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Sugar- Sweetened Beverages: A Survey to Assess Adults Knowledge, Attitudes, and
Consumption Patterns of Sugar-Sweetened Beverages

By

Jeff Schafer

A Thesis Submitted in Partial Fulfillment of the

Requirements for the Degree of

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Mankato Minnesota

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Sugar- Sweetened Beverages: A Survey to Assess Adults Knowledge, Attitudes, and
Consumption Patterns of Sugar-Sweetened Beverages.

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Jeff Schafer

This thesis has been examined and approved by the following members of the Student's
committee.

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Abstract

Sugar-sweetened beverages (SSBs) have a direct impact on the general health of the country when looking at the rising obesity levels (CDC, 2017a). The USDA's dietary guidelines suggest that the daily intake of added sugar should be limited to 6 teaspoons for women and 9 teaspoons for men (Hughes, 2017). However, the average American consumes 20 teaspoons of sugar daily (Hughes, 2017). These extra calories are converted into fat and stored in the body. Data collected throughout the years indicates a rise in the number of Americans living with a weight above healthy recommendations, which is termed, obese. Obesity is a precursor to other life-threatening diseases, and SSBs are a contributor that can be avoided (CDC, 2017b).

In this study, we concluded that there was a significant relationship between the knowledge and the attitude of participants. If the knowledge was high on the subject matter, the attitude reflected the same. However, there was no significant correlation between knowledge and attitude and the number of SSBs that were consumed. In addition, there was no a significant correlation between the demographics of race, income, education, or sex and the number of SSBs consumed. The only significant correlation to the number of SSBs consumed was that of age. The younger a person was, the more SSBs were consumed, and the older an individual the less SSBs were consumed. Finally, we concluded that there is split support for a tax on SSBs and that if a tax were imposed, about one third would not change their behaviors.

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Chapter 1: Statement of the Problem

Introduction

A balanced diet consists of eating from all five food groups (fruits, vegetables, grains, dairy, and protein) in the correct amounts indicated by the United States Department of Agriculture (USDA)(2018). Many Americans tend to consume over the suggested 2,000 calorie recommendation and eat foods that are high in sugar (Hughes, 2017). In addition to consuming sugar in foods like snacks and desserts, the beverages that Americans are consuming are also riddled with added sugar. This consumption of added sugar in the quantities of the average American, about 20 teaspoons per day (Hughes, 2017), is having a direct impact on the general health of the county when looking at the rising obesity levels (Centers for Disease Control and Prevention [CDC], 2017a). Sugar-sweetened beverages (SSBs), such as pop, fruit juices, and energy drinks, make up 47% of the added sugar that is consumed in the United States (U.S. Department of Health and Human Services [USDHHS] & USDA, 2015). Sugar accounts for an extra 270 calories per day, on average, for the American population, while contributing nothing to daily nutrition (USDHHS & USDA, 2015). The age group that is nine to eighteen years has the statistically highest consumption of added sugar, most of that coming from SSBs (USDHHS & USDA, 2015). Frequently drinking SSBs is associated with “many preventable diseases” and “obesity” (CDC, 2017b). Therefore, as a preventative measure, government agencies have applied a tax on SSBs in their state and cities (County Health Rankings & Roadmaps [CHRR], 2017).

This paper will evaluate the beverage consumption patterns of adults and their anticipated reaction to a tax being added to SSBs.

Statement of the Problem

For decades obesity has crept into American society (CDC, 2018b). Reduced levels of exercise and poor nutrition are major contributors for this cultivation of mass (CDC, 2018b). Studies have shown that obesity is on the rise across our society, and no ethnic or racial group is exempt from the trend (CDC, 2015a). Obesity has increased in both adults and youth over the 18-year period from 1999-2000 to 2015-2016, from 30.5% to 39.6% in adults and 13.9% to 18.5% in youth (CDC, 2017c). Currently all states report that 20% or more of their adult residents are obese (CDC, 2018b). Sugar is being added to many foods and beverages, contributing to the growing obesity epidemic. If consumers are not diligent now with the beverages and foods they ingest, Americans will live harder and shorter lives than if they did not consume sugar at the current rate. (CDC, 2015b). The added risk that can be attributed to added sugar in diets, may lead to obesity, and other diseases that are byproducts of obesity. (CDC, 2017b).

Need for the Study

The negative impacts of SSBs are prevalent in American health as a whole. Gaps in education and knowledge of SSBs need to be identified to stop the ever-increasing waistlines and ensure the public is informed about what the beverages they put into their body are doing to them in the long-term. Some states and cities in the United

States have instituted a tax on SSBs to help deter people from purchasing these drinks (CHRR, 2017). The idea is that if the cost is too high, then consumers will reconsider purchasing and make a healthier choice. This is optimal for those that have low social economic status, as they are the ones that are most affected by price changes and lack of nutritional options (CHRR, 2017). The purpose of this study is to determine the current consumption pattern of sugar-sweetened beverages among adults 18 years of age and older, and to gauge their anticipated reaction to an added tax on these products in order to conclude about SSBs and the risk factors to healthy living.

Questions to Be Answered

1. What are respondents sugar-sweetened beverage consumption patterns?
2. What are the demographics of those who consume sugar-sweetened beverages?
3. What is the knowledge of respondents about links between SSB consumption and certain health conditions?
4. What is the knowledge of respondents about links between obesity and certain health conditions?
5. What are respondents anticipated purchase behavior of sugar-sweetened beverages if there is tax increase on sugar-sweetened beverage?
6. What are respondents support levels to an increased tax on sugar-sweetened beverages?

(Questions modeled from Rivard, Smith, McCann, & Hyland, 2012)

Limitations

One limitation is under-reporting of dietary data in the self-reported survey. Because the surveys are being filled out by participants, past research has indicated that participants under-report by 25% when pertaining to diet (Rivard et al., 2012). Sample size is going to be small considering the population of the United States, and the resources available.

Delimitations

The data will only be collected in the winter months of January and February, and people may have a higher prevalence to consume SSBs in the summer due to the heat. This is limited because of the timelines for the thesis to be completed.

Assumptions

One assumption is that all participants will answer honestly and accurately, without having to train each person on what an SSB is, or about their consumption of SSBs.

Definitions

- I. Added sugar— “any sweetener containing the molecule fructose that is added to food in processing” (Lustig, Schmidt, & Brindis, 2012, para. 5).
- II. Body mass index (BMI)— “a person's weight in kilograms divided by the square of height in meters. A high BMI can be an indicator of high body fatness. BMI can be used to screen for weight categories that may lead to health problems but it

is not diagnostic of the body fatness or health of an individual” (CDC, 2018a, para. 1).

- III. Obesity— “is frequently subdivided into categories:
 - a. Class 1: BMI of 30 to < 35
 - b. Class 2: BMI of 35 to < 40
 - c. Class 3: BMI of 40 or higher. Class 3 obesity is sometimes categorized as ‘extreme’ or ‘severe obesity’” (CDC,2015a, para. 1).
- IV. Sugar-sweetened beverage (SSB)— “Sugar-sweetened beverages are any liquids that are sweetened with various forms of added sugars like brown sugar, corn sweetener, corn syrup, dextrose, fructose, glucose, high-fructose corn syrup, honey, lactose, malt syrup, maltose, molasses, raw sugar, and sucrose” (CDC, 2017b, para. 2).

