UNDERSTANDING, RESPONSE AND SUPPORT REGARDING THE HEALTH PROMOTION LEVY AMONG URBAN CONSUMERS EMPLOYED AT PRIMARY AND SECONDARY SCHOOLS IN PIETERMARITZBURG, KWAZULU-NATAL, SOUTH AFRICA

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ABSTRACT

Obesity can be highly attributed to the excessive consumption of sugar-sweetened beverages (SSBs). The Health Promotion Levy (HPL) was introduced in South Africa (SA) in April 2018, increasing the price of SSBs with the aim to reduce consumption of SSBs. The current study aimed to assess the understanding, response and support regarding the HPL among urban consumers employed at primary and secondary schools in Pietermaritzburg (PMB), KwaZulu-Natal (KZN). The objectives were to determine (i) consumer demographics (ii) awareness, knowledge, and perceptions of the HPL, (iii) responses to the HPL in terms of purchasing behaviour, (iv) whether the national corona virus disease (COVID-19) level four to five lockdown contributed to increased sugar intake from SSBs, (v) perceptions and attitudes regarding obesity and its causes and (vi) which obesity preventative strategies were believed to complement the HPL. A cross-sectional descriptive study was conducted in 13 schools where the consumers answered a self-administered consumer questionnaire (SACQ). Almost all consumed SSBs, however, less than half were aware of the HPL. Consumers have not changed their SSB purchasing behaviours since the HPL implementation and did not increase their SSB consumption during the COVID-19 lockdowns. Consumers were aware that obesity is a serious condition and perceived the HPL positively.

KEYWORDS

health promotion levy; sugar-sweetened beverages; obesity; self-administered consumer questionnaire

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INTRODUCTION

Obesity affects economies worldwide by reducing productivity and life expectancy and increasing health care costs (World Health Organization (WHO) 2021). The World Obesity Federation (WOF) (2020) estimated that 770 million adults worldwide were obese in 2020, and this number is anticipated to exceed one billion by 2030 (WOF 2020). According to the WHO (2023a), more than one billion people worldwide were obese in 2022. Low and middle-income countries, including South Africa (SA) are most affected by obesity, yet it is preventable (WHO 2023b). The obesity rates in SA have risen over the past 30 years, making it the 'most obese' country in sub-Saharan Africa (National Department of Health (NDOH) *et al*. 2019; National Treasury 2016). According to the South African National Health and Nutrition Examination (SANHANES-1) conducted in 2012, 11.6% of males and 40.1% of females in SA were obese (Shisana *et al*. 2013). The SA Demographic and Health Survey (SADHS) indicated that the prevalence of overweight and obesity in SA increased from 31.2% in 1998 to 31.3% in 2016 among men and increased from 53.8% in 1998 to 67.6% in 2016 among women (NDOH *et al*. 2019).

The consumption of SSBs is a major contributor to obesity as they contain little nutritional value and do not provide the same feeling of fullness that solid food provides (Stacey *et al.* 2021). As a result, total energy intake may increase, resulting in weight gain (WHO 2023c). SSBs are defined as 'beverages that contain added caloric sweeteners such as sucrose, high fructose corn syrup or fruit juice concentrates.' These include soft drinks, fruit drinks, sports/energy drinks, vitamin water drinks, sweetened iced tea and lemonade (National Treasury 2016). The consumption of SSBs has increased globally, and in SA because of their affordability, availability, acceptability (Blecher *et al.* 2017; National Treasury 2016) and heavy marketing (WHO 2023c). This study was conducted in PMB because it is an urban area where the consumption of SSBs is especially high, as working consumers, who can afford SSBs, experience stress and long work hours and may seek foods and beverages high in energy and sugar to cope (Bawadi *et al*. 2019; Global Alliance for Improved Nutrition 2020).

A tax on SSBs was proposed by the South African Minister of Finance in February 2016 (National Treasury 2016), introduced to SA in April 2018 and subsequently named the HPL (Stacey *et al.* 2021). It is assumed that when consumers are aware of a price increase due to taxes, they are conscious of the penalty and are less likely to make the purchase (Acton *et al.* 2022; Ortega-Avila, Papadaki & Jago 2019; Stacey *et al.* 2021). The HPL in SA led to an approximate 11% increase in the price of SSBs. This implied a cost of 2.1 (0.0012 United States Dollar [USD*]) cents per gram of sugar above a threshold of 4 grams of sugar per 100 ml of beverage (Hofmeyer 2018; Stacey *et al.* 2021). However, the WHO (2023d) recommended an average price increase of 20% or more to effectively reduce SSB consumption and obesity rates (SARS 2023; WHO 2023d). The HPL encourages SSB manufacturers to

reformulate their products to lower- or zero-sugar options (Okop *et al*. 2019). In 2017, Coca-Cola™ SA (2022), which is the largest SSB manufacturer in SA, reduced the sugar content of their SSBs by 26% and the volume of their SSB packaging by 10% (Okop *et al.* 2019).

Some studies worldwide have shown reduced SSB purchases after implementation of a sugar tax (Mandal *et al*. 2020; Stacey *et al.* 2021; Wrottesley *et al*. 2020). An observational study was conducted in SA between January 2014 and March 2019 to determine the changes in beverage purchases following the announcement and implementation of the HPL (Stacey *et al.* 2021). A 28% decrease in SSB purchases was found, implying a possible reduction in sugar intake (Stacey *et al.* 2021). However, a 'substitution effect' may be occurring which is the compensation for a reduction in sugar intake from a reduction in SSB intake by consuming other high-sugar sources (Brukalo *et al.* 2022; Essman *et al*. 2021; Fletcher, Frisvold & Tefft 2013). This could affect the sustainability of the HPL and should be researched further (Fletcher *et al.* 2013). Further research is also required to determine whether there was an increase in SSB consumption among South African consumers during the corona virus disease (COVID-19) lockdown as this may have long-term effects on health-related behaviours and obesity rates in SA (Kirby & Duffett 2020). The president of SA, Cyril Ramaphosa, declared a national state of disaster because of the COVID-19 pandemic on 15 March 2020 (South African Government 2022). Thereafter, a level 5 national lockdown was implemented on 27 March 2020, which resulted in people isolating in their homes to reduce the spread of the contagious virus (South African Government 2022). Limitations on movement meant more time spent at home feeling bored. As a result, consumers purchased more groceries and consumed more sugar (Kirby & Duffett 2020).

