

Are Saudi adults supportive of Saudi Food & Drug Authority's food policies? Assessment of public support & awareness for Saudi Food & Drug Authority's food policies

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Abstract

Background

Numerous countries, including Saudi Arabia, are considering nutrition and food policies to help control the obesity epidemic and other non-communicable diseases. The present study examined public support and awareness, among Saudi adults, for the Saudi Food and Drugs Authority's (SFDA) food policies, specifically whether public support and awareness for SFDA policies and regulations have a significant impact on their average Body Mass Index (BMI), and how socio-economic variables impact the public support and awareness for SFDA policies and regulations.

Methods

In this cross-sectional study, 584 Saudi adults completed an electronic questionnaire, collected data on whether the public were aware and supportive of SFDA's different food policies and regulations. To examine whether participants' awareness and support of SFDA's food policies had a significant impact on their average BMI, two sample t-test was used, and a logistic regression model was used to examine the impact of demographics variables on participants' support and awareness for SFDA policies and regulations.

Results

Saudi adults followed SFDA's latest news and regulations and were supportive of SFDA's food policies. Particularly, high support was for food policies of requiring restaurants and coffee shops to report calorie amounts in foods and beverages, reducing the salt amount in bread, eliminate hydrogenated oil from food products, and preventing misleading written nutrition information on food products, and preventing food advertisements without permission. The results of the two-sample t-test showed that there was a significant difference in the mean BMI between the participants who followed and those who did not follow SFDA news and regulations. The mean BMI between the participants who cooperated and those who did not cooperate with SFDA by reporting food safety violations was significantly different. The results of the binary logit model indicated that several socio-demographic characteristics were significantly associated with food policy awareness and support.

Conclusion

The findings of this study may assist nutrition educators to plan programs to improve health-related behaviors, and may allow stakeholders and policy makers to consider public perception and social desirability in the policy-making and implementation process.

Background

The prevalence of overweight and obesity has been a significant public health issue, worldwide. In adult population (aged 18 years and over), 39% were overweight, and 13%, were obese in 2016, according to the WHO [1]. In 2013, overweight and obesity affected 30.7%, and 28.7%, respectively, of adult (15 years and older) Saudi Arabians [2]. Previous research has revealed that obesity is among the major causes of co-morbidities, including diabetes, cardiovascular diseases, some types of cancers. In addition, obesity is related issues that may lead to morbidity and mortality [3, 4, 5]. The total cost of obesity and overweight is considered a relative high burden on both health care systems and for society [6].

Taking into account Saudi Arabia's vision 2030 and WHO guidelines on eliminating non-communicable diseases, the Saudi Food & Drug Authority (SFDA) aims to reduce the levels of sugar, salt, and saturated and transformed fat in food products [7, 8, 9, 10]. It also raises the awareness and adoption of food products manufacturers and importers to reduce these contents and include the calories levels in restaurants and cafes' menus to determine the daily calorie consumption per capita. A recent study by Alkhalidy et al. evaluated the views of the Saudi public towards the mandatory menu energy-labelling policy in restaurants and found that Saudis welcomed this policy and believed that such energetic information would encourage them to select lower-energetic food items [11]. By the end of 2018, the SFDA has set up food policies to regulate healthy foods and include: 1) requiring restaurants and coffee shops to display calorie amounts in their products; 2) reducing the salt content in food products (especially bread); 3) eliminating hydrogenated oils in food products; 4) preventing misleading nutritional information on food products; 5) and preventing food advertisements without permission [7, 8, 9, 10].

Such policies may get implemented if they are supported and adopted by the general public [12, 13, 14, 15]. In addition, an individual may support a policy if it is useful, relevant, and applicable to their life. Moreover, food and nutrition policies' support may vary based on individuals' socio-demographic and economic characteristics [14, 16, 17]. However, to our knowledge, no study to date has assessed public support and awareness for SFDA's food policies and regulations. Therefore, the primary purpose of this study was to assess public support and awareness

for SFDA's food policies in Saudi adults. In addition, the study aimed to examine whether public support and awareness for SFDA's policies and regulations have a significant impact on their average BMI and to examine the impact of socio-economic variables on public support and awareness for SFDA policies and regulations.

Methods

Study design and participants

Using a convenience sampling method, the data of this cross-sectional study were collected through self-completed online survey, created using Google form and distributed via social media networks and targeted Saudi adults (≥ 18 years old). Saudi public figures with a high number of followers in Saudi Arabia were asked to share the questionnaire link in their social media channels. **Respondents to the study survey were asked to provide consent before participating and were able to exit the survey at any point.**

Measures

The survey questions collected demographic data, including gender, weight, height, occupation, marital status, education level, geographic location, and household income. The survey also included questions on whether the public were aware and supportive of SFDA's different food policies and regulations. Table 1 presents survey questions, related to SFDA's food policies and regulations. At the end of the survey, the participants given the option to write their suggestions for future SFDA's food policies. Prior to the current study, the survey questions (data not shown) were pre-tested for ease of completion and wording with 185 respondents, recruited from university students (≥ 18 years old).

