

KNOWLEDGE, ATTITUDE AND CONSUMPTION PATTERN OF SUGAR SWEETENED BEVERAGES AMONG SOMALI STUDENTS IN TURKEY

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ABSTRACT

Purpose: Unhealthy dietary habits, such as high consumption of sugar-sweetened beverages are major risk factors for chronic diseases, particularly if adopted during early adulthood. The aim of this study was to assess knowledge, attitude, and consumption pattern of SSBs and related sociodemographic and lifestyle factors among Somali students in Turkey.

Methods: Participants of this analytical cross-sectional study were the Somali students living in Turkey, aged ≥ 18 years old, who were selected through an existing panel of Somali students obtained from the Somali Student Organization in Turkey.

Results: A total of 325 students participated. 30.5% of students reported 2.2 + 1.07 regular servings of SSBs. Consumption of SSBs was associated with being single (92%) and studying at one of the non-health faculties (66.8%). Students of educated parents were more likely to consume SSBs (OR:2.86; 95%CI:1.00-8.12). Younger-age students (59.5%) and undergraduates (53.8%) had a negative attitude and were more likely to consume SSBs. Health faculty students ($p = 0.04$) had a clear knowledge of the types of SSBs and their adverse effects.

Conclusion: In this study, single students, non-health faculty students, and students of highly educated parents were found to consume SSBs frequently, despite having good knowledge of adverse health effects.

Keywords: Knowledge, Attitude, Consumption, Sugar-Sweetened Beverages, Somali students.

INTRODUCTION

Sugar-sweetened beverages (SSBs) contain soft drinks, flavored fruit drinks, tea and coffee drinks, sweetened milk, sports drinks, energy drinks, and any other sugar-added beverages (1). Adolescents are the main users of SSBs (1, 2).

Sweetened drinks that typically contain sucrose, high-fructose corn syrup, or fruit juice concentrate are

considered to be major sources of added sugar in the diet and can result in weight gain due to high added sugar content, low satiety, and inadequate total energy compensation, resulting in increased energy intake (3, 4). A portion containing 330 ml or 12 ounces of sugar-sweetened soft drinks contains about 35 grams (about nine teaspoons) of sugars and provides about 140 calories of energy and generally has little

nutritional value. Moreover, scientific studies have shown how a drink or a daily drink can increase the risk of many health problems. Some of these health problems are obesity, diabetes, tooth decay, osteoporosis, undernourishment, heart disease, and many neurological disorders (5).

SSB intake has grown globally and has added substantially to the overall per capita sugar and energy consumption over the past three decades (6). In many low- and middle-income countries (LMICs), SSB consumption is increasing, and this has been associated with the increasing burden of non-communicable diseases (NCDs) (7, 8). Each year, non-communicable diseases (NCDs) kill 41 million people, equivalent to 71 per cent of all deaths worldwide. More than 85% of such "premature" deaths occur in low- and middle-income countries each year (9). It is estimated that NCDs represents 24 per cent of all deaths in Somalia (10). High rates of type-2 diabetes and NCDs are mainly due to the nutrition transition in African countries that are advancing economically (11). Some of these transitions include rapid urbanization and shift from traditional diets to more globalized foods (9). Because of their predominant proportional effect on the young, the burdens attributable to SSBs are also relatively unique. Intakes at younger ages throughout much of the world are much higher than later in life. Younger adults still account for the largest proportion of the population in most countries, resulting in huge economic losses in these age groups due to SSB intakes (10). Due to insufficient compensation for the total energy intake in subsequent meals, insulin resistance and systemic inflammation, high SSB consumption predisposes people to gain weight and increase adiposity (4). The main sources of the type 2 diabetes epidemic and the metabolic syndrome are both obesity and overweight (4, 12). Intake of SSB is also associated with risk of cardiovascular disease in adults (7). Consequently, the proportional death rate from SSBs among younger adults is remarkably high, exceeding 1 in 10 of all diabetes and obesity-related deaths in almost every region of the world. Higher SSB consumption was associated with an 18 percent rise in the incidence of type 2 diabetes per single serving per day in a study that included 17 prospective longitudinal studies in the U.S. and UK populations (10). The majority of chronic diseases in adulthood derive from dietary habits that mostly evolve during childhood (13, 14). Furthermore, the

intake of SSBs was also linked to dental caries (15), hypertension (16), disruptive behaviors and poor mental health (17).