School-based obesity preventative strategies are important to prevent obesity in adulthood because children develop lifelong health-related habits at school and are easily influenced by their educators (Erzse *et al*. 2021). A wide selection of school employees was included in this study because improved awareness of the relationship between SSB consumption and health among all school staff could help support obesity preventative strategies, such as sugar taxes in the school setting (Blaine *et al*. 2017; Rauzon *et al*. 2020). A study by De Villiers *et al*. (2015) conducted in eight South African primary schools, outlined the need for healthy lifestyle promotion among learners and educators. Few studies have been conducted on the health of school employees who are also consumers (Rauzon *et al.* 2020; Statista 2022).

The sustainability of a sugar tax is influenced by consumer awareness, knowledge and perception (Williams, Hill & Oyebode 2022), however, it has not been adequately researched worldwide (Ortega-Avila *et al.* 2019), and in SA (Bosire *et al*. 2020; Brukalo *et al.* 2022; Stacey *et al.* 2021). Poor consumer awareness regarding sugar taxes poses a challenge worldwide because it reduces consumer support of sugar taxes (World Bank Group, Health and Nutrition Population 2020). Thus, there is a need to evaluate the HPL after five years of its implementation in SA. This study aimed to assess the understanding, response and support regarding the HPL among urban consumers employed at primary and secondary schools in Pietermaritzburg (PMB), KwaZulu-Natal (KZN), SA.

METHODS AND MATERIALS

Study design

This was a cross-sectional observational

study that collected quantitative data.

Study population and sample selection

A 'school master list' for each district was created by the KZN Department of Education (DOE) (2020). A list of 96 schools was used to locate all primary and secondary schools within the urban areas of PMB. Participants in the study were referred to as consumers as they purchase goods and services for personal use (SA Consumer Complaints 2024). Consumers were sampled from PMB schools, through convenience sampling, and consisted of educators, educator assistants, principals, administrative employees, food service employees, security staff, and maintenance staff, among others (DOE 2021). The study population consisted of consumers who were adults (18 years of age or older), of all races and both sexes, and residing in PMB. All consumers were invited to participate, however, only those who met the inclusion criteria and who gave written consent were allowed to participate in the study. A minimum sample size was determined by the statistician to be 384. If the sample size was exceeded, the data was still included in the study. The researcher visited all schools that gave permission for the study. There was no minimum sample size of consumers per school or per category (i.e. educator or non-educator), thus, the sample was not representative.

Self-administered consumer questionnaire

The SACQ was based on a 2018 study where awareness, attitudes and response to the HPL were assessed among consumers in PMB, KZN (Baijnath & Pillay 2019). Some questions from the SACQ used in the 2018 study were repeated in the SACQ used in the current study, as the studies were of a similar nature. Three other studies conducted on the South African HPL (Essman *et al.* 2021; Hofman *et al*. 2021; Stacey *et al.* 2021), formed the basis for the SACQ developed for the current study as they determined the outcomes of the HPL, post implementation, in terms of consumer response. The researcher used the gaps in the literature from these studies to develop questions to include in the SACQ. The SACQ was validated by two experts, an independent practising statistician and a nutrition epidemiologist and researcher from the University of North Carolina, in the United States of America (USA).

The pilot study was conducted at My Pace Cottage School in PMB. Twenty participants took about 15–20 minutes each to complete the SACQ. Participants did not omit any questions, which suggested that there was no respondent fatigue. After a pilot study, the researcher changed the wording of some questions in the SACQ to ensure clarity. The SACQ consisted of five sections (A to E). Section A determined demographic and socio-economic characteristics, while section B determined awareness of the HPL. If the consumer indicated that they were unaware of the HPL, they were handed a note before continuing to answer the SACQ. The note defined the HPL and its purpose in a factual form and did not contain the researcher's opinions on the HPL. This note did not create bias as the consumer needed to be made aware of the HPL to formulate their own perceptions and perspectives of it. However, consumers who only found out about the HPL during data collection may not have had time to formulate their perceptions and perspectives towards the HPL. Section B also covered consumer knowledge and perceptions of the HPL. Section C determined the consumer responses to the HPL, whether there was a possible 'substitution effect', and whether the consumers increased their SSB intake during the level 5 (26 March 2022–30 April 2022) and level 4 (1 May 2022–31 May 2022) COVID-19 lockdowns, as this was when SA had the most severe restrictions on movement (SA Government, 2022). Section D

assessed consumer support of the HPL and section E determined consumer attitude towards obesity and whether it was of significant concern to them.

Data collection

The researcher and a trained research assistant used the SACQ to collect the data. The school hall or a vacant classroom was used to administer the SACQ. Consumers based at schools were invited to participate in the study via announcements on the intercom, emails, social media messages or word of mouth. They were given an informed consent form to sign before being given the SACQ to complete. The researcher and research assistant explained the purpose of the study and assisted with providing clarity on the questions. Data collection commenced at each school for the duration of one working day, from 8 a.m. until 4 p.m.

Statistical analysis

The researcher captured the data from the SACQ onto a Microsoft Excel spreadsheet. The research assistant checked the data entry for errors. Only three typing errors were noted, and the researcher recaptured the correct data after verifying the raw data. Thereafter, data were analysed using the Statistical Package for the Social Science (SPSS) version 26.

Ethical considerations

Ethical approval was obtained from the University of KwaZulu-Natal (UKZN) Humanities and Social Sciences Research Ethics Committee (HSSREC) (Reference Number: 00005595/2023). An approval letter was obtained from the DOE uMgungundlovu District Municipality to allow the researcher to conduct the study at schools in PMB (Reference Number: 2/4/8/62). Consent letters were sent to the school management, who served as gatekeepers of each school, to obtain permission for the study.

RESULTS

The principals of 13 out of 96 schools gave permission for the schools to participate in the study. From these schools, a total of 385 consumers participated in the Study, including those who consumed SSBs and those who did not.

Sugar-sweetened beverage consumption and household expenditure characteristics of the consumers

Table 1 displays the, SSB consumption and household expenditure characteristics of the consumers.