Data analysis

Using participants' reported height and weight, each participant's BMI was calculated (with the formula of $BMI = \text{kg}/\text{m}^2$, where kg is a person's weight in kilograms and m^2 is their height in meters squared) [18]. A BMI of less than 18.5 is considered underweight while the BMI of normal/healthy weight is 18.5 to 24.9. A BMI of 25.0 to 29.9 is overweight, and a BMI of 30 or more is considered obese. The demographic characteristics of the participants were analyzed, including descriptive statistics of percent, measures of central tendency (frequency and mean), and a measure of distribution (standard deviation).

For questions on the participants' awareness and support of SFDA's food policies, frequency distributions were used to display the number and percentage of participants who answered agree or disagree. To examine whether participants' awareness and support of SFDA's food policies had a significant impact on their average BMI, a two sample t-test was used to examine the null hypotheses. The Levene's test for homogeneity of variance was conducted (the null hypothesis of Levene's test is that variance is equal between the groups), and the two sample t-test assuming equal variance was used.

To examine the impact of demographical variables on the study participants' support and awareness for SFDA policies and regulations, a binary logit model was implemented. The model was first implemented considering all participants' socio-economic characteristics. Then the model was reduced to include only statistically significant explanatory variables. The R software was used to analyzed the study data. The study protocol was approved by King Faisal University's Ethics of Scientific Research Committee.

Results

Sample characteristics

After eliminating incomplete or unreliable data, the total number of observations results were 584 responses from all the five regions, Central, Western, Eastern, Southern, and Northern, of Saudi Arabia. Table 2 presents a brief description of the nominal and ordinal variables. About 77% of the participants were female, and the age mean of the participants was 31.5 years old (± 2). As for the participants' BMI mean, it was 25 (± 0.08). Out of the study participants, 35.4% of them were employed, almost 64% of them were married, 58.4% of them had a bachelor's degree, and the monthly household income of 20% of the participants was over SR19,000 (~ \$5,000).

Public support and awareness for SFDA's food policies & regulations

The results showed that even though 56% of the study participants followed SFDA's latest news and regulations via social media accounts, a smaller percent (42%) of the participants were aware of the latest SFDA's educational awareness messages (Table 3). Almost all (96%) of the participants were satisfied that SFDA had required restaurants and coffee shops with providing calorie amounts in their food products, and 93% of the participants agreed that requiring restaurants and coffee shops to report calorie amounts had increased their awareness about their food and beverage consumption. In addition, 65% of the participants agreed that knowing calorie amounts, provided in restaurants and coffee shops, had helped them decrease eating out. About 56% of the participants knew how to calculate their daily food calorie needs.

Regarding the SFDA policy of requiring food companies to reduce salt amount in bread, 92% were satisfied with that policy even though 53% of respondents did not know the daily amount of salt their body needs. Yet, 69% of the participants reported that they read nutrition labels on food packages, and 95% of the participants supported the SFDA's policy of eliminating hydrogenated oil from food products. In addition, 96% of the participants were supportive of SFDA's policy to prevent misleading written nutrition information on food products, and 97% of the participants were supportive of SFDA's policy of preventing food advertisements without permission. Moreover, 96% of the participants agreed that preventing food advertisement without permission had helped their rights as consumers.

Even though 56% of the participants did not follow SFDA news and food policies through SFDA's media channels, 67.5% of the participants cooperated with SFDA by reporting food safety violations. As for the optional question regarding the participants' suggestions for future SFDA's food policies, over 50% of the participants suggested food policies they wished for. The most frequently suggested food policies included: 1) Regulating the use of food artificial colors and flavors, especially in children's foods and sweets; 2) Requiring food companies to increase nutrient (vitamins and minerals) amounts in their food products; 3) Promoting healthy and organic foods and controlling their prices; and 5) Promoting nutrition education, school nutrition, and food safety programs.

The impact of public support & awareness for SFDA's food policies & regulations on the public's BMI

The second objective of this study was to examine whether participants' support and perception of SFDA's food policies had a significant impact on their average BMI. The results of the Levene's test (data not shown) indicated that we failed to reject the null hypothesis of equal variance. After using two sample t-test assuming equal variance (Table 4), there was no significant difference in the means of BMI between the participants who were aware and the participants who were unaware about updated SFDA educational awareness messages. There was no significant difference in the means of BMI between the participants who were satisfied and the participants who were unsatisfied that SFDA required food companies to provide calorie amounts in their products. There was no significant difference in the means of BMI between the participants who agreed and the participants who disagreed that requiring food companies to provide calorie amounts in their products had helped increase their awareness about foods and beverages.

