Too sweet to be wholesome: Sugar and diabetes

It is difficult to imagine a holiday season without sugar, for sweet-flavoured substances have become an increasingly large part of our diet.

Many of us involved see the rising tide of sugar consumption, our obesogenic environment of reduced physical activity, and the obesity that parallels these as a serious contributor to, if not the root cause of, the unfolding diabetes epidemic.

Much of the research in this area comprises epidemiological studies, rather than randomised controlled trials. Thus, wishing to take effective action on the back of medical evidence to curtail sugar consumption is to potentially enter a minefield of vested interests and distracted politicians. In this editorial, I examine the link between sugar, obesity and diabetes, and explore what can be done about the problem of rising sugar consumption.

The ubiquity of sugar

Sugars are found everywhere in our food supply. Glucose is an important fuel for the human body, particularly the brain. A well-balanced diet often contains naturally occurring sugars, which are integral components of fruit, vegetables, dairy products and many grains. The table or granulated sugar most customarily used as food is sucrose. But deleterious health effects may occur when sucrose is consumed in large quantities.

In Europe, sugar-sweetened beverages (SSBs) are primarily sweetened with sucrose, whereas in the US high-fructose corn syrup is often used, which may have an increased impact on insulin resistance (Malik et al, 2006). Many substances that are chemically different from sucrose may also have a sweet taste but are not classified as sugars. Some are used as low-calorie sugar substitutes, and these are described as artificial sweeteners. Their impact on obesity and the risk of developing diabetes is the subject of much debate.

Sugar consumption and diabetes

Is sugar consumption linked to diabetes? There is indirect evidence to suggest that this is the case. A recent study confirmed that intake of free sugars or SSBs is a determinant of body weight (Te Morenga et al, 2012). Too large an intake of sugars is postulated to lead to obesity, particularly if these are consumed in SSBs, since studies suggest that the lack of satiety results in a lack of compensatory reduction in food calories, and overall increased calorie consumption (Malik et al, 2006). A large cohort study also corroborated the association between increased incidence of type 2 diabetes and high consumption of SSBs in European adults (InterAct consortium, 2013). A meta-analysis published in 2010 provided evidence for a link between the consumption of SSBs and both the metabolic syndrome and diabetes (Malik et al, 2010). SSBs can cause rapid spikes in glucose and insulin, which may in turn lead to insulin resistance (Hu and Malik, 2010).

Guidance and recommendations

Guidance is two-fold: public health guidance recommending population reduction in sugar intake; and guidance on what to do when diabetes and impaired glucose handling is diagnosed.

As long ago as 2003, the World Health Organization recognised that increased intake of SSBs was harmful to health and recommended a reduction, particularly in children and young adults (http://www.who.int/topics/diet/en/ [accessed 13.11.13]). *The Guardian* has recently reported the intention of the World Health Organization to modify its guidance and recommend a further reduction in the intake of these beverages (http://bit.ly/1cQ0kYA [accessed 13.11.13]). The American Heart Association recommended minimising the intake of beverages and food with added sugars, proposing a specific upper limit of intake

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for added sugars (Johnson et al, 2009). There is some evidence from randomised controlled trials that school-based education can reduce intake of carbonated SSBs, and that this can impact on rates of obesity and overweight over as little as a year (James and Kerr, 2005). It is also worth considering if these beverages are displacing milk in the adolescent diet and the potential impact of this on long-term health.

When diabetes has been diagnosed there is also clear guidance. The American Diabetes Association (2013) has recently published recommendations which suggest that individuals at risk of type 2 diabetes should be encouraged to limit their intake of SSBs. Diabetes UK's recommendation is that the total amount of carbohydrate consumed is a strong predictor of glycaemic response, and that monitoring total carbohydrate intake is a key strategy in achieving glycaemic control (Diabetes UK, 2011).

Politicians and diabetes

A recent analysis suggests that a moderate 20% tax on SSBs would lead to a reduction in the prevalence of obesity in the UK of 1.3% (around 180 000 people; Briggs et al, 2013), with the greatest impact on young people. Taxation of SSBs could be a promising population measure to target population obesity. Recent data show that considerable excess mortality with type 2 diabetes is now seen in younger adults (Dart et al, 2013).

Faced with clear recommendations, and evidence of benefit, why is there so little activity on the part of governmental bodies in the UK? There is certainly a lot of hand-wringing about the rising obesity epidemic and the potential for it to add considerably to the chronic disease burden going forward, but action is lacking. There may be unseen influencing from lobbyists and vested interests. There is no clear direction from the European parliament. A bill currently going through the UK parliament may flush out the influence of lobbyists. However, politicians in democracies often have a very short-term view, avoiding legislating for short-term pain where there is long-term gain.

Looking outside of the UK, where governments have taken actions they have been met with mixed results. Faced with a national obesity rate of 32.8% and a reported type 2 diabetes rate of 9.2%, the parliament in Mexico has just passed a law imposing significant new taxes on junk food and sugary drinks (http://bbc.in/16pXiIh [accessed 13.11.13]). Norway, Samoa and Australia all have taxes on sugary drinks and confectionery. The Danish government attempted something similar in 2011, taxing foods high in saturated fats and sugar, but subsequently – in the face of opposition and the recognition that it is difficult for any nation to do this in isolation – rescinded the legislation (http://bbc.in/WQiGDr [accessed 13.11.13]). In New York, Mayor Bloomberg introduced a tax on high-sugar drinks, only to have it made the subject of a judicial review (Mariner and Annas, 2013). Bloomberg was not seeking re-election and was prepared to take resolute action, but judges felt he had exceeded his powers. His main concern seemed to be about the portion size of SSBs, which have increased dramatically over the last 10 years without a commensurate increase in price.

The large multinational drink manufacturers are active participants, faced with falling sales as consumers become more aware of the exact contents and health impact of their beverages. Consumers are moving away from high-fructose drinks and concerns have been expressed about aspartame-containing products, leading manufacturers to reduce sugar content and change formulas.

Summary

A seasonal holiday is an occasion to share food with family and friends. Why not use the opportunity to reflect and learn about your own sugar consumption from labels and packaging? Sophisticated consumers take their lead from scientists and medical advisers. We should be advocates for a much more robust approach to reduced sugar in our daily life to prevent diabetes, and to advise people diagnosed with diabetes on the potential benefits of dramatically reducing sucrose in their diet. ■

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