Chapter 2: Literature Review

Introduction

This chapter will review the recommendations of a healthy diet and the trends of adhering to a healthy diet. This chapter will also discuss the effects of sugar on the body and how overconsumption of SSBs can lead to metabolic syndrome, excessive weight gain, and development of insulin resistance. Finally, this chapter will discuss how taxing SSBs is a potential solution to SSBs that has been enacted in several communities.

A Healthy Diet

In order for the body to work harmoniously and maintain its homeostasis, one must do two things: get the correct amount of exercise and take in the correct amount of nutrients. (USDHHS & USDA, 2015). A deficiency or surplus in one or the other can make the body systems operate in dysfunction or overtime. The following paragraphs will be concentrating on nutrients what makes a healthy diet.

The USDHHS and USDA have indicated the guidelines for healthy eating (USDHHS & USDA, 2015). The guidelines include the five statements: “follow a healthy eating pattern across the lifespan; focus on variety, nutrient density, and amount; limit calories from added sugars and saturated fats and reduce sodium intake; shift to healthier food and beverage choices; and support healthy eating patterns for all” (USDHHS & USDA, 2015, p. 14).

The first guideline suggests eating daily, a balanced diet from all food groups within the suggested caloric recommendation. If weight trends continue to raise long term, one needs to lower caloric intake and/ or increase physical activity (USDHHS & USDA, 2015). Guideline two recommends that one chooses foods that are dense with nutrients from all food groups and ensure that more than one food from each group is being consumed within the suggested amounts (USDHHS & USDA, 2015).

Recommendation three explains that one must eat from all food groups and limit the amounts of added sugars to less than 10% of calories taken in per day. It is difficult to correctly receive all the nutrients needed in a diet if the caloric intake of added sugars is over 10%. Saturated fat also needs to be limited to less than 10% of caloric intake.

Sodium intake needs to be limited to 2300mg for adults in comparison to the 3,440 mg average (USDHHS & USDA, 2015). The fourth recommendation adds the need for substituting lower-calorie and nutrient-dense foods, such as switches like “high calorie snacks to nutrient-dense snacks, fruit products with added sugars to fruit, refined grains to whole grains, snacks with added sugars to unsalted snacks, solid fats to oils, and beverages with added sugars to no-sugar added beverages” (USDHHS & USDA, 2015, p.40). Finally, the fifth statement calls for all to support and promote healthy nutrition in what is offered in sectors, such as organizations, systems (health care, education), and businesses and industries, and settings (home, schools, worksites, recreational facilities). Supporting settings and sectors is an individual’s responsibility to help change the social and cultural norms and values that are in place (USDHHS & USDA, 2015).

A healthy eating pattern should include particular amounts from the different food groups: fruits, vegetables, protein, dairy, grains, and oils and limit or avoid saturated and trans fats, added sugars, and sodium (USDHHS & USDA, 2015). The basis of these guidelines is a 2000 calorie diet per day. The guidelines have been tailored to the American diet using data that have been collected on the food consumption pattern over the past 30 years (USDHHS & USDA, 2015). The dietary guidelines added an extra emphasis on limiting added sugar, saturated fats, and sodium by placing it in the guidelines twice (USDHHS & USDA, 2015). The USDA's MyPlate plan suggests the following recommendations for daily consumption: two cups of fruits, two and a half cups of vegetables, six ounces of grains, five and a half ounces of protein, and three cups of dairy (USDA, 2018). The plan suggests limiting the amount of added sugar to 50 grams reinforcing the guidelines produced by the USDHHS & USDA. The suggested limit of daily added sugar is "6 teaspoons for women and 9 teaspoons for men" (Hughes, 2017, para. 1). In contrast, "Americans average about 20 teaspoons of sugar per day" (Hughes, 2017, para. 1).

A healthy eating pattern is beneficial to a person's health by reducing risk for heart disease, certain cancers, obesity, type 2 diabetes, developing kidney stones, and decreasing bone loss (USDA, 2016). Consumption of fruits and vegetables has been linked to reduced risk of cardiovascular disease (USDHHS & USDA, 2015) Some experts in the health arena hypothesize that fruits and vegetables may be a preventative measure to some cancers, as well (USDHHS & USDA, 2015). In addition to reducing risk

factors for diseases, a healthy diet can make the skin, eyes, teeth, and gums healthier (USDA, 2016). Finally, diet can help with cholesterol levels and blood pressure (USDA, 2016).

Sugars Effects on the Body

Sugar, or sucrose, is made up of one glucose and one fructose molecule and is found naturally in fruits, vegetables, and honey (Malik & Hu, 2015). Fructose and glucose are also found in high fructose corn syrup (HFCS) which is substituted for sugar in many foods in the United States (Malik & Hu, 2015). Because the glucose and fructose are seldom separated in food and beverages, the negative and positive effects on the body are attributed to both and are not differentiated in epidemiologic studies (Malik & Hu, 2015). Fructose and glucose are metabolized by the body differently. Fructose enters the portal vein and does not require insulin secretion while glucose will enter the glycolytic process, which will manufacture it into ATP or usable energy (Malik & Hu, 2015). Fructose bypassing the glycolytic process “can promote triglyceride synthesis from unchecked pathways” (Malik & Hu, 2015, pg. 4) which can be left unprocessed and ultimately turn into unused fat (Malik & Hu, 2015). Increasing postprandial triglycerides in conjunction of consuming 10%-25% of energy needs from fructose or HFCS beverages “produce significant linear increases in postprandial triglycerides, suggesting a dose-response relationship between fructose consumption and increases in triglycerides” (Malik and Hu, 2015, pg. 4). “Sugar fuels every cell in the brain. Your brain also sees sugar as a reward, which makes you keep wanting more of it. If you often eat sugar,

you're reinforcing that reward, which can make it tough to break the habit." (Hughes, 2017, p. 3) The over- consumption of sugar can increase the glycemic load what has been shown to increase the development of becoming insulin resistant, which is linked to type two diabetes (Hu & Malik, 2010).

Consuming SSBs as a habit is associated with the higher reports of type 2 diabetes, regardless of the level of obesity (Imamura, O'Connor, Ye, Mursu, Hayashino, Bhupathiraju & Forouhi, 2015). Basu, McKee, Galea, & Stuckler (2013, para.4) concluded: "Soft drink consumption is significantly linked to overweight, obesity, and diabetes worldwide, including in low- and middle-income countries." The study showed that consumption of soft drinks increased from 1997 to 2010 as did the rates of adult obesity and diabetes (Basu et al., 2013). Hu and Malik (2010) also noted that the consumption of SSBs and obesity are rising at parallel rates (Hu et al., 2010). Soft drinks and other SSBs have high sugar content and the American infatuation with them is cause for concern due to overall obesity level of the United States (Basu et al., 2013). Metabolic syndrome, insulin resistance, and excessive weight gain are byproducts of drinking too many SSBs because of the large amounts of sugar that they contain. This is contributing to the continuing rising levels of obesity and diabetes (Basu et al., 2013).

