What young Australians think about a tax on sugar-sweetened beverages

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Abstract

Objective: To determine support for a tax on sugar-sweetened beverages (SSBs) among young Australian adults and the potential impact on SSB consumption if a tax is introduced.

Methods: Cross-sectional convenience survey of Australians aged 18–30 years sampled in the City of Greater Geelong, Australia, in November–December 2017.

Results: A total of 1,793 responses were recorded. Overall, 48% supported a tax on SSBs, which increased to 74% and 72% if tax revenue was allocated to subsidising fruit and vegetables or funding community exercise facilities, respectively. If a tax of $0.40/100g of sugar were introduced, 53% of participants would reduce their SSB consumption and most of this group (63%) reported that they would consume more water instead. Participants who consumed SSBs more frequently were less likely to support a tax or reduce their consumption. Gender, obesity and SES were not associated with support for a tax.

Conclusions: Most young adults supported the idea of a tax on SSBs if tax revenue would be used to support healthy eating or physical activity. If a tax was introduced, most indicated that they would reduce their SSB consumption and substitute water for SSBs.

Implications for public health: Policymakers can expect support from young people should an SSB tax be introduced in Australia.

Key words: beverages, obesity, young adult, tax, public health

Australia is in the midst of an obesity epidemic, with two-thirds of adults and more than one-quarter of children either overweight or obese.[1] Obesity is a well-established risk factor for many non-communicable diseases such as type 2 diabetes mellitus, ischaemic heart disease, stroke, musculoskeletal disease and cancer. These complications result in substantial costs to society, with direct costs estimated to be above $21 billion each year.[2] Furthermore, obesity is set to increase, with approximately one-third of children and three-quarters of adults predicted to be overweight or obese by 2025.[3]

The consumption of sugar-sweetened beverages (SSBs) is a significant contributor to obesity.[4] In Australia, the highest consumers of SSBs are teenagers aged between 14 and 17, followed by young adults aged between 18 and 30, with males generally consuming more than females.[5] SSBs have a high energy content with minimal nutritional value and, as such, interventions to reduce their consumption have been proposed as a way to reduce obesity.

One such intervention used internationally has been the introduction of a tax on SSBs.[6] Impact analysis from Mexico and Berkeley has shown a 12% and 21% decrease, respectively, in SSB consumption over a 12-month period following tax introduction.[7,8] In Australia, economic modelling has predicted that an SSB tax of $0.40/100g of sugar would decrease SSB consumption by approximately 15%, resulting in a 2% fall in obesity rates, while also raising $500 million in tax revenue for the Australian Government.[9] Despite the growing body of evidence on the positive impacts of an SSB tax on public health and its potential to raise public revenue, no such policy has been introduced and the potential tax has frequently been dismissed by the Australian Government.[10] This raises the question of the political feasibility of an SSB tax in Australia and the need for more public opinion on the issue.

Support for SSB taxation varies significantly within and between countries. In the US, support for an SSB tax is predicted to be between 22% and 50% and associated with certain demographics including age, gender, body mass index (BMI), income and educational status.[11-13]

In the UK, it has been predicted that a tax on SSBs is likely to have the greatest impact on young adults under the age of 30.[14] In Australia, no data is available on the opinions of this high-risk consumer group towards an SSB tax, and whether their opinions are associated with the same demographic characteristics as seen in other countries. It also remains unclear as to the impact a tax might have on their consumption.

The purpose of this study was to determine the level of support for a tax on SSBs among Australians aged 18–30 years and whether the introduction of a tax would affect consumption.

Methods

Data collection

A cross-sectional anonymous survey was conducted using convenience sampling of participants in the City of Greater Geelong in Victoria, Australia, between November 26 and December 18, 2017. The City of Greater Geelong has a population of more than 238,000 people and is one of the largest non-capital cities in Australia.[15] It contains a mix of

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rural, suburban and metropolitan populations with significant diversity in socioeconomic status (SES) and is broadly representative of the wider Australian population.[15,16]

We targeted 1,700 participants, or approximately 4% of the Geelong population, aged 18–30 years.[15] Potential participants were approached by data collectors in public locations throughout the City of Greater Geelong, including shopping centres, train stations, hospitals, university campuses and a large sporting event. The purpose of the study was explained to each participant, with verbal consent gained prior to completion of the survey. Participants were included if they were between the ages of 18 and 30 years (inclusive), spoke English and were residents of the City of Greater Geelong. Residence was ascertained through postcode. Ethics approval was obtained from the Human Research Ethics Committee at Deakin University (Approval number HEAG-H 166_2017).

