


PERSONAL VIEWPOINT

Too much sugar does not just make us fat; it can also make us sick

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COVID, sugar, sugar-sweetened beverage, chronic kidney disease, insulin resistance, metabolic syndrome.

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Received 1 November 2021; accepted 21 February 2022.

Abstract

The post-COVID-19 care era is likely to see a burgeoning of metabolic dysfunction and chronic kidney disease. Attention to self-care, including nutrition, will underpin the management of those affected. The damaging effects of sugar-sweetened beverages are well documented and profound and counter many accepted medical treatments. Government leadership is urgently required with explicit and strong messaging to avoid sugar-sweetened beverages.

I will apply dietetic measures for the benefit of the sick according to my ability and judgement; I will keep them from harm and injustice. (Extract from the classic version of the Hippocratic Oath).¹

In Australia, sugar-sweetened beverages (SSB) (including carbonated and non-carbonated soft drinks, fruit-flavoured drinks and sports/energy drinks) are a major contributor to added dietary sugar. Australians are high consumers of SSB with past week prevalence of 47% and daily prevalence of 14%.² Of all the pre-packaged drinks assessed, consumption of fruit juices (any type) was the most prevalent (39%), followed by bottled water (37%), SSB (29%), artificially sweetened soda (18%), sports drinks (8%) and energy drinks (4%).² The impact is significant: SSB have been associated with a higher risk of obesity, type 2 diabetes, metabolic syndrome, chronic kidney disease (CKD) and cardiovascular disease, linked by the common pathophysiology of insulin resistance.³ Indeed, sugar has adverse health effects beyond obesity. As writes Laura A. Schmidt, 'too much sugar does not just make us fat; it can also make us sick'.⁴

In June 2021 the Australian Medical Association renewed the call for a tax on SSB, a position echoed by the Australian Chronic Disease Prevention Alliance, a group of multiple key stakeholder organisations. A sugar tax, known as soft drinks industry levy, was introduced into the United Kingdom in 2016 and has resulted in a reduction in sugar consumption of 10% without impacting industry sales in a single year.⁵ In Australia, policy documents have been developed to reduce the consumption of SSB⁶ and sugar content of non-alcoholic beverages by 20% by 2025.⁷ However, this approach has been rebuked by some as too slow⁸ so far achieving a 12% reduction in sugar consumption over 6 years to 2020.⁷ The report also noted a slowing in progress in the second half of 2020 as sales rebounded as COVID-19 lockdowns eased⁷ and data for 2021 are yet to be released.

Kidney Health Australia is the national organisation for kidney health with the vision of achieving good kidney health for all Australians. CKD has emerged as a global health burden. In Australia, one in 10 people have biomedical evidence of CKD with an estimated glomerular filtration rate (eGFR) of less than 60 mL/min/1.73 m² that has been present for at least 3 months and/or evidence of underlying kidney damage.⁹ The burden of disease is greater in Aboriginal and Torres Strait Islander peoples with a prevalence that is among the highest in

Conflict of interest: None.

the world with rates of kidney failure over six times that of non-indigenous Australians.⁹ The impact of CKD is significant costing the economy over \$5 billion a year and is a factor in 16% of hospitalisations.⁹ While CKD may progress to kidney failure that may be treated with dialysis or transplantation, many more with CKD will die prematurely, mostly of cardiovascular disease.⁹ The health, economic, societal and personal impacts of these statistics are sobering.

Insulin resistance is an early metabolic change in patients with CKD, being apparent when the glomerular filtration rate is still within the normal range and becomes almost universal in those who reach kidney failure.¹⁰ The evidence from animal and epidemiological studies of the adverse effect of SSB, specifically fructose, on kidney health is growing. In the remnant kidney model in Sprague–Dawley rats, fructose potentiated kidney injury with glomerular sclerosis, tubular atrophy and dilatation manifesting with proteinuria and CKD was accelerated.¹¹ Epidemiological studies have revealed a positive correlation between a Western-style dietary pattern with poor metabolic health, including CKD. A systematic review and meta-analysis of five studies that focussed on sugar consumption through the proxy of SSB consumption, indicated an increased relative risk of 1.58 (95% confidence interval (CI) 1.00–2.49) for kidney disease.¹² A unique epidemiological data set arising from the Blue Mountains Eye Study has allowed an estimation of prevalence and incidence of CKD in the context of carbohydrate nutrition. Among 2600 participants aged ≥ 50 years, those consuming energy-dense but nutrient-poor carbohydrates at baseline were more likely to have CKD defined as an eGFR < 60 mL/min/1.73 m² (odds ratio = 1.55 (95% CI 1.07–2.26)) and threefold higher risk of incident CKD over the ensuing 5 years.¹³

These data have led Kidney Health Australia to explicitly provide the advice to ‘avoid high calorie sweetened carbonated beverages at all costs’ in the CKD Management in Primary Care handbook (4th edition).¹⁴ A similar stance and ban on SSB has been implemented by several recreation centres¹⁵ and health services across Australia in recognition of their harmful health effects. Wider adoption of this public health approach requires the support of the Australian government and alignment of the National Dietary Guidelines, which are currently under review. The current guidelines advise to ‘limit intake of foods and drinks containing added sugars such as sugar-sweetened soft drinks and cordials, fruit drinks, vitamin waters, energy and sports drinks’.¹⁶ As the dietary guidelines are currently under review, the timing is opportune to be explicit on the need to avoid SSB.