The Possible Solution to Sugar-Sweetened Beverages (SSB)

There are added sugars in many fruit juices and all-natural juices. Consumers need to be aware of the nutrition labels on the food packaging. The Food and Drug

Administration (FDA) has issued a compliance date of January 1, 2021, that all manufacturers must adhere to in implementing a new food label format (FDA, 2018). On the new food labels, manufacturers must include the amount of added sugar in an item in addition to the standard total sugars (FDA, 2018). In their study about SSBs, Zheng, Allman-Farinelli, Heitmann, and Rangan (2015, para.5) concluded that the “available evidence suggests a potential beneficial effect on body weight outcomes when SSBs are replaced by water or low-calorie beverages.”

Taxing SSBs is an additional solution to reducing consumption levels of these beverages. Malik and Hu (2015) suggest that a minimum of a 10% tax should be imposed on SSBs to encourage healthier beverage choices. If taxes, and ultimately the price of the product, go up the overall consumption rate will go down, as will the level of obesity (CHRR, 2017). As with any kind of legislation, there are many options. The taxing of SSBs to help the public health, may seem controversial, but many communities have started to help those that cannot help themselves with this sugar consumption trend and some large cities across the United States have begun to add taxes on SSBs (CHRR, 2017).

Summary:

A healthy diet consists of a balance between all of the food groups. Consuming the correct number of calories from the correct food groups suggested by the USDA can lead to a healthier life. In the past decades, sugar has been added to foods and

beverages and this has had a detrimental impact in the health of American's. Excess sugar (fructose) can lead to metabolic syndrome which can increase the risk of obesity and type 2 diabetes. To aid in the battle against SSBs, researchers are concluding that SSBs should be replaced with water and low-calorie beverages. In addition, to help address the obesity crisis in America many cities have started taxing SSBs to discourage their purchase.

Chapter 3: Research Methodology

Introduction

This chapter will discuss the research methodology and how it applies to the topic of sugar-sweetened beverages consumptions and a reaction to a proposed tax on these beverages. The framework for the research is the Health Belief Model (HBM). Also, discussed will be the sampling process, instrumentation, data analysis, and the participants who took the survey in an attempt to answer the following research questions:

1. What are respondents sugar-sweetened beverage consumption patterns?
2. What are the demographics of those who consume sugar-sweetened beverages?
3. What is the knowledge of respondents about links between SSB consumption and certain health conditions?
4. What is the knowledge of respondents about links between obesity and certain health conditions?
5. What are respondents anticipated purchase behavior of sugar-sweetened beverages if there is tax increase on sugar-sweetened beverage?
6. What are respondents support levels to an increased tax on sugar-sweetened beverages?

(Questions modeled from Rivard, Smith, McCann, & Hyland, 2012)

Theoretical Framework

In the 1950s, American psychologists developed the Health Belief Model (HBM) to explain why people did not participate in curricula that could detect and prevent disease (Glanz, Rimer, & Viswanath, 2008). The HBM helps determine why some people choose to, or not to, follow the health-related services, schedules, and guidelines that experts have instituted (Glanz et al., 2008). The constructs in the model include susceptibility, seriousness, benefits and barriers to a behavior, cues to action, and self-efficacy (Glanz et al., 2008). The constructs of the HBM will be used in this study to predict what people's reaction to a tax increase on SSBs would be, their understanding of obesity and its correlation to other diseases, and their consumption rates of SSBs. The survey addresses the constructs of perceived susceptibility, directly and perceived benefits, indirectly.

Participants

The participants were recruited from an online survey company, surveymonkey.com. They were of different ages (above 18 years of age), genders, race, economic status', and educations. The sample type is a simple random sample. Surveymonkey.com sent out the survey to all individuals in their database with no bias to any demographic. A simple random sample is defined by Salkind (2012, p.74) as "when the population is homogeneous (very similar) and when the research question at hand does not require any attention to special characteristics of the population."

Instrumentation

The survey is a 21 question self-report instrument (Rivard et al., 2012) that incorporates three different categories: beverage consumption, knowledge and attitudes, and demographic information. The survey begins with six questions that asks participants to identify how much of a particular beverage they have consumed in the last week. The next section asks, in true or false form, about the participant's belief of risk and specific diseases. Continuing in a dichotomous form, respondents are asked to address their perception of obesity and its relation to other diseases. The next section utilizes a multiple-choice format and allows participants to present their opinion on taxation of SSBs. The potential answers are: no impact at all, I'd switch to untaxed drinks (like diet soda, fruit juice, water, or milk), or I'd cut back on my soda and sweetened beverage consumption. The second question follows a modified Likert-type format with the responses of: Strongly support, support, oppose, or strongly oppose. The last series of questions asks participants their demographic information: sex, age, race, education level, and income. The validity and reliability were measured using collected data by computing a Cronbach's alpha and by measuring internal consistency to determine if respondent's answers were consistent.

The Health Belief Model (HBM) is the framework of the questions used to determine the participants' perceptions of SSBs and the relationship of obesity and how obesity can be linked to other diseases. Perceived susceptibility will be assessed from respondents' knowledge of SSBs in relation to diseases and crossed with their

consumption rates. The perceived benefits are indirectly administered throughout the survey through the questions and topic at hand. Participants could now perceive the topic of SSBs as a larger health risk than before they responded to the survey. It was not stated by Rivard et al. (2012) what model was used when developing their instrument, but the survey resembles the HBM closely. The instrument will use similar wording as the original survey, however instead of using an automated and automated dialing system the survey will be conducted online through the survey distribution site: [surveymonkey.com](https://www.surveymonkey.com).

Data Collection Procedure

Data was collected via an online survey company [surveymonkey.com](https://www.surveymonkey.com). There was a brief description of the items and amounts to identify specifically what the question is asking. The survey was completed by a population of 216 people which means a sample of 104 participants was needed for an appropriate sample size (Krejcie & Morgan, 1970).

Data Analysis

To analyze the data, the Statistical Package for the Social Sciences (SPSS) version 25 was used. The SPSS generated means, standard deviations, and frequency distribution to assess perceived attitude towards a tax increase on SSBs; correlation of drinking SSBs in regards to gender, race, age, income, and education of the respondents; demographics of respondents'; and the perceived correlation of obesity and other diseases (diabetes, heart disease, asthma, hypertension, and cancer).

1. What are respondents SSB consumption patterns?

To answer research question one the ratio data will be assessed from survey questions 2-6 and analyzed using SPSS to generate a mean score with standard deviations. High scores will indicate high consumption patterns.

2. What are the demographics of those who consume SSB?

To answer research question two the ratio data will be assessed from survey questions 17-21 and analyzed using an SPSS to generate a frequency distribution.