Instrument and variables

We developed a 20-item researcher-assisted survey to ascertain young people's views (see Supplementary File 1). The survey was tested for comprehension with members of the community prior to dissemination. As there is no international consensus on the definition of SSBs, for this study, SSBs were defined as non-alcoholic, water-based beverages with added sugar, in line with the Grattan Institute.[9] This includes non-diet soft drinks, sports drinks, energy drinks, flavoured mineral waters, fruit drinks and cordials. Drinks that did not meet the criteria of SSBs were classified as non-SSBs, and included water, artificially sweetened drinks such as zero-sugar soft drinks and sports drinks, flavoured milk, coffee and tea. This definition was explained to participants and was included on the survey form. Views on an SSB tax and its potential impact on consumption levels were captured using a 5-point Likert scale from 'strongly disagree' to 'strongly agree'. To assess the impact of a tax on consumption levels, we used a tax of $0.40/100g of sugar, as recommended by the Grattan Institute.[9] A diagram was included on the survey, which modelled the expected price increases of several commonly available SSBs based on this tax (see Supplementary File 1). Participants were shown this diagram by data collectors prior to commencing the survey.

Sociodemographic characteristics included in the study were gender, weight status based on BMI, and SES. BMI was calculated from self-reported height and weight and was grouped into three categories: BMI of <25 kg/m^2 was classified as 'normal'; 25-30 kg/m^2 as 'overweight'; and ≥30 kg/m^2 as 'obese', based on the WHO definition of obesity.[17] Self-reported consumption and BMI have been used in similar studies exploring views on SSB tax policy.[11,13,18] Postcodes were used to determine participants' SES using the Socio-Economic Indexes for Areas (SEIFA) decile scoring system based on the 2011 census provided by the Australian Bureau of Statistics.[19] Suburbs within deciles 1–3 represent the lowest 30% of Australian suburbs for social advantage and were classified as 'low' SES, with deciles 4–7 being 'middle' SES and deciles 8–10 classified as 'high' SES. The SEIFA system provides a broad definition of relative socioeconomic disadvantage using Australian census variables including income, unemployment and educational attainment.[20]

Analysis

Firstly, descriptive statistics were used to characterise participant demographics, consumption habits, distribution of support for taxation and the predicted impact of a tax, equivalent to $0.40/100g of sugar, on future consumption. Chi-squared tests were then used to examine bivariate associations between frequency of consumption, volume of consumption and key independent variables (gender, BMI and SES) because of the categorical nature of variables. Lastly, ordinal logistic regression using the Polytomous Universal Model (PLUM) procedure was used to examine association of support for and potential impact of a tax with sociodemographic characteristics and consumption habits. Outcome variables that measured support for and impact of an SSB tax were ordinal in nature, hence, ordinal logistic regression was used to calculate the odds ratio.[21,22] All models were adjusted for the following variables: gender, SES, BMI, frequency of consumption, and volume of consumption. The models were tested for the proportional odds assumption that underpins ordinal logistic regression using the test of parallel lines. Results have been presented as adjusted odds ratios along with 95% confidence intervals and level of statistical significance. Statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS Version 24).

Results

Sample characteristics

Data was collected from 2,768 people. Data was excluded from 975 people who resided outside the City of Greater Geelong or who were not between the ages of 18 and 30, leaving 1,793 participants – equivalent to approximately 4.3% of the 18–30-year-old population of the region.[15] Non-residents were excluded to reduce the potential bias in consumption habits that may be present in visitors to the region and preserve the representative nature of our sample. A total of 98% (n=1,753) of participants reported height and weight, from which BMI was calculated. Table 1 displays sample characteristics according to gender, BMI and SES. More than half (55%) of the sample were female with a median age of 22 years. Ninety-five per cent of the sample reported having no children, while 5% reported having at least one child.

SSB consumption

Two out of five participants reported consuming an SSB the previous day. Soft drinks were the most frequently consumed type of SSB (52%), followed by fruit drinks (15%), energy drinks (12%), sports drinks (8%), flavoured mineral waters (8%) and cordials (5%). Frequency of consumption was highest for those who were obese ($p<0.001$) and of low SES ($p<0.001$), see Supplementary File 2. Males consumed higher volumes of SSBs ($p<0.001$) and consumed SSBs more frequently than females ($p<0.001$), see Supplementary File 3.

Taxation and impact

Table 2 outlines participant views on SSBs and health, the introduction of an SSB tax and how such a tax would impact SSB consumption.

Overall, 1,442 (82%) participants identified SSBs as being 'unhealthy' or 'very unhealthy'. Of these participants, 586 (41%) reported that they would view SSBs as even more unhealthy if a tax of $0.40/100g of sugar was introduced, while 763 (54%) were unlikely to change their view. Of the 75 (5%) participants that identified SSBs as 'healthy' or 'very healthy', 25 (33%) reported that they would view SSBs as less healthy following the introduction of a tax, while 29 (39%) were unlikely to change their view.