However, there was a significant difference in the mean BMI between the participants who agreed and the participants who did not agree that knowing calorie amounts in food products had helped them decrease eating out. The result of Cohen's D was 0.28, indicating a small effect size. Yet, there was no significant difference in the means of BMI between the participants who knew and the participants who did not know how to calculate their daily food calorie needs. Regarding participants' satisfaction with the SFDA's policy of requiring food companies to reduce salt amounts in bread, there was a significant difference in the means of BMI between the participants who were satisfied and the participants who were unsatisfied. The result of Cohen's D was 0.46, indicating a small effect size. Nonetheless, there was no significant difference in the means of BMI between the participants who knew and the participants who did not know the daily amount of salt their body needs.

There was no significant difference in the means of BMI between the participants who read and the participants who did not read the nutritional label on food products. There was no significant difference in the means of BMI between the participants who were satisfied and the participants unsatisfied with SFDA's policy of eliminating hydrogenated oils in food products. There was no significant difference in the means of BMI between the participants who supported and the participants did not support SFDA's policy of preventing written misleading nutritional information on food products. There was no significant difference in the means of BMI between the participants who supported and the participants did not support the SFDA's policy of preventing food advertisements without permission. There was no significant difference in the means of BMI between the participants who agreed and the participants who disagreed that preventing food advertisements without permission saved their right as a consumer.

Nevertheless, there was a significant difference in the means of BMI between the participants who followed and the participants who did not follow SFDA's news and regulations through SFDA's media networks. The result of Cohen's D was 0.21, indicating a small effect size. Lastly, there was a significant difference in the means of BMI between the participants who cooperated and the participants who did not cooperate with SFDA by reporting SFDA's policy violations related to food safety. The Cohen's D value for this group was 0.25, indicating a small size effect.

The impact of demographical variables on public support & awareness for SFDA's food policies & regulations

The third objective of this study paper was to examine the impact of demographical variables on the study participants' support and awareness for SFDA's policies and regulations (Table 5). The results showed that as the participants got older, they would be less likely to be aware of updated SFDA's educational awareness messages. The participants who earned SR 10,000-13,999 were more likely to be aware of updated SFDA's educational awareness messages compared to the participants who earned less than SR 6,000. Also, the probability that a participant aged 34 and earned SR 10,000-13,999 to be aware of updated SFDA's educational awareness messages was 64%.

In addition, men were more likely to be satisfied that SFDA requiring restaurants and coffee shops to provide calorie amounts in their products compared to women. Unemployed participants are less likely to be satisfied that SFDA requiring restaurants and coffee shops to provide calorie amounts in their products compared to employed participants. The probability that unemployed male participants to be satisfied that SFDA

requiring restaurants and coffee shops to provide calorie amounts in their products was 14%. Furthermore, married and single participants compared to divorced participants were less likely to agree that requiring restaurants and coffee shops to provide calorie amounts in their products helped increase their awareness about foods and beverages.

Moreover, the participants who were singles and the participants who were students were less likely to know how to calculate their daily food calorie needs compared to the divorced participants and the employed participants. The probability that a single male student to know how to calculate his daily food calorie needs was 53%. As participants got older and knew calorie amounts in food products, they would be less likely to eat out. Additionally, a male participant with a post-graduate degree and a household income of SR14,000- 19,000 or over SR19,000 was more likely to eat out compared to a female participant who held a bachelor's degree and earned less than SR 6,000. The probability that a male participant with a post-graduate degree and a household income of SR14,000- 19,000 and knew calorie amounts in food products to eat out was 70%, and the probability that a male participant with a post-graduate degree and a household income of over SR19,000 and knew calorie amounts in food products to eat out was 65%.

In addition, for every one kg increased in a participant's weight, they probably would be satisfied that SFDA requiring food companies to reduce salt amounts in bread. The probability that a 34-year-old male participant with a household income of SR14,000-SR19,000 to know the daily amount of salt required by his body was 78%. Reading the nutritional label on food products was more probable among male participants compared to female participants and less probable among unemployed participants compared to employed participants. The participants were more likely to be satisfied with SFDA's policy of eliminating hydrogenated oils in food products when they were male and earning less than SR 6,000. The participants with a household income of SR 6,000-9,999, SR 10,000-13,999, or over SR19,000 were less likely to be supportive of the SFDA's policy of preventing misleading written nutritional information on food products compared to the participants who earned a household income of less than SR 6,000.

Surprisingly, the participants with a household income over SR 19,000 were less likely to support the SFDA's policy of preventing food advertisements without permission. Compared to male participants, female participants were more likely to agree that preventing food advertisements without permission had saved their right as a consumer. Lastly, the participants who held post graduate degrees and the participants who were students were more likely to cooperate with SFDA by reporting SFDA's policy violations related to food safety compared to the participants who were bachelor's holders and the participants who were employed. The participants with high school degrees and a household income of SR6,000-9,000 were less likely to cooperate with SFDA by reporting SFDA's policy violations related to food safety compared to the participants who were bachelor's holders and earning less than SR 6,000.