Nutrition knowledge is thought to be important for promoting healthier eating habits (18). Nevertheless, knowledge of nutrition alone may not be sufficient to change dietary habits, which suggests that a positive attitude about healthy eating early in childhood needs to be formed (19-21). Recommendations for national and international public health have emphasized the significance of reducing sugar consumption from SSBs (14, 22).

To the best of our knowledge, epidemiological research conducted in African countries to evaluate nutritional knowledge, attitudes and consumption habits of sugar-sweetened beverages are very scarce (23, 24) and no study has been conducted in Somalia, where each year NCDs increasingly has been becoming a major burden. The main aim of this study is to assess nutritional knowledge, attitude, consumption of SSBs among Somali students in different universities in Turkey. In addition, this study aims to determine the association of sugar sweetened beverages' knowledge-attitude-consumption with sociodemographic and economic characteristics such as age, gender, own and parental socioeconomic status to help researchers to better understand the social and behavioral determinants of nutritional status of Somali students where policymakers can develop further investigation and implement appropriate nutrition prevention policies.

METHODS

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving research study participants were approved by the Yeditepe University Clinical Research Ethics Committee (Decision number: 934, Date: 10.01.2019). The study participants were the Somali students living in Turkey, aged ≥ 18 years old, who were selected through an existing panel of Somali students obtained from the Somali Student Organization in Turkey. Somalia student organization is a center for Somali students that is focused on records of Somali students. The minimum sample size of 326 students was calculated for this study with a 95% two-sided confidence level and 80% power by using Epi info version 7.2.2.6. Upon informed consent approval, 325 students agreed to participate in the

Table 1. Consumption of sugar-sweetened beverages per month.

Type of Beverages	Consumption pattern of SSBs (servings per month / amount in litres)		Amount of sugar consumed in SSBs (grams per month)	
	Median	IQRs	Median	IQRs
Regular Sodas ¹	4.0	8.6	146.0	325.5
Soft drinks ²	5.8	8.8	43.8	135.0
Fruit juices ³	1.8	5.6	54.0	168.0
Energy Drinks	3.0	6.6	87.7	169.3
Tea*	60.0	75.0	105.0	181.5
Coffee*	24.7	24.9	49.5	87.0

¹Regular sodas include coke etc.

²Soft drinks include fused tea, iced tea, and limonite.

³Fruit juices include packaged fruit juices and fruit drinks.

*Tea/coffee sweetened with sugar

study. Data collection was conducted by face-to-face interview-based survey. This was carried by using structured questionnaire to collect information on sociodemographic characteristics, knowledge and attitude of the students with regard to the health implications of frequent/ excessive consumption of SSBs and their lifestyle factors. The questionnaire was pre-tested on a convenient sample of 15 students from Yeditepe University as a pilot study which was conducted a month before the study. The data collection period was completed in five months, between January 2019 and May 2019.

The sociodemographic information about the study participants included gender, age, marital status, country of birth, department of study, parental educational level, and perceived household economic status was collected via questionnaire. Students' knowledge of SSBs was measured based on their understanding of the ingredients of the SSBs, the benefits of SSBs and health risks associated with SSBs consumption. Their knowledge was then rated as good knowledge if they scored above or equal to 50% and poor knowledge if they scored below 50%. Students' attitude toward SSBs was measured based on how they felt regarding SSBs, how much they agree with SSBs consumption and how willing they were to stop consuming SSBs if they were aware of the health risks.

The consumption pattern of SSB was assessed by using FFQ (24). Participants were asked to report on how much SSBs specified in the FFQ are consumed. For consumption habits, five types of SSBs were assessed, including fruit juice, soft carbonated beverages, soda drinks, energy drinks, and tea or coffee with added sugar. The sugar in cold beverages was calculated in cubes multiplied by the size of servings, and the amount of sugar in hot beverages (tea and coffee) was calculated in grams as the

amount of sugar in one cube per a cup. One cube of sugar contains 4 grams of sugar. Participants were divided into daily consumers (≥ 1 drink/day) and non-daily consumers (< 1 drink/day, including non-consumers) for each SSBs based on their responses to consumption.