There was broad support from participants for a tax on SSBs, which increased substantially if tax revenue was allocated

towards subsidising fruit and vegetables or community exercise facilities. If a tax of $0.40/100g of sugar was introduced, 940 (53%) participants reported that they would increase their consumption of non-SSBs. Among these, 591 (63%) participants were more likely to consume water, 137 (15%) coffee, 57 (6%) flavoured milk, and 23 (2%) artificially sweetened beverages, and 6 (1%) participants were more likely to consume other unspecified non-SSB drinks. One hundred and twenty-six (13%) participants did not state an alternative.

In terms of associations, frequency of consumption negatively predicted the odds of supporting a tax in a stepwise manner, such that lower frequency consumers were more likely to agree to the introduction of an SSB tax (see Supplementary File 4). Unsurprisingly, frequency of consumption was also associated with anticipated reductions in consumption. Those reporting lower frequency of consumption were significantly more likely to report reductions in their consumption with the imposition of a tax. Gender, obesity status and SES did not affect the odds of supporting a tax or anticipated consumption. No obvious patterns were observed with volume of consumption.

Discussion

This study provides the first Australian data of young adults' views on an SSB tax. More than 90% of participants agreed that SSBs contributed to obesity and 85% believed the government should do more to address the obesity problem. Almost half (48%) of participants supported the introduction of a tax outright, while 20% of participants 'strongly disagreed' or 'disagreed' with a tax.

Our findings are similar to results reported in adult populations in other countries.[12,18] Participant support for taxation increased substantially if tax revenue was allocated to subsidising fruit and vegetables or funding community exercise facilities. Previous Australian studies looking at the wider adult population found similar results, with 69% supporting taxation on soft drinks if tax revenue is used to reduce the cost of healthy food.[23]

Consumption habits in our sample aligned with national data, with soft drinks being the most commonly consumed SSB.[5] Also, on the day prior, 35% of females and 47% of males consumed an SSB, compared to 39% and 53%, respectively, in a 2012 national survey of the same age group.[5] The lower consumption rates observed in our study are consistent with a steady decline in SSB consumption in the Australian population over time.[5]

Frequency of SSB consumption was the only characteristic associated with participants' opinions on taxation. Participants who consumed SSBs frequently were more likely to oppose a tax, a finding consistent with a study from the US, where consumption of SSBs on a daily basis was associated with opposition to an SSB tax.[12]

SSB taxes are considered by some to be regressive, because low SES groups would be those most adversely affected financially.[24] As such, it was interesting that SES was not associated with support for a tax in our study. Studies from the US have demonstrated links between lower levels of educational attainment and income and opposition to a tax.[11] The SEIFA classification used to determine SES in our study incorporates measures of income and education, and therefore a similar result was anticipated in our sample. One possible explanation for this discrepancy is that the majority of participants in our study came from middle income postcodes. Secondly, many young Australians reside with and are financially dependent on their parents, which may confound SES associations.[25]

In addition to exploring young people's views on a tax, we were interested in whether or not they would change their consumption patterns if a tax was introduced. SSB taxes have reduced consumption in Mexico and Berkeley, California.[7,8] A majority of our participants reported that they would reduce their consumption of SSBs, and of these most (63%) would compensate by drinking more water. Only 2% reported increasing consumption of artificially sweetened beverages. This is consistent with consumption patterns in Mexico and Berkeley, where non-SSB consumption, particularly water, increased after the introduction of a tax.[7,8] Such changes are consistent with lowering the risk of obesity.

Not all young people surveyed supported a tax or indicated that they would reduce their consumption if a tax was introduced. Our observation that the most frequent consumers were least supportive and least likely to reduce their consumption suggests additional public health interventions may need to accompany any SSB tax.

Table 1: Participant characteristics and consumption habits (N=1,793).

Characteristics and consumption habits	N	Percentage of total (%)
Gender		
Male	812	45.3
Female	981	54.7
BMI[a]		
Normal (<25)	1,109	63.3
Overweight (25–<30)	439	25.0
Obese (≥30)	205	11.7
Socioeconomic status		
Low	290	16.2
Middle	1,103	61.5
High	400	22.3
Consumed a SSB on the previous day		
Female		
Yes	341	34.9
No	611	62.6
Unsure	24	2.5
Male		
Yes	379	47.0
No	408	50.7
Unsure	20	2.5
Frequency of SSB consumption		
Several times per day	91	5.1
Once daily	222	12.5
Several times per week	620	34.9
At least once per month	631	35.5
At least once per year	160	9.0
Never	53	3.0
Volume of SSBs consumed each time[b]		
<250mL	610	35.1
250–400mL	766	44.2
400–600mL	217	12.5
600–800mL	115	6.6
>800mL	27	1.6
Category of SSB consumed the most		
Soft drinks (non-diet)	892	52.1
Energy drinks	209	12.2
Fruit drinks	263	15.4
Sports drinks	138	8.1
Flavoured mineral waters	126	7.4
Cordials	83	4.9