Discussion

Numerous countries, including Saudi Arabia, are considering nutrition and food policies to improve dietary behaviors related health outcomes [13, 14, 19, 20, 21]. A potentially powerful role for food policies is to support an environment that encourages healthy preference and the learning of healthy behaviors [22]. This study sought to assess awareness and support for SFDA's food policies and regulations among Saudi adults, to examine the differences in means of BMI of Saudi adults, and to examine the effect of Saudi adults' socioeconomic characteristics on their BMI.

The results of the first study objectively demonstrated that many Saudi adults followed SFDA's latest news and regulations and were supportive of SFDA's food policies. Particularly, high support was for food policies of requiring restaurants and coffee shops to report calorie amounts in foods and beverages, reducing salt amount in bread, eliminating hydrogenated oil from food products, and preventing written misleading nutrition information on food products, and preventing food advertisements without permission. These findings are consistent with similar studies in Australia, Canada, Mexico, the U.K., and the U.S.A., where people tend to support intrusive food policies, such as calorie menu labeling, food package warnings, and maximum salt levels for packaged products [19, 23].

In this study, Saudi adults agreed that such food policies had increased their awareness of what they consumed, and they even cooperated with SFDA by reporting food safety violations. However, about 50% of the Saudi adults participated in this study lacked in knowledge of their daily calorie and salt needs. Similar findings were reported in a study on Saudi adults that found that at least 50% of the participants were able to identify the correct energetic intake for moderately active men and women [11]. Yet, only 36% of the participants reported the correct energy requirements for inactive adults. Implementation of policy actions, such as population education and point-of-purchase labelling are increasingly and widely used [24]. Increasing nutrition education messages on the calculation of calorie and nutrient needs and healthy food choices are needed for Saudi adults in order that they are able to interpret the values on food packages for their individual needs.

To encourage the public to reconsider their preferences and make alternative choices, food policies should influence the prices, availability, and presentation (choice architecture) of healthier food options [22]. The most frequently suggested food policies by the study participants were regulating the use of food artificial colors and flavors, requiring food companies to increase nutrients in their food products, promoting healthy and organic foods and controlling their prices, and promoting nutrition education, school nutrition, and food safety programs. Based on the

concept of “price elasticity,” manipulating food prices could shift consumption patterns towards a healthier direction [25]. However, none of the suggested food policies by the study participants included increasing taxes on unhealthy foods.

The results of the second study objective results showed that there was a significant difference in the mean of BMI between the participants who agreed and the participants who disagreed that knowing food products calories amount had helped decrease eating out. Likewise, there was a significant difference in the mean of BMI between the participants who were satisfied and those who were not satisfied that SFDA required bread producers to decrease salt amount. Furthermore, there was a significant difference in the mean of BMI between the participants who followed SFDA news and those who did not follow SFDA news.

In addition, the participants who cooperated with SFDA by reporting food safety violations were found to have significant difference in their BMI means compared to those who did not cooperate with SFDA. These findings, supported by statistical significance, meant that participants’ awareness was reflected in their average BMI. The outcomes of significant impact of public support and awareness for these SFDA’s policies on BMI were also reported by Bhawra et al. who found an association between the BMI and the public support, particularly the higher the BMI, the more support for menu labelling among Canadian youth and young adults [19]. The study suggested that this might be reflective of an increased interest in nutritional information, such as calories.

The results of the third study objective indicated that several socio-demographic variables were significantly associated with food policy awareness and support. While previous studies similarly found socio-demographic characteristics to be associated with policy support, the direction of these relationships varied across studies. For example, in a study by Julia et al. found that older French adults were more likely to support a sugary drink tax [26], while a study by Curry et al. found that young American adults were more supportive of such a tax [27]. In addition, a greater health consciousness among women supporting food policies had been reported previously [23, 28]. In the current study, awareness and support for food policies generally were among middle class income male young adults who were employed. Saudi young adult participants in this study might be more health conscious. Additional information on Saudi adults’ attitudes and beliefs was not collected in the present study, and this may be an area for further exploration. Moreover, further studies are needed to and further understand the influence of demographic characteristics on policy support.

Strengths & limitations

The key strength of this study is its novelty, being the first attempt to assess Saudi public support and awareness of SFDA’s food policies to change dietary and health related behaviors. Future qualitative studies are needed to better understand why these policies receive public support, and to examine the differential influence of certain sociodemographic characteristics, such as household income and education levels, on policy support.