Of the 385 consumers, 90.1% (n=347) were consumers of SSBs. Just over half of the consumers (54.5%; n=210) earned up to R30 000 (1 687.01 USD*) monthly and almost a third of the consumers (29.4%; n=113) spent up to R100 (5.62 USD*) on SSBs every month (Table 1).

Table 2 indicates frequency of consumption of SSBs.

The chi-square goodness-of-fit test was applied to determine which categories of SSBs were consumed more frequently than the others. Fifty-one per cent (n=177) of consumers drank soft drinks 1–2 times a week (p=0.000). About 36% (n=126) consumed sports/energy drinks 1–2 times a week, while 48.4% (n=168) (p=0.000) did not consume these drinks at all. Furthermore, 26.5% (n=92) also drank squashes 1–2 times a week, while 41.5% (n=144) (p=0.000) did not consume these drinks at all. This also applied to vitamin/flavoured water, where 23.3% (n=81) of consumers drank it 1–2 times a week, while 59.1% (n=205) (p=0.000) did not. In regard to iced tea, 73.2% (n=254) (p=0.000) of

TABLE 1: SUGAR-SWEETENED BEVERAGE (SSB) CONSUMPTION AND HOUSEHOLD EXPENDITURE CHARACTERISTICS OF THE CONSUMERS

Characteristic	Category	n (%)*
SSB consumption (n=385)	Yes	347 (90.1)
	No	38 (9.9)
Total monthly household income (n=384)#	Up to R10 000	104 (27.0)
	R10 001–R20 000	47 (12.2)
	R20 001–R30 000	59 (15.3)
	R30 001–R40 000	25 (6.5)
	R40 001–R50 000	24 (6.2)
	More than R50 000	19 (4.9)
	I do not know	36 (9.4)
	I do not want to answer	70 (18.2)
Money spent on SSBs per month (n=354)#	Up to R50	38 (9.9)
	R51–R100	75 (19.5)
	R101–R150	43 (11.2)
	R151–R200	42 (10.9)
	R201–R250	24 (6.2)
	R251–R300	19 (4.9)
	More than R300	63 (16.4)
	I do not know	50 (13.0)

#Some consumers did not answer; *Percentage of sample (n=385); SSB=sugar-sweetened beverage; SSBs=sugar-sweetened beverages

TABLE 2: FREQUENCY OF SUGAR-SWEETENED BEVERAGE CONSUMPTION (N=347)

Sugar sweetened beverages	0 times a week	1-2 times a week	3-4 times a week	5-6 times a week	Every day	Missing data	X^2	df	p-value*
	n (%)								
Soft drinks	49 (14.1)	177 (51.0)	53 (15.3)	22 (6.3)	33 (9.5)	13 (3.7)	236.539	4	0.000
Sports/energy drinks	168 (48.4)	126 (36.3)	24 (6.9)	8 (2.3)	9 (2.6)	12 (3.5)	333.970	4	0.000
Squashes (e.g., Oros, Jungle Yum, Halls)	144 (41.5)	92 (26.5)	42 (12.1)	28 (8.1)	24 (6.9)	17 (4.9)	159.758	4	0.000
Iced tea	254 (73.2)	57 (16.4)	9 (2.6)	2 (0.6)	7 (2.0)	18 (5.2)	702.900	4	0.000
Vitamin/flavoured water	205 (59.1)	81 (23.3)	18 (5.2)	6 (1.7)	16 (4.6)	21 (6.1)	428.632	4	0.000
Other sugar-sweetened beverages	10 (2.9)	57 (16.4)	26 (7.5)	9 (2.6)	26 (7.5)	219 (63.1)	58.797	4	0.000

*Chi-square goodness-of-fit test; X^2=chi-square statistic; df=degrees of freedom

consumers did not consume it (Table 2).

Awareness, knowledge, and perceptions of the HPL among the consumers

Table 3 indicates awareness of the HPL among consumers. Table 3 also indicates when the consumers thought that the HPL had been implemented in SA.

A binomial test outlined that 41% (n=158) of consumers were aware of the HPL, while 59% (n=226) were unaware of the HPL (p=0.001). Most of the consumers did not know when the HPL was implemented in SA (92.2%; n=355) (Table 3).

Table 4 indicates the consumers' level of agreement or disagreement with various statements about the HPL.

A one-sample t-test was applied to determine if there was significant agreement or disagreement with various statements about

TABLE 3: CONSUMERS' AWARENESS OF THE HEALTH PROMOTION LEVY (HPL) (N=384), COMPARISON OF THE AWARENESS OF THE HPL AMONG EDUCATOR VERSUS NON-EDUCATOR CONSUMERS (N=384) AND RESPONSES REGARDING THE IMPLEMENTATION DATE OF THE HPL (N=385)

Consumer awareness of the HPL	n (%)*	p-value^{o}
Aware	158 (41.0)	0.001
Unaware	226 (59.0)	
Consumer responses regarding the implementation date of the HPL	**n (%)#**	
27 February 2017	5 (1.3)	
01 April 2017	4 (1.0)	
25 October 2017	2 (0.5)	
28 February 2018	1 (0.3)	
01 April 2018	18 (4.7)	
I don't know	355 (92.2)	

*Percentage of sample (n=384); ^{o}Binomial test; #Percentage of sample (n=385); HPL=Health Promotion Levy

TABLE 4: CONSUMERS' LEVEL OF AGREEMENT OR DISAGREEMENT WITH STATEMENTS PROVIDED REGARDING THE HPL

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean agreement score	t	df	p-value^{o}
	n (%)*								
The HPL will reduce obesity in South Africa (SA) (n=377)#	29 (7.5)	57 (14.8)	90 (23.4)	146 (37.9)	55 (14.3)	3.37	6.386	376	0.000
The HPL will reduce the consumption of SSBs in SA (n=376)#	23 (6.0)	75 (19.5)	88 (22.9)	163 (42.3)	27 (7.0)	3.26	4.715	375	0.000
The HPL is a revenue-generating policy of the government (n=369)#	8 (2.1)	31 (8.1)	114 (29.6)	151 (39.2)	65 (16.9)	3.63	12.950	368	0.000
The HPL will affect the economy due to job losses (n=372)#	22 (5.7)	80 (20.8)	125 (32.5)	99 (25.7)	46 (11.9)	3.18	3.194	371	0.002
The government should be allowed to influence the beverage purchasing decisions of consumers (n=370)#	56 (14.5)	98 (25.5)	80 (20.8)	100 (26.0)	36 (9.4)	2.90	-1.601	369	0.110

#Some consumers did not answer; *Percentage of sample (n=385); ^{o}One sample t-test; t=test statistic; df=degrees of freedom; HPL=Health Promotion Levy

the HPL. There was agreement among the consumers that the HPL would reduce obesity and the consumption of SSBs in SA (p=0.000). There was also agreement that the HPL is a revenue-generating policy of the government (p=0.000) and that the HPL would negatively affect the economy on account of job losses (p=0.002). There was neither agreement nor disagreement that the government should be allowed to influence the beverage purchasing decisions of consumers (p=0.110) (Table 4).