3. What is the knowledge of respondents about links between SSB consumption and certain health conditions?

To answer research question three the ratio data will be assessed from survey question 7-9 and analyzed using SPSS to generate a mean score with standard deviations. Low scores will indicate higher knowledge.

4. What is the knowledge of respondents about links between obesity and certain health conditions?

To answer research question four the ratio data will be assessed from survey questions 10-14 and analyzed using SPSS test to generate a mean score with standard deviations. Low scores will indicate higher knowledge.

5. What are respondents anticipated purchase behaviors of SSBs if there is tax increase on SSBs?

To answer research question five the nominal data will be assessed from survey question 15, and analyzed using an SPSS to generate a mean score with standard deviations.

6. What are respondents support levels to an increased tax on SSBs?

To answer research question six the ordinal data will be assessed from survey question 16, and analyzed using an SPSS to generate a mean score with standard deviations.

Table 1
Table of Specification

<i>Research Question</i>	<i>Survey Items</i>	<i>Level of Data</i>	<i>Analysis</i>
What are respondents SSB consumption patterns?	Survey questions 2-6	Ratio	Means, standard deviations, and Frequency Distribution
What are the demographics of those who consume SSB?	Survey questions 17-21	Ratio	Frequency Distribution
What is the knowledge of respondents about links between SSB consumption and obesity?	Survey question 7-9	Ratio	Means, standard deviations, and Frequency Distribution
What is the knowledge of respondents about links between obesity and certain health conditions?	Survey question 10-14	Ratio	Means, standard deviations, correlation, and Frequency Distribution
What are respondents anticipated purchase behaviors of SSBs if there is tax increase on SSBs?	Survey question 15	Nominal	Means, standard deviations, and Frequency Distribution
What are respondents support levels to an increased tax on SSBs?	Survey question 16	Ordinal	Means, standard deviations, and Frequency Distribution

Summary

Participants from around the United States took a 21- question survey about their consumption of SSBs, their knowledge and attitude of diseases, and finally their own demographic information. The study results assessed the attitudes and knowledge of the participants pertaining to SSBs and diseases. The analysis compared the results of different races, genders, ages, income, and education using a means, standard deviations, correlations, and frequency test analysis.

Chapter 4: Findings and Discussion

Introduction

The purpose of the research was to determine the participants behaviors, knowledge, and attitudes pertaining to SSBs. The study's research questions to be answered were:

1. What are respondents' sugar-sweetened beverage consumption patterns?
2. What are the demographics of those who consume sugar-sweetened beverages?
3. What is the knowledge of respondents about links between SSB consumption and certain health conditions?
4. What is the knowledge of respondents about links between obesity and certain health conditions?
5. What are respondents anticipated purchase behaviors of sugar-sweetened beverages if there is a tax increase on sugar-sweetened beverages?
6. What are respondents support levels to an increased tax on sugar-sweetened beverages?

The data collected for the purpose of answering these questions were collected via a 21 question survey formatted by the investigator on the survey collection site [surveymonkey.com](https://www.surveymonkey.com). The results of the research are constructed in order of the research questions above.

Demographic Results

In Table 2, below, the demographics of the research participants are represented. Participants analyzed in this survey (n=216) were from the United States. Of the participants 44.4% were male (n=91) and 55.6% were female (n=114). The distribution among ages were 22.9% for 18-29 years of age (n=47), 22% for 20-44 years of age (n=45), 28.8% for 45-60 (n=59), and 26.3% for older than 60 years (n=26.3%). The other characteristics that were collected from participants were race, education level, and income. The results of their measure are also shown in Table 2.

Table 2

Demographics of Participants

Characteristics	n	%
Race		
White or Caucasian	146	76%
Black or African American	11	5.70%
Hispanic or Latino	14	7.30%
Another race	14	7.30%
Education		
less than 12 years	3	1.50%
high school graduate or GED	29	14.80%
some college	58	29.60%
college graduate or higher	104	53.10%

Age

18-29	47	22.90%
30-44	45	22%
45-60	59	28.80%
>60	54	26.30%

Gender

Male	91	44.40%
Female	114	55.60%

Income

\$0-\$9,999	15	7.30%
\$10,000-\$24,999	21	10.20%
\$25,000-\$49,999	40	19.50%
\$50,000-\$74,999	35	17.10%
\$75,000-\$99,999	24	11.70%
\$100,000-\$124,999	20	9.80%
\$125,000-\$149,999	12	5.90%
\$150,000-\$174,999	6	2.90%
\$175,000-\$199,999	5	2.40%
\$200,000+	5	2.40%

*Not all percentages will equal 100% nor will all n-values equal 216. If participants chose not to answer a specific question, their response was indicated as such and was not included in this table.

Findings Related to Research Questions

The following section describes the analysis conducted and the results for each of the research questions. The reliability of the survey was measured using Cronbach's alpha. A score of 1 indicates the highest reliability. The reliability of this survey scored a .761, indicating that it is a reliable survey.

Research Question One: What are respondents' sugar-sweetened beverage consumption patterns?

Participants were asked to indicate the number of beverages they drank in a typical week, on a scale from 0-50 servings, in the areas of: sugar-sweetened beverages, regular or diet soda, and sweetened coffee or tea. These three areas of beverages were defined as follows: A serving of a Sugar Sweetened Beverages (SSB) is 12 fluid ounces of Kool-Aid, Gatorade, lemonade, Hi-C, soda pop (regular or diet), and energy drinks. A serving of sweetened coffee is defined as a 6 oz serving.

Participants were also asked to indicate on a scale of 0-50 how many unsweetened beverages and alcoholic beverages they consumed over a typical week. The definition of unsweetened beverages was as follows: Unsweetened beverages are defined as 100% fruit or vegetable juice with no sugar added, such as orange and grapefruit juice, or V8 vegetable juice. We define a serving of 100% fruit or vegetable juice as a half a cup, or 4 fluid ounces. Do not count drinks such as Kool-Aid, Gatorade, cranberry juice cocktail or fruit punch. Alcohol was defined as: one 12 oz can or bottle of

beer, one 6 oz glass of wine, one 10 oz can or bottle of wine cooler, one 2 oz cocktail or one shot of liquor.

In order to analyze the results of these questions, descriptive statistics a (frequency distribution) were completed. The frequencies can be seen in Table 3. The mean for number of SSBs consumed in a typical week was 14.6 with the standard deviation being 18.6. This means there is a range of 0-32 SSBs consumed in the first deviation. This is a considerable difference to consume no SSBs to approximately 4.5 SSBs per day. Also, the average number of alcoholic beverages consumed daily per the mean and standard deviation ranges from 0-3 per day.

Table 3

Behavior Levels

Question	n	Mean	Std. Deviation
1. In a typical week, approximately how many servings of sugar-sweetened beverages do you consume over the entire week?	201	14.602	18.64942
2. In a typical week, approximately how many servings of regular or diet soda do you consume over the entire week?	197	11.665	17.9929
3. In a typical week, approximately how many servings of sweetened coffee or tea do you consume over the entire week?	191	11.5969	16.85042

4. In a typical week, approximately how many servings of 100% fruit or vegetable juice do you consume over the entire week?	182	9.3846	18.2274
5. In a typical week, approximately how many alcoholic beverages do you consume over the entire week?	181	7.337	15.31166

*Not all percentages will equal 100% nor will all n-values equal 216. If participants chose not to answer a specific question, their response was indicated as such and was not included in this table.

