

Analysis of Factors on Affecting Sugar Tax Awareness among Adults in South Korea Using Social Computing Technology

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Abstract. Sugar tax is levied on food that contains added sugar. The aim is to discourage the intake of such food as their overconsumption has adverse effects on people's health. Although various countries, including South Korea, are considering implementation of a sugar tax, they have failed to introduce it due to tax resistance and lack of public awareness. This study analyzed Korean adults' awareness of sugar tax and the associated factors. An online survey was conducted with 240 adults, residing in Daejeon and Chungcheong region, between August 5 to 20, 2021. The collected data were analyzed using SPSS. The results revealed that respondents lacked awareness regarding the sugar tax. The average score of sugar tax awareness of respondents was 2.42 on a five-point scale. The score on items indicating approval of sugar tax was 2.2 and was lower than the total average; this indicated the negative views on sugar tax. A majority of respondents lacked information and education regarding sugar tax. Furthermore, sugar tax awareness was positively and significantly related to respondents' educational level and sugar-related nutrition knowledge. However, no significant correlation was observed between sugar tax awareness and respondents' gender, monthly income, and body mass index (BMI). These findings imply that constant publicity and education on sugar tax is needed through mass media and other channels to improve people's awareness on this issue. Such publicity and educative activities will not only increase people's awareness but also push for greater acceptance of the government's policies to curb sugar consumption.

Keywords: Sugar, taxation, sugar tax, social, computing

1. Introduction

The dietary behavior of South Koreans is transforming greatly with increased industrialization and modernization. In particular, sugar intake has been rising steadily as processed food consumption increases. Therefore, preventive measures need to be adopted to ensure that sugar intake does not exceed the appropriate level (Jung, 2016). The main function of sugar is to provide energy to the human body as the main form of carbohydrates. Sugar is an essential nutrient, especially for human tissues that use glucose as an energy source, such as brain and nerve tissues (Kim et al., 2015). However, excessive intake of added sugar is associated with numerous diseases including obesity, diabetes, cardiovascular diseases, and dental caries. Obesity can cause diabetes, high blood pressure, stroke, myocardial infarction, depression, fatty liver, metabolic syndromes, infertility, and cancers. Moreover, with changes in dietary behavior, fast-food consumption is increasing; thus, people are unknowingly consuming more sugar (WHO, 2021).

According to the World Health Organization (WHO), sugar intake is related to multiple chronic diseases. Hence, WHO has recommended imposing sugar tax as a way to limit sugar consumption below 10% of daily caloric value (WHO, 2015). Many countries have already introduced various forms of health tax, including sugar and obesity taxes, to promote people's health. Lately, an increasing number of countries are introducing such taxes (Yoo, Yoon, 2019).

For instance, Norway introduced chocolate and sugar products tax in 1922, which is imposed on products that contain either chocolate or sugar; Finland and France began imposing their sugar taxes in 2012 on carbonated beverages, chocolate, confectionary products, and ice cream (Ministry of Agriculture, Food and Rural Affairs, 2018). Thus, following WHO's recommendation, the introduction of sugar tax has become a worldwide trend: by 2020, approximately 45 countries had already imposed sugar taxes to reduce added sugar consumption.

There are more examples: European countries, such as the United Kingdom, Spain, and France, levy sugar taxes on drinks with sugar content more than the permissible level. Furthermore, eight city governments in the U.S.A., including Berkeley, Philadelphia, and Seattle, impose sugar tax on sweetened beverages (Vellakka et al., 2014).

Countries like India, Thailand, the Philippines, Mexico, Chile, and the United Arab Emirates have also introduced this tax (World Bank, 2021). Although it has been less than 10 years since the active imposition of sugar-sweetened beverages (SSB) taxes in several countries, which levy 10-20% of tax on such drinks, it has produced positive outcomes like reducing the obesity rate and overweight prevalence in a population and is now regarded as a necessary policy (Vellakkal et al., 2014, Asdrejeva et al., 2010, Long et al., 2010, Schwendicke et al., 2017, Manyema et al., 2014).

However, the problem is that such changes have a profound effect on children and adolescents, in varying patterns, depending upon their socioeconomic status. For example, such changes are more severe in low-income groups and lead to greater unhealthiness (Yoo, Yoon, 2019). Powell and Chaloupka (Powell, Chaloupka 2009) reported that taxation on health-risk foods has a relatively larger effect on specific groups (obesity risk groups), such as low-income and overweight people, who are frequently exposed to such foods.

