FACT SHEET

Sugar and diabetes

In the not so distant past, people generally associated the intake of too much sugar with the development of diabetes. The misconception was mainly because diabetes is a condition characterised by a variation in blood glucose levels (often known as blood sugar levels) due to a lack of insulin. It was therefore assumed that the sugar we consumed in our diet was directly linked to diabetes.

Health professionals would often advise people with diabetes that they could eat potatoes and slices of bread in their meal, but definitely not sugar. Today, new dietary guidelines based on sound science promote a balanced diet that can include sugar.

The New Zealand Dietetic Association published a position paper in 1997 entitled; "The Nutritional Management of Diabetes Mellitus in New Zealand".[1] In this, NZDA states; "Sucrose incorporated with meals should account for not more than 10% of total energy and minimised in those who are overweight". This recommendation was further supported by the European Association for the Study of Diabetes (EASD) in 2000 and by Diabetes UK in 2003.[2,3]

The recently released American Diabetes Association "Position statement on the nutrition recommendations and interventions for diabetes", takes a more liberal approach to sugar. It recommends that "sucrose containing foods can be substituted for other carbohydrates in the meal plan or, if added to the meal plan, covered with insulin or other glucose-lowering medications. Care should be taken to avoid excess energy intakes."[4] These papers form the basis of advice given to people with diabetes by health professionals today.

The aim is for people with diabetes to achieve as close to normal blood glucose levels as possible (4–7mmol/L glucose),[5] although goals are set for individuals depending on age, treatment methods and other co-existing health problems. Consistently high blood glucose readings can lead to heart disease, kidney failure, blindness and circulation problems or strokes.

Nutritional management for people with diabetes aims to help optimise glycaemic control and therefore reduce the risk of developing some of the complications mentioned earlier. All nutritional programmes should be planned to meet the specific needs of the individual and these may change with time.

The following information provides an overview of the role of sugar in the diet of people with diabetes.

Understanding diabetes

The level of glucose in our blood is controlled by insulin. Insulin is a hormone secreted by the pancreas whenever the level of glucose in the blood rises. The insulin removes the glucose from the blood and allows it to pass into the cells and muscles, thus lowering the blood's glucose level.

TYPE 1

Type 1 diabetes is an autoimmune* condition where the cells in the pancreas that would normally produce insulin have been destroyed. In such instances, the amount of glucose builds up in the blood rather than being taken into body cells for energy production or converted to glycogen or fat. This is when people are insulin dependent. They require regular injections of insulin, which will be released into the blood to move glucose into cells. An individual's insulin regime (what type of insulin they use and how often they inject it) influences the flexibility they have with their food/carbohydrate choices and how their food is distributed over the day.

** Autoimmunity is defined as the body's immune system going awry and attacking the body itself.*

TYPE 2

People with Type 2 diabetes; usually adults, although increasingly seen in younger people, produce insulin, but for some reason the insulin cannot perform its role of carrying glucose into body cells as the cells are resistant to insulin's action. The total amount of sugar intake is not associated with the development of Type 2 diabetes.[6,7] Type 2 diabetes is quite different and is more prevalent than Type 1. Many dietary and lifestyle factors can contribute to the development of Type 2. People who have Type 2 diabetes are often overweight and their blood glucose levels can generally be controlled by diet, exercise and if necessary, tablets and/or insulin. In many cases loss of body weight is usually accompanied by an improvement in diabetes.

CONTINUED OVER

FACT SHEET

Where does sugar fit in?

Carbohydrate foods are an important part of the diet for people with diabetes, as they are for the general population. Around half or 50–55% of total energy intake should come from carbohydrates and 30–35% from fat (ideally no more than this and less than 30% for those who are overweight) with the remainder being made up of protein. Saturated and trans-fats should provide less than 10% of total energy.[1]

People with diabetes have for years been told to avoid "simple" sugars, such as table sugar and those found in sugary snacks, because they were thought to elevate blood glucose more quickly and more severely than other carbohydrates. However, this is not the case. Though sugars from foods and drinks are rapidly absorbed, moderate amounts of sucrose (normal table sugar), less than 10% of total energy, can be eaten within the context of a healthy diet by most people with diabetes.[1,2,3,4] Many sugary foods cause no greater swing in blood glucose than starchy food and should not compromise glycaemic control. Sucrose is best incorporated into the diet as part of a low fat, low Glycaemic Index and high soluble fibre (a good proportion of which is utilised) meal or snack which enhances food structure and palatability.[1]

Carbohydrates in the form of sweet drinks, juices, soft drinks and alcohol often provide an extra carbohydrate load that the body is unable to manage successfully in the person with diabetes. They also add extra energy (calories or kilojoules) to the diet which can be a barrier to weight loss. For this reason it is often recommended that sugar-free, low energy drinks are chosen instead.

GLYCAEMIC INDEX

For the GI of common foods go to: www.glycemicindex.com

The Glycaemic Index (GI) was developed to help rank foods based on their immediate effect on blood glucose levels. Put simply, carbohydrate foods which break down quickly during digestion have higher GI and carbohydrate foods that break down slowly have lower GI. The Glycaemic Index is a useful tool for people with diabetes to work out what combination of foods suits them best to control their blood glucose levels.