BMI was calculated using self-reported weight and height calculations. The BMI was calculated using the World Health Organization (WHO) guidelines and participants were classified as "underweight" when the BMI was < 18.50 kg/m², "normal weight" if the BMI was between 18.51 and 24.99 kg/m², "overweight" when the BMI was between 25.00 and 29.99 kg/m² and obese when BMI was ≥ 30 kg/m² (24). The lifestyle characteristics were physical activity, smoking status (current smokers, and non-smokers) and how frequently they consumed fast food. The level of physical activity of the participants was measured using the short form of the International Physical Activity Questionnaire (IPAQ), a series of seven questions relating to intense activity, moderate activity, walking and sitting during the last seven days. Using a normal monitoring technique, the metabolic equivalent (MET) was determined in which the mean MET-min per week was assessed as the MET activity level multiplied by the exercise time (in minutes)/day multiplied by the number of days per week. Based on MET-min per week, three physical activity levels were classified as low activity, moderate and highly active (25, 26).

The data were analyzed by using SPSS 25.0. Descriptive statistics such as frequency distributions, percentages, means and standard deviations were used to describe sociodemographic and socioeconomic characteristics. The main study variables knowledge, attitude and consumption patterns were considered as categorical variables. To evaluate associations, logistic regression models

were used, and the level of significance was set at $p < 0.05$.

RESULTS

In this study, 325 adults with a mean age of 24.1 ± 3.2 years, out of these students 60% were males while 40% were female. Majority of the participants (82.1%) were born in Somalia and 33.2% of respondents were of health faculty. 92% of students were unmarried. Regarding body weight, the mean BMI was 22.1 ± 3.08 and almost three quarters (62.8%) of the students reported a moderate level of physical activity. The daily consumption of SSBs was reported

by 30.5% of students and their consumption was 2.2 ± 1.07 servings per day on average.

The amount of sugar consumed in each beverage was calculated in grams and the consumption pattern of SSBs was measured as servings in litres among the students, who consumed sugar sweetened beverages one month before the study, as shown in Table 1. Soft drinks were the most commonly consumed cold beverage, with a median of 5.7 ± 8.8 servings per month, while regular soda was consumed with a median of 4.0 ± 8.6 servings per month. Sweetened tea was the highest consumed sugar sweetened drink with a median of 60.0 ± 75.0

Table 2. The associations between the consumption of sugar-sweetened beverages and socio-demographic characteristics.

	SSBs		Total (n 325)	p-value*
	Daily consumers (n 88)	Non-daily consumers# (n 237)		
Gender				
Male	28.6 (56)	71.4 (140)	100% (196)	0.52
Female	24.8 (32)	75.2 (97)	100% (129)	
Age				
<22 years	32.7 (32)	67.3 (66)	100% (98)	0.24
23-24 years	23.6 (21)	76.4 (68)	100% (89)	
>25 years	23.6 (30)	76.4 (97)	100% (127)	
Marital status				
Single	28.6 (85)	71.4 (212)	100% (297)	0.04
Married	11.5 (3)	88.5 (23)	100% (26)	
Country of birth				
Somalia	23.3 (62)	76.7 (204)	100% (266)	0.01
Others	44.8 (26)	55.2 (32)	100% (58)	
Educational level				
Undergraduate	28.0 (49)	72.0 (126)	100% (175)	0.66
Postgraduate (master)	24.8 (32)	75.2 (97)	100% (129)	
Postgraduate (PhD)	33.3 (7)	66.7 (14)	100% (21)	
Faculty				
Health	17.6 (19)	82.4 (89)	100% (108)	0.01
Non-health	31.8 (69)	68.2 (148)	100% (217)	
Household income				
High income	30.6 (26)	69.4 (59)	100% (85)	0.25
Just get-by	20.3 (13)	79.7 (51)	100% (64)	
Low income	34.6 (9)	65.4 (17)	100% (26)	
Father's education level				
No formal education	21.2 (14)	78.8 (52)	100% (66)	0.01
Primary education	20.0 (7)	80.0 (28)	100% (35)	
Secondary education	19.3 (16)	80.7 (67)	100% (83)	
Tertiary education	36.9 (48)	63.1 (82)	100% (130)	
Mother's education level				
No formal education	18.7 (20)	81.3 (87)	100% (107)	0.01
Primary education	33.9 (21)	66.1 (41)	100% (62)	
Secondary education	25.2 (26)	74.8 (77)	100% (103)	
Tertiary education	44.4 (20)	55.6 (25)	100% (45)	

*p values were computed by Pearson chi-square test.

