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Research Article

Soft Drink Consumption of Diabetic and/or Obese Patients with Medical Consequences in Southern Turkey

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Abstract: Despite increasing awareness; soft drink consumption is rapidly growing in Turkey. We aimed to assess the soft dring use of diabetic and/or obese patients with duration of use , amount of use and to determine the co-morbid conditions. 2815 patients attending to Baskent University outpatient clinic of diabetes and obesity of family medicine were questioned for regular soft drink use. 1342 patients (621 male, 721 female, 47,67%) responding affirmatively were included into the study. They were given a scale of six questions to answer which included age, gender, social status, type (diet or regular) and amount of soft drink being used, duration of usage and associated diseases. The Mean Body Mass Index (BMI) values statistically increased in association with the increase in daily amount of soda used. As the duration of use in terms of years increase daily amount of soda use also increases. Long time users have been consuming greater amounts. The number of accompanying diseases increased with increasing amount consumed. Soda use increases BMI of the patients. As time goes by the consumption transforms into an addictive pattern and the amount being used also increases, which maybe contributing to the disease burden of these patients as they have a greater number of accompanying diseases.
Keywords: Soda, Soda Consumption, Addiction

INTRODUCTION

Despite heightened awareness about its many negative effects on health, many of us still reach for soft drinks daily for caffeine and sugary satisfaction either through the snacks of the day or accompanying lunch or dinner as choice of beverage.

Soft drinks are introduced at an early age by teachers, parents and other loved ones because they too have the addiction. It is sold as a tasty treat to refresh, to cool, and to fortify, when really it is damaging. And it's legal.

The problems associated with soft drinks are serious. The term "soft drink" is basically a misnomer since the chemical make up of most drinks in this category is toxic to the human body. "Soft drinks" includes most non-alcoholic beverages: sodas, surely, but juice drinks and energy drinks are not left out of this group of dangers.

The term *soda/soft drinks* encompasses sugar-sweetened carbonated beverages such as colas. It is among the many sources of excess calories contributing to the obesity epidemic. 1 can of soda (or 1 soda) = 1 serving of soda provides 150 kcal and 40–50 g sugar in the form of high-fructose corn syrup [(HFCS) ≈45% glucose and 55% fructose], which is equivalent to 10 teaspoons of table sugar. That's a staggering amount of sugar. And not just any sugar, but some of the worst we know of – fructose, in the form of HFCS. If these calories are added to typical diet without reducing intake from other sources, 1 soda/d could lead to a weight gain of 6.75 kg or 15 lb in 1 year [1, 2].

Tragically, high fructose corn syrup, in the form of soda, has become an important source of calories in most countries, and it is very clear that it is the primary cause of the obesity epidemic.

Perhaps because of a person's overall unhealthy food and beverage choices, studies have shown that even minimal soda consumption may lead to weight gain [2-4]. Unfortunately, that weight gain can lead to the development of Type 2 diabetes. Women who went from drinking less than one, non-diet soda a day to one or more daily sodas were nearly twice as likely to develop type 2 diabetes over a four-year period as women who drank less than one soft drink a day [5-6].

ADA 2013 guidelines for Primary prevention for type 2 diabetes with medical nutrition therapy suggest limiting intake of sugar-sweetened beverages [7]. According to the World Health Organization (WHO), >1 billion adults throughout the world are overweight, with a body mass index (BMI; in kg/m^2) ≥25. Of these, at least 300 million are considered obese (BMI ≥30; 1) [8].

Analysis of data from more than 28,000 people in eight European countries was done to explore the association between sugar-sweetened soft drinks and type 2 diabetes. The study did not prove cause and effect. It was found that just 12 ounces a day (the amount in a standard U.S. can of soda) raised participants' risk for type 2 diabetes by 18 percent when participants' calorie intake and body mass indexes were taken into account [9]. People who drank a can or more of diet soda daily showed a 34-percent higher risk of developing the metabolic syndrome: a cluster of cardiovascular disease and diabetes risk factors including elevated waist circumference and high blood pressure, blood lipids, and fasting glucose levels [10].

