



Dr Jana Anderson

SUGAR IS THE NUMBER ONE TARGET IN THE WAR ON OBESITY: BUT IS IT REALLY TO BLAME?

In a recent study, published in *The International Journal of Epidemiology*, Dr Anderson and Professor Pell et al examined the extent to which sugar, relative to other macronutrients, was associated with adiposity. Here they examine the background to the study and share with us their key findings.



Prof Jill Pell

Dr Jana Anderson is a research associate working in the Public Health research in the Institute of Health and Wellbeing at the University of Glasgow. Jana's main research interests are lifestyle factors, such as diet and physical activity and their impact on health.

Prof Jill Pell is the Henry Mechan Professor of Public Health and Director of the Institute of Health and Wellbeing at the University of Glasgow. She is also an Honorary Consultant in Public Health in Greater Glasgow and Clyde Health Board.

Earlier this year, the Chancellor of the Exchequer announced that a tax on sugary drinks will be implemented from April 2018. Drinks containing 5.0-8.0g of sugar will be taxed at 18pence/litre and those containing more than 8.0g at 24pence/litre.¹

It has been estimated that the sugar tax will generate an additional £520m in revenue in its first year.³ In England, the money raised by the new tax will be used to increase funding for sports in primary schools.

Why have sugary drinks been singled out? Compared with other sweet foods, people are less aware of the high calorie content and they do not consider them as treats. Because they do not contribute to satiety, they are consumed in addition to other foods, not instead of them. Also, children and young adults are the most common consumers of sugary drinks; therefore, the sugar tax may specifically combat the worrying childhood obesity epidemic.²

Whether the tax succeeds in its aim of reducing sugar consumption will depend on many other factors, such as whether the tax has been set sufficiently high to impact on affordability as well as cost, the extent to which consumers will accommodate increased cost by making other changes in their spending (price elasticity), and the extent to which drinks producers proactively protect their market by reducing the sugar content of their products.

If the sugar tax does reduce consumption of sugar, will it solve the obesity epidemic? The current focus on

sugary drinks and snacks might suggest that it is sugar specifically, rather than calories more generally, that causes obesity. We tested this in our study published recently in *The International Journal of Epidemiology*,⁴ in which we analysed data collected on more than 132,479 members of the general public who took part in UK Biobank. Compared with slim people, the diets of obese people contained 12% more calories and 15% more fat, but only 5% more sugar. Therefore, the main predictors of obesity were overall calories and fat consumption, rather than sugar consumption. These findings suggest that if the only effect of the sugar tax is to reduce sugar consumption this will have some impact on obesity, but is unlikely to provide the full solution.

But will this be the only impact of the sugar tax? It might be tempting to assume that a tax that discourages sugar consumption might also result in a general improvement in diet. However, there is evidence of a 'sugar-fat see-saw' whereby, if people focus specifically on reducing consumption of one, they compensate by eating more of the other. Furthermore, our study showed a relatively low correlation between sugar and fat intake; the people who consume the most sugar are not necessarily the ones who consume most fat, and vice versa. This leads to the possibility that measures which over-emphasise sugar consumption may lead to a paradoxical increase in fat, thereby obviating any beneficial impact on obesity.

So where does this leave us? Sugar

provides empty calories. It is non-essential for anyone other than, possibly, endurance athletes. It is a specific risk factor for dental caries, but its contribution to obesity is not specific but rather as a result of its contribution to our excessive consumption of overall calories. Therefore, whilst it is desirable to reduce our sugar consumption by relegating it to an occasional treat, we need to ensure that any public health interventions or messages clearly emphasise that reduction in sugar consumption must be done within the context of reducing overall calories. So instead of aiming a single bullet at sugar, we need a smart bomb to combat all of the culprits.

THE RESULTS

We found evidence that people who are overweight or obese do consume, on a daily basis, more sugar (by 4.7%). However, they also consumed significantly more fat (14.6%), protein (by 13.8%) and starch (by 9.5%). This results in a significantly higher total daily calories intake (by 11.5%).

We also looked at how much individual macronutrients contribute to the overall intake of calories. We

found that overweight and obese people get proportionally less calories from sugar than people with normal weight (22.0% vs 23.4%), while they get proportionally more daily calories from fat compared to people with normal weight (34.3% vs 33.4%).

In conclusion, our study found that amongst UK Biobank participants, adiposity (for which we used multiple measures), body mass index (BMI), waist circumference and percentage body fat, had the strongest association with total daily intake of calories and then with the absolute and percentage daily intake of fat (i.e. daily intake of fat adjusted for daily total energy intake). The association between obesity and absolute intake of sugar was less strong than other macronutrients. As a non-interventional, cross-sectional study, we could not look at the 'sugar-fat see-saw', but since we can see a low correlation between daily sugar and fat consumption ($r=0.24$) the participants in our study who consume diets with the most sugar tended to consume the least fat and vice versa, suggesting two distinct opposing energy sources.

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UK BIOBANK

UK Biobank is a medical research project, which was set up with the aim of improving the prevention, diagnosis and treatment of a wide range of serious and life-threatening illnesses including cancer, heart diseases, stroke, diabetes, arthritis, osteoporosis, eye disorders, depression and forms of dementia. Between April 2007 and December 2010, UK Biobank recruited 502,628 participants aged between 37-69 years from the general population. Participants attended one of 22 assessment centres across England, Wales and Scotland and provided physical measures, biological samples, and detailed information about themselves and about their lifestyle. They also agreed to be followed and, since the start, participants have provided further measures, including repeated online 24-hour recall dietary questionnaires that were used in this study. For further information about UK Biobank, please visit www.ukbiobank.ac.uk/about-biobank-uk/.

References:

- 1 Institute for Fiscal Studies
- 2 Briggs A et al (2013). Overall and income specific effect on prevalence of overweight and obesity of 20% sugar sweetened drink tax in UK: econometric and comparative risk assessment modelling study. BMJ
- 3 Budget. www.gov.uk/government/publications/budget-2016-documents/budget-2016#fnref:84
- 4 Anderson et al (2016). Adiposity among 132,479 UK Biobank participants; contribution of sugar intake vs other macronutrients. Int J Epidemiol



NUTRICIA
Nutrini
Peptisorb Energy
1.5 kcal/ml

1. Data on file, Nutricia Ltd.
* Gastrointestinal