Research Question Two: What are the demographics of those who consume sugar-sweetened beverages?

A multivariate ANOVA was conducted with consumption patterns based on income, race, and education and no significant findings existed. To determine if there were significant differences in consumption patterns based on gender, an independent t-test was performed. No significance was found. No group scored significantly higher or lower based upon race, gender, income, or education. However, there was a significant difference when it pertained to age. The younger someone was the more they consumed (mean 19.37 for respondents 18-29 years of age), and the older they were, the less they consumed (mean 8.78 for older than 60 years of age, $F=2.830$, $p=.040$). See Table 4.

Table 4

Behavior by Age

Age	n	Mean
18-29	45	19.37
30-44	43	16.6
45-60	57	13.79
>60	49	8.78

Research Question Three: What is the knowledge of respondents about the health risks of sugar-sweetened beverage consumption?

In order to create a knowledge score, questions seven through nine asked about sugar-sweetened beverages and whether they increased the health risks of obesity, diabetes, and cavities. They were tabulated using a true/false format. An answer of true received a score of one, an answer of false received a score of two, and the answer of prefer not to answer received a value of three. A perfect score is represented as a three. The lower the score the better the knowledge, and vice versa. The numbers indicate that there is a strong knowledge of the links that SSBs have to health risks. Almost 85% of respondents scored a 100% in this portion of the survey. See Table 5.

Table 5

Knowledge of Increased Health Risks

Score	n	%
3	167	84.80%
4	15	7.60%
5	8	4.10%
6	3	1.50%
7	2	1%
9	2	1%

Research Question Four: What is the knowledge of respondents about links between obesity and certain health conditions?

In order to create a knowledge score (which indicates their attitude about the links), questions ten through fourteen asked about obesity and whether it is related to the following diseases: diabetes, heart disease, asthma, hypertension, and cancer.

Responses were tabulated using a yes/no format. An answer of yes received a score of one, an answer of no received a score of two, and the answer of prefer not to answer received a value of three. A perfect score is represented as a five. The lower the score the better the attitude, and vice versa. There is a moderate level of attitude in which 77.5% of participants scored above 50%. It is not as strong as the previous section's knowledge score (Table 5) but shows that there is a good level of knowledge as to whether obesity is linked to other diseases. See Table 6.

Table 6

Attitude of Perceived Risk to Diseases

Score	n	%
5	55	28.8%
6	50	26.2%
7	43	22.5%
8	19	9.9%
9	13	6.8%
10	8	4.2%
11	3	1.6%

The scores of the knowledge scale (Table 5) and the attitude scale (Table 6) were then compared to determine if there was a correlation between knowledge and attitudes regarding sugar-sweetened beverages. Missing scores were coded as such and were not used for statistical analysis. To determine the relationship between knowledge and attitudes, the scale scores were compared using a Pearson r correlation. The results showed a positive (moderate) significant correlation ($p\text{-value}=.000$, $r=.347$).

The scores for the previous Pearson r correlation were then compared using another Pearson r correlation to the number of SSBs respondents consumed in an entire week. The results showed no (weak) significant correlation ($p\text{-value}=.077$, $r=.128$). Respondents know that SSBs increase risk factors for obesity and other diseases, yet their consumption levels do not have any correlation with their knowledge levels.

Research Question Five: What are respondents anticipated purchase behavior of sugar-sweetened beverages if there is a tax increase on sugar-sweetened beverages?

A frequency distribution was done to analyze the question fifteen responses statistically. The question asked participants what their response would be if their state put a twenty percent tax on sugar-sweetened beverages. Of the participants, 36.6% said it would not impact their behavior (n= 71), 27.3% indicated they would switch to untaxed drinks (n=53), and 36.1% reported they would cut back on the taxed beverages (n=70). This question divided respondents almost in thirds, to indicate there are mixed emotions on the subject. See Table 7.

Table 7

Behavior on Tax

Response	n	%
No impact at all	71	36.6%
I'd switch to untaxed drinks	53	27.3%
I'd cut back on my soda consumption	70	36.1%

Research Question Six: What are respondents support levels to an increased tax on sugar-sweetened beverages?

A frequency distribution was done to analyze the question sixteen responses statistically. The question asked participants what their support level would be if their state put a twenty percent tax on sugar-sweetened beverages. Of the participants,

16.3% strongly supported the increase (n=32), 31.1% supported the increase (n=61), and 23.5% opposed and strongly opposed the increase (n=46). Table 8 below shows that respondents were divided in their support levels on a tax for SSBs almost 50% to 50%.

See Table 8.

Table 8

Attitude on Tax

Response	n	%
Strongly support	32	16.3
Support	61	31.1
Oppose	46	23.5
Strongly oppose	46	23.5

Summary

The purpose of this study was to identify the behaviors, knowledge, and attitudes pertaining to sugar-sweetened beverages. The researcher examined the consumption levels of sugar-sweetened beverages along with other beverages. The knowledge levels of participants pertaining to obesity and its links to sugar-sweetened beverages as well as links to other health conditions were also assessed. Finally, the attitude and behavior levels of participants were measured for a proposed 20% tax on sugar-sweetened beverages.

Respondents reported consuming sugar-sweetened beverages (Mean= 14.602, Std. Deviation 18.649) at a rate of two per day in a typical week with the knowledge that SSBs can cause diseases like obesity, diabetes, and cavities (Mean score 3.3 out of 3 and

a Std. Deviation of .902, n=201(the closer to 3 the better the score)). The attitude scores also showed a grade of 6.5 (mean) out of 5. Once again, a score low and close to 5 is a score that shows a positive correlation of the attitude/ knowledge towards the links of obesity and other diseases.

After reviewing the analysis, there was a positive correlation between knowledge and attitudes. Those that received low scores (correct answers) in knowledge also received low scores on the attitude scale, which indicates that knowledge does influence attitudes towards SSBs. However, there was no significant correlation between these categories (knowledge and attitudes) and the number of SSBs consumed.

Chapter 5: Discussion, Recommendations, and Conclusions

Discussion

According to this study, the participants knew that SSBs are not healthy for them and that they could be linked to obesity, which in turn could be linked to other harmful and life-threatening diseases. However, this did not stop the average American from consuming two SSBs per day in a typical week. The data reports that public is divided on whether they support a tax on SSBs, but the data indicated they may not buy SSBs if a tax was imposed. The results also showed that the younger one was the more SSBs they consumed. There is no other demographic measured to indicate a higher or lower correlation between race, gender, income, or education and how many servings of SSBs are consumed per week.