At least daily consumption of diet soda was associated with a 36% greater relative risk of incident metabolic syndrome and a 67% greater relative risk of incident type 2 diabetes compared with nonconsumption [11].

Soft drinks have also found to increase risk of hip fractures in postmenapausal women [12] and increase risk of developing rheumatoid arthritis in women [13].

Nearly half of all the people in the USA drink soda every day**. That adds up to 7.5 billion gallons.** It is the sugar and the caffeine in such drinks that make them so addictive.

Addiction is a repeated behavior despite adverse consequences. It is a state in which biological, psychological, behavioral and social factors interact. According to DSM-IV one needs to display at least three of the criteria listed below in the last 12 months to be classified an addict [25].

Tolerance: Does the patient tend to need more of the substance over time to get the same effect?

Withdrawal **symptoms:** Does the patient experience withdrawal symptoms when he or she does not use the substance?

Continued use of substance despite harm: Is the patient experiencing physical or psychological harm from the substance?

Loss of control: Does the patient take the substance in larger amounts, or for longer than planned?

Attempts to cut down: Has the patient made a conscious, but unsuccessful, effort to reduce his or her substance use?

Salience: Does the patient spend significant time obtaining or thinking about the substance, or recovering from its effects?

Reduced involvement: Has the patient given up or reduced his or her involvement in social, occupational or recreational activities due to the substance?

Soft drink addiction can be considered within the context of caffeine addiction. At present we have internet addiction and even mobile phone overuse which is a close thing to addiction that have been presented to societies in package of advances in technology [14].

In the present study we aimed to determine soda/soft drink addiction on a group of patients associated with; age, gender, social status, duration of usage, amount being used, and additional diseases.

MATERIALS AND METHODS

Intake of sugar-sweetened beverages including colas, other carbonated beverages and sweet fruit drinks of 2815 diabetes and obesity patients of family medicine outpatient clinic was assessed using a validated food frequency questionnaire. 1342 patients who reported to be taking any form of soft drinks regularly for the last six months (721 female-621 male) were taken into the study. After obtaining informed consent the height and weight of the participants were measured and they were given a scale of six questions to answer which included age, gender, social status, type (diet or regular) and amount of soft drink being used, duration of usage and associated diseases. The study was approved by Baskent University Ethics Committee (KA14/152).

Statistical analysis

Statistical analysis was performed using the statistical package SPSS software (version 17.0, SPSS Inc., Chicago, IL, USA). The categorical variables between the groups were analyzed by using the Chi square test or Fisher Exc. Test. A p value of 0.05 was taken as the level of significance.

RESULTS

- Mean Body Mass Index (BMI) values statistically increased in association with the increase in daily amount of soda used.
- As the duration of use in terms of years increase daily amount of soda use also increases. Long time users have been consuming greater amounts.

- The number of accompanying chronic diseases increased with increasing daily amount being consumed. Specifically; Obesity, obesity +1 chronic disease, obesity +2 chronic disease and Diabetes + Obesity + 2 chronic disease increased significantly with consumption.

DISCUSSION

In Turkey 2,6 billion liters of soda has been consumed in 2012. That was 35 liters per person, per year. In the same year 1 billion liters of fruit juice was consumed.

Turkey is 6th in Europe in terms of soda production and 23rd for consumption per person per year. The soda consumption in European Unity is 71.7 liters per person per year [15].

There is no study about soda use in Turkey. The cases in this study were not healthy individuals, so this one can only be regarded as the initial work to assess the consumption for soda on a group of diabetic and obese patients with additional chronic diseases in which the effects of duration and amount of consumption were also determined.

In our study the increase in daily amount of soda used showed a significant higher bmi values. This significance accounted for both sexes. Our cases were mostly overweight and obese already. This can be due their overall unhealthy nutritional choices rather than solely being depended on soft drinks. This weight gain was also shown in San Antonio Heart Study (SAHS) which examined the relationship between artificially sweetened beverage consumption and long term weight gain [16]. In SAHS the cases were compared in terms of users vs. nonusers. In our study the difference between amount of use is being highlighted. In another study artificailly sweetened soda use was found to decrease body weight of males only compared to high-fructose corn syrup which increases body weight in both sexes [17]. Long periods of follow up with sugar sweetened beverages showed a positive association between greater intakes of SSB and weight gain and obesity in both children and adults [2].

