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ORIGINAL ARTICLE

Parental perspectives towards sugar-sweetened beverages and polices: a qualitative study

J. X. Y. Chan[1] · M. L. Wong[1] · X. Gao[1,2] · K. S. Chia[2] · C. H. L. Hong[1] · S. Hu[1]

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Abstract

Purpose This qualitative study aimed to understand parental perception of (1) sugar-sweetened beverages (SSB) and implications of SSB on health; (2) their role in shaping their children's consumption of SSB; (3) the influences on SSB consumption of their children; and (4) potential government policies targeted at controlling SSB consumption.

Methods English-speaking parents of pre-schoolers aged 2–6 years were recruited. Semi-structured interviews based on the knowledge, attitude, practice framework were conducted, and transcripts were subjected to thematic analysis based on inductive approaches. Recruitment continued until data saturation was reached.

Results Twenty parents participated in the study and themes addressing the objectives identified. (1) There were misconceptions regarding the healthfulness of certain non-packaged SSB such as traditional remedies and juices. Some were unaware about the association between SSB and dental caries. (2) The need to reduce and restrict sugar consumption for overall and oral health reasons was well-recognised, but the extent of control varied. (3) Multiple stakeholders including pre-schools, grandparents and domestic helpers were involved in shaping children's diet. Children's sugar intake was also influenced by environmental factors, such as the ubiquitously available SSB, targeted marketing and high cost of healthy alternatives. (4) Participants were less accepting towards SSB taxation than the ban of SSB sales.

Conclusion Despite the awareness of the types of SSBs and the general/oral health implications of sugar consumption, misconceptions exist. Although most parents possessed the knowledge and attitude, this did not translate into the practice of reducing sugar consumption in their children. There was no SSB reduction policy that had overwhelming acceptability.

Keywords Sugar-sweetened beverages · Health knowledge, attitudes, practice · Health policy · Oral health · Pediatric dentistry

Introduction

Other than the well-documented associations with systemic conditions such as obesity and diabetes mellitus, excessive sugar-sweetened beverage (SSB) intake is also associated with an increased risk of dental caries in children (Sheiham and James 2015). In a study of children aged 2–6 years, an additional SSB serving per day increased the odds of severe early childhood caries by 14% (Evans et al. 2013). In Singapore, sugar intake made up about 10% of Singaporeans' total dietary energy intake. More than half of their daily sugar intake were from sugar-sweetened beverages (SSBs) (Health Promotion Board Singapore 2018).

An American study revealed that there was a considerable level of consumer confusion about the amount and types of sugars in different beverages (Rampersaud et al. 2014). This lack of knowledge may have resulted in people unknowingly consuming excessive amounts of sugar from SSBs. Children are a particularly vulnerable groups as they rely on caregivers for their nutritional needs. A recent study found that a majority of parents strongly agreed that their child ate healthily but in reality only a small proportion actually met dietary recommendations (Eliason et al. 2020). Positively impacting caregivers' eating behaviours can appropriately influence their children's diet and food preferences through the food choices that parents offer their children (Robinson et al. 2007).

✉ S. Hu
Shijia_hu@nuhs.edu.sg

[1] Faculty of Dentistry, National University of Singapore, Singapore, Singapore

[2] Saw Swee Hock School of Public Heath, National University of Singapore, Singapore, Singapore