The findings of this research have been consistent with the results of other research reports on the same topic. In their report, Rivard et al. (2012), reported that 69% of participants in their survey had consumed SSBs (in the past week). In the current set of data, we find that 81% have consumed one SSB or more in a typical week. Rising levels of obesity and type 2 diabetes have been consistent with the rise of the number of servings of SSBs consumed across the American population. Rivard et al. (2012) reported that their research participants consumed seven servings of SSBs and our findings indicate double that number (fourteen servings). Rivard et al. states, “previous research has found that adults under-report their dietary consumption by as much as 25% and may do so more for foods containing fats and sugars” (2012, p. 10). One can

presume that the actual measure of SSBs consumption by Americans may be significantly higher than this report states.

Applying the constructs of the Health Belief Model (HBM), a behavior change model, the participants' scores showed a positive correlation between knowledge and attitudes and SSBs which indicates that they knew drinking SSBs was not a healthy decision and that it would increase the risk to obesity. Yet, the participants chose to drink, on an average of two SSBs a day. Since knowledge and attitude did not inform behavior it could be concluded the participants perceived susceptibility, which is their perceived risk of acquiring a disease, was low. The HBM indicates that one's perceived benefits are derived from one's perceived susceptibility.

It is also important to identify the perceived barriers in making healthy beverage choices. When looking at an economic barrier that has been tried in states like California and Illinois, in which an additional tax had been imposed on SSBs in some communities. Taxes may deter the purchasing of SSBs.

Recommendations for Practice

For health educators we must maintain a comprehensive approach to education by following the national health standards of the HECAT and teaching the dietary goals that are suggested (USDA, 2018). In addition to health education; physical education, healthy choices in schools' vending machines, and a healthier school lunch program we

are striving toward a healthier future generation by way of concerted effort (USDHHS & USDA, 2015).

The next wave of interventions to limit sugar consumption can be led by parents and government agencies. Parents can be more cognizant of the foods and beverages they are serving their children and checking for reduced sugar options. Government can implement taxes on foods that have added sugars. Advocating for a healthier society, we can collectively reduce the consumption of added sugars which in turn will make this a healthier America.

An example that can be used in the classroom can be to have students document the food that they have eaten for one week. After said week, have them determine how much sugar was in each item that they consumed. Next, gather a bag of sugar and large measuring cup (clear), and have each student, or group of students measure for themselves (or as a whole class) the amount of sugar that they have consumed. To conclude the lesson, ask students about typical food in their diets and determine, as a class, a suitable substitute that has no sugar in it. Creating a list of replacements on the board or Smartboard is also a great ending that will allow students to see the number of options is greater than they think.

Recommendations for Future Research

Continued research in regard to SSBs and obesity is needed. The effects of a tax increase and how it will impact Americans' decisions to purchase SSBs also needs to be

investigated further. There are suggestions that a tax on SSBs could generate up to \$9 billion annually and this revenue could be used to combat obesity via education and nutrition programs (Rivard et al., 2012). A replication of this survey to children would also be beneficial since the data shows that the younger adults are the ones consuming more SSBs. The data could then be used to identify strategies to reduce the consumption rates of SSBs and develop an evidence-based program to facilitate the reduction of SSBs in the American diet.

Conclusions

There is a need to increase the knowledge of SSBs and how they are linked to obesity and other diseases. There seems to be a good base of knowledge of SSBs and their link to obesity, but it appears to not be enough to for people to become proactive in reducing their consumption of SSBs. Education programs need to emphasize the replacement of SSBs with water and not to simply reduce the number of SSBs consumed. Obesity and being overweight is on the raise and SSBs are a main contributor to the problem. A change in diet and how food is produced to avoid glucose and fructose should be at the forefront of policy. A taxation on SSBs and foods with sugar added may be the change that is needed to combat the obesity trends.

References

- Basu, S., McKee, M., Galea, G., & Stuckler D. (November, 2013). *Relationship of Soft Drink Consumption to Global Overweight, Obesity, and Diabetes: A Cross-National Analysis of 75 Countries*. *American Journal of Public Health*, 103, 11, 2071-2077. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3828681/>
- Centers for Disease Control and Prevention. (November 5, 2015a). *Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, Trends 1960–1962 Through 2007–2008*. Retrieved from https://www.cdc.gov/nchs/data/hestat/obesity_adult_07_08/obesity_adult_07_08.htm
- Centers for Disease Control and Prevention. (June 5, 2015b). *Healthy weight: The health effects of overweight and obesity*. Retrieved from <https://www.cdc.gov/healthyweight/effects/index.html>
- Centers for Disease Control and Prevention. (April 11, 2017a). *Defining adult overweight and obesity*. Retrieved from <https://www.cdc.gov/obesity/adult/defining.html>
- Centers for Disease Control and Prevention. (April 7, 2017b). *Nutrition: Get the facts: Sugar-sweetened beverages and consumption*. Retrieved from <https://www.cdc.gov/nutrition/data-statistics/sugar-sweetened-beverages-intake.html>

- Centers for Disease Control and Prevention. (October, 2017c). *Prevalence of obesity among adults and youth: United States 2015-2016, National Center for Health Statistics data brief*, 288. <https://www.cdc.gov/nchs/data/databriefs/db288.pdf>
- Centers for Disease Control and Prevention. (July 6, 2018a). *Body mass index*. Retrieved from <https://www.cdc.gov/healthyweight/assessing/bmi/index.html>
- Centers for Disease Control and Prevention. (August 13, 2018b). *Overweight & Obesity: adult obesity facts*. <https://www.cdc.gov/obesity/data/adult.html>
- County Health Rankings & Roadmaps. (February 23, 2017). *Sugar sweetened beverage taxes*. Retrieved from <http://www.countyhealthrankings.org/take-action-to-improve-health/what-works-for-health/policies/sugar-sweetened-beverage-taxes>
- Glanz, K., Rimer, B., Viswanath, K. (2008). *Health behavior and health education: Theory, research, and practice (4th ed.)*. San Francisco: Jossey-Bass.
http://fhc.sums.ac.ir/files/salamat/health_education.pdf
- Hu, F., & Malik, V. (April 26, 2010). Sugar-sweetened beverages and risk of obesity and type 2 diabetes: epidemiologic evidence. *Physiology & Behavior*, 100, 1, 47-54.
<https://www.sciencedirect.com/science/article/pii/S0031938410000600?via%3Dihub>
- Hughes, L. (March 23, 2017). *How does too much sugar affect your body?* Retrieved from <https://www.webmd.com/diabetes/features/how-sugar-affects-your-body>