Non-daily consumers include weekly, monthly and non-consumers.

Table 3. Associations between consumption of sugar-sweetened beverages and lifestyle characteristics.

	SSBs		p *
	Daily consumers (n 88)	Non-daily consumers# (n 237)	
Physical Activity level			
High	39.4	60.6	0.01
Moderate	22.1	77.9	
Low	22.2	77.8	
BMI category			
Normal weight	27.5	72.5	0.25
Overweight	17.5	82.5	
Obese	42.9	57.1	
Smoking status			
Current smoker	63.6	36.4	0.01
Non-smoker	25.8	74.2	
Fast-food consumption			
None	10.4	89.6	0.01
Daily	40.8	59.2	
Weekly	35.7	64.3	
Monthly	20.0	80.0	

*p values were computed by Pearson chi-square test.

Non-daily consumers include weekly, monthly and non-consumers.

servings per month, probably due to the traditional customs of drinking tea after meals.

The socio-demographic characteristics shown in Table 2, which includes marital status, country of birth and faculty ($p < 0.01$), depicts that all these factors were positively associated with a daily intake of SSBs. Unmarried respondents ($p = 0.04$) consume more sugary drinks compared to married students. On the other hand, those students born in Somalia consume less sugary beverages ($p < 0.01$). Additionally, respondents whose fathers and mothers ($p < 0.01$) completed tertiary education was positively associated with daily consumption of SSBs.

The association between SSBs consumption, level of physical activity, smoking status, and fast-food consumption is shown in Table 3. Highly active students were associated with daily SSBs ($p < 0.01$). Students that consume fast food frequently and current smokers were positively associated with a daily intake of SSBs ($p < 0.01$) respectively. Moreover, as shown in Tables 4 and 5, there was a significant association between nutritional knowledge, faculty ($p = 0.04$), father's tertiary education ($p = 0.03$), and mother's tertiary education ($p = 0.02$). As far as attitudes were concerned, the age of the students ($p < 0.01$) and undergraduate students ($p < 0.01$), had a positive association. The level of physical activity shows a direct correlation between knowledge and attitude ($p < 0.01$), as students who frequently exercise are more conscious of the health effects of excessive consumption of sugary beverages, thus showing a positive attitude.

For the multivariate-adjusted analysis, in Table 6, indicates that daily consumption of SSBs was more likely consumed by Somali students born in other countries (OR:2.88; 95%CI:1.00-8.23) and students whose fathers completed tertiary education (OR:2.86; 95%CI:1.00-8.12). Participants of health faculty consumed less of SSBs. Regarding the physical activity status, majority of the physically active students were more likely to consume SSB (OR:2.27, 95% CI: 1.25-4.11) as well as frequent fast-food consumers (OR:2.81 95% CI: 1.03-7.65).

DISCUSSION

This study focused on the frequency of SSB consumption, knowledge, and attitudes regarding the health effects of its excessive consumption among Somali students in Turkey. Daily consumption of SSBs was reported by about one third of the participants (30.5%). On average, the students reported consuming 2.2+1.07 servings of SSBs per day. This finding was higher than the global means of consumption of 0.58 servings/day – 0.80 servings/day and 0.59 servings/day in upper and lower-middle income countries, respectively (27). Increased physical activity was significantly associated with higher consumption of SSBs. Students who are highly active prefer sugary drinks before and after physical activity to refuel the energy lost during physical activity. This finding is consistent with other studies conducted among adolescents in Texas (28) and Spain (29). This correlation may

Table 4. Associations of knowledge, and attitude among study participants with sociodemographic characteristics.