Figure 1 indicates consumer responses regarding which beverages were taxed according to the HPL.

Nearly a third of consumers indicated that they did not know which beverages were taxed according to the HPL (32.2%; n=124). However, most consumers indicated that soft drinks were taxed according to the HPL (68.3%; n=263), while just over half of the consumers (53.2%; n=205) indicated that sports/energy drinks were taxed according to the HPL (Figure 1).

Table 5 displays the consumers' overall

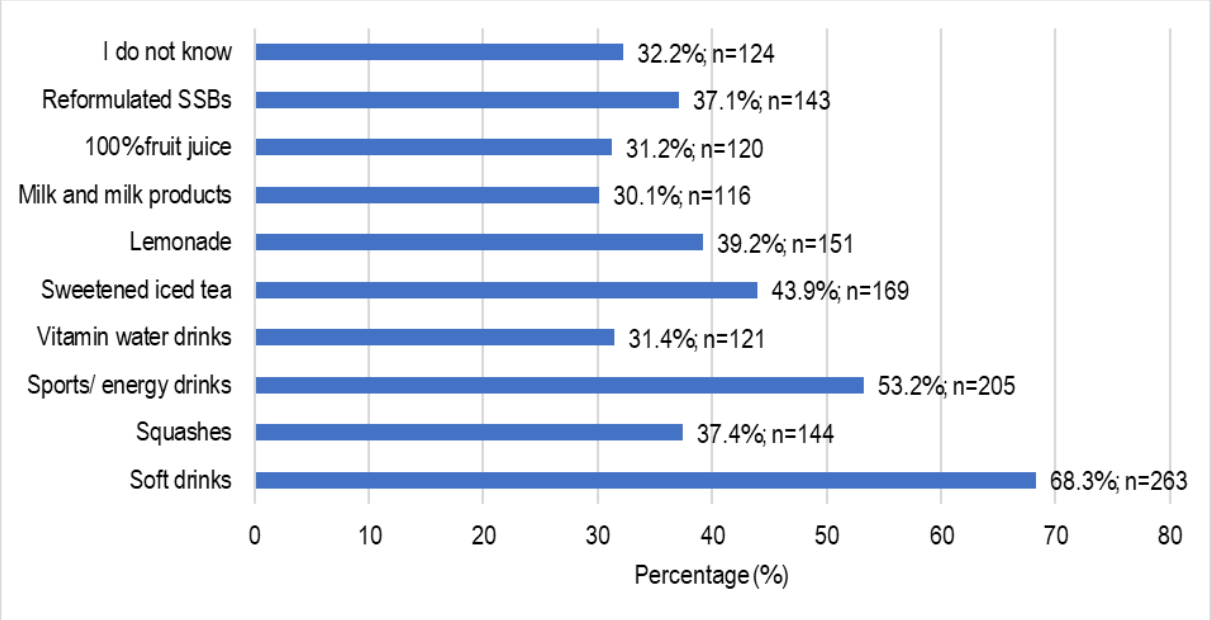

FIGURE 1: CONSUMERS' RESPONSES ON WHICH BEVERAGES WERE TAXED ACCORDING TO THE HPL (N=385)

TABLE 5: CONSUMERS' OVERALL PERCEPTION OF THE HPL (N=376)

Consumers' overall perception of the HPL	n (%)*	p-value^{o}
Negative	28 (7.3)	0.000
Slightly negative	32 (8.3)	
Neutral	126 (32.7)	
Slightly positive	71 (18.4)	
Positive	119 (30.9)	
Missing data	9 (2.3)	
Mean	3.59	
T	9.317	
Df	375	
*Percentage of sample (n=385); ^{o}One sample t-test; t=test statistic; df=degrees of freedom		

perception of the HPL.

A one-sample t-test was applied and determined that about one third of the sample remained neutral on this point (32.7%; n=126), however, perceptions were generally positive (49.3%; n=190) (p=0.000) (Table 5).

Response to the HPL among the consumers employed at primary and secondary schools in PMB

Table 6 outlines the consumer responses, in terms of purchasing behaviour, following the implementation of the HPL.

The chi-square goodness-of-fit test showed that consumers were either not aware of the HPL and had therefore been buying SSBs as normal (52.5%; n=202) (p=0.000) or following the implementation of the HPL, they continued to buy SSBs with the same quantity and frequency that they did before the HPL was introduced (14.3%; n=55) (p=0.000) (Table 6).

Figure 2 outlines the food/beverages selected as alternatives to SSBs by consumers if SSBs were no longer affordable to them.