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In light of broader public health measures to promote healthy eating, policy measures were explored by the Singaporean government to reduce SSB consumption to less than 10% of total energy intake for adults and children (Meyer and Lee 2015). Several policies were put forward but consensus on the acceptability and effectiveness of various policies was lacking. This led to a public consultation launched in 2018. One such policy was SSB taxation; however, its effectiveness has been varied. In Mexico, SSB taxation resulted in a 6–12% drop in the average volume of SSBs purchased monthly (Colchero et al. 2016); however, in 2 North American cities, consumption reduction was more modest at 0–5% (Rojas and Wang 2017). Moreover, SSB taxation can be viewed as regressive, disproportionally affecting low-income populations, thus increasing opposition towards it. Another policy was the ban of the sale of higher-sugar SSB, which is perceived as a more intrusive measure. Intrusive approaches are unpopular as they restrict personal choices (Bélanger-Gravel et al. 2019). Other policies included more stringent advertising regulations, and improved nutrition labelling which were generally well accepted but often less effective (Muth et al. 2019). Given the pros and cons associated with each measure, eliciting public perceptions of governmental interventions is desirable prior to introduction of new policies as this will provide an indication of the acceptability which can impact the effectiveness of the implemented measure (Oliver 2006).

In typical knowledge, attitudes and practices (KAP) models often leveraged in public health interventions, changes in knowledge and attitudes are assumed to translate to the adoption of preventive measures (Rav-Marathe et al. 2016). Unfortunately, in a KAP study by Tang et al. (2020) who evaluated 1136 parents, demonstrated that parents tended to have good attitudes towards reducing sugar consumption but often lacked the knowledge and actual practice to affect reduction in SSB consumption. This may explain the continued consumption of SSB despite robust evidence of the deleterious impact of SSBs on health. Using a KAP framework in a qualitative approach allows for systematic inquiry of parental perspectives towards SSB consumption. Furthermore, this approach will facilitate identification of context specific factors regarding their acceptance of policies to reduce SSB consumption (Muleme et al. 2017).

This qualitative study aimed to understand parental perceptions with regard to (1) SSBs and implications of SSBs on health; (2) their role in shaping their children's consumption of SSBs; (3) the influences on SSB consumption of their children; and (4) potential government policies to limit SSB consumption.

Methods

Recruitment of participants

Singaporean parents (either mother or father) of children aged 2–6 years were recruited using a 2-stage recruitment process involving 2 sampling methods. The first recruitment phase used a purposive sampling method, to stratify the sample to include representative subjects of different genders, ethnicity and social economic status. Parents of pre-schoolers from either a local pre-school or who presented at the dental clinic at National University Centre for Oral Health Singapore (NUCOHS) were approached. The second phase used a snowball sampling method, which involved asking recruited parents to nominate other parents who fit the study's inclusion criteria of having (1) a child aged 2–6 years and (2) the ability to converse confidently in English.

Written informed consent was obtained prior to participation. Participants were recruited between August 2018 and October 2019. This study was approved by the Institutional Review Board (IRB) (NUS-IRB Reference Number: S-18-220E).

Data collection

The following socio-demographic information of the participants was collected: age, gender, ethnicity, marital status, level of educational attainment and monthly household income. A semi-structured interview guide based on the KAP framework was developed (Table 1). The interview was conducted in English and in person by the same study team member (JC), who was trained in qualitative interviewing. For the initial interviews, an observer (HSJ) was present. A discussion between HSJ and JC regarding refinement of interview guide and generation of initial codes was conducted post-interview. All interviews were conducted in a private room and notes were taken by the primary interviewer regarding the conduct of the interview. The interviews were audio-recorded and transcribed verbatim (JC).

Analysis

Thematic analysis was applied using inductive (themes emerging from data) methods (Fereday and Muir-Cochrane 2006). Emergent themes were identified following a series of steps: first, open line-by-line coding was used with initial codes generated. Next, the initial codes were grouped according to their similarity, and then further organised into themes. After

Table 1 Topic guide with the knowledge (K), attitude (A) and practice (P) construct

