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ARTICLE

Sugar sweetened beverages, obesity, diabetes and oral health: a preventable crisis.

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Introduction

Sugar sweetened beverages (SSBs) are a leading risk factor for many non-communicable diseases (NCDs) especially obesity, type II diabetes and tooth decay. Over the past decade, the consumption of sugar sweetened beverages (SSBs) has dramatically increased both globally and in New Zealand and the Pacific. Besides having no nutritional value, SSBs displace healthier beverage options. SSBs are cheap, readily available and accessible, and are one of the most widely advertised products, particularly to children, adolescents, and low income groups. It is suggested that the response to SSBs follows that of tobacco and alcohol where legislation and regulation are essential components of policies to curb their use. A tax of 50% on SSBs, advertising restrictions, sponsorship bans, restrictions of sale, and the formation of a agency to promote health, modelled on SmokeFree New Zealand are some of the policy options required in order to address the tsunami of SSB-related diseases are overwhelming the health system.

Sugar Sweetened Beverages: consumption and trends

SSBs include soft drinks, sports drinks, energy drinks, fruit drinks, flavoured milk and other beverages that contain added caloric sweeteners. Globally, soft drink consumption increased from 36 litres per person per year in 1997 to 43 litres in 2010. A 1 % rise in soft drink consumption has been shown to be associated with an additional 4.8 overweight adults per 1001.

New Zealanders, on average, consume 53.8kgs of sugar per person per year[2], equivalent to 37 teaspoons of sugar per person per day. The World Health Organisation recommends that free sugars should contribute to no more than 10% of total energy intake, equivalent to approximately 12 teaspoons of sugar for an average adult[3]. New Zealand has one of the highest consumption rates of sugar in the western world. SSBs are the leading source of sugar for New Zealand children[4]. Findings from the 2008/2009 New Zealand Adult Nutrition Survey indicate that Pacific people living in New Zealand are significantly more likely to consume soft drinks or energy drinks compared with non-Pacific people, and women in particular.[5] The survey also found that people living in deprived areas were more likely to consume soft drinks and energy drinks than people living in the least deprived areas.

The ongoing Pacific Islands Families Study, now into its 13th year, has uncovered some concerning statistics in regards to Pacific children's soft drink consumption. Three out of four 9 year old Pacific children had consumed soft drinks in the previous week. Of particular concern, 62% of 2 year old Pacific children and 21% of one year old Pacific children had consumed an SSB in the previous week[6]. The Youth 2007 study which surveyed youth from all ethnic groups, found that 49% of Pacific youth consumed 4 or more soft drinks per week compared with 39% of Maori, 25% Asian and 23% NZ European [7].

Health effects of sugar sweetened beverages

New Zealand and Pacific Island countries are in the midst of an obesity epidemic. New Zealanders are the third most overweight and obese population in the OECD8 and ranks 12th globally[9]. More than a third (37%) of all New Zealanders aged over 15 are overweight and just over a quarter (27%) are obese[10]. Maori and Pacific New Zealanders have obesity rates of 45 per cent and 58 per cent respectively making obesity an important cause of health inequalities. One in five NZ children aged between 2 - 14 years are overweight and one in twelve are obese (8%). Adjusted for age, Pacific children are at least 2.5 times more likely to obese than children in the total population[11].

SSBs are associated with displacement of healthy beverages, poor nutrition and an increase in risk for obesity and diabetes[11 12.] One observational study found that for each extra can or glass of SSB consumed per day, the likelihood of a child becoming obese increases by 60%[13]. SSB consumption is also linked to a decreased bone density[14]. Because caffeine is a common ingredient in many SSBs, their consumption has also been linked to other health issues such as headaches, anxiety and loss of sleep[15]. There is also mounting evidence that sugar is addictive[16]. Interventional studies reveal that a reduction in SSBs leads to an improvement in health[17 18].

Reducing SSB consumption is especially important for

Pacific people because diabetes occurs far more frequently in Pacific people than in others[19]. For example in 2007, 10% of Pacific people in New Zealand aged over 15 years were diagnosed with diabetes. This was three times the diagnosis rate for the total New Zealand Population[11].

Oral health conditions have significant physical, social and health implications; good oral health is critical to general health and well being[20]. Dental caries, also known as tooth decay, is the most prevalent chronic and reversible disease in New Zealand and is a significant cause of health inequalities. Maori, Pacific people and people living in areas of high socioeconomic deprivation have the worst oral health outcomes[21]. In NZ, dental caries is one of the most common reasons for children's admission to hospital. The rate of admission to hospital for dental care has more than doubled in the period 1990 - 2009[22].

A diet high in sugar is a leading cause of dental caries. Dental caries occurs when bacteria coating the teeth (known as plaque) come into contact with sugar in the mouth and acid is produced. It is this acid that results in tooth decay. There is a clear correlation between the amount and frequency of sugar consumed and dental caries[23]. SSBs, particularly soft drinks, have been identified as a major source of added sugar; consumption of SSBs significantly increases the chance that a child or adult will develop tooth decay[24]. There is a significant relationship between obesity and dental caries in children in industrialised nations[25].