Analysis of data from the San Antonio Heart Study following more than 5,000 adults for between seven and eight years had shown that although people who drank both sugar-sweetened and diet sodas gained weight, diet soda drinkers were more likely to become obese. Participants those drank more diet sodas gained greater weight [24].

The Framingham analysis included 9,000 middle-aged men and women followed for four years. It was found that those people those drank both sugar-sweetened and diet soda were more likely to develop metabolic syndrome (a cluster of symptoms often linked to obesity that increase risk for heart disease and diabetes) in coparision to people who didn't drink sodas at all [24].

Because both of these studies were observational, it is impossible to say if diet soda played a direct role in the weight gain. It may be that people switch to diet soda when they begin gaining weight without addressing other aspects of their diet that are causing the weight gain.

Artificial sweeteners are also found to be associated with obesity with forward causation (they cause obesity) and backward causation (obese people consume more artificial sweeteners to loose weight) [16, 18-20].

Some studies have found increases in subjective (self-report) or demonstrated (eats more) appetite with aspartame.On the otherhand, some studies argue a suppression of appetite for aspartame [21]. On investigation regarding weight changes associated with aspartame, some studies have found that none are seen if other variables are controlled. These variables tend to be calories, as some studies have found that if calories are kept equal, weight can be lost to an equal degree with both diet soda and regular soda [22-23].

So; when general data is checked no strong information is present to conclude that aspartame effects appetite positively or negatively. We also agree that the research linking diet sodas to weight gain is scant and inconclusive but are still concerned that artificial sweeteners condition people to want to eat more sweet foods.

The second finding of the study was; the amount consumed by cases increased with duration of use; mimicking an tolerance pattern of addiction. It is known that soda has addictive potential. It is the caffeine that makes sodas addictive.

Caffeine is the world's most popular psychoactive drug, soluble in both water and fat and easily crosses the blood-brain barrier. The caffeine molecule is similar to adenosine which slows down nerve cell activity along neural pathways, and when caffeine is present adenosine receptors are blocked. Over time, the brain attempts to compensate it by growing more adenosine receptors and decreasing the number of receptors for norepinephrine, another stimulant like adrenaline. Thus caffeine addicts tend to need more and more [26]. Addictive effect of sodas is expressed in the study.

The final result of the study that the cases consume greater amounts of soda with greater number of coexisting diseases must be underlined. This issue may be of paramount importance. It arouses suspicion that soda these cases consume might be contributing to their disease burden and also possible that excessive soda use is already one of their overall unhealthy

choices. We could not find any data or any study on this subject.

CONCLUSION

The rate of soda use of our patients of diabetes and obesity was 47,67 %. Although we don't have any information regarding to soda use of the population let alone the patients in southern Turkey, we feel this is a frightening ratio. The rate of soda use was not associated with socio-economical status. Apart from underlining the addictive potency of soda our study has found a positive association between soda use and body mass index. This finding has been supported by some literature already discussed. It is not easy to conclude whether the extra body mass index of the soda consumers come from the soda or from the possible overall unhealthy habits of the cases. The third and final result was a growing amount of soda consumption with growing number of coexisting diseases. Soda may be contributing to the disease burden of the patients.

We believe our study strengthen the ideas on weight gain and addictive effects associated with soda. Major pitfall of this study is lack of an investigation on whether or not soda induced appetite. Also most of our patients have specified their choice of consumption as regular soda which prevented this study to be a novel work comparing the effects of diet soda versus regular soda and proved that physicians in this region still have a lot to deal with patient education. We believe; at first family practitioners and then any type of physicians should question patients for soda consumption. We also suggest parents to keep children away from such products. Governmental regulations regarding to soda use must be supported by all medical organizations. The field is open for further studies.

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