Objective	Questions and prompts
Area of inquiry 1: parental general knowledge about SSB and the health consequences of sugar consumption	
Knowledge	
Sources of sugar in child's diet	What are sugar-sweetened beverages?
Impact of sugar on child's oral health	Would you say that your child's diet has too little/just enough/too much sugar? What happens if we consume too much sugar? What are some possible reasons/causes of dental caries? How can dental caries affect your child?
Area of inquiry 2: parental role in shaping children's diet	
Attitude	
Willingness to control sugar in child's diet	How willing are you to reduce the amount of sugar that your child consumes? Who is responsible for deciding if your child is eating the right kind of food/ drinks?
Practice	
Diet of the child	How do you keep track of the sugary food & drinks your child takes?
Health-seeking behaviours	How do you try to reduce your child's sugar intake?
Area of inquiry 3: the influences on the sugar consumption of Singaporean children	
Knowledge	
Primary caregiver	Who is your child's primary caregiver?
Sources of sugar	Who is in charge of your child's diet? How about childcare and their menu? Where does your child usually get SSB?
Attitude	
Availability of SSB	Who should be responsible for reducing availability of SSB?
Seeking sugar behaviour	Why do you think children like SSB?
Practice	
Reducing consumption	How can we reduce exposure to SSB in children?
Area of inquiry 4: parental views on certain government policies to limit SSB consumption in Singapore	
Knowledge	
Governmental polices	What are some of the policies put in place by the government to limit sugar consumption? What do you know about SSB tax?
Attitude	
Towards SSB tax	How do you feel about the implementation of an SSB tax?
Towards SSB ban	Where should the tax revenue be spent on?
Towards advertising regulations	How do you feel towards a nationwide ban on the sale of higher sugar pre-packaged SSBs?
Towards front-of-pack nutrition labelling	How do you feel towards tightening the regulations on the advertising of less healthy food and drinks to children? How do you feel towards implementing front-of-pack nutrition summary labels?
Practice	
Towards SSB tax	At what amount of tax will it affect your purchasing habits?

which a code book was generated from the first interview and guided by the interview guide and subsequently modified when new themes emerged from other interviews. To ensure the reliability of the coding process, two study team members (HSJ and JC) independently coded one of the transcripts. The results were compared and showed a high level of agreement. The subsequent transcripts were analysed by one study team member (JC) and verified every 5th script (WML). The coding was completed manually. No software was used. Descriptive summaries and illustrative quotes were used to describe each theme. When no new themes or codes were generated after the analysis of the latest interview, data saturation was deemed to have been achieved and recruitment of participants ceased.

Results

There were 14 mothers and 6 fathers. Their mean age was 37.9 years (range 30–44). The majority were Chinese, with Malay and Indian minorities which closely represented the ethnic make-up of Singapore (Table 2). All were able to converse fluently in English, the primary language medium of education in Singapore. The mean interview duration was 24.6 ± 7.4 min (range 11.5–41.6 min). Themes under each area of inquiry were identified (Table 3).

Area of inquiry 1: parental general knowledge about SSB and the health consequences of sugar consumption

Parents' awareness of the types of SSB in the market

Overall, the participants were able to list a wide range of pre- and non-packaged SSB available.

Table 2 Demographics of participants

Characteristics	$N=20$	%
Gender		
Female	14	70
Male	6	30
Age range		
30–34	4	20
35–39	9	45
40–44	7	35
Ethnicity		
Chinese	16	80
Malay	3	15
Indian/Sikh	1	5
Child's age		
3	3	15
4	6	30
5	7	35
6	4	20
No. of children		
1	3	15
2	11	55
3	4	20
4	2	10
Education		
Pre-Bachelor's	10	50
Bachelor's and higher	10	50
Monthly household income		
$2000–$3999	4	20
$4000–$5999	2	10
$6000–$9999	6	30
$10,000–$24,999	6	30
$25,000 and above	2	10

Parents' misconceptions about SSB

While some participants were aware that certain non-packaged SSB such as home-made barley water, soya milk, bubble tea and bottled chrysanthemum tea (a traditional herbal remedy) contained sugar, there were a few participants who were unaware of the hidden sugars in such non-packaged SSB.