As of 2018, the intake of processed food added sugars (fructose) reached 7.4% of daily calorie intake. However, it had reach worrisome levels for some groups: 10.1% for those aged 3 to 5 and 10.3% for those aged between 12 and 18. Furthermore, according to the Ministry of Health and Welfare, and the Korea Health Promotion Institute, the overweight and obesity rate of children and adolescents had increased from 21.9% in 2015 to 25.8% in 2019.

This is particularly true during the times of COVID-19: as children and adolescents were restricted from outdoor activities, the incidence of overweight and obesity is increasing in leaps and bounds (Korea Health Promotion Institute, 2021). The Korean government has acknowledged that excessive intake of added sugar causes various chronic diseases and has implemented several policies to combat this problem.

To curb SSB consumption and prevalence of obesity, it has also acknowledged the need to review the introduction of a sugar tax in the health policy direction of local taxes. However, many countries, including South Korea, face much resistance due to a lack of public awareness because it is seen as imposing tax on the low-income class. Despite the need to investigate the awareness level in the public regarding sugar tax to educate them and organize campaigns, to the best of our knowledge, there is marginal research evidence pertaining to factors associated with the awareness of sugar taxes among South Koreans.

This study attempts to identify the level of awareness in South Koreans regarding levy of sugar tax; and analyzes the associated factors. The findings may be used as basic data when planning for introduction of the sugar tax.

2. Methods

2.1. Participants

An online survey was conducted on 240 adults (aged 20 years and above), residing in Daejeon and Chungcheong region, between August 5 to 20, 2021. Convenience sampling method was adopted for selecting the sample. G*power 3.1. program was used to perform the power analysis. The significance level was fixed at 0.05. The obtained statistical power was 0.8, while the medium effect size was 0.25. An ANOVA test can be performed for a minimum sample of 200. The sample size of this study was 240, hence, this demonstrates the study's statistical power.

2.2. Survey methods

A self-administered questionnaire was used to gather information pertaining to the general characteristics of the participants (age, gender, educational level, income level, height, and weight [6 questions]); level of awareness on sugar tax (7 questions); sugar-related nutrition knowledge (20 questions); and subjective health status (3 questions) (summarized in Table 1). The questionnaire was designed using the Naver Corp's survey template and an anonymous online survey was conducted. The link to the questionnaire was sent individually using social media mobile apps, which the respondents used for accessing and responding to the questions. A total of 240 questionnaires were received and used in the final analyses.

Table 1: General characteristics of participants

Variables	Items	Score		Cronbach's Alpha
		Max	Min	
General characteristics	5	-	-	-
Sugar awareness	7	5	1	0.92
Sugar-related knowledge	20	20	0	0.88
Subjective health status	3	5	1	0.84

a) Sugar tax awareness

Information pertaining to sugar tax awareness was procured through the analytical tool used in Choi and Kim's (2020) study with slight modification. This tool included seven questions on a five-point scale with scores ranging between 1 to 5 ("strongly agree" = 5; "agree" = 4; "average" = 3; "disagree" = 2; and "strongly disagree" = 1), where higher scores indicated greater awareness on sugar tax. The value of Cronbach's Alpha was 0.92, which demonstrated the reliability of the tool.

b) Sugar-related nutrition knowledge

Items seeking information on sugar-related nutrition knowledge were taken from the analytical tools developed by Yun et al. (2017). This tool included 20 items of true or false type. For every correct (incorrect) response, 1 (0) point was given. On a scale of 20, higher scores depicted better sugar-related nutrition knowledge. The value of Cronbach's Alpha was 0.88, which showed that the tool was reliable.

c) Subjective health status

Questions developed by Speake et al. (1989) were used to measure respondents' subjective health status. The three items on this topic were developed on a five-point scale with scores ranging between 1 to 5 (very good = 5; very poor = 1). Higher scores indicated a more positive view on subjective health. The value of Cronbach's Alpha was 0.84, which demonstrated the reliability of the tool.