In general foods can be divided into those that have a high GI (some breads, potatoes, some breakfast cereals, glucose-based sports drinks), a moderate GI (sucrose, soft drinks, tropical fruit) or a low GI (dairy foods, lentils, legumes, oats and cold climate fruits such as apples).[8] Some examples are given in Table 1.

However, the GI value can be affected by a number of factors including the protein, fat and dietary fibre content of a particular meal and the form in which foods are consumed (hot, cold, cooked). While the GI value of particular foods is often specified, there can be a considerable variation between what might appear to be the same foods. For example, not all breads and breakfast cereals have high GI. People with diabetes need to be aware of this and know how specific foods affect them.

In the past few years, the role of low GI diets and the risk of diabetes has gained much attention scientifically. While in the past results may have been inconclusive, the results of a recent meta-analysis conclude, "low GI and/or low Glycaemic Load (GL)* diets are independently associated with a reduced risk of certain diseases" and that in relation to diabetes, "the protection is comparable with that seen for whole grain or fibre intakes".[9] The American Dietetic Association has also amended its position on GI and recommend that "the use of Glycemic Index and Load may provide a modest additional benefit over that observed when total carbohydrate is considered alone".[4]

While it is a useful tool, GI is only one aspect of appropriate food selection. Overall, consumption of carbohydrate foods which are rich in dietary fibre or have a low GI are encouraged, particularly those foods also low in fat.

** Glycaemic Load (GL) takes into consideration the GI of a food and its total available carbohydrate content.*

More information on GI and GL can be viewed at www.sras.org.nz in the sugar basics section.

TABLE 1

COMMON FOODS AND THEIR GI VALUES*

LOW GI (≤ 55)	MED GI (56-69)	HIGH GI (≥70)
Lentils (30)	Apricot (57)	Watermelon (72)
Skim milk (32)	Pita bread (57)	White bread (70)
Apple (32)	Basmati rice (58)	Brown rice (76)
Rolled oats porridge (42)	Banana (58)	Water crackers (78)
Apple muffin (44)	Shortbread (64)	Jelly beans (78)
Spaghetti (44)	Raisins (64)	Cornflakes (81)
Low-fat yoghurt (47)	Pineapple (66)	Baked potato (85)
Baked beans (48)	Sucrose (std. sugar) (68)	Parsnip (87)
Whole grain breads (49)	Wholemeal bread (69)	Rice bubbles (87)

**Note that while one GI value is given to each food in this table, this is an average figure from a number of published studies. The GI of any particular food can vary within and between individuals. Often the degree of variation is very large – especially for foods in the medium and high category.*

FACT SHEET

What else?

There are some other important factors that need to be considered by people with diabetes to maintain control and balance within the diet.

PHYSICAL ACTIVITY

Physical activity is particularly important to people with Type 2 diabetes to help weight loss and control blood glucose levels. For people with Type 1 diabetes, exercise can take some glucose out of the blood to use for energy during and after exercise, which lowers blood glucose levels. Secondly, exercise can help delay or stop large blood vessel damage and the subsequent onset of heart disease. Diabetes New Zealand recommends that people with diabetes engage in moderate levels of physical activity for at least 30 minutes a day on most days of the week.[10]

Brisk walking, swimming and mowing the lawns all count. It is also not necessary to do all the activity in one burst. For example, activity could be broken down in to three 10 minute bursts.

ALCOHOL CONSUMPTION

People with diabetes should be careful about alcohol consumption. Under normal circumstances blood glucose will not be affected by moderate use of alcohol (two to three standard drinks per day of 150mls per drink), when diabetes is well controlled.[1] Recent studies show the degree of sweetness of wine and beer has no impact on glycaemic control in moderate quantities and when consumed with food. In susceptible individuals it may however elevate blood pressure and triglyceride levels.[1]

Excessive consumption of alcohol (4.5 standard drinks) may induce hypoglycemia up to 12 hours after consumption and the signs are often masked by inebriation.[1]

FAD DIETS

People with diabetes should stay clear of fad diets, which can be potentially dangerous, particularly those that focus on one food group – such as low carbohydrate diets or high protein diets. The long-term effects of diets like these can cause kidney damage or heart disease, conditions that people with diabetes are already especially prone to developing.

Summary points

- People with Type 1 and Type 2 diabetes can include moderate amounts of sucrose within a balanced and healthy diet.
- Foods and drinks with very high amounts of fat and/or sugar are energy dense so should be minimised for better glycaemic and weight control.
- Sugar-containing foods are best incorporated as part of a low fat, high fibre, low GI meal.
- The intake of foods high in fat particularly saturated and trans-fats (these are fats which have been shown to increase 'bad' (LDL) cholesterol and decrease 'good' (HDL) cholesterol) should be minimised.
- Regular and moderate physical activity will help with weight management, blood glucose control and cardiovascular health.
- If consuming alcohol, only small amounts should be drunk and always with food.

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