- Krejcie, R., & Morgan, D. (1970). Determining Sample Sizes for Research Activities. *Educational and Psychological Measurement*, 30, 607-610.
https://home.kku.ac.th/sompong/guest_speaker/KrejcieandMorgan_article.pdf
- Kubala, J. (June 3, 2018). *11 reasons why too much sugar is bad for you*. Retrieved from <https://www.healthline.com/nutrition/too-much-sugar>
- Lustig, R.H., Schmidt, L.A., & Brindis, C.D. (February 2, 2012). The toxic truth about sugar. *Nature*, 482. <http://www.nature.com.ezproxy.mnsu.edu/articles/482027a>
- Imamura, F., O'Connor, L., Ye, Z., Mursu, J., Hayashino, Y., Bhupathiraju, S., Forouhi, N. (July 21, 2015). Consumption of sugar sweetened beverages, artificially sweetened beverages, and fruit juice and incidence of type 2 diabetes: systematic review, meta-analysis, and estimation of population attributable fraction. *BMJ* 2015, 351, h3576.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4510779/#__ffn_sectitle
- Johnson, R.K., Lichtenstein, A.H., Anderson, C.A.M., Carson, J.A., Després, J.P., Hu, F.B., Kris-Etherton, P.M., Otten, J.J., Towfighi, A., & Wylie-Rosett J. (Aug 28, 2018). *Low-calorie sweetened beverages and cardiometabolic health: a science advisory from the american heart association*. *Circulation*, 138, 9.
<https://www.ncbi.nlm.nih.gov/pubmed/30354445>
- Malik, V. & Hu, F. (October 6, 2015). Fructose and cardiometabolic health: What the evidence from sugar-sweetened beverages tells us. *Journal of the American*

College of Cardiology, 66,14, 1615-1624.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4592517/#!po=2.63158>

Poppitt, D.S. (August 11, 2015). *Beverage consumption: are alcoholic and sugary drinks tipping the balance towards overweight and obesity?* *Nutrients, 7, 8.*

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4555143/>

Rivard, C. Smith, D., McCann, S.E., Hyland, A. (January 24, 2012). *Taxing sugar-sweetened beverages: A survey of knowledge, attitudes and behaviours. Public Health Nutrition, 15, 8.*

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4778078/>

Salkind, N.J. (2012). *100 Question (and answers) about research methods.* Thousand Oaks, California: Sage Publications, Inc.

United States Department of Agriculture. (January, 2016). *MyPlate Plan: find your healthy eating style.* Retrieved from https://choosemyplate-prod.azureedge.net/sites/default/files/myplate/checklists/MyPlatePlan_2000cals_Age14plus.pdf

United States Department of Agriculture (USDA). (August 14, 2018). *MyPlate plan:2000 calories, age 14+.* Retrieved from

https://www.choosemyplate.gov/MyPlatePlan_2000cals_Age14plus

U.S. Department of Health and Human Services (USDHHS) & U.S. Department of Agriculture (USDA). (December, 2015). *2015–2020 Dietary Guidelines for*

Americans, 8th Edition. Retrieved from

<http://health.gov/dietaryguidelines/2015/guidelines/>

U.S. Food and Drug Administration. (November 2, 2018). *Changes to the nutrition facts label*. Retrieved from

<https://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/ucm385663.htm#dates>

Zheng M, Allman-Farinelli M, Heitmann BL, Rangan A. (May 2015). Substitution of sugar-sweetened beverages with other beverage alternatives: A review of long-term health outcomes. *Journal of the Academy of Nutrition and Dietetics*, 115, 5, 767 – 779. <https://www.ncbi.nlm.nih.gov/pubmed/25746935>

Appendices

Appendix I
Literature Review Matrix

Source	Type	Purpose	Methodology	Results	Conclusion
Basu, S., McKee, M., Galea, G., & Stuckler D. (Nov, 2013). Relationship of Soft Drink Consumption to Global Overweight, Obesity, and Diabetes: A Cross-National Analysis of 75 Countries. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3828681/	Abstract	To analyze relationship of drink consumption of SSBs and obesity	Multivariate linear regression in 75 countries.	SSB consumption increased (1%) as well as obesity (4.8%).	SSB consumption is significantly linked to obesity.
Centers for Disease Control and Prevention. (Nov 5, 2015). Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, Trends 1960–1962 Through 2007–2008. Retrieved From https://www.cdc.gov/nchs/data/hestat/obesity_adult_07_08/obesity_adult_07_08.htm	Government information site	To inform the public about obesity and other health risks	Uses data and research from leading professionals	N/A	Obesity is increasing in adults as the years have past throughout the last 30 years.
County Health Rankings & Roadmaps [CHRR]. (Feb 23, 2017). Sugar sweetened beverage taxes. Retrieved from http://www.countyhealthrankings.org/take-action-to-improve-health/what-works-for-health/policies/sugar-sweetened-beverage-taxes	Report on Taxing SSBs	To inform about how taxing SSBs may help with obesity	N/A	N/A	Taxing SSBs will help decrease the purchases of SSBs which will lower obesity levels

Glanz, K. (2008). Health behavior and health education: Theory, research, and practice (4TH ed.) San Francisco. Retrieved from http://www.repository.poltekkesmajpahit.ac.id/index.php/E-POL/article/viewFile/595/507	Abstract	To Describe and explain the HBM	Analysis of model	N/A	HBM is a model to help people identify why they do or do not perform health measures.
Hughes, L. (March 23, 2017). How does too much sugar affect your body? Retrieved from https://www.webmd.com/diabetes/features/how-sugar-affects-your-body	Online Medical articles	To inform about the dangers of sugar	N/A	N/A	Americans are eating too much sugar.
Johnson, R.K., Lichtenstein, A.H., Anderson, C.A.M., Carson, J.A., Després, J.P., Hu, F.B., Kris-Etherton, P.M., Otten, J.J., Towfighi, A., & Wylie-Rosett J. (Aug 28, 2018). Low-calorie sweetened beverages and cardiometabolic health: a science advisory from the american heart association. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/30354445	Abstract	To advise Americans about SSBs	N/A	N/A	Drinking water and Low-calorie sweeteners should be substituted for SSBs
Krejcie, R., & Morgan, D. (1970). Determining Sample Sizes for Research Activities, Educational and Psychological Measurement. Retrieved from https://home.kku.ac.th/sompong/gu	Sample size analysis tool	To determine sample size of a	N/A	N/A	Sample sizes vary depending on popula

est_speaker/KrejcieandMorgan_article.pdf		popula tion.			tion size
Kubala, J. (June 3, 2018). 11 reasons why too much sugar is bad for you. Retrieved from https://www.healthline.com/nutrition/too-much-sugar	Health newsle tter	To inform about the dang ers of sugar	N/A	N/A	Eating sugar can cause avoid able disease s.
Poppitt, D.S. (Aug 11, 2015). Beverage consumption: are alcoholic and sugary drinks tipping the balance towards overweight and obesity? Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4555143/	Abstrac t	To find a link of SSBs and alcohol and their contrib ution to obesity .	Observ ational and Interve ntion studies .	Varied and inconcl usive,	There is a associa tion betwe en SSBs and obesity . Removi ng energy- contain ing bevera ges should be the public health messag e.
Rivard, C. Smith, D., McCann, S.E., Hyland, A. (Jan 24, 2012). <i>Taxing sugar-sweetened beverages: a survey of knowledge, attitudes and behaviours</i> . Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4778078/	Abstrac t	To analyze the SSB consu mption levels of	Self- comple ted survey	As bevera ge consu mption increas es the	SSB causes in increas e in obesity and

		participants and their knowledge and belief of the health risks.		belief and knowledge of risk decreases	other diseases that are preventable.
Salkind, N.J. (2012). 100 Question (and answers) about research methods. Thousand Oaks, California: Sage Publications, Inc.	Education guideline	To answer questions about research methods	N/A	N/A	Questions about research can be answered
United States Department of Agriculture (USDA). (Jan, 2016). MyPlate Plan: find your healthy eating style. Retrieved from https://choosemyplate-prod.azureedge.net/sites/default/files/myplate/checklists/MyPlatePlan_2000cals_Age14plus.pdf	Government guideline	To inform Americans on what is recommended to eat daily	N/A	N/A	A balanced diet avoiding/limiting added sugars
United States Department of Agriculture (USDA). (Aug 14, 2018). MyPlate plan:2000 calories, age 14+. Retrieved from https://www.choosemyplate.gov/MyPlatePlan_2000cals_Age14plus	Government guideline	To inform Americans on what is recommended to eat daily	N/A	N/A	A balanced diet avoiding/limiting added sugars