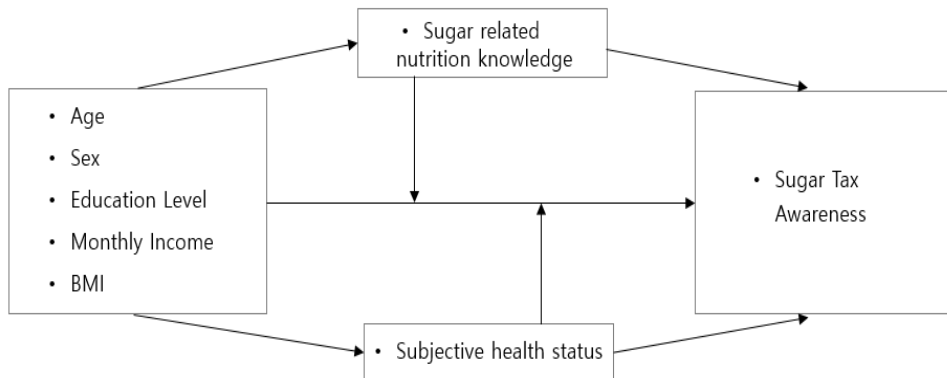


Fig. 1: Study model

2.3. Ethical consideration of participants

To ensure the ethical protection of research participants, this study conducted an online survey, for only those who volunteered their involvement, by posting a recruitment notice on regional online community boards of Daejeon Metropolitan City and Cheongju City in Chungcheongbuk-do Province. The notice described the purpose and contents of the research, and informed that all collected data would be anonymized and would not be used for other purposes outside of the study. To encourage truthful responses from participants and to protect their anonymity, the function to exclude their internet protocol (IP) addresses was used. In addition, the collected data were immediately codified and saved as a data file on a secured computer of the researcher so that only they could access the original data. The collected data on general characteristics and contents related to the study were used only for research purposes. The data will be stored for three years after the end of the research and discarded thereafter. The contact information of the researcher was made available on the questionnaire sheet for participants who had inquiries regarding their rights or the study itself. Participants were given a free beverage coupon after completing the survey as a token of appreciation.

2.4. Statistical analysis

The collected data were analyzed using SPSS (IBM SPSS Statistics 20.0, IBM Inc., U.S.A.). The real numbers and percentages were computed to depict general characteristics, while mean and standard deviation were calculated to depict sugar tax awareness, sugar-related nutrition knowledge, and subjective health status. Differences between each variable, depending upon the respondents' characteristics, were first analyzed by using the t-test and ANOVA, followed by Scheffe' test for post hoc testing. The relationship between sugar tax awareness, sugar-related nutrition knowledge, and subjective health status was analyzed using Pearson's correlation coefficient. The reliability of the analytical tools was tested for Cronbach's α with the level of statistical significance set at 0.05.

3. Results

3.1. General characteristics of survey participants

Among the total survey participants, 52.9% were females and 47.1% were males. The distribution of participants with respect to age was as follows: 20-35 years (33.8%); 36-50 years (32.9%); and 51 years and above (32.9%). Regarding educational level, 26.3% were high school graduates and 73.7% were at least college graduates. Regarding the monthly income, 38.4% earned less than 3 million won, 35.8% earned 3-5 million won, and 25.8% earned over 5 million won. Lastly, participants' body mass index (BMI) was distributed as follows: BMI < 24 points (62.1%); BMI [24-30] points (28.7%); and BMI > 30 points (28.7%) (Table 2).

Table 2: General characteristics of participants

Variables		N	%
Age	20~35	81	33.8
	36~50	79	32.9
	50<	80	33.3
Sex	Female	127	52.9
	Male	113	47.1
Educational level	High School	63	26.3
	University~Graduate school	177	73.7
Monthly income (10,000 won)	>300	92	38.4
	300-500	86	35.8
	500<	62	25.8
BMI	>24	149	62.1
	24-30	69	28.7
	30<	22	9.2

3.2. Sugar tax awareness

The average score of survey participants on sugar tax awareness was 2.42. The average scores for each question were as follows: "I am aware of sugar tax" = 2.23; "I have heard about sugar tax and have knowledge about it" = 1.98; "I know the countries that levy sugar tax" = 1.72; "Implementation of sugar tax will help reduce the consumption of sugar (e.g., SSB and snack)" = 2.76; "Implementation of sugar tax will help reduce medical expenses and health management costs" = 2.99;

“Introduction of sugar tax will promote health” = 3.01; and “I approve of introducing sugar tax” = 2.21 (Table 3).