Dental erosion is a widespread and increasing problem globally[26]. Dental erosion arises from the chemical wear of hard tooth tissue as a result of extrinsic or intrinsic acids acting on plaque-free tooth surfaces[27]. The most common extrinsic acids that can lead to erosion are dietary acids contained in SSBs such as phosphoric acid and citric acid[28]. SSBs are particularly damaging to teeth due to their high level of sugar and their acidic nature.

Artificially sweetened beverages and alternative drinks: are they healthier?

The term "diet" beverage is used to describe beverages that are sweetened with artificial sweeteners. Aspartame is one of the most common forms of artificial sweeteners.

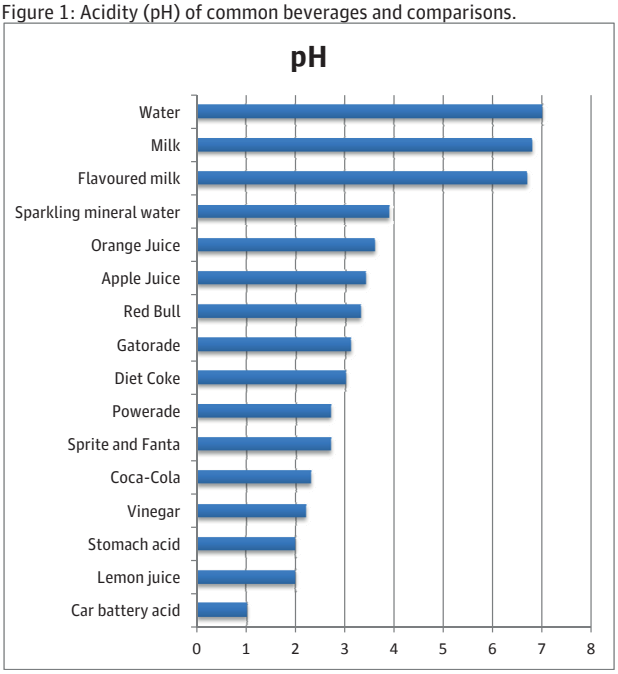
Artificially sweetened beverages, along with SSBs, displace healthier beverage options. "Diet" soft drinks are also of significant concern due to their ability to maintain a taste for sweetness which often leads to poor diet; consumers of artificially sweetened beverages often avoid healthy foods that are less sweet. The promotion of diet beverages as healthy alternatives is ill advised, as they may have unintended deleterious impacts[29]. They may be free of calories but not of consequences, especially to the teeth.

Although flavoured milk has a low acidic level similar to unsweetened milk and water, it is classified as a SSB because of the high added sugar content. A standard 600ml bottle of flavoured milk contains 15 tsp of sugar, almost the same as in a standard soft drink (17 tsp of sugar). Even though there is some nutritional value in consuming milk, it is not recommended as a main source of milk for children. In contrast, Coca-Cola is very acidic (low pH), slightly less acidic than vinegar or lemon juice. See Figure 1.

A standard 750ml "sports" drink contains 15 tsp of sugar which is equivalent to 1050kJ of energy which would take an average 70kg male approximately an hour of fast walking to burn off. Sports drinks, such as Powerade and Gatorade, also generally contain citric acids, which contributes to dental erosion. Sports drinks are also high in sodium levels. Sports drinks are an unnecessary form of rehydration for the vast majority of the population and drinking water after exercise is more effective than sports drinks in replacing fluid[30].

Natural juice is not considered to be a SSB as no sugar is added to the product. However, juice is still high in sugars and citric acids, and has been associated with tooth decay, dental erosion and obesity.

Figure 1: Acidity (pH) of common beverages and comparisons.



Strategies to reduce SSB consumption

Reducing population levels of sugar consumption is a complex and challenging task. However, targeting SSBs is an appropriate place to start because of their deleterious health impacts and the fact that they are an unnecessary part of our diet. Lessons can be learned from experience with tobacco control; SSBs need to be controlled in the same way. In 2011 the UN high level summit on non-communicable disease recognised a role for food taxes1 and several countries have introduced increases in taxes on SSBs. In the UK the Academy of Medical Royal Colleges called for a 20% tax on SSBs as part of its 2012 enquiry into the obesity epidemic[2].

There is no single solution to the problem. Comprehensive approaches are required and these include advertising, sponsorship and marketing bans, limits on portion sizes, limitations on where SSBs are sold, improved labelling and reformulation of unhealthy products.

Government intervention, including taxation, is justified due to the significant detrimental impact of SSBs and associated diseases, both to individuals and to society as a whole. The same argument has been applied for tobacco and alcohol. GST is already levied on foods and beverages, thus a proposed tax on sugary drinks would be an adjustment to existing policy

rather than a change of policy.