Nevertheless, the findings should be interpreted in of the study’s limitations. The sample cannot be considered to be nationally representative since non-probability-based sampling was used to recruit participants. Due to collecting the study data electronically, the study sample differed from the general population, with a larger proportion of highly educated participants and those who had access and knew how to use electronic questionnaires. In addition, BMI was calculated based on self-reported height and weight. Even though the cross-sectional study design is appropriate for determining food policy support, repeated surveys are required to assess how food policy support changes over time. Lastly, the participants’ actual knowledge of calorie and salt needs and their actual recall of any SFDA’s educational awareness messages seen were not verified. Future studies could include a qualitative component that allows participants to give examples regarding these topics.

Conclusions

Overall, Saudi adults reported high levels of support for SFDA food policies, particularly for 1) requiring restaurants and coffee shops to display calorie amounts in their products; 2) reducing salt content in food products (especially bread); 3) eliminating hydrogenated oils in food products; 4) preventing misleading nutritional information on food products; 5) and preventing food advertisements without permission. Public perceptions and support generally impacted public BMI, especially for older age participants, males, and students. The findings of this study may assist nutrition educators to plan programs to improve health related behaviors and may assist stakeholders and policy makers as public perception and social desirability are important to the policy-making and implementation process.

Abbreviations

Saudi Food & Drug Authority

SFDA

Body Mass Index

BMI

Declarations

Ethics approval and consent to participate:

Respondents to the study survey were asked to provide consent before participating (by clicking on the agree to participate button) and were able to exit the survey at any point. The study protocol was approved by King Faisal University's Ethics of Scientific Research Committee.

Consent for publication:

Not applicable

Availability of data and materials:

The datasets during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests:

The authors declare that they have no competing interests.

Funding:

The current study did not receive any funding.

Authors' contributions

SHT conducted the study and collected and analyzed the study data. MA devolved the data analyzing models and analyzed the study data. The paper manuscript was prepared by SHT, with major contributions from MA. Both authors read and approved the final manuscript.

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References

1. World Health Organization. Obesity and overweight. [Internet]. 2020 [cited 2020 May 18]. Available from: <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
2. Memish ZA, El Bcheraoui C, Tuffaha M, Robinson M, Daoud F, Jaber S et al. Obesity and associated factors—Kingdom of Saudi Arabia, 2013. *Prev Chronic Dis*, 2014; 11: E174. doi: 10.5888/pcd11.140236.
3. Bhaskaran K, Douglas I, Forbes H, dos-Santos-Silva I, Leon DA, Smeeth L. Body-mass index and risk of 22 specific cancers: A population-based cohort study of 5.24 million UK adults. *Lancet*, 2014; 384(9945):755-65. doi: 10.1016/S0140-6736(14)60892-8.
4. CDC. The health effects of overweight and obesity [Internet]. 2020 [cited 2020 May 18]. Available from: <https://www.cdc.gov/healthyweight/effects/index.html>
5. NHLBI. Managing overweight and obesity in adults: Systematic evidence review from the obesity expert panel [Internet]. 2013 [cited 2020 May 18]. Available from: <https://www.nhlbi.nih.gov/sites/default/files/media/docs/obesity-evidence-review.pdf>
6. Tremmel M, Ulf-G G, Nilsson PM, Saha S. Economic burden of obesity: A systematic literature review. *Int J Environ Res Public Health*, 2017; 14(4): 435. doi:10.3390/ijerph14040435
7. Saudi Food & Drug Authority. Food regulations [Internet]. Undated [cited 2020 June 6]. Available from: <https://www.sfda.gov.sa/en/food/about/regulations/Pages/default.aspx>
8. Saudi Food & Drug Authority. Food Technical regulations and Standards project [Internet]. Undated [cited 2020 June 6]. Available from: https://www.sfda.gov.sa/en/food/about/administration/management_regulations/pages/regulations_standards-project.aspx
9. Saudi Food & Drug Authority. SFDA healthy food strategy [Internet]. Undated [cited 2020 June 6]. Available from: <https://www.sfda.gov.sa/ar/awareness/Documents/SFDA-HealthyFoodStrategy.pdf>
10. Saudi Food & Drug Authority. SFDA launches Healthy Food Regulation Strategy tomorrow [Internet]. 2018 [cited 2020 June 6]. Available from: <https://www.sfda.gov.sa/en/food/news/Pages/f11-9-2018a1.aspx>
11. Alkhalidy AA, Taha DS, Alsaifi SE, Naaman RK, Alkhalaf MM. Response of the public and restaurant owners to the mandatory menu energy-labelling implementation in restaurants in Saudi Arabia. *Pub Health Nutr*, 2020; 1-13. doi:10.1017/S1368980020000245