	Knowledge			Attitude		
	Poor Knowledge (n 99)	Good Knowledge (n 226)	p*	Positive Attitude (n 217)	Negative Attitude (n 108)	p*
Gender						
Male	30.6	69.4	0.52	66.3	33.7	0.46
Female	30.2	69.8		67.4	32.6	
Age						
<22 years	33.7	66.3	0.45	56.1	43.9	0.01
23-24 years	29.2	70.8		69.7	30.3	
>25 years	26.0	74.0		74.8	25	
Marital status						
Single	30.6	69.4	0.50	68.4	31.6	0.10
Married	23.1	76.9		53.8	46.2	
Country of birth						
Somalia	31.6	68.4	0.16	68.0	32.0	0.16
Others	24.1	75.9		60.3	39.7	
Educational level						
Undergraduate	31.4	68.6	0.50	61.7	38.3	0.01
Postgraduate (master)	31.0	69.0		69.0	31.0	
Postgraduate (PhD)	19.0	81.0		95.2	4.8	
Faculty						
Health	24.1	75.9	0.04	69.4	30.6	0.27
Non-health	33.6	66.4		65.4	34.6	
Household income						
High income	20.0	80.0	0.30	77.6	22.4	0.07
Just get-by	25.0	75.0		64.1	35.9	
Low income	34.6	65.4		57.7	42.3	
Father's education level						
No formal education	19.7	80.3	0.03	74.2	25.8	0.23
Primary education	20.0	80.0		57.1	42.9	
Secondary education	27.7	72.3		69.9	30.1	
Tertiary education	37.7	62.3		63.1	36.9	
Mother's education level						
No formal education	19.6	80.4	0.02	71.0	29.0	0.33
Primary education	40.3	59.7		59.7	40.3	
Secondary education	34.0	66.0		68.9	31.1	
Tertiary education	31.1	68.9		60.0	40.0	

*p values were computed by Pearson chi-square test.

reflect adults' perceptions that sugary drinks aid water and electrolyte recovery.

In this study, frequent fast-food consumption was positively associated with SSB consumption ($p < 0.01$). As in previous studies (30, 31) an association was present between unhealthy food consumption and daily SSB consumption. Several studies also reported (32, 33) that poor sleep quality increased SSB consumption among adolescents. All of these results seem to suggest that people who consume SSBs are more likely to encounter various unhealthy habits, including smoking, sleeping problems, and unhealthy eating (30, 31).

Many complex factors overlap between one's consumption of sugary drinks and socioeconomic status. The best indicator of socioeconomic status is education, which affects one's health through lifestyle choices and behaviors such as diet and drink options

(34). In this study, students who belonged to families with a high educational background were less influenced by their families in terms of health. This study did not find a significant difference between SSBs consumption and employment status; however, there was a negative association between parents' educational status and daily SSB intake. Students of educated parents were more likely to consume SSBs. Contrary to our findings, another study in Canada shows that students whose parents have completed college or university were less likely to consume SSBs on a daily basis (35). This difference may be due to different epidemiological and demographic factors according to the different countries' development levels. To influence health and diet-related behaviors and conceptualized by existing health behavior theories, social and psychological factors including normative beliefs and modelling are

Table 5. Associations of knowledge, and attitude with lifestyle characteristics among study participants.

	Knowledge			Attitude		
	Poor Knowledge (n 99)	Good Knowledge (n 226)	p*	Positive Attitude (n 217)	Negative Attitude (n 108)	p*
Physical activity level						
Low	48.1	51.9	0.01	55.6	44.4	0.01
Moderate	25.0	75.0		72.5	27.5	
High	37.2	62.8		57.4	42.6	
BMI category						
Normal weight	29.4	70.6	0.12	67.1	32.9	0.77
Overweight	15.0	85.0		72.5	27.5	
Obese	14.3	85.7		71.4	28.6	
Fast-food consumption						
None	16.7	83.3	0.10	57.6	42.4	0.04
Daily	38.8	61.2		73.3	26.7	
Weekly	30.4	69.6		65.2	34.8	
Monthly	33.0	67.0		64.4	35.6	
SSBs consumption						
Daily consumers	37.5	62.5	0.06	59.1	40.9	0.05
Non-daily consumers	27.8	72.2		69.6	30.4	

*p values were computed by Pearson chi-square test.

potential targets. In this study, the disparity may be attributed to demographic factors, such as the more likely intake of sweetened coffee and tea by students born in Somalia. Somali tea is typically prepared with large quantities of sugar, which is the main explanation. On the other hand, the higher consumption of sugary beverages such as sodas and energy drinks were correlated with students born and raised in other countries. As they had better access to a variety of soft drinks, sodas and energy drinks, their consumption was higher than that of native Somalis.