More than half of the consumers selected water as an alternative if SSBs were no longer affordable to them (54.0%; n=208). Following

TABLE 6: CONSUMERS' RESPONSES, IN TERMS OF PURCHASING BEHAVIOUR, FOLLOWING THE IMPLEMENTATION OF THE HPL (N=385)

Statement	n (%)*	X^2	df	p-value^o
I was not aware of the Health Promotion Levy and have therefore been buying sugar-sweetened beverages as normal.	202 (52.5)	617.623	7	0.000
Following the implementation of the Health Promotion Levy, I have continued to buy sugar-sweetened beverages in the same quantity and with the same frequency that I did before the tax was introduced.	55 (14.3)			
Following the implementation of the Health Promotion Levy, I still buy sugar-sweetened beverages but less often.	42 (10.9)			
Following the implementation of the Health Promotion Levy, I still buy sugar-sweetened beverages but in smaller quantities (cans/ bottles).	18 (4.7)			
Following the implementation of the Health Promotion Levy, I have resorted to buying reformulated sugar-sweetened beverages (made with less sugar/ zero sugar/ artificial sweeteners).	29 (7.5)			
Following the implementation of the Health Promotion Levy, I have stopped buying sugar-sweetened beverages and have opted for another type of beverage.	3 (0.8)			
I do not buy sugar-sweetened beverages at all.	31 (8.1)			
Other.	2 (0.5)			
Non-response/missing data.	3 (0.8)			

*Percentage=total number of consumers applicable to each statement/by total number of consumers in the study x100; X^2=chi-square statistic; df=degrees of freedom; ^{o}Chi-square goodness-of-fit test

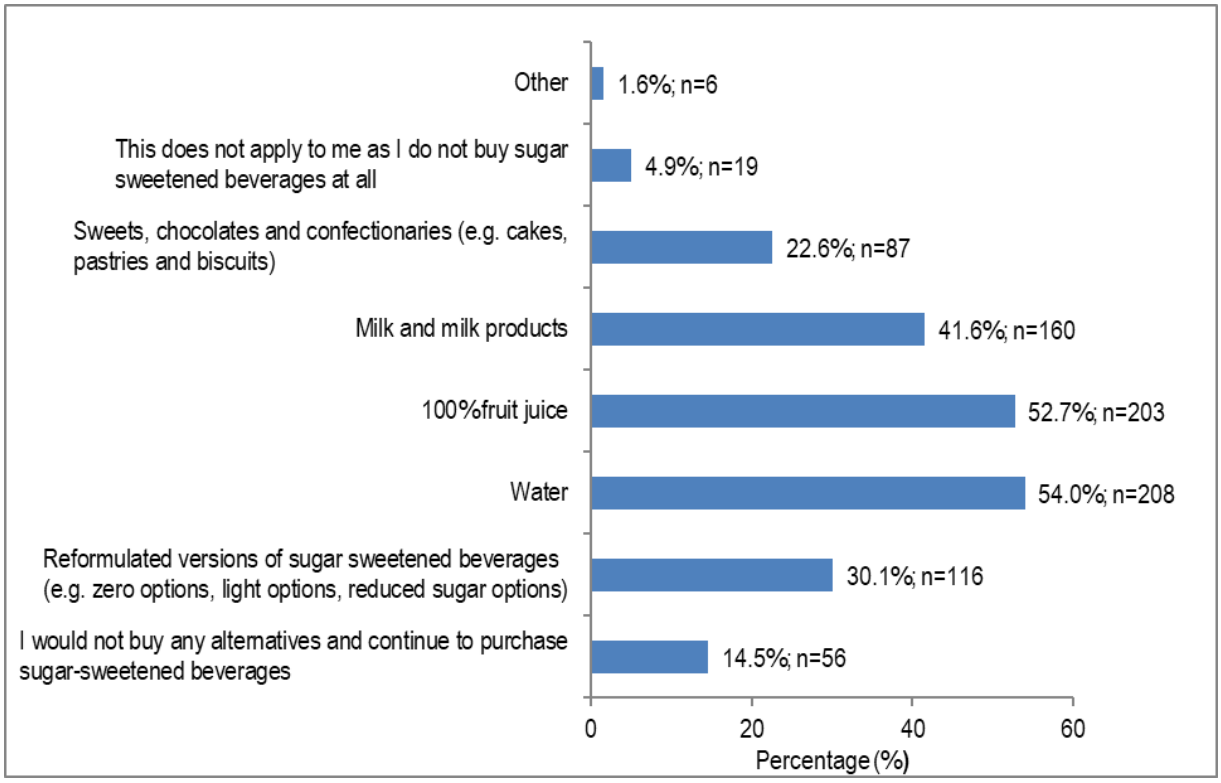

FIGURE 2: CONSUMERS' RESPONSES TO FOOD/BEVERAGE ALTERNATIVES SOUGHT IF SSBS WERE NO LONGER AFFORDABLE TO THEM (N=385)

this, a similar number of consumers selected 100% fruit juice as an alternative if SSBs were no longer affordable to them (52.7%; n=203). Thereafter, the options selected were milk and milk products (41.6%; n=160), reformulated sugar-sweetened beverages (RSSBs) (30.1%; n=116) and sweets, chocolates, and confectionaries (22.6%; n=87) (Figure 2).

TABLE 7: CHANGES IN SSB CONSUMPTION DURING THE 2020 LEVEL 4 AND 5 COVID-19 LOCKDOWNS IN SOUTH AFRICA (SA) (N=385) AND CONSUMERS' REASONS FOR CHANGES IN SSB CONSUMPTION DURING THE COVID-19 LEVEL 4 AND 5 LOCKDOWNS IN SA (N=146)

Changes in SSB consumption during the COVID-19 lockdown (n=385)			**n (%)***	**p-value^{o}**
A lot more SSBs than usual			24 (6.2)	0.000
A little more SSBs than usual			44 (11.4)	
No change in consumption of SSBs			92 (23.9)	
A little less SSBs than usual			105 (27.3)	
A lot less SSBs than usual			111 (28.8)	
Missing data			9 (2.3)	
Mean			2.38	
T			-10.080	
Df			375	
Consumers' reasons for consuming a lot less or a little less SSBs during the lockdown				
Common reasons	**n (%)**	**Verbatim comments**		
I avoided leaving my home as much as possible due to restrictions in movement and/or due to fear of getting COVID-19	21 (14.4)	'The pandemic meant I avoided leaving home'; 'police were all over'; 'didn't go into public places as I wasn't vaccinated'.		
I did not have enough money to purchase SSBs/financial reasons	33 (22.6)	'Didn't have enough money because I was out of work'; 'everything was expensive'.		
I wanted to take care of my health	23 (15.8)	'Decided to take my health into major consideration'; 'I wanted to maintain a healthy immune system and reduced sugar'.		
Availability of SSBs	18 (12.3)	'I consumed what was available'; 'I did not have it at home'.		
Diabetes	6 (4.1)	'I am diabetic and didn't want to risk my sugar going high and ending up in hospital where I could get COVID-19'.		
More time to prepare home-made beverages instead	4 (2.7)	'I had more time to make tea instead'; 'I had time to prepare healthier alternatives'.		
Fewer social gatherings meant fewer opportunities to consume SSBs	2 (1.5)	'Home more and a lot less time socialising'; 'less opportunity to consume them due to less social gatherings'.		
Consumers' reasons for consuming a lot more or a little more SSBs during the lockdown				
Common reasons	**n (%)**	**Verbatim comments**		
Boredom and stress	35 (23.9)	'Being confined at home made eating and drinking the only pleasurable pass-time [sic]'; 'boredom and snacking by the TV'.		
Bulk buying of groceries, including SSBs	4 (2.7)	'I bought SSBs in bulk and couldn't control my consumption'.		