Table 3: Sugar tax awareness

Item	Mean	SD
I am aware of sugar tax.	2.23	1.12
I have heard about sugar tax and have knowledge about it.	1.98	0.87
I know the countries that levy sugar tax.	1.72	0.93
Implementation of sugar tax will help reduce the consumption of sugar (e.g., SSB and snack)	2.76	0.85
Implementation of sugar tax will help reduce medical expenses and health management costs.	2.99	1.02
Introduction of sugar tax will promote health.	3.01	0.90
I approve of introducing sugar tax.	2.21	1.24
Total	2.42	0.99

3.3. Sugar tax awareness based on general characteristics

Participants’ sugar tax awareness differed significantly based on educational level. High school graduates scored an average of 2.23 on sugar tax awareness, while the average score of participants having college diplomas or higher qualification was 2.59. This indicated that participants possessing higher educational qualification were more aware of the sugar tax ($p < 0.05$). Sugar tax awareness did not significantly differ with participants’ age, gender, monthly income, and BMI (Table 4).

Table 4: Sugar tax Awareness based on general characteristics

Variables		M±SD†	t/F	p-value
Age	20~35	2.32±0.82	1.201	0.083
	36~50	2.43±0.73		
	50<	2.51±0.39		
Sex	Female	2.39±0.61	.242	0.472
	Male	2.45±0.59		
Educational level	High School	2.23±0.93	4.926	0.048*
	University~Graduate school	2.59±1.09		
Monthly income	>300	2.40±0.82	0.903	0.091
	300-500	2.39±0.93		

(10.000 won)	500<	2.47±1.09		
BMI	>24	2.39±0.82	0.160	0.873
	24-30	2.42±0.93		
	30<	2.45±1.09		

†M±SD: mean ± standard deviation

* p < 0.05, ** p < 0.01, statistically significant by t-test and one-way ANOVA

3.4. Sugar-related nutrition knowledge

The average score of participants’ sugar-related nutrition knowledge was 15.95 points out of 20 points. The scores by topic area are shown in Table 5: 3.99 out of 5 in “concept and characteristics of sugar”; 5.73 out of 7 in “sugar and sugar-related food”; and 2.36 out of 3 in “importance of sugar reduction.” (Table 5).

Table 5: Sugar-related nutrition knowledge

Item		M±SD†	Max-Min
Concept and characteristics of sugar	Sugar is a small molecule dissolved in water and a sweet substance	3.99±1.04	5-0
	Sugar provides 9 kcal of energy per gram		
	Glucose is the type of sugar circulating in the blood		
	The brain uses only glucose as an energy source		
	Setting up physiological control with enzyme and hormone is carbohydrate		
Sugar and sugar-related food	Sugars in natural foods are digested and absorbed faster than the sugar in processed food	5.73±1.21	7-0
	Milk contains sugar		
	There are sugars in natural foods such as fruits, honey, sweet potatoes, and sweet pumpkin		
	Sugarless juice has no sugar		
	Black sugar is safer for health than white sugar		
	White rice is more nutritious than rice with beans		
	Higher consumption of fruits has no effect on weight gain		
Sugar and health	Tooth decay is caused by foods that stick to teeth such as caramel, irrespective of the sugar content in such food item	3.87±1.18	5-0
	After eating a lot of sugar, the remaining sugar is converted to fat in the body		
	Diabetic patients should never eat sugar		

	Excessive intake of sugars can cause diabetes, cardiovascular disease		
	Diet Coke is helpful for drinking less calories as well as good dental health, so it is okay to drink lots of it		
Importance of sugar reduction	The World Health Organization (WHO) recommends that the party consume less than 10 percent of its total calories	2.36±1.19	3-0
	There is no limit to the sales and advertisement of “high calorie food” for preventing sugar		
	The nutrition labeling is mandatory for the marking of the sugar content		
	Total	15.95±2.42	20-0

3.5. Sugar-related nutrition knowledge based on general characteristics

Sugar-related nutrition knowledge significantly differed by age and educational level. Scores differed by age as follows: 20-35 scored 17.05 points, 36-50 scored 16.28 points, and 51 and above scored 14.52 points. Thus, younger adults had better sugar-related knowledge than their older counterparts ($p < 0.05$). Scores differed by educational level as follows: college graduates scored 17.01 points, and high school graduates scored 14.89. Thus, higher educational qualification meant better sugar-related nutrition knowledge ($p < 0.01$). Finally, sugar-related nutrition knowledge did not significantly differ with participants’ gender, monthly income, and BMI (Table 6).