Perhaps there are lessons to be learnt from the multi-pronged approach to tobacco control. A series of

smoking and tobacco laws in Australia, which include a tax on tobacco products, advertising bans, laws on smoking in public places and age limits on who can purchase tobacco, has led to a reduction in the prevalence of smoking and averted many lung cancer deaths. Aiming for zero smoking by 2025 is projected to result in 360 000 more lung cancer deaths being averted by 2100.¹⁷ These strategies have changed the norm regarding tobacco use and reduced the prevalence of smoking as a risk factor for chronic diseases. Could a similar tactic targeting SSB consumption, sugar content of SSB and a soft drink tax, be effective in improving the health and well-being of Australians?

There is a pressing urgency to address this issue. A bidirectional relationship between poor metabolic health and COVID-19 has emerged: metabolic disease potentiates the severity of COVID-19, and infection with the SARS-CoV-2 exposes metabolic frailty.¹⁸ The post COVID-19 infection era will likely focus the spotlight on poor metabolic health¹⁹ and the sequelae of the pandemic will be seen for years to come. Drawing on the experience of survivors from severe acute respiratory syndromes, long-term metabolic abnormalities were evident and included insulin resistance, hyperglycaemia, diabetes, cardiovascular disease, fatigue, depression and sleep disorders.²⁰ Further, the prevalence of CKD is likely to soar in the post-COVID-19 era with emerging data demonstrating progressive and more rapid kidney dysfunction in COVID-19 survivors across the spectrum of severity of infection, including mild disease not requiring hospitalisation, compared to those not infected.²¹ In 2019 there were ~ 27 000 Australians living with a kidney transplant (12 815) or receiving life-supporting therapy with dialysis (13 931) for kidney failure.²² Over 3000 Australians commenced dialysis in 2019 alone.²² Our health system cannot accommodate the inevitable surge in people with kidney failure that will follow as we move into the post-COVID-19 era.

The emphasis of management must therefore turn to slowing the progression of kidney disease and associated poor metabolic health that will characterise post-COVID-19 care prioritising self-care and modifying lifestyle factors ensuring adequate sleep, physical activity and social connection.²³ Attention to the diet adjusted to prevailing insulin resistance will be fundamental. There is evidence in those with CKD, which highlight the importance of diet in modifying CKD progression. Recent observational data on a cohort of 143 participants with type 2 diabetes and mild CKD, in which added sugar was completely removed from the diet, in addition to starchy carbohydrates, showed an improvement in kidney function in two-thirds of the cohort over 30 months.²⁴ These data support previous reports where patients with type

2 diabetes and stage 2–3 kidney disease were allocated to a carbohydrate-restricted (35%), low-iron available, polyphenol-enriched (CR-LIPE) diet or control and followed for ~4 years. The CR-LIPE diet was 40–50% more effective than standard protein restriction in improving kidney and overall survival rates.²⁵ Furthermore, in overweight/obese adults without diabetes, reducing the glycaemic index (GI), a measure of carbohydrate quality and surrogate for the amount of glucose released into the circulation, and/or the percentage of calories from carbohydrate in the diet (to 40%), improved kidney function as compared to a high GI and high carbohydrate (58%) diet.²⁶

The syndemic of poor metabolic health, kidney disease and post-COVID syndrome, on top of the existing burden of chronic conditions, is likely to define health care service delivery over the next decade or more. There is an urgent need to flip the current paradigm of the treatment of illness to one of salutogenesis, an approach to

health that encompasses physical and mental well-being even in the face of adversity or stressful conditions. The first pillar of management of all chronic disease is attention to self-care, of which nutrition is fundamental. The adverse health effects of SSB are irrefutable with over 8000 studies linking sugar consumption to a range of chronic diseases. It is time for our government to action to raise awareness among the Australian public of the life-changing and life-threatening dangers of SSB consumption. This strategy has the potential to improve the health and well-being of thousands of Australians.

Acknowledgements

Open access publishing facilitated by Deakin University, as part of the Wiley - Deakin University agreement via the Council of Australian University Librarians.

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