<p>U.S. Department of Health and Human Services (USDHHS) & U.S. Department of Agriculture (USDA). (December 2015). 2015–2020 Dietary Guidelines for Americans, 8th Edition. Retrieved from http://health.gov/dietaryguidelines/2015/guidelines/</p>	<p>Government report/guideline</p>	<p>to advise Americans on the diet they should maintain for a healthy lifestyle.</p>	<p>Data collection from the National Health Interview Survey 2008 & 2013</p>	<p>N/A</p>	<p>Most Americans are NOT getting enough fruits and vegetables and are overeating proteins, dairy, wheats.</p>
<p>U.S. Department of Health and Human Services (USDHHS) & U.S. Department of Agriculture (USDA). (December 2015). 2015–2020 Dietary Guidelines for Americans, 8th Edition. Retrieved from http://health.gov/dietaryguidelines/2015/guidelines/</p>	<p>Government guidelines</p>	<p>to state new guidelines for Nutrition labels</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>
<p>Zheng M, Allman-Farinelli M, Heitmann BL, Rangan A. (May 2015). Substitution of Sugar-Sweetened Beverages with Other Beverage Alternatives: A Review of Long-Term Health Outcomes. <i>Journal of the Academy of Nutrition and Dietetics</i>, Volume 115 , Issue 5 , 767 – 779. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/25746935</p>	<p>Study Abstract</p>	<p>Review of a study to show that SSBs need to be replaced with low-calorie alternatives.</p>	<p>Randomized controlled studies</p>	<p>inconclusive on what the best beverage alternative would be, need to replace SSBs</p>	<p>further studies need to be done on the topic of SSBs to determine the best substitute for SSBs.</p>

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Appendix II
Institutional Review Board Approval Letter



February 18, 2019

Dear Margaret Murray-Davis:

Re: IRB Proposal entitled "[1395309-6] Sugar-sweetened beverages: A survey of knowledge, attitudes, and consumption patterns of adults and their anticipated reaction to a tax being added." Review Level: Level [I]

Your IRB Proposal has been approved as of February 18, 2019. On behalf of the Minnesota State University, Mankato IRB, we wish you success with your study. Remember that you must seek approval for any changes in your study, its design, funding source, consent process, or any part of the study that may affect participants in the study (see <https://grad.mnsu.edu/irb/revision.html>). Should any of the participants in your study suffer a research-related injury or other harmful outcome, you are required to report them to the Associate Vice-President of Research and Dean of Graduate Studies immediately.

When you complete your data collection or should you discontinue your study, you must submit a Closure request (see <https://grad.mnsu.edu/irb/closure.html>). All documents related to this research must be stored for a minimum of three years following the date on your Closure request. Please include your IRBNet ID number with any correspondence with the IRB.

Cordially,

Handwritten signature of Bonnie Berg in black ink.

Bonnie Berg, Ph.D.
Co-Chair

Handwritten signature of Jeffrey Buchanan in black ink.

Jeffrey Buchanan, Ph.D.
IRB Co-Chair

Handwritten signature of Mary Hadley in black ink.

Mary Hadley, Ph.D.
IRB Coordinator

Appendix III
Survey Consent Form

Title: Sugar-sweetened beverages: A survey of knowledge, attitudes, and consumption patterns of adults and their anticipated reaction to a tax being added.

Faculty Advisor: Dr. Margaret Murray-Davis, Department of Health, Science, Minnesota State University, Mankato;

Student Investigator: Jeff Schafer

IRBNet #: 1395309-6

What is the purpose of the study?

You are being invited to complete a research survey about sugar-sweetened beverages that will assess knowledge, attitude, consumption patterns.

What is the purpose of this form?

This consent form gives you the information you will need to help you decide whether to take the survey or not. Please read the form carefully.

Why am I being invited to participate?

You are being invited to take part in this research survey because you are an adult in America. Participation is voluntary. If you choose not to take the survey or are not eligible, you need not proceed through the survey. Only individuals ages 18 years of age and above are permitted to take the survey.

What will happen during this study and how long will it take?

If you agree to take part in this research survey, your involvement will last for approximately 4 minutes. You are being asked to complete a survey that will assess your knowledge, attitude and consumption patterns of sugar-sweetened beverages. Your completion of the survey marks the end of participation in this study.

What are the risks of this study?

There are few reasonably foreseeable risks in completing the survey. Your responses will remain anonymous.

What are the benefits of this study?

You may be compensated There are no benefits to you the participant for completing this study. However, it is hoped that the information gained from this study will allow health professionals to better understand the gaps in education and information concerning sugar-sweetened beverages.

Who will see the information?

The information you provide during this research study will be kept confidential. To help protect your confidentiality, we will ensure that only the Principle Investigator and student investigators will have access to the completed surveys. Your name will NOT be attached to the survey nor will any other information capable of personally identifying you. Surveys will be stored in a secure database and all surveys will be destroyed within 5 years of completion of this study. The study will be completed by March 1, 2019. We will take all reasonable steps to protect your identity. If the results of this project are published your identity will not be made public.

Do I have a choice to take part in this study?

If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any benefits or rights you would normally have if you choose not to volunteer. You can stop at any time during the study and still keep the benefits and rights you had before volunteering. You will not be treated differently if you decide to stop taking part in the study. The decision whether or not to participate will not affect your relationship with Minnesota State University, Mankato, and refusal to participate will involve no penalty or loss of benefits. If you have any questions about this research study, contact Dr. Margaret Murray-Davis at 507-389-2709 or **marge.murray-davis@mnsu.edu** If you have any questions about participants' rights and for research-related injuries, please contact the Administrator of the Institutional Review Board at (507) 389-1242.

All participants have the right to a copy of the consent form. You have been provided a copy for your records.

Submitting a survey with responses on it indicates that you are at least 18 years of age and consent to participate in the research.

Margaret Murray-Davis, PhD, Professor
Department of Health Science
Minnesota State University, Mankato
Office: HCN 213
Phone Number: 507-389-2709
Email: marge.murray-davis@mnsu.edu

MSU IRBNet ID # 1395309-6
Date of MSU IRB Approval: 02/18/2019