a: BMI=Body Mass Index (N=1,753) based on self-reported height and weight

b: Consumption habits on most occasions

The tax itself may also have the potential to educate young people about unhealthy SSB consumption. In our sample, more than two-fifths of participants who reported that SSBs were 'very unhealthy' or 'unhealthy' stated that with the introduction of an SSB tax they would view SSBs as even more unhealthy. Furthermore, one-third of those who identified SSBs as being 'healthy' or 'very healthy', would view SSBs as being 'less healthy' after the introduction of a tax. This suggests that a tax on SSBs may not only affect consumption through financial

Table 2: Participant views on SSBs taxation and the potential impact of a SSB tax on their consumption (N=1,784).

	Overall Support[a] (%)	Distribution of support				
		Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)
Views on SSBs						
SSBs are unhealthy[b]	1,461 (81.9)[c]	21 (1.2)	54 (3.0)	248 (13.9)	844 (47.3)	617 (34.6)
SSBs contribute to obesity	1,624 (91.0)	8 (0.4)	28 (1.6)	125 (7.0)	882 (49.4)	742 (41.6)
Australian Government should do more to address obesity	1,518 (85.5)	9 (0.5)	25 (1.4)	224 (12.6)	762 (42.9)	756 (42.6)
Taxation						
A tax on SSBs would help to reduce obesity in Australia	962 (54.0)	96 (5.4)	294 (16.5)	429 (24.1)	606 (34.0)	356 (20.0)
A tax on SSBs should be introduced in Australia	860 (48.2)	113 (6.3)	252 (14.1)	561 (31.4)	546 (30.6)	314 (17.6)
A tax on SSBs should be introduced in Australia if the tax revenue is used to subsidise fruit and vegetables	1,308 (73.7)	39 (2.2)	104 (5.9)	324 (18.3)	747 (42.1)	561 (31.6)
A tax on SSBs should be introduced in Australia if the tax revenue is used to fund community exercise facilities	1,278 (71.7)	31 (1.7)	101 (5.7)	373 (20.9)	785 (44.0)	493 (27.7)
Potential impact on personal consumption habits[d]						
Would reduce consumption if a tax on SSBs was introduced[e]	908 (52.9)	77 (4.5)	271 (15.8)	460 (26.8)	668 (38.9)	240 (14.0)
Would increase consumption of non-SSBs if a tax on SSBs was introduced[e]	904 (52.7)	78 (4.6)	272 (15.9)	460 (26.8)	659 (38.4)	245 (14.3)

Notes:

a: Overall support is calculated as the sum of 'Agree' and 'Strongly agree'

b: Responses to this question were as follows (in the following order): 'Very healthy', 'Healthy', 'Neutral', 'Unhealthy' and 'Very unhealthy'

c: Calculated as the sum of 'Unhealthy' and 'Very unhealthy'

d: Predicted effect on consumption if a tax of $0.40/100g of sugar is introduced

e: Participants who never consume SSBs were removed (total of 53)

deterrence but may also act as a population-wide health promotion tool to change perception around the healthiness of SSB consumption.

Several potential limitations of our study have been identified. Participants were recruited using convenience sampling, creating the potential for selection bias. To reduce this, the research team used a standardised recruitment script to approach potential participants. However, we ended up with a gender bias and the data are not weighted to match the age and gender distribution of the Geelong population. Secondly, the use of self-reported physical characteristics and consumption habits may underestimate the strength of the observed associations as both weight and consumption habits are frequently underestimated.[26,27] Thirdly, our survey is cross-sectional, and the associations observed are not necessarily causal. Finally, opinions on SSBs and taxes are complex and change over time, and there may be factors we did not measure that confounded our observations.

Australia is in the midst of an obesity epidemic that poses a significant challenge to the healthcare system. Taxation of SSBs is one mechanism that has been proposed to combat this issue. Young adults are high consumers of SSBs and are therefore most likely to be affected by the introduction of such a tax. Despite this, a large proportion of young adults in our study supported a potential tax on SSBs, particularly if tax revenue was used to fund public health initiatives. In addition, a majority indicated that they would reduce their consumption if a tax was introduced. This suggests that a tax on SSBs may be a well-received and effective public health intervention, which should be considered by policymakers to reduce obesity in Australia.

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Supporting Information

Additional supporting information may be found in the online version of this article:

Supplementary File 1: Survey.

Supplementary File 2: Frequency of SSB consumption by gender, SES and obesity status.

Supplementary File 3: Volume of SSB consumption by gender, SES and obesity status.

Supplementary File 4: Associations between participant characteristics and consumption with support for and potential impact of a SSB tax.