> "If it's like home-cooked drinks (barley water/green bean soup), they actually (don't) really put so much sugar." (P19)

It was interesting that a few participants believed that certain SSB were healthy, when in fact these contained large amounts of added sugar (> 10%).

> "Certain drinks (are) not so healthy, or high in sugar…that's why (we have) cultured drinks (or) chrysanthemum tea". (P8)

Parents' lack of awareness of oral health implication of sugar consumption

Participants were aware of the health implications and were able to list systemic diseases associated with excessive sugar consumption such as diabetes and obesity. However, a few were unclear of the strength of association between sugar intake and dental caries; some even felt that dental caries was common and normal in children.

> "We are not aware that children below like seven years (old)…are very vulnerable to be decayed." (P2)

Area of inquiry 2: parental role in shaping children's diet

Parents' perception of their responsibility in shaping their child's diet

Some participants felt that parents should be solely responsible for their child's dietary choices. Others felt that the school should share such responsibility as parents did not have control of that environment.

> "At home, the parents will (be) responsible. In the school, they will follow the school diet." (P10)

Table 3 Main themes and transcript highlights

Area of inquiry	
Themes	Quotes
Parental general knowledge about SSBs and the health consequences of sugar consumption	
Misconceptions about SSB	"If it's like home-cooked drinks (barley water/green bean soup), they actually (don't) really put so much sugar." (P19)
Lack of awareness of oral health implication of sugar consumption	"We are not aware that children below like seven years (old)…are very vulnerable to be decayed." (P2)
Parental role in shaping children's diet	
Perception of their responsibility in shaping their child's diet	"At home, the parents will (be) responsible. In the school, they will follow the school diet." (P10)
Intention and attempts to control sugar consumption in children	"Because if we control even more, then it will become … the other kind of extreme … she will become more addicted, or (crave more for) such things in the future." (P11)
The influences on the sugar consumption of Singaporean children	
Inter-personal influences	"My husband he likes to drink sweet drinks or syrup drinks and all that. So, my children sort of follow." (P18) "We have grandparents at home, we have (a) helper at home … I don't know the full picture. Even though I'm the main caregiver, I don't know if they give (sugary food and beverages)." (P6)
Environmental influences	"I think initially…it might be the characters that attracted him. But eventually, he found out that it (taste) good." (P17)
Parental views on certain government policies to limit SSB consumption in Singapore	
Acceptability and effectiveness of SSB taxation	"Why tax parents? It's always tax, cars and tax, housing and tax. Increasing tax doesn't solve all the world's issues… I don't know, it's still back to individual choice." (P5)
Ban of sale of higher sugar SSB	"You might as well ban all these drinks, it's better … (unlike) the cigarettes tax … people still smoke." (P8)
More stringent advertising regulations	"If sugared drinks … were not advertising much … then I would think that kids actually also do not get influenced by the advertising and want to try these sweetened beverages." (P7)
Improving nutrition labelling	"It's difficult … I consider myself well-educated…and very sensitive to numbers … and I still find it difficult, I can imagine how difficult for other people." (P6)

Parents' intention and attempts to control sugar consumption in children

Although participants often recognised the need to reduce and restrict sugar consumption for overall health and oral health reasons, the extent of control varied.

> "Because if we control even more, then it will become … the other kind of extreme … she will become more addicted, or (crave more for) such things in the future." (P11)

The few participants who established strict controls over sugar consumption limited the frequency of SSB intake and purchased SSBs with less sugar by comparing nutrition labels.

Area of inquiry 3: the influences on the sugar consumption of Singaporean children

Child's personal influences

Taste appeared to be the primary individual influence, as many of the participants reported that their child generally enjoyed sweet-tasting food.

Inter-personal influences

Participants' personal preferences influenced their SSB purchasing habits, which contributed to the frequency of their child's exposure to SSB.

