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Invited Editorial

Focus on sugar-sweetened beverages

The rising contribution of sugar-sweetened beverages (SSB) to the human diet is a relatively recent phenomenon. One report estimated that US consumption of SSB rose from 40 to 187 litres per person per annum in just five decades[1]. While consumption appears to be levelling off in recent years, today still millions of persons around the world consume as much as 20 % of their daily energy in the form of caloric fluids.

SSB have been the focus of concern because of the global obesity epidemic, today affecting over 1·4 billion people, particularly in low- and middle-income countries. Childhood obesity has increased worldwide by 54 % since 1990, and it is estimated that there are currently over 42 million children <5 years of age with excess body weight[2], over 80 % of them residing in low- and middle-income countries[3]. In the USA, childhood and adult obesity remain among the highest of developed nations[4].

Health effects

Since obesity is the result of an excess in dietary energy intake relative to energy expenditure, food intake and physical activity are two major targets for prevention interventions. At the same time, it is recognized that the global diet profile shows an undesirable trend towards more consumption of refined carbohydrates and animal fat, and less fruits and vegetables[5]. Consumption of beverages sweetened with sucrose or high-fructose corn syrup is another component of this trend. A number of observational and randomized studies have documented the adverse effects of SSB on risk of obesity[6], type 2 diabetes[7] and high blood pressure[8]. In this issue of *Public Health Nutrition*, a systematic review by Keller *et al.* confirms the association of SSB consumption with vascular risk factors[9]. In another article in this issue, Bigornia *et al.* present strong evidence that consumption of SSB also correlates with gain in central and total adiposity in adolescents[10].

Sugar-sweetened beverage consumption

As the global obesity epidemic is affecting more and more prominently lower-income populations, so does the consumption of SSB. Globally, low- and middle-income countries are at the top in per capita SSB consumption, as shown by surveys in Mexico[11] and Brazil, as reported by Pereira *et al.*[12] in this issue.

The ubiquitous presence of SSB in our daily life provides plenty of opportunity for excess consumption, aided by powerful advertisement campaigns linked to professional sports and movie celebrities. Children's exposure to SSB advertising is substantial and appears to be more intense for minorities and less-educated families, as shown in this issue by Kumar *et al.*[13].

The emergence of SSB as a major contributor to total energy intake poses novel issues for human energy balance and for the interactions between energy and fluid needs. It should be pointed out that healthy persons can fulfil their daily energy needs without having to consume caloric fluids, i.e. fluid needs can be met by consuming exclusively calorie-free liquids[14]. Obviously, this is a crucial public health consideration for any population with a high prevalence of excess weight. Furthermore, some studies have shown that energy consumed in fluid form is poorly recognized by the system regulating energy balance, which may result in excess involuntary energy intake[15]. On this topic, an interesting interaction between solid foods and fluid intake is shown in the article in this issue by Yang and Chun[16]. The finding that individuals who consume more water have a healthier dietary profile is another powerful reason to recommend water instead of caloric beverages to fulfil fluid needs.

The paper by Skreden *et al.* in this issue deals with the changes in beverage intake in pregnancy[17]. Remarkably, 15 % of the women in the sample reported that they did not drink water daily. Since most women reduced or abstained from alcohol during pregnancy, it is of concern that alcoholic beverages were replaced by caloric soft drinks, particularly in overweight women.

The article in this issue by Bryant *et al.* underscores the importance of cultural factors on SSB consumption[18]. In a convenience sample of UK households, the authors found about three times more consumption of SSB in Pakistani than white British homes. These ethnic differences in SSB consumption are consistent with those found among Hispanics, African Americans and white groups in the USA and elsewhere[19]. It is likely that these differences are mediated in part by socio-economic factors.

Action to reduce consumption

While many aspects of SSB effects on health remain to be elucidated, there is a growing consensus that the available information is sufficient to support immediate action to stop adverse dietary trends, with reduction of SSB consumption as a priority. Some of the countries with the highest SSB consumption per capita have begun to take action. Mexico, which has one of the highest per capita

consumptions of SSB in the world, enacted an SSB tax last year, as part of legislation also taxing selected unhealthy ('junk') foods and promoting consumption of water instead of SSB. Similar legislations have been passed or are under consideration in several countries in Latin America[20]. In the USA several initiatives at the state and local levels are undergoing debate and testing through the legislative and marketing process.

The articles included in this issue of *Public Health Nutrition* cover many of the key aspects related to SSB consumption, its health effects and the impact of socio-cultural and marketing factors. They represent a timely contribution to research in this area, and will further cement the foundations of ongoing and future public health policies aimed at improving diet quality to reduce disease burden of future generations.

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