*Percentage of sample (n=385); ^{o}One-sample t-test; t=test statistic; df=degrees of freedom; SSB=sugar-sweetened beverage; SSBs= sugar-sweetened beverages; COVID-19= coronavirus disease

Table 7 outlines the changes in consumption of SSBs, if any, during the 2020 level 4 and 5 COVID-19 pandemic lockdowns in SA. Table 7 also describes the consumer reasons for changes in SSB consumption during the COVID-19 level 4 and 5 lockdowns in SA.

Results of the one-sample t-test found that the average SSB consumption (mean=2.38) during the COVID-19 lockdown was less than usual (p=0.000) (Table 7).

The most common reasons for the increase in consumption of SSBs during the lockdown were boredom and stress (23.9%; n=35). Conversely, the most common reason for the decrease in consumption of SSBs during the lockdown was not having enough money/ financial reasons (22.6%; n=33) (Table 7).

Consumer views of obesity in SA and the HPL

Table 8 indicates the consumers' level of

TABLE 8: CONSUMERS' LEVEL OF AGREEMENT THAT OBESITY IS A SERIOUS CONCERN IN SA (N=384)

Consumers' level of agreement that obesity is a serious concern in South Africa	n (%)*	p-value^{o}
Strongly disagree	10 (2.6)	0.000
Disagree	12 (3.1)	
Neither disagree nor agree	38 (9.9)	
Agree	158 (41.0)	
Strongly agree	166 (43.1)	
Missing data	1 (0.3)	
Mean	4.19	
t	25.266	
df	383	

*Percentage of sample (n=385); ^{o}One sample t-test; t=test statistic; df=degrees of freedom

TABLE 9: CONSUMERS' LEVEL OF AGREEMENT OR DISAGREEMENT WITH STATEMENTS PROVIDED REGARDING THE CAUSES OF OBESITY

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean agreement score	t	df	p-value^{o}
	n (%)*								
Eating too much (n=373)#	11 (2.9)	24 (6.2)	44 (11.4)	177 (46.0)	117 (30.4)	3.98	19.324	372	0.000
Not exercising enough (n=378)#	7 (1.8)	9 (2.3)	25 (6.5)	175 (45.5)	162 (42.1)	4.26	29.448	377	0.000
Stressful lifestyle (n=358)#	15 (3.9)	29 (7.5)	43 (11.2)	158 (41.0)	113 (29.4)	3.91	16.148	357	0.000
Medically diagnosed disorders that result in weight gain (n=371)#	10 (2.6)	31 (8.1)	67 (17.4)	153 (39.7)	110 (28.6)	3.87	16.399	370	0.000
Genetics and family history (n=368)#	10 (2.6)	28 (7.3)	65 (16.9)	168 (43.6)	97 (25.2)	3.85	16.618	367	0.000
Excessive sugar intake (n=376)#	14 (3.6)	15 (3.9)	34 (8.8)	156 (40.5)	157 (40.8)	4.14	22.167	375	0.000
Frequent consumption of SSBs (n=355)#	12 (3.1)	18 (4.7)	60 (15.6)	161 (41.8)	104 (27.0)	3.92	17.663	354	0.000

#Some consumers did not answer; *Percentage of sample (n=385); ^{o}One sample t-test; t=test statistic; df=degrees of freedom

agreement or disagreement that obesity is a serious concern in SA.

Consumers agreed that obesity is a serious concern in SA (84.1%; n=324) (p=0.000) (Table 8).

Table 9 outlines the consumers' level of agreement or disagreement with statements provided regarding the causes of obesity.

A one-sample t-test indicated agreement among consumers that the following statements were causes of obesity (ordered from the greatest perceived cause to the least perceived cause): not exercising enough, excessive sugar intake, eating too much, frequent consumption of SSBs, stressful lifestyle, medically diagnosed disorders that result in weight gain and genetics and family history (Table 9).

Table 10 outlines the consumers' narratives on which measures could be taken to reduce obesity in SA and/or which strategies could complement the HPL.

Almost half of the consumers who answered the question (49.4%; n=158) responded that obesity reduction could occur through creating initiatives and/or aiding the public to increase physical activity. Following this was a healthy, balanced diet (29.4%; n=94) and reducing sugar intake and SSB consumption (21.6%; n=69) (Table 10).

TABLE 10: CONSUMER'S NARRATIVES OF MEASURES WHICH COULD REDUCE OBESITY IN SA AND/OR STRATEGIES THAT COULD COMPLEMENT THE HPL (N=320)*

Common reasons	n (%)	Verbatim comments
The provision or improvement of medical services	24 (7.5)	'Better medical care so that timely diagnosis and treatment can be done'; 'create affordable wellness clinics'; 'regular health checks.'
Addressing the media as a tool to reduce obesity	14 (4.4)	'Advertise healthy foods'; 'highlight the impact advertising has on sugar intake'; 'educate and use social media platforms.'
Create initiatives and/or aid the public to increase physical activity	158 (49.4)	'Make gyms more affordable'; 'regular exercise'; 'exercise at home'; 'upgrade community sports centres'; 'exercise parks.'
Enforce government policies and procedures to reduce obesity	63 (19.7)	'Allow people to finish work earlier to have time for gym and exercise'; 'legislation on what nutritious food should be affordable'; 'better nutrition labelling'; 'monitor advertising.'
Target obesity in childhood via the school environment	43 (13.4)	'An active PE program at schools at least 3 times a week for learners'; 'tuck shops at schools to have more healthy offerings'; 'health awareness programs that start at a school level.'
Reduce sugar intake and SSB consumption	69 (21.6)	'Introduce more sugar free products'; 'avoid sugary drinks'; 'reduce accessibility of SSBs'; 'provide healthier alternatives to SSBs that tastes the same.'
Follow a healthy, balanced diet	94 (29.4)	'Portion control'; 'eat healthy foods'; 'stick to controlled diets'; 'consume more traditional foods'; 'reduce energy intake'; 'cut down on junk food.'
Obesity requires psychological intervention	34 (10.6)	'Be positive on your outlook'; 'discipline, routine, habit'; 'motivational talks'; 'have will power'; 'help people with obesity to regain their confidence.'
Increase water intake	15 (4.7)	'Promote drinking of water.'
Nutrition education	66 (20.6)	'Awareness campaigns'; 'clinics and hospitals to also do healthy education'; 'health education in schools.'
Reduce the cost of healthy food	33 (10.3)	'Healthy food should be cheaper than junk food'; 'government must reduce the price of food.'
*Among the 320 consumers who answered the question, some responded with more than one common reason, so n does not equal 320		