"My husband he likes to drink sweet drinks or syrup drinks and all that. So, my children sort of follow." (P18)

In some families, where there were multiple caregivers (e.g., grandparents, domestic helpers) involved in the child's upbringing, participants reported that they were not in full control of their child's diet as other caregivers contributed to the child's daily dietary intake.

"We have grandparents at home, we have (a) helper at home … I don't know the full picture. Even though I'm the main caregiver, I don't know if they give (sugary food and beverages)." (P6)

Environmental influences

Participants highlighted that the ubiquity of advertisements, and the bright colours and cartoon characters on the SSB packaging often attracted the attention of their children and subsequent request for the products.

"I think initially…it might be the characters that attracted him. But eventually, he found out that it (taste) good." (P17)

Cost was another major consideration, with participants pointing out that healthier alternatives were more expensive, less tasty and not as widely available. Some participants also commented that when SSB were offered as part of set meals, changing the SSBs to a healthier option was not always available.

"If the item is too expensive, sometimes I may not buy it so often … we may have almond milk that is sugarless, but they are in the organic section, that is more expensive." (P3)

Area of inquiry 4: parental views on certain government policies to limit SSB consumption in Singapore

Acceptability and effectiveness of SSB taxation

Participants were often unaware as to how the SSB tax would affect them. After explanation of the potential impact of taxation on SSB consumption, participants expressed divided views. Some were receptive; others who were against taxation cited the lack of freedom of choice and the perception that taxation was another way for policy makers to generate revenue.

"Why tax parents? It's always tax, cars and tax, housing and tax. Increasing tax doesn't solve all the world's issues… I don't know, it's still back to individual choice." (P5)

There were divergent views on the effectiveness of taxation in reducing SSB consumption in Singapore. Some participants felt that it would deter consumers from purchasing SSB, if the SSB price was appreciably higher. Some felt that it would only deter consumers who were price-sensitive, such as lower income families. A handful of the participants opined that the tax revenue could be used to subsidise healthier beverages, which may make taxpayers more receptive to the SSB tax.

Ban of sale of higher-sugar SSB

Participants were generally supportive of the ban of SSBs with high sugar levels (> 5.5 teaspoons of sugar/250 ml).

"Because if government can help us to make these decisions … they (children) won't be angry (with) me." (P6)

Interestingly, some participants remarked that the tax would not deter the consumers who were addicted to consuming SSB and cited tobacco tax as an analogy. Thus, a ban was thought to be more effective.

"You might as well ban all these drinks, it's better … (unlike) the cigarettes tax … people still smoke." (P8)

More stringent advertising regulations

A number of participants felt that tightening advertising regulations would be effective to reduce SSB exposure among children.

"If sugared drinks … were not advertising much … then I would think that kids actually also do not get influenced by the advertising and want to try these sweetened beverages." (P7)

Improving nutrition labelling

Regarding food labels, some participants were unsure how to interpret the information; they either did not understand the scientific jargons, or found it challenging to compare the labels of different SSB.

"It's difficult … I consider myself well-educated…and very sensitive to numbers … and I still find it difficult, I can imagine how difficult for other people." (P6)

The majority of the participants felt that mandating a front-of-pack (FOP) nutrition label would be advantageous. In addition, the information on the labels should use simple language and be standardised for easy comprehension and comparison between products.

"They can come up with a label … one star, two stars, three stars, (so) even (the) elderly can also understand." (P19)

Discussion

A careful examination of parental KAP with regard to reducing sugar consumption in children was conducted. Regarding the knowledge domain: some gaps in knowledge were identified. Participants displayed misconceptions regarding the health benefits of certain SSB. Some of these SSB are considered Traditional Chinese Medicine (TCM) remedies which is common among Chinese families which make up about 70% of the Singapore population. Many TCM remedies, such as chrysanthemum tea used to treat coughs, often require the addition of sugar to mask the bitter flavours (Liu et al. 2015). This finding highlighted the need for cultural consideration when planning public education efforts, particularly in the multi-ethnic countries. Another worrying finding were participants who were still unclear about the association between sugar and dental caries, despite good awareness of general health-related consequences associated with excessive sugar consumption. In situations of low knowledge, the KAP relationship is more linear, as such, awareness campaigns could be effective in addressing these issues (Muleme et al. 2017).