Table 6: Sugar-related nutrition knowledge based on general characteristics

Variables		M±SD†	t/F	p-value
Age	20~35	17.05±3.92 ^b	2.889	0.033*
	36~50	16.28±3.13 ^{ab}		
	50<	14.52±3.99 ^a		
Sex	Female	16.23±3.43	.242	0.472
	Male	15.67±4.68		
Educational level	High School gar	14.89±4.01	4.926	0.01**
	University~Graduate school	17.01±3.32		
Monthly income (10.000 won)	>300	16.04±3.28	1.093	0.353
	300-500	15.69±3.51		
	500<	16.12±4.68		
BMI	>24	16.02±4.42	0.160	0.873
	24~30	15.84±4.13		
	30<	15.99±3.99		

†M±SD: mean ± standard deviation

* $p < 0.05$, ** $p < 0.01$, statistically significant by t-test and one-way ANOVA

3.6. Subjective health status based on general characteristics

Participants' subjective health status significantly differed with their age and BMI. Subjective health status scores were 4.07 points for age 20-35, 3.89 points for 36-50, and 3.47 points for age 51 and above. Thus, younger participants had higher subjective health status scores ($p < 0.001$). Participants with BMI below 24 scored 3.92 points, with BMI 24-30 scored 4.06 points, and with BMI over 30 scored 3.48 points. This indicated low subjective health scores for those with BMI equivalent to extreme obesity ($p < 0.001$). Subjective health status did not significantly differ with participants' gender, educational level, and monthly income (Table 7).

Table 7: Subjective health Status based on general characteristics

Variables		M±SD†	t/F	p-value
Age	20~35	4.07±0.82 ^b	8.374	0.001***
	36~50	3.89±0.93 ^b		
	50<	3.47±1.09 ^a		
Sex	Female	3.74±0.51	0.250	0.861
	Male	3.88±0.76		
Educational level	High School	3.73±0.71	0.211	0.889
	University~Graduate school	3.89±0.62		
Monthly income (10.000 won)	>300	3.90±1.18	0.187	1.028
	300-500	3.83±0.89		
	500<	3.70±0.78		
BMI	>24	3.92±1.22 ^b	11.622	0.001***
	24~30	4.06±0.93 ^b		
	30<	3.48±0.99 ^a		

†M±SD: mean ± standard deviation

* $p < 0.05$, ** $p < 0.01$, statistically significant by t-test and one-way ANOVA

a, b, and c: different letters represent significant different by Scheffe' method comparison at 0.05 significance level

3.7. Relationship among sugar tax awareness, sugar-related knowledge, and subjective-health status

The results of correlational analysis show that sugar tax awareness and subjective health status were negatively correlated ($p < 0.01$), while sugar-related nutrition knowledge and sugar tax awareness were positively correlated ($p < 0.01$). That is, higher the sugar-related nutritional knowledge, greater the awareness of sugar tax;

meanwhile, the better the people perceive their subjective health conditions to be, the lower is the sugar tax awareness (Table 8) (Fig. 2).

Table 8: Correlations among sugar tax awareness, sugar-related knowledge, and subjective health status

Variable	Mean	SD	Sugar tax awareness	Sugar-related Nutrition knowledge	Subjective Health status
Sugar tax awareness	2.42	0.99	1		
Sugar-related nutrition knowledge	15.95	1.21	0.401**	1	
Subjective health status	3.81	0.89	-0.314**	0.113	1

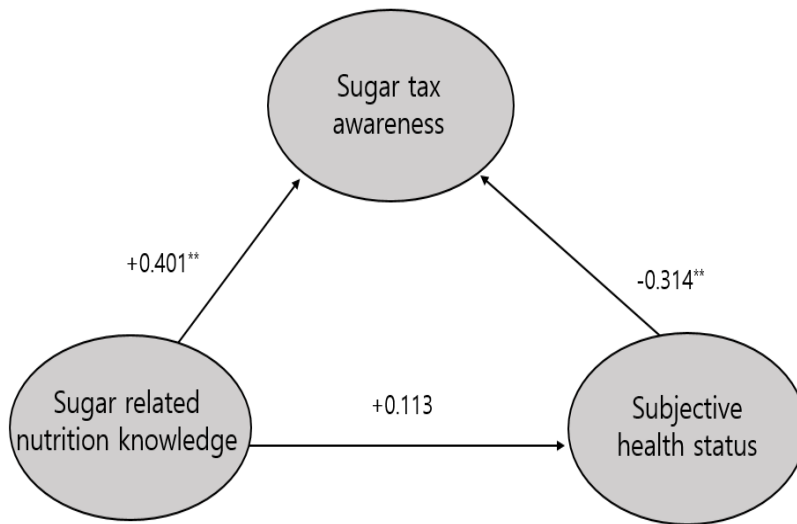


Fig. 2: Correlation among sugar tax awareness, sugar-related nutrition knowledge, and subjective health status