This research found that students who were overweight and obese were more likely to consume sodas and sweetened hot beverages. Conversely, the results of a study on Turkish students showed that substantial amounts of refined sugar added to beverages per day contributed to higher BMIs. In other words, a rise in BMI of 0.13 kg / m² was the average intake of refined sugar added to tea and coffee (14.7 g / day) in subjects (36). The study also claimed that obese people are perceived as having strong preferences for the consumption of large quantities of soft drinks compared to their non-obese counterparts (37).

The association between the respondents' knowledge and attitudes was that students who excessively consumed SSBs demonstrated an acceptable level of knowledge about their negative effects whereas health faculty students showed an even higher knowledge and positive attitude compared to non-health faculty students. This was

comparable to research carried out in South Africa that indicated that those with poor knowledge and attitude consumed substantially more SSBs (P < 0.01) than those with higher awareness and attitude levels (24). On the other hand, frequent fast food consumers increased their odds of consuming SSBs

Table 6. Multivariable associations of daily consumption of sugar-sweetened beverages with socio-demographic characteristics and lifestyle factors.

	SSBs	
	OR	95% CI
Country of birth		
Somalia	1.0	ref.
Others	2.88	1.01 - 8.23
Father's education level		
No formal education	1.0	ref.
Primary education	1.54	0.40-5.89
Secondary education	3.56	0.84-15.1
Tertiary education	2.86	1.01-8.12
Mother's education level		
No formal education	1.0	ref.
Primary education	0.60	0.40-6.91
Secondary education	1.67	0.16-2.23
Tertiary education	1.65	0.50-5.49
Physical activity level		
High	2.27	1.25-4.11
Moderate	2.93	0.83-10.40
Low	1.0	ref.
Smoking status		
Non-smoker	0.19	0.04-0.87
Current smoker	1.0	ref.
Fast-food consumption		
None /monthly	1.0	ref.
Daily/weekly	2.81	1.03-7.65

* Adjusted by age, gender, marital status, faculty and body mass index variables.

daily due to SSBs' low-priced inclusion in the meals. Adults who were unaware of the effects of sugar on health were more likely to consume SSBs. A study by Park et al. reported that knowledge about the adverse effects of SSBs was significantly associated with less consumption and lower added sugar intake (38). This study noted many limitations. Firstly, the temporal association between sociodemographic characteristics, lifestyle variables, SSB consumption, and respondents' knowledge and attitudes could not be identified due to the cross-sectional study design. Furthermore, the results of this study may be limited due to the fact that the information was self-reported by the respondents, specifically in relation to portion size estimation, which is subject to recall bias errors. In addition, the generalizability of research findings on the adult Somali community in Turkey may be limited because the participants in this study were solely university students, enrolled in the Somali student association.

CONCLUSION

In conclusion, this study pointed out that single students, students who did not belong to the health faculty, respondents born outside of Somalia, and learners of highly educated parents were found to regularly consume SSBs despite having good knowledge of their adverse health effects. Other individual factors influencing students' consumption of sugar beverages included admiration for sugary sodas and frequent visits to fast food outlets. Understanding students' attitudes and behaviors towards the consumption of sugary drinks will help us find ways to enhance community nutrition, leading to a healthier community for families and professionals alike. Public health interventions should intensify ongoing campaigns about the harmful effects of excessive SSB consumption, targeting students. The findings of this study can be presented as background information for the development of effective nutrition and health interventions for sugar consumption. Further research is necessary to investigate the negative association between SSB intake among students and the higher education level of their parents. Moreover, adolescents and children should be assessed for their lifestyle and dietary behaviors, particularly among the Somali population in Turkey and Somalia.

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responsibility for the final content. All authors read and approved the final Manuscript.

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Ethical approval: This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving research study participants were approved by the Yeditepe University Clinical Research Ethics Committee (Decision number: 934, Date: 10.01.2019).

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