Regarding attitude, the study found that parents were willing to limit their child's SSB consumption but commented that this was not always possible as they were not the sole determinant of their child's diet. In Singapore, 27.7 and 12% of children aged ≤ 12 years are cared for primarily by grandparents and domestic helpers, respectively (Goh et al. 2013). Unfortunately, grandparents often lacked knowledge and attitude on enforcing healthy feeding practices, which conflicted with and undermined parental efforts to reduce SSB consumption (Tan et al. 2019). Outside the home, parents also expressed that they had minimal control over their child's diet when they were at childcare centres or in preschools. Although there are local dietary guidelines, they are not mandatory and hence, the level of adherence to the guidelines vary.

In this study, most parents were aware of SSB being unhealthy (knowledge) and expressed a desire (attitude) to reduce consumption. However, this was not reflected in the practice of restricting SSB consumption in their children. Based on a local survey revealing that 28% of caregivers provided their children aged 4–9 years with SSBs more than once a week (Health Promotion Board Singapore 2018). The disparity in perception and practice corroborate the need to consider other interventions such as governmental policies to discourage SSB consumption.

Of the interventions, SSB taxation (at least 20%) is supported by WHO (Andreyeva et al. 2011). However, in this study, SSB taxation was viewed unfavourably due to the general negativity towards taxes and the lack of clarity on how this additional tax revenue will be spent. The participants opined that banning the sale of higher-sugar SSBs was more acceptable and effective compared to SSB taxation. This was an unexpected response given that SSB taxation is considered to be a less restrictive measure. To increase acceptability of SSB taxation, efforts could be directed towards communicating the purpose. In addition, consideration to use the revenue to subsidise healthier alternatives may make SSB taxation less regressive and more appealing.

A limitation of the study was the recruitment of a large number of participants from a dental clinic which may have introduced a selection bias, since those who were seeking dental care might hold views that were notably different from others. However, this was mitigated by recruiting from a community setting (pre-school) and the use of the snowballing recruitment method. This allowed us to capture a wide spectrum of views and reduce the possible bias. Another limitation was the recruitment of only English-speaking participants. However, this likely excluded a minority of participants as Singapore's education system is compulsory for a minimum of 10 years and is conducted primarily in English resulting in a population with the highest literacy rate globally (OECD 2011).

Conclusions

- Despite the awareness of the types of SSBs and the overall health implications of sugar consumption among Singaporean parents, certain misconceptions continue to exist.
- Although most parents possessed the knowledge and attitudes towards reduction of SSB consumption, this did not translate into the practice of reducing sugar consumption in their children. As such, governmental policies may be required as part of broader public health measures to reduce the consumption of SSB.
- Regarding policies targeting sugar consumption, there was no SSB reduction policy that received overwhelming acceptability. Effective measures require better understanding and acceptance from parents to ensure buy-in and successful implementation.

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Author contributions JC is considered the first author and SH the senior author. SH, KSC and CH conceived the idea; JC participated in data collection; JC and MLW conducted the data analysis; JC, XG and

SH led the interpretation and writing; MLW, KSC and CH revised the manuscript for important intellectual content.

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Availability of data and materials NA.

Code availability NA.

Declarations

Conflict of interest The authors declare no conflict of interest. All authors have made substantive contribution to this study and/or manuscript, and all have reviewed the final paper prior to its submission.

Ethics approval This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted from the Ethics committee, National University Institutional Review Board (NUS-IRB Reference Number: S-18-220E).

Consent to participate Informed consent was obtained from all subjects prior to enrolment.

Consent for publication The authors affirm that human research participants provided informed consent for publication.

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