4. Discussion

Various types of health taxes, such as sugar and obesity taxes, have been introduced and implemented in multiple countries globally to promote national health. Moreover, an increasing number of countries are newly implementing or pursuing the adoption of health taxes. As a well-known type of health tax, sugar taxes seek to reduce consumption of food and beverages with added sugar, as these items can cause

diabetes and obesity. This study investigated the level of sugar tax awareness among South Korean adults and analyzed the factors associated with this awareness.

The average score of sugar tax awareness of respondents was 2.42, which showed the low level of awareness. The scores on items pertaining to sugar tax awareness, “educational experience on sugar tax” and “approval of sugar tax”, ranged between 1.72 and 2.23, again exhibiting considerably low values. The score on items indicating approval of sugar tax was 2.2 and was lower than the total average; this indicated the prevalence of negative views on sugar tax. The score on “introducing sugar tax will improve health” was 3.01, which is surprisingly a relatively high score compared to scores on other items. This implies that while the public do not have much knowledge about sugar taxes, they consider that its implementation will have a positive effect on improvement of health. Choi and Kim [14], who studied sugar tax and its relationship with the oral health of South Korean adults, also reported similar results that majority of respondents were not aware of sugar tax and did not have any knowledge or information pertaining to sugar tax.

In the case of overseas cases, a meta-analysis of public acceptability of SSB tax reported that approximately 42% of respondents (from countries like the US, Australia, the UK, France, etc.) supported SSB tax (Eykelboom et al., 2019). Regarding the correlations between participants’ general characteristics and sugar tax awareness, sugar tax awareness was significantly related to their educational level, but not with age, gender, monthly income, and BMI. According to similar studies (Sainsbury et al., 2018, Donaldson et al., 2015, Julia et al., 2015) conducted in countries like U.S.A., Australia, and France, which have already introduced sugar tax, adults with higher educational level showed greater support for sugar tax than those with lower educational level. Therefore, to increase public interest, it is necessary to actively share information and publicize sugar tax through mass media and other channels. Continuous education and publicity on sugar tax will increase people’s awareness, and they may be more willing to accept government’s policies that target reduction in sugar intake.

Next, sugar-related nutritional knowledge significantly differed with participants’ age and education level; however, there was no significant difference by gender or monthly income. Thus, younger adults or those with higher education level exhibited higher sugar-related nutritional knowledge. Contrary to our results on gender, Choi (2020) investigated attitudes of college students and found that women had higher awareness of sugar than men. In the case of young people, assuming that as women are generally more conscious of diet, obesity, and appearance than men, their nutritional knowledge about sugar is also higher.

The correlational analysis revealed that sugar tax awareness was greater among those with better sugar-related nutrition knowledge. Studies have shown that groups with lower nutrition knowledge preferred sweet food and consumed it more (Kim, 2019, Ahn, Kim, 2020). This implies that sugar-related nutrition knowledge

influences sugar consumption behavior, which positively influences sugar tax awareness. The government should not only undertake various educational programs on nutrition to improve sugar-related eating behavior and raise sugar tax awareness but also implement comprehensive measures to control the production and sale of processed food with high sugar content.

Subjective health status differed significantly with participants' age and BMI. The younger the age group, the higher the subjective health status scores. Furthermore, the subjective health status score was very low when the BMI was in the severe obesity range. Analyzing sugar tax awareness and subjective health status revealed that respondents who perceived themselves as healthy obtained lower scores on sugar tax awareness. Subjective health perception is an index that can estimate one's level of health, besides clinical health condition. High subjective health status implies that an individual views oneself as healthy. Those who were confident about their own health conditions showed less sugar tax awareness.