12. Bos C, Van der Lans IA, Rijnsoever FJV, Van Trijp HCM. Understanding consumer acceptance of intervention strategies for healthy food choices: A qualitative study. *BMC Pub Health*, 2013; 13(1073)
13. Diepeveen S, Ling T, Suhrcke M, Roland M, Marteau TM. Public acceptability of government interventions to change health-related behaviours: A systematic review and narrative synthesis. *BMC Pub Health*, 2013; 13(756)
14. Mazzocchi M, Cagnone S, Bech-Larsen T, Niedzwiedzka B, Saba A, Shankar B, et al. What is the public appetite for healthy eating policies? Evidence from a cross-European survey. *Health Econ Pol Law*, 2015; 10, 267–292.
15. Raine KD, Nykiforuk CI, Vu-Nguyen K, Nieuwendyk LM, VanSpronsen E, Reed S, et al. Understanding key influencers' attitudes and beliefs about healthy public policy change for obesity prevention. *Obesity*, 2014; 22(11), 2426–2433.
16. Public Health Agency of Canada. Canadians' perceptions of, and support for, potential measures to prevent and reduce childhood obesity: Final report. [Internet]. 2011 [cited 2020 May 18]. Available from: http://epe.lac-bac.gc.ca/100/200/301/pwgsc-tpsgc/por-ef/public_health_agency_canada/2011/100-10/report.pdf
17. Coalition Poids. Sugar-sweetened beverage marketing unveiled [Internet]. 2012 [cited 2020 May 18]. Available from: https://www.cqpp.qc.ca/documents/file/2012/Report_Marketing-Sugar-Sweetened-Beverage_Volume2-Price_2012-03.pdf
18. CDC. About adult BMI [Internet]. 2020 [cited 2020 May 18]. Available from: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html
19. Bhawra J, Reid JL, White CM, Hammond D, Vanderlee L, Raine K. Are young Canadians supportive of proposed nutrition policies and regulations? An overview of policy support and the impact of socio-demographic factors on public opinion. *Can J Public Health*, 2018;109(4):498–505.
20. Brambila-Macias J, Shankar B, Capacci S, Mazzocchi M, Perez-Cueto FJA, Verbeke W et al. Policy interventions to promote healthy eating: a review of what works, what does not, and what is promising. *Food Nutr Bulletin*, 2011; 32(4), 365–375.
21. Mozaffarian D. Dietary and policy priorities to reduce the global crises of obesity and diabetes. *Nature Food*, 2020; 1, 38–50. <https://doi.org/10.1038/s43016-019-0013-1>
22. Hawkes C, Smith TG, Jewell J, Wardle J, Hammond RA, Friel S, Thow AM, Kain J. Smart food policies for obesity prevention. *Lancet*, 2015; 385(9985):2410-21. doi: 10.1016/S0140-6736(14)61745-1.
23. Kwon J, Cameron A J, Hammond D, White CM, Vanderlee L, Bhawra J, Sacks G. A multi-country survey of public support for food policies to promote healthy diets: Findings from the International Food Policy Study. *BMC Public Health*, 2019; 19:1205. <https://doi.org/10.1186/s12889-019-7483-9>
24. Mozaffarian D, Angell SY, Lang T, Rivera JA. Role of government policy in nutrition—barriers to and opportunities for healthier eating. *BMJ*, 2018; 13; 361: k2426. doi: 10.1136/bmj.k2426.
25. Temple NJ. Strategic nutrition: A vision for the twenty-first century. *Public Health Nutr*, 2016; 19(1):164-75. doi:10.1017/S1368980014003292
26. Julia C, Méjean C, Vicari F, Péneau S, Hercberg S. Public perception and characteristics related to acceptance of the sugar-sweetened beverage taxation launched in France in 2012. *Public Health Nutr*. 2015;18(14):2679–88.
27. Curry L, Rogers T, Williams P, Homsy G, Willett J, Schmitt C. Public attitudes and support for a sugar-sweetened beverage tax in America's heartland. *Health Promot Pract*. 2017;19(3):418–26.
28. Sainsbury E, Hendy C, Magnusson R, Colagiuri S. Public support for government regulatory interventions for overweight and obesity in Australia. *BMC Public Health*. 2018;18(1):513–24.

Tables

Table 1

Survey Questions

| Item | Question |
|------|--|
| Q1 | I always am aware of updated SFDA educational awareness messages |
| Q2 | Generally, I'm satisfied that SFDA requiring restaurants and coffee shops to provide calorie amounts in their products |
| Q3 | Requiring restaurants and coffee shops to provide calorie amounts in their products has helped increase my awareness about foods and beverages |
| Q4 | Knowing calorie amounts in food products has helped decrease eating out |
| Q5 | I know how to calculate my daily food calorie needs |
| Q6 | I'm satisfied that SFDA requiring food companies to reduce salt amounts in bread |
| Q7 | I know the daily amount of salt my body requires |
| Q8 | I read the nutritional label on food products |
| Q9 | I'm satisfied with SFDA's policy of eliminating hydrogenated oils in food products |
| Q10 | I support the SFDA's policy of preventing misleading written nutritional information on food products |
| Q11 | I support the SFDA's policy of preventing food advertisements without permission |
| Q12 | Preventing food advertisements without permission has saved my right as a consumer |
| Q13 | I follow SFDA's news and regulations through SFDA's media channels |
| Q14 | I cooperate with SFDA by reporting SFDA's policy violations related to food safety |