DISCUSSION

Sugar-sweetened beverage consumption and household expenditure characteristics of the consumers

According to the DOE (2021), employees at schools earn between R6 795 (382.11 USD*) to R31 839 (1 790.43 USD*) per month. In the current study, most of the consumers earned up to R30 000 (1 687.01 USD*) monthly. The majority of the consumers spent up to R100 (5.62 USD*) on SSBs every month. Findings by Stacey, Tugendhaft and Hofman (2017a), indicated that the monthly average amount of money spent on soft drinks and squashes in SA households was R37.49 (2.11 USD*) and R5.46 (0.31 USD*), respectively in 2011. In addition, findings from a 2018 study on the sugar tax in PMB reported that 42% of consumers spent R0–R100 (0–5.62 USD*) on SSBs monthly (Baijnath & Pillay 2019). According to Statista (2023b), the SSB market in SA is expected to grow annually by 3.97% between 2023 and 2027. This is evident because just over 90% of the consumers in the current study were consumers of SSBs, which was a valid sample group for the study. Similarly, findings from a study in PMB indicated that 92.9% of the sample consumed SSBs (Baijnath & Pillay 2019). In the current study, most consumers drank soft drinks and/or sports/energy drinks one to two times a week. Similarly, findings from a 2018 study on the sugar tax in PMB indicated that soft drinks were consumed one to two times a week by almost half the consumers (49.2%), while energy drinks were consumed one to two times a week by 30.6% of consumers. In SA, the SSBs which achieved the most sales in 2021 were soft drinks and energy drinks (Euromonitor Passport International 2022).

Consumers in the current study were not consuming iced tea. Results of the Insight Survey (2021) found that iced tea was not as popular as other SSBs in SA. The frequency with which SSBs were consumed among consumers in the current study was shown to be high. The Centre for Community Impact (2022) outlined that SA is among the top 10 consumers of SSBs, worldwide.

Awareness, knowledge and perception of the HPL among the consumers

Forty-one per cent of consumers were aware of the HPL in the current study. In 2018, 58.1% of PMB consumers, who were shopping at malls, were aware of the HPL (Baijnath & Pillay 2019), showing a decrease in HPL awareness between 2018 and 2023. According to Bosire *et al.* (2020), most consumers were unaware of the HPL in Soweto, Johannesburg, SA three months before the implementation date of the HPL. According to Koen *et al*., (2022), 46% of consumers in Cape Town, SA were aware of the HPL after one year of implementation in SA. Only 18 consumers in the current study could correctly identify the implementation date of the HPL. According to Baijnath and Pillay (2019), in 2018, 22.3% of consumers correctly identified the date. This suggests that when the HPL was implemented in 2018, there may have been more exposure to it in the news, resulting in increased awareness of the date of implementation.

According to Bosire *et al.* (2020), in 2018, only a few participants viewed the HPL as a means to combat obesity in SA. However, they were uncertain of how productive the use of the tax revenue would be (Bosire *et al.* 2020). In the current study, there was agreement among the consumers that the HPL would reduce obesity and the consumption of SSBs in SA. According to Baijnath and Pillay (2019), in 2018, the PMB consumers were neutral on whether the South African sugar tax would help to reduce obesity in SA. In addition, the PMB consumers were neutral on whether the sugar tax would reduce the consumption of SSBs (Baijnath & Pillay 2019). This indicates that after five years of the HPL being implemented, there is increasing consumer agreement that the HPL would aid in reducing the consumption rates of SSBs and the obesity rates in SA. However, the current study was conducted in schools, while the 2018 study by Baijnath and Pillay (2019) was conducted in shopping malls in PMB. It is likely that the health education levels of the school staff may have been higher than the convenience sample of consumers taken from shopping malls in PMB in 2018. Higher health education levels may indicate increased awareness of the dangers of excessive sugar consumption and the obesity problem in SA (Fard *et al.* 2021). In 2019, less than half (46.8%) of the participants in Cape Town agreed that the HPL would reduce obesity rates in SA (Koen *et al.* 2022).

In the current study, consumers agreed that the HPL is a revenue-generating policy of the government and that the HPL has negatively affected the economy because of job losses. According to Baijnath and Pillay (2019), there was agreement among the PMB consumers in 2018 that 'the sugar tax is a money-generating scheme by the government' and 'the South African sugar tax will negatively affect the economy due to job losses.' In 2018, three months before the HPL was implemented, more than half of the participants perceived the HPL as a means for the government to raise additional revenue (Bosire *et al.* 2020). This was expressed in a way that suggested the HPL was not in the interest of the health of ordinary citizens but was related to government corruption (Bosire *et al.* 2020).

Most consumers correctly indicated that soft drinks were taxed according to the HPL, while just over half of the consumers correctly

indicated that sports/energy drinks were taxed according to the HPL. This emphasises that soft drinks and sports/energy drinks are the most common SSBs among consumers (Euromonitor Passport International 2022; Stacey *et al.* 2017b). Consumers in a South African study by Bosire *et al.* (2020), collectively referred to SSBs which are taxed according to the HPL as 'Coke', during focus group discussions. In an urban area, knowledge of SSBs is generally higher than rural areas (Stacey *et al*. 2017b). Consumers in PMB are exposed to the same SSBs in their schools and stores. This could explain why most of the consumers could identify soft drinks and sports/energy drinks as SSBs that are taxed according to the HPL. However, approximately a third of consumers indicated that they did not know which SSBs were taxed according to the HPL. This emphasises the need for greater awareness of the HPL among consumers and knowledge of which SSBs are taxed according to the HPL. To the best of the researcher's knowledge, there have been no studies conducted in SA which tested whether consumers knew which SSBs were taxed according to the HPL.

