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Invited Commentary

Healthy beverage initiatives in higher education: an untapped strategy for health promotion

Sugar-sweetened beverages (SSB) are the largest source of added sugar and a leading contributor of dietary energies[1]. Intake of SSB promotes dental caries, obesity and obesity-related comorbidities (type 2 diabetes, abnormal cholesterol and fatty liver disease) and is associated with a higher risk of mortality[2,3]. The COVID-19 pandemic has increased the urgency of strategies such as SSB reduction, to prevent obesity and related comorbidities. Obesity has been identified as an independent risk factor for susceptibility to infection and severity of illness from the severe acute respiratory syndrome coronavirus-2[4]. Given the second pandemic of 'covibesity' that is looming, there is no time like the present to think creatively about prevention[5].

In their article, 'The University of British Columbia Healthy Beverage Initiative: Changing the beverage landscape on a large postsecondary campus', Sebastiano *et al.* describe the evaluation of a campus Healthy Beverage Initiative (HBI)[6]. The HBI included (1) renegotiation of the campus beverage contract to allow for limited marketing of SSB, (2) a multi-media campaign to promote intake of tap water and (3) removal of SSB from a residential hall. The study found that the HBI did not lead to a decrease in beverage revenue or result in compensatory purchases of SSB from nearby retail locations that continued to sell SSB. There was also little resistance to the HBI efforts from students, faculty and staff[6].

This university-wide effort naturally flows from a long history of successful efforts to reduce SSB consumption through environmental interventions in primary and secondary schools. In an effort to reduce consumption of SSB among children to promote lifelong health, many jurisdictions globally have passed policies to restrict SSB access in schools[7]. In the USA, for example, the 2010 Healthy, Hunger-Free Kids Act established national nutrition standards (Smart Snacks) for all foods and beverages sold in schools[8]. With regard to beverages, Smart Snacks standards do not allow SSB (except flavored milks) in elementary or middle schools and only allow low-energy drinks with added sugar (a maximum of 167·36 kJ (40 kcal) per 8 oz or < 251·04 kJ (60 kcal) per 12 oz) in high schools. Studies suggest that healthy snack and beverage standards, including Smart Snacks, can decrease consumption of SSB and may be cost effective[9,10]. Despite such benefits, there has been limited adoption of beverage standards in post-secondary educational settings.

Although previous studies, primarily conducted in primary and secondary school settings, suggest that SSB restrictions can reduce intake of SSB, bundled initiatives are likely needed to achieve the substantial reductions in SSB intake that can significantly impact health[11,12]. Here we highlight effective strategies to reduce SSB intake, gleaned from previous school and home-based studies, that hold promise for future HBI in post-secondary educational settings[13].

One such strategy is to pair an SSB sales ban with an initiative that increases healthy beverage alternatives. Limited studies in primary and secondary schools suggest that increasing access to appealing, safe drinking water is a promising strategy for promoting intake of water[14–16], reducing intake of SSB[14,17] and preventing obesity[18,19]. Coupling SSB sales bans with increased access to drinking water may also help in increasing the acceptability of bans. Indeed, in their study, Sebastiano *et al.* found that increasing access to free drinking water was most popular among a range of HBI initiatives proposed[6].

In previous studies, installing drinking water sources, such as reusable water bottle stations that have more appeal and function, has been more effective for increasing water intake than traditional drinking fountains[15,16,18,19]. Providing drinking vessels is another important approach for encouraging water intake[14]. As a part of their sustainability efforts, the University of Michigan instituted a comprehensive programme that included (1) installing over 300 reusable water bottle filling stations across the campus, (2) implementing a campaign to promote use of reusable water bottles and (3) supplying all incoming freshman with a reusable water bottle. A longitudinal evaluation of the initiative found that it was successful in decreasing the use of single-use bottled water and increasing the use of reusable water bottles among students[20].

According to data from the National Health and Nutrition Examination Survey, rates of tap water avoidance are increasing, particularly following the Flint drinking water crisis which exposed Detroit residents to unsafe levels of lead, a potent neurotoxin[21,22]. While the majority of tap water in developed countries is regularly tested for

safety by water suppliers, lead can still enter drinking water at the tap through lead-laced plumbing, solder or fixtures in older buildings. Many US states have implemented policies to test for lead in school drinking water[23]; yet, similar efforts are limited in post-secondary educational institutions. In 2016, the University of California, San Francisco (UCSF)[24], implemented a novel programme to test drinking water for lead across its campus and medical centre locations[24]. As expected, older campus buildings did have some locations that sampled above the EPA Action level of 20 parts per billion (ppb). However, no samples with elevated lead were found in newly constructed campus buildings. Results were communicated with faculty, staff and students, and all drinking water sources with lead exceedances were remediated.

Another component that could be bundled into SSB reduction efforts involves modelling of healthy beverage intake by parents/guardians, teachers, peers and other respected role models[13,25]. Interventions that have incorporated influential peers as educators have successfully curbed SSB intake in a variety of settings[26,27]. Given that no post-secondary educational interventions have incorporated this HBI strategy, this could be yet another area for further investigation. Given the billions of dollars that is spent on marketing SSB to young people each year and the heavy marketing of SSB by celebrities and athletes[28], innovative approaches to promote healthy beverages and model healthy beverage intake are needed.

Other than the study by Sebastiano *et al.*, there is only one other published evaluation of a multifaceted HBI on a post-secondary educational campus, which occurred at UCSF[29]. Unlike the efforts at the University of British Columbia which focused the sales ban on a single residential dining hall, the UCSF initiative eliminated sales of SSB across all campus and medical centre venues. Another unique feature of the UCSF HBI was the addition of an educational counselling intervention focused on reducing campus employees' SSB intake at home, a key setting targeted by previously successful SSB reduction interventions[30]. Employees who reported heavy consumption of SSB (drinking at least 360 ml or 12 fl oz of SSB daily for the past three months) on a baseline survey were randomised to receive a brief motivational intervention targeting reductions in SSB intake or to a control group that received no educational intervention. Those exposed to the SSB sales ban and the brief motivational intervention had greater reductions in SSB intake and improvements in cardio metabolic health (decreases in waist circumference, total cholesterol, insulin and insulin resistance) than those who were exposed to the sales ban alone. In a cost analysis, the ban was projected to lead to healthcare savings over time[31], and a separate study found that the initiative is likely to reduce the university's footprint of greenhouse gas emissions[32].

College and university campuses are a critical setting for obesity prevention in young adults[33]. Meta-analyses have confirmed that students experience significant weight gain during this time related to stress, increased alcohol consumption, unhealthy eating patterns and a more sedentary lifestyle[33]. Emerging data, including results from a single study of US college students, demonstrate increases in screen time and energetic intake and decreases in physical activity that could lead to energy imbalance during the pandemic[34]. As Sebastiano *et al.* note, HBI initiatives in post-secondary educational institutions have the ability to alter beverage intake patterns and health during a critical time when young adults have increased autonomy over their dietary choices[6]. Moreover, since many students live in college and university campuses, HBI efforts in post-secondary educational settings are also unique in their ability to impact students' 'at home' SSB consumption.

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