Table 2

Summary of study participants' characteristics

| Participants' characteristics | Number | Percentage |
|--------------------------------------|---------------|-------------------|
| Gender | | |
| Male | 136 | 23% |
| Female | 448 | 77% |
| Occupation | | |
| Employed | 207 | 35% |
| Student | 184 | 32% |
| Unemployed | 193 | 33% |
| Marital Status | | |
| Divorced | 19 | 3% |
| Married | 313 | 54% |
| Single | 247 | 42% |
| Widow | 5 | 1% |
| Education Level | | |
| Less than high school | 21 | 4% |
| High school or equivalent | 154 | 26% |
| Bachelor degree | 341 | 58% |
| Post graduate degree | 68 | 12% |
| Household Income | | |
| ≤ SR 6,000 | 125 | 21% |
| SR 5,999-9,999 | 115 | 20% |
| SR 10,000-13000 | 128 | 22% |
| SR 14,000-18,999 | 86 | 15% |
| ≥ SR 19,000 | 130 | 22% |

Table 3
Public support and awareness for SFDA's food policies & regulations

| Survey Question | Number | Percentage |
|------------------------|---------------|-------------------|
| Q1 | | |
| Agree | 247 | 42% |
| Disagree | 337 | 58% |
| Q2 | | |
| Agree | 560 | 96% |
| Disagree | 24 | 4% |
| Q3 | | |
| Agree | 545 | 93% |
| Disagree | 39 | 7% |
| Q4 | | |
| Agree | 382 | 65% |
| Disagree | 202 | 35% |
| Q5 | | |
| Agree | 326 | 56% |
| Disagree | 258 | 44% |
| Q6 | | |
| Agree | 535 | 92% |
| Disagree | 49 | 8% |
| Q7 | | |
| Agree | 273 | 47% |
| Disagree | 311 | 53% |
| Q8 | | |
| Agree | 403 | 69% |
| Disagree | 181 | 31% |
| Q9 | | |
| Agree | 553 | 95% |
| Disagree | 31 | 5% |
| Q10 | | |
| Agree | 561 | 96% |
| Disagree | 23 | 4% |
| Q11 | | |
| Agree | 565 | 97% |
| Disagree | 19 | 3% |
| Q12 | | |
| Agree | 560 | 96% |
| Disagree | 24 | 4% |
| Q13 | | |
| Agree | 256 | 44% |

| | | |
|------------|-----|-----|
| Disagree | 328 | 56% |
| Q14 | | |
| Agree | 394 | 67% |
| Disagree | 190 | 33% |

Table 4

The impact of public support & awareness for SFDA's food policies & regulations on BMI

| Null Hypothesis | P- Value | Decision |
|--|-------------|-------------------|
| There was no significant difference in the means of BMI between the participants who were aware and the participants who were unaware about updated SFDA educational awareness messages. | 0.076 | Fail to Reject |
| There was no significant difference in the means of BMI between the participants who were satisfied and the participants who were unsatisfied that SFDA required food companies to provide calorie amounts in their products. | 0.829 | Fail to Reject |
| There was no significant difference in the means of BMI between the participants who agreed and the participants who disagreed that requiring food companies to provide calorie amounts in their products had helped increase their awareness about foods and beverages. | 0.734 | Fail to Reject |
| There was no significant difference in the means of BMI between the participants who agreed and the participants who did not agree that knowing calorie amounts in food products had helped them decrease eating out. | 0.001* | Reject |
| There was no significant difference in the means of BMI between the participants who knew and the participants who did not know how to calculate their daily food calorie needs. | 0.100 | Fail to Reject |
| There was no significant difference in the means of BMI between the participants who were satisfied and the participants who were unsatisfied that SFDA required food companies to reduce salt amounts in bread. | 0.002* | Reject |
| There was no significant difference in the means of BMI between the participants who knew and the participants who did not know the daily amount of salt their body needs. | 0.653 | Fail to Reject |
| There is no significant difference in the means of BMI between the participants who read and the participants who did not read the nutritional label on food products. | 0.427 | Fail to Reject |
| There was no significant difference in the means of BMI between the participants who were satisfied and the participants unsatisfied with SFDA's policy of eliminating hydrogenated oils in food products. | 0.349 | Fail to Reject |
| There was no significant difference in the means of BMI between the participants who supported and the participants did not support SFDA's policy of preventing misleading written nutritional information on food products. | 0.333 | Fail to Reject |
| There was no significant difference in the means of BMI between the participants who supported and the participants who did not support the SFDA's policy of preventing food advertisements without permission. | 0.987 | Fail to Reject |
| There was no significant difference in the means of BMI between the participants who agreed and the participants who disagreed that preventing food advertisements without permission saved their right as a consumer. | 0.281 | Fail to Reject |
| There was no significant difference in the means of BMI between the participants who followed and the participants who did not follow SFDA's news and regulations through SFDA's media networks. | 0.011* | Reject |
| There was no significant difference in the means of BMI between the participants who cooperated and the participants who did not cooperate with SFDA by reporting SFDA's policy violations related to food safety. | 0.005* | Reject |