Health taxes implemented in countries around the world have different names, such as sugar, obesity, meat, and junk food taxes. Essentially, these countries are generally using a kind of price policy that levies excise taxes under various names to reduce the consumption of unhealthy foods. In 2013, the Korean government attempted to introduce health taxes on sugar and junk food to expand health insurance finances; however, it could not do this due to various problems such as an increase in tax burden and inconsistency in tax sources. Unlike other countries that implemented health taxes to promote national health, the main goal of the Korean government was to expand health insurance finances through excise taxes (value-added taxes, individual consumption taxes, and liquor taxes) on junk food, sweet drinks, and alcoholic beverages. Due to these fundamental differences, the consent of the South Korean taxpayers could not be attained, and the introduction of health tax eventually failed due to tax resistance (Chae, 2018).

Thereafter, since 2016, the Korean government has carried out campaigns, created media contents, supported education, and expanded requirements on sugar-related nutritional information on food packages. The government implemented various policies, such as adding SSB in the fee for Health Promotion that was also applied to cigarettes. However, despite the global trend of decreasing consumption of carbonated drinks, the beverage market is growing rapidly in Korea with the growth in food delivery culture. Increased consumption of processed food with added sugar in general, and growing obesity rate among children and adolescents are problems of great concern. Therefore, the policies set forth by the government are suitable as they aim to improve people's health by discouraging excessive consumption of added sugar and encouraging appropriate eating behavior.

Numerous studies have demonstrated that a sugar tax is effective in reducing SSB consumption and improving people's health as it increases the price of such beverages and brings renewed interest in the public (Vellakkal et al., 2014, Asdrejeva et al.,

2010, Long et al., 2010, Schwendicke et al., 2017, Manyema et al., 2014, Long et al., 2015, Briggs et al., 2013). Therefore, considering the growing intake of sugar and rising obesity rate, implementing a sugar tax is a feasible policy to improve people's eating behavior to combat the high sugar consumption and obesity rates. However, other studies suggest a minimal effect of sugar tax on reducing obesity rate, while bringing financial burden on low-income households (Fletcher et al., 2010). Evidently, since there is a sharp divide regarding the impact of sugar tax, it is necessary to closely examine the countries that have already implemented it and review its effects in each country. In addition, the public's acceptance of the sugar tax requires research in various aspects because the political, economic, and socio-cultural environment varies by country (Eykelboom et al., 2021). Immediately introduction of sugar tax is likely to be criticised because it would be viewed as an attempt to secure tax revenue by the government rather than a positive health measure. Therefore, sufficient inputs from various parties including stakeholders, experts, and the public, are required for progress on implementing sugar taxes.

Overall, this study verified that sugar tax awareness was overall very low regardless of respondents' gender, monthly income, and BMI. However, the awareness was greater among those with higher educational level and higher sugar-related nutritional knowledge. Hence, to create awareness of sugar taxes among people, organizing campaigns and imparting knowledge pertaining to sugar consumption to the public are needed.

Ultimately, a consensus must be formed on the purpose of introducing sugar tax to increase public acceptance, since it may bring tax resistance from those who experience financial burden and may result in opposition from the beverage industry. Furthermore, a social agreement needs to be formed on how the newly collected tax revenue will be used to improve people's health. Therefore, the government should undertake comprehensive measures, such as publicity and educational programs on nutrition to increase people's awareness of sugar tax and improve their eating behavior with regard to sugar consumption.

This study's research results may not be generalizable because the participants were limited to adults in some local areas. Nevertheless, this study is important as it investigates the general public's perception of sugar tax and analyzes related factors.

5. Conclusion

As a well-known type of health tax, sugar taxes seek to reduce consumption of food and beverages with added sugar, as these items can cause diabetes and obesity. This study investigated the level of sugar tax awareness among South Korean adults and analyzed the factors associated with this awareness. Data were collected using an online survey conducted on 240 adults, residing in Daejeon and Chungcheong region, between August 5 to 20, 2021.

The results revealed that respondents lacked awareness of the sugar tax. A majority of respondents lacked information and education regarding sugar taxes. Importantly, sugar tax awareness was positively and significantly related to respondents' educational level and sugar-related nutrition knowledge. No significant correlation was observed between sugar tax awareness and respondents' gender, monthly income, and BMI.

These findings imply that constant publicity and education on sugar tax is needed through mass media and other channels to improve people's awareness on this issue. Such publicity and educative activities will not only increase people's awareness but also push for greater acceptance of the government's policies to curb sugar consumption.

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