Significant increases in the cost of SSBs through added taxes, as shown with tobacco, have the largest potential to reduce SSB consumption. Modest taxation levels on SSBs would raise substantial revenue and would have a significant impact on obesity levels, especially among children. A recent study concluded that a 20% tax on SSBs could reduce the number of obese and overweight people in the UK by 465,000 (180,000 obese people and 285,000 overweight people)[3] and the greatest reduction in obesity would occur among young people and that health gains would be similar for all income groups.

A recent New Zealand study on price elasticity estimated that a 10% tax on carbonated soft drinks would lead to a 13% decrease in these beverages across the population and concluded that low-income groups appear more sensitive to price changes in a similar way to tobacco price elasticity, thereby helping to reduce inequalities[4].

Taxes on SSBs have been implemented in the US, Mexico, France, Cook Islands, Fiji, Samoa, Nauru and French Polynesia. The highest tax thus far is in Nauru at 30%. In order to make a significant impact, a 50% tax on SSBs in New Zealand would be an appropriate response to the crisis. New Zealand would again become a world leader as in the field of tobacco control with the 1990 Smokefree Legislation and the Smokefree 2025 goal.

Barriers to progress

Numerous barriers to effectively tackling SSB consumption have been identified. They include a lack of political will at local and national level. To date no city or district Council in New Zealand has instigated a ban on SSBs on their properties or at their events. Sponsorship of schools and sports by SSB companies is endemic in NZ (for example Coca-Cola and Powerade's sponsoring the All Blacks). A lack of an alternative sponsor has been identified as a significant barrier to ceasing such sponsorships. Lack of clear labelling and warnings on SSBs is a barrier to increasing awareness about the amount of sugar contained with SSBs. Another significant barrier is the price of SSBs which are cheaper, and more profitable, than healthier alternatives.

Another barrier is that members of the dental professional have been influenced by the sugar industry. In 2003 the American Academy of Paediatric Dentistry accepted US$1 million from the Coca-Cola Company[5]. Later that year the Academy stated that "scientific evidence is not clear on the exact role that soft drinks play in terms of children's oral disease". This contradicts their previous statement "consumption of sugars in any beverage can be a significant factor that contributes to dental caries".[6] Unfortunately, even in New Zealand some dentists continue to advise the Sugar Research Advisory Service (SRAS) and the Coca-Cola company; this is a contradiction to their health promoting roles.

Discussion about the merits of advocating for substitution of sugary drinks with sugar-free alternatives is also a distraction, if not a barrier[7]. Ideally SSBs should be substituted with water and unsweetened milk; the substitution of SSBs for artificially sweetened beverages could, however, be a stepwise process to address the health impacts of SSBs.

Perhaps the greatest barrier will be the sugar industry itself which has vested interests in maintaining the status quo. The industry actively manipulates the sugar content in SSBs to create a "bliss point" where the beverage isn't too sweet but is just enough that consumers want more[8]. The industry contributes to the escalating economic costs of obesity, diabetes, and poor oral health in New Zealand and the Pacific and it is appropriate that the Government takes strong measures to reduce the impact of cheap SSBs. It is likely that the industry will suggest that government led policy interventions reflect a "nanny" state. In fact, political actions are an example of responsible government acting on behalf of its most vulnerable citizens, especially children.

Goal of a SSB Free New Zealand by 2025

The steps needed to ensure a SSB Free New Zealand by 2025 are highlighted. They include moving the policy response to SSBs up the political agenda, both at the local and national levels. The establishment of a Health Promotion Fund/Organisation based on SmokeFree New Zealand would be a critical step in order to replace existing SSB company's sponsorships. Banning SSBs on all Government, Council, school and University premises would be another proactive step. Taxing SSBs at 50% and limiting sales to certain locations, away from schools in particular, would also help reduce consumption. Another policy measure would be to mandate that each SSB container has a warning on the label. For example on a 1.5l bottle of soft drink the label would read: "Warning: this bottle contains 40 teaspoons of sugar".

Conclusion

A range of policy responses is urgently required to reduce the rates of NCDs and the widening inequalities of these diseases. One obvious policy option to consider is the introduction of a tax on SSBs. This would help address the problems arising from consumption of SSBs, including tooth decay, obesity and type II diabetes. In the current economic crisis it would also help raise revenue for the Government, part of which could be channelled to help prevent and treat the diseases that consumption of SSBs cause.

The adverse health consequences associated with SSB consumption relate to conditions that are higher in Pacific people compared with other ethnic groups in New Zealand. SSBs are unique in that they have no nutritional value to the consumer, they contribute more calories to the diet than any other product, and the association between SSBs and obesity is stronger than for any other food or beverage. In other words, SSBs may be the most important driver of the obesity epidemic[17]. It is recommended that the New Zealand Government introduce a 50% tax on SSBs and create a Health Promotion Fund to support the full range of NCD policies and programmes.

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