vital resource in maintaining a healthy body.

However, sugar in the form of sucrose is causing harm in our bodies. Sucrose is a disaccharide carbohydrate composed of fructose and glucose. This form of sugar is also known as table sugar and can be found in plants such as the sugarcane, sugar beet and sugar maple. When sugar is obtained from the plant it goes through many nutritionally stripping processes which include sulphur dioxide washing and heating to get the final product of table sugar. Examples of table sugar include refined white sugar, granulated sugar and unrefined brown sugar.

Effects of sugar on the body

When your pancreas detects a rush of sugar, it releases a hormone called insulin to deal with all of that excess sugar. Insulin helps regulate that level of sugar in our blood. The more sugar in the bloodstream, the more insulin is released. Insulin helps store all of this glucose in the liver and muscles as glycogen and in fat cells. Sometimes our body struggles to get that balance right. When too many sugar levels are too high, it results in our blood sugar dropping below normal levels. This is called hypoglycaemia, a sugar crash: it is a signalling to the body that it needs more sugar.

A continuous high intake of sugar can have various negative effects on the brain, including the following:

- It can impair memory and learning skills.
- It has shown to contribute to depression and anxiety and brain damage.

Effects of sugar on the teeth

The bacteria in our mouth come together to become plaque. They use sugar as a form of energy. They multiply faster and the plaque grows in size and thickness. Some of the bacteria turn the sugar into a kind of glue that they use to stick themselves to the tooth surface.

Regular loss of enamel can lead to cavities and exposure of the inner layers of the teeth that may become sensitive and painful. Severe erosion can lead to changes in the way that your upper and lower teeth come together, a significant reduction in the size of your back teeth.

Diabetes reduces your ability to fight bacteria and slows healing. If plaque isn’t removed with regular brushing and flossing, it’ll harden under your gum line into a substance called tartar. The longer plaque and tartar remain on your teeth, the more they irritate the gingiva, which is the part of your gums around the base of your teeth. Overtime, your gums become swollen and bleed easily. This is also known as gingivitis.

Left untreated, gingivitis can lead to a more serious infection called periodontitis. This destroys the soft tissue and bone that support your teeth. Eventually, periodontitis causes your gums and jawbone to fall away from your teeth, which is in turn causes your teeth to loosen and eventually fall out.

Effects of sugar on the brain

Sugar sends a message to the brain activating its reward system. This reward system is a series of electrical and chemical pathways systems across several different regions of the brain. The main chemical released from the brain’s reward system is dopamine. People who are addicted to alcohol and drugs have receptors which are sent into overdrive, which causes them to constantly seek that “high” feeling. Sugar causes a similar reaction in the brain, however, it is not as extreme as in the case of other addictive substances. As humans whenever we consume any food dopamine is released in the brain. After eating a certain type of food for a long time the dopamine levels even out and we no longer find the food as satisfying. However, with sugar the dopamine levels will never even out, causing the body to constantly crave it.

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Experiment

The objective of this experiment was to see the effect of sugar on the heart rate and to also see how long this sugar rush would last for.

For this experiment we had controls who drank nothing for the whole experiment. We then had three other pairs of a boy and a girl who were each given a drink. One pair drank water, another 7 UP Zero which only contains sugar and the last pair drank Cherry Fizzy which contains 29.26g per 380ml bottle. Before the participants consumed the beverage their pulse rate was taken. Their pulse rate was then taken every five minutes for 15 mins. By doing this we saw an increase and then decrease in their pulse. Women generally had a higher pulse rate than men.

Conclusion of experiment

From our results we were able to see a number of conclusions. The first obvious one which can be seen on the table is that the controls did not have a high pulse rate for the duration of the experiment. The 7UP Zero caused an average of 5.5 increase after the first 5 mins of consuming the drink compared to the initial pulse rate. After the next five minutes the pulse decreased by an average of 5.8. Vino Cherry Fizzy had the highest increase of the pulse rate. On average it showed an increase of 6.5.

Survey

Purpose of our survey

The survey was designed after watching the “Sugar Crash” documentary and we intended to find out how much that students and teachers in primary and secondary schools knew about sugar and the negative effects that it can have on the body. The survey was typed out, printed and distributed to each person. 350 respondents were surveyed from local primary and secondary schools.

Survey Graphs

Fun Sugar Facts

- A can of coke contains 10 teaspoons of sugar. That is 40 g of sugar which is over the recommended sugar allowance for two days.
- Most people eat 100% of their daily sugar allowance during breakfast.
- Putting sugar on a wound will greatly reduce the pain and speed up the healing process.
- When you eat a big dose of sugar, like a chocolate bar, you temporarily weaken your immune system’s ability to respond to infectious challenges. The effect lasts for several hours, so if you eat sweets several times a day, your immune system may be perpetually operating at a distinct disadvantage.
- To get the iron from 1 cup of sugar you must consume 8.5 cups (170g) of sugar. This shows how sugar has an incredibly low nutritional value.

Next Steps and Recommendations

- Substitute for sugar - Stevia is an herb that is up to 40 times sweeter than sugar but has zero calories and won’t cause a jump in your blood sugar. Works well in coffee and tea or sprinkled over fruit, cereal, or yogurt. However you can’t substitute stevia for sugar in baked goods, though, because these products are sweeter than sugar and don’t offer the same colour and texture.
- Reading food labels can help you know how much sugar is in the food we purchase. Remember, there are approximately 4 grams of sugar in one teaspoon. This may require a bit of mental maths, but it’s worth it.
- Learn sugar’s aliases - On a food label sugar may hide under many sneaky names so getting familiar with its various names will be useful. Some names are high fructose corn syrup, dried cane syrup, invert sugar, molasses, sucrose, brown rice syrup, honey, and maple syrup.
- Avoid “diet” and “zero” fizzy drinks - In order to cut down on sugar we tend to go for diet fizzy drinks, however this works in the opposite way because when we eat something sweet our bodies expect calories. With diet drink we don’t get calories and weight can be gained.

Survey

Sugar Survey

- Which of the following is a vital source of energy to the body? Glucose I don’t know
- What is the average daily intake of sugar for a child in Ireland? 6g I don’t know
- Which do you think, on average, has the greatest amount of sugar per 100g grams? White bread I don’t know
- On average, how much of our packaged foods contain added sugar? 74% 5% I don’t know
- How many grams of sugar are in a teaspoon? 5g 4g I don’t know

Conclusion from the survey

The best result of the survey was obtained by the students of 3rd year. For the first question the majority of all the respondents that answered knew that glucose was the correct answer. For the second question 100% of the third class students knew the average recommended intake daily intake of sugar. This was followed by 95% of first years, 89% of 6th class and 80% of the teachers. The third question had the most varied results: 77% of first years, 63% of third class had the correct answer, 44% of sixth class and 40% of teachers. For the fourth question 94% of third years were correct, 80% of the teachers, 73% of sixth class and 72% of first years. With the last question 79% of third years, 60% of teachers, 50% of first years and 34% of sixth class.

From our results we observed that it wasn’t necessarily the older respondents that knew the most about sugar. Overall the third class had the best results followed by the first class students, then the teachers and finally the sixth class students.

Learn sugar’s aliases

- Sucrose
- Fructose
- Glucose

Survey Graphs

Survey Questions

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