
Sugar in the diet: is there a sweet spot?

Ms Kim Tikellis, President ILSI Australasia welcomed ~ 85 participants to the seminar.

Mr Bill Shrapnel, Shrapnel Nutrition Consulting, discussed the evolution of the sugar and health debate. He attributed this to 35+ years of Australian Dietary Guidelines health messages focused on low fat and relatively high carbohydrate diet, resulting in insufficient emphasis on lowering sugar intake. While sugar has been noted as a risk factor for developing dental caries by Australian and global health organisations, Mr Shrapnel recommended a more comprehensive review of current literature investigating the health effects of high carbohydrate diets on cardiometabolic health.

Dr Alan Barclay, Consultant Dietitian and Nutritionist, presented the historical perspective of sugars, commencing with honey as our first sweetener. Stone Age evidence of honey consumption is found via ancient rock art in Spain, Northern Australia, Tanzania and DR of Congo.

Dr Barclay explained that high fructose corn syrup was introduced in 1975 - 1985, replacing sucrose as the preferred sweetener in the USA. Alternate sweeteners such as saccharin, xylitol, aspartame, sucralose and stevia were developed. In 2014, a World Health Organization (WHO) meta-analysis showed that increased sugar intake was associated with weight gain but no evidence of a dose-response association was found. Dr Barclay noted that Dietary Guidelines have always recommended strategies to eat less added sugar. In 2015, WHO recommended reduction of free sugars to less than 10% of total energy intake with suggested further reduction to below 5%.

Ms Danielle Baird, Research Project Officer, CSIRO Food and Nutrition, presented data on ‘apparent’ and ‘actual’ Australian sugar consumption. Ms Baird highlighted that defining ‘sugar’ was complex with varying terminologies used in research literature and on food labels. She reinforced the importance of health professionals providing accurate definitions to alleviate consumer confusion. Data sourced from Australian Bureau of Statistics (ABS) and McNeill & Shrapnel showed a decline of 13% in apparent sugar consumption from 1939 - 2011. This trend was also reflected in actual consumption data from the Australian Health Survey 2011-13, which draws on self-reported consumption data from the National Nutrition and Physical Activity Survey 2011/12. Overall, Australians consumed an average 105 grams (g) of total sugar daily, with males being the larger consumer at 116g total sugar /day compared to females at 94g/day.

Professor Luc Tappy, University of Lausanne, Switzerland, presented on the physiological and pathological effects of sugars. He noted that various nutrition recommendations for sugars exist. Sugar is composed of glucose plus fructose and all body cells can use glucose as an energy substrate. Fructose is converted into lactate, glucose or fatty acids in the liver with ~ 5% energy loss. Glucose production and oxidation is slower with mixed meals.
Some epidemiological studies show a positive association between added sugar and sweetened beverages with body weight but this depends on adjustment for energy intake.

**Ms Megan Cobicraft**, Principal Policy Analyst Food Policy, NSW Ministry of Health, presented the steps undertaken by NSW Health to develop a policy position for sugars and implementation recommendations aligned to the NSW Healthy Eating and Active Living Strategy 2013-2018. This includes a review of healthy food provision guidelines for hospitals and schools in NSW using data from the Australian Health Survey 2011/12, and evidence statements from the Australian Dietary Guidelines 2013 (NHMRC). Results were presented from a rapid literature review conducted by the Physical Activity, Nutrition and Obesity Research Group (PANORG), University of Sydney focusing on sugar and health outcomes. There appears to be strong evidence of adverse effects on body weight from consuming sugar sweetened beverages (SSBs), and sufficient evidence to recommend reducing energy dense, nutrient poor (EDNP) food sources with more than 50% of total and added sugars. To substantiate sugar consumption intake data from the Australian food supply, further analysis of dietary data from the Australian Health Survey, and Health Star Rating (HSR) system will be included in the review process. Future health campaigns will promote reducing consumption of EDNP foods and increasing water intake to replace SSBs. A review on utilising the HSR system to support policy implementation will also be completed.

**Ms Sarah Hyland**, Research Director, Colmar Brunton, presented on consumer attitudes, behaviours and trends. She noted that while obesity rates have been increasing globally over time, there is no evidence linking any specific nutrient or food to addictive behavior. In a French study, participants with high sweet taste preferences were less likely to become obese and were more likely to consume natural sources of sugar. The spectrum of sugar control ranges from low to high level. Low level acknowledges that sugar is related to weight and reducing intake is good. The middle level, mostly women, are concerned primarily for children and believe sugar is addictive, may lead to other health problems and tend to limit fruit and use ‘healthier sweeteners’. At the high level, people tend to follow celebrity influencers and may avoid all sugar sources including fruit. She concluded that consumers report being confused and many would like to reduce their sugar intake with proper guidance.

**Professor Luc Tappy** presented an overview of current global sugar research. Epidemiological and short-term studies demonstrated the role that sugar sweetened beverages play in the pathogenesis of metabolic diseases. Although mechanistic and intervention studies suggest high fructose intakes can lead to adverse metabolic effects, no safe upper limit level has been defined. Studies investigating the hedonistic effects of sugar in terms of inducing satiety or appetite stimulation report conflicting results, highlighting the complexities of homeostatic responses underlying physiological responses to food intake, such as the influence of taste receptors. Professor Tappy proposed the need to consider various components such as fibre content, glycaemic load or wholegrain foods, in seeking appropriate carbohydrate sources to replace sugar.

**Ms Caitlin Reid**, Dietitian, Health and the City, presented on what dietitians and consumers need to know. She explained that consumers turn to celebrities and food bloggers for nutrition and wellness advice as the messages are relatable and easily understood. She proposed that credibility of dietitians has over time declined due to their association with food companies. Raising awareness of the role of dietitians in food industry will help increase consumer trust. Consumers on the other hand need to understand that apart from sugar, foods may contain other nutrients such as fat and salt. They need to know that sugar has a number of technical roles in foods, for example enhancing flavor, preservation, fermentation, colour, gelling and increasing softness. She concluded that portion size is the key and added sugar can be enjoyed when eaten in moderation and mindfully.
Panel discussion overview:

1) Sugar consumption data
Concerns regarding the reliability and availability of sugar intake data, particularly in relation to added sugar consumption was raised. This can be alleviated by adopting consistent methodologies for estimating sugar intake and continued comparisons against apparent consumption trends from national surveys.

2) Evidence base for sugar and health
Although fructose is recognized as a non-essential nutrient, it cannot be attributed as the sole factor causing cardiometabolic risk factors. Moderating sugar consumption at 10% of energy intake has shown to have no apparent adverse health effects.

3) Future research
There are recognized gaps underlying homeostatic mechanisms affecting the control of food intake. Further studies are needed to better understand related physiological pathways and responses. Randomized controlled satiety studies using sugar are also a gap.

4) Intense sweeteners / sugar alternatives
Replacing sugar with sugar alternatives / intense sweeteners was discussed. Marketing to commercialise sugar alternatives, such as stevia, has potentially driven anti-sugar messages. Evidence indicates consumption of sugar alternatives in large quantities may result in adverse effects on the gut microbiome.

5) Consumer Messages
Consumers have difficulty understanding nutrition information regarding added sugar, eg food label nutrition information panels. Consumers may benefit from messages promoting associated benefits of whole foods, eg fibre in fruit.

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