*Indicates rejecting the null hypotheses at the 5% level or less

Table 5

The impact of demographical variables on public support & awareness for SFDA's food policies & regulations

| Variable | Intercept | Age | Weight | Male | Household income | Occupation | Marital status | Education | Predicted probability |
|--|----------------------|----------------------|---------------------|---------------------|---|-------------------------------------|---|--------------------------------------|-----------------------|
| Awareness of updated SFDA educational awareness messages | 0.6552** (0.284) | -0.020** (0.008) | - | - | 0.543** (0.260) [SR 10,000-13,000] | | | | 0.64 |
| Satisfaction that SFDA required restaurants and coffee shops to provide calorie amounts in their products | -3.813*** (0.486) | | | 1.046** (0.472) | | 0.972* (0.502) [Unemployed] | | | 0.14 |
| Requiring restaurants and coffee shops to provide calorie amounts in their products & increasing awareness about foods and beverages | -1.321** (0.562) | | | | | | -1.417** (0.610) [Married] -1.348** (0.619) [Single] | | 0.06 |
| Knowing how to calculate daily food calorie needs | 0.564 (0.498) | | | 0.722*** (0.222) | | -0.676** (0.265) [Student] | -0.870* (0.513) [Single] | 0.363* (0.213) [High school] | 0.53 |
| Knowing calorie amounts in food products & decreasing eating out | 0.585 (0.359) | -0.058*** (0.011) | | 0.646*** (0.233) | 0.921*** (0.310) [SR 14,000-19,000] | | | 0.545* (0.286) [Post-graduate] | 0.70 |
| | | | | | 0.662** (0.292) [Over SR 19,000] | | | | 0.65 |
| Satisfaction that SFDA required food companies to reduce salt amount in bread | -3.283*** (0.655) | -0.025 (0.016) | 0.021*** (2.650) | 0.584* (0.354) | | | | | 0.11 |
| Knowing the daily amount of salt the body requires | 0.635*** (0.290) | -0.028*** (0.008) | | 0.735*** (0.222) | 0.790*** (0.297) [SR 14,000-19,000] | | | | 0.78 |
| Reading the nutritional label on food products | -0.686*** (0.178) | | | 0.522** (0.222) | | -0.557** (0.232) [Unemployed] | | | 0.33 |
| Satisfaction with SFDA's policy of eliminating hydrogenated oils in food products | -1.219* (0.689) | | | 0.867** (0.411) | -1.292** (0.618) [Over SR 19,000] | | -1.372* (0.700) [Married] -1.384* (0.709) [Single] | | 0.04 |
| Supporting the SFDA's policy of preventing misleading written nutritional information on food products | -0.591 (0.856) | -0.056* (0.032) | | | -1.827** (0.772) [Over SR19,000] -1.498** (0.654) [SR 10,000-13,999] -1.109* (0.588) [SR 6,000-9,999] | | | | 0.03 |
| Supporting the SFDA's policy of preventing | 2.363 (1.845) | -0.147** (0.060) | | | -2.760** (1.137) | | | 1.564** (0.783) | 0.01 |

| | | | | | | |
|--|-----------|-----------|--------------------|-----------|-----------------|------|
| food advertisements without permission | | | [Over SR 19,000] | | [Post-graduate] | |
| | | | -2.055** | | | |
| | | | (0.779) | | | |
| | | | [SR 10,000-13,999] | | | |
| Preventing food advertisements without permission & saving consumers' right | 0.961*** | -0.022*** | | | | 0.56 |
| | (0.259) | (0.007) | | | | |
| Cooperating with SFDA by reporting SFDA's policy violations related to food safety | -0.824*** | | -0.748** | 0.789*** | -0.627*** | 0.19 |
| | (0.272) | | (0.318) | (0.238) | (0.236) | |
| | | | [SR 6,000-9,999] | [Student] | [High school] | |
| | | | | | 0.650** | |
| | | | | | (0.285) | |
| | | | | | [Post-graduate] | |

Note: ***, **, and * denote significance level at the 1%, 5%, and 10%, respectively.

Numbers in parenthesis () are standard errors, and indicators variable category are specified in brackets [].