In 2018, there was a definite split as to whether consumers in PMB were in favour of the HPL or not (Baijnath & Pillay 2019). In the current study, the perceptions of the HPL were mostly positive. The positive perceptions towards the HPL in the schools could stem from the ethos instilled in the learners about healthy eating during life orientation lessons and assemblies, which are part of the school curriculum (DOE 2021). Thus, the schools may have created a positive perception of health-promoting initiatives among staff. Essman *et al.* (2021) performed a quantitative content analysis of online South African news articles related to the HPL published between January 2017 and June 2019. Just over half (54%) of the articles expressed positive perceptions towards the HPL, while 26% displayed opposition to it (Essman *et al.* 2021). In 2019, 55.8% of Cape Town participants were positive about the HPL, while 11.2% were very positive (Koen *et al*. 2022). Jankeeparsad and Jankeeparsad (2022) reported that the perception of the HPL was linked to individual beliefs and cultures, thus causing differences in perceptions of the HPL. To achieve a positive perception of the HPL among consumers, Bosire *et al.* (2020) and Piekara (2022) suggested that the revenue from a sugar tax should be used for health promotion or for providing health care to patients already suffering from NCDs caused by obesity.

Response to the HPL among the consumers employed at primary and secondary schools in PMB

Consumers in the current study indicated that they were not aware of the HPL and had therefore been buying SSBs as normal. Alternatively, they indicated that following the implementation of the HPL, they continued to buy SSBs in the same quantity and frequency as they did before the HPL was introduced. In 2018, consumers in PMB stated that they would 'still buy SSBs but less often' and 'continue to buy SSBs in the same quantity and with the same frequency that they did, before the tax was introduced' (Baijnath & Pillay 2019). This suggests that after five years of the implementation of the HPL, consumers in PMB have not changed their SSB purchasing behaviours. However, Stacey *et al.* (2021) found that the HPL led to a reduction in SSB purchases between January 2014 and March 2019, in South African households. Similarly, Essman *et al.* (2021) noted large reductions in SSBs purchases between February 2018 and March 2019, due to consumer price sensitivity.

More than half of the consumers in the current study selected water as an alternative if SSBs were no longer affordable to them. This is similar to results from 2018, where just over 50% of consumers in PMB indicated that they

would choose water as an alternative to SSBs (Baijnath & Pillay 2019). These are positive findings as it suggests that consumer response did not change between 2018 and 2023. School staff can significantly contribute to obesity reduction in SA by acting as role-models and by conveying knowledge of the importance of water to learners (Lambrinou *et al*. 2020; UNICEF 2021). Water should be the main beverage in all school meals (Valencio *et al*. 2022) and numerous studies have indicated that water is the best beverage option for a healthy lifestyle over any other beverage (Malik & Hu 2022; Reese *et al*. 2022; WHO 2023e). Similar findings in the study by Koen *et al*. (2022) outlined that SSBs were substituted with water by 58.5% of Cape Town participants.

It was hypothesised that SSB intake would decrease during the COVID-19 pandemic as entertainment sectors, where SSBs are usually consumed, were prohibited (Claassen *et al*. 2022; Sylvetsky *et al*. 2022). In England and the USA, SSB intake increased during the lockdown due to stress, boredom, and loosened restrictions on healthy dietary practices (Claassen *et al.* 2022; Sylvetsky *et al.* 2022). In the current study, consumers self-reported that their average SSB consumption was lower than usual during the lockdown, due to financial constraints. Consumers in SA experienced financial difficulty during the COVID-19 pandemic because many either lost their jobs, were not working or their businesses were closed, resulting in reduced or no household income (Claassen *et al*. 2022; Sylvetsky *et al*. 2022). Thus, some consumers could not afford to buy SSBs during the lockdown (Hart *et al*. 2022).

Consumer views of obesity in SA and the HPL

Some South Africans are of the opinion that being obese is considered good, healthy and a sign of prosperity (Manafe, Chelule & Madiba 2022). However, consumers in the current study agreed that obesity is a serious concern in SA. This could be attributed to the fact that the study took place in an urban area, where the ideologies that obesity is considered a sign of health and wealth, are slowly being changed (Manafe *et al.* 2022). According to the WHO (2023b), the fundamental cause of obesity is an imbalance between energy consumed and energy expended. The consumers in the current study were knowledgeable about this as they mostly attributed obesity to not exercising enough, followed by excessive sugar intake. Consumers indicated that the South African government could reduce obesity in SA by consumer□suggested initiatives and/or aiding the public to increase physical activity. Physical education lessons are compulsory in schools, making school staff aware of their importance for health (DOE 2021). Furthermore, all schools offer extra-mural activities, which may include sports (DOE 2021).

Study limitations

Consumers were made aware, by the school principals, that they would be participating in a study about the HPL before data collection. This may have created bias because consumers may have researched the topic after being informed by the principals.

Conclusion

The highest proportion of consumers in this study were Indian females, aged 21–30 years old. Consumer support of the HPL can be increased through initiatives to increase awareness and knowledge of the HPL among consumers. This would assist consumers to reduce their SSB purchases because most were unaware of the HPL and had not changed their SSB purchasing behaviours. This in turn, will sustain the efforts of the HPL to reduce obesity in SA. Water should

continue to be emphasised as the beverage of choice and an alternative to SSBs. It is encouraging that the COVID-19 lockdown did not contribute to increased sugar intake from SSBs among the consumers in the current study as it may have negatively affected the goals of the HPL. It is also encouraging that consumers viewed obesity as a serious concern and perceived the HPL positively. The South African government could aid in obesity reduction by creating more initiatives for physical activity. The study findings are relatively new to SA and serve as important baseline data for future studies on the HPL.

*ZAR to USD calculation done on 28 August 2024.

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