

# An Overview of Effects of Carbonated Drinks

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**Abstract:** Soft drinks are those drinks which do not contain alcohol. These soft drinks are either carbonated or non-carbonated soft drinks. Carbonated soft drinks are consumed widely across the globe. Today, when people are becoming more health conscious, concerns are being raised regarding the impact of carbonated soft drinks on health. When discussing the effects of carbonated soft drinks on health carbon dioxide, phosphoric acid and sugar are of main concern. Most carbonated beverages have acidic pH which results in gastroesophageal reflux disease (GERD) like symptoms. The phosphoric solution in these beverages is powerful enough to cause human teeth to become soft. The caffeine present in colas is known to be a hazardous factor for osteoporosis. When taken after a period of dehydration, the sugar in these beverages is known to cause more renal injury than plain water. The sugar content in these beverages may lead to lipids production in the body and result in obesity, hypertension, non-alcoholic fatty liver disease (NAFLD), and pancreatic cancer. Hence, it is necessary to monitor diet and focus on natural and healthy beverages.

**Keywords:** Soft drinks, Side-effects, Diseases, Obesity, Tooth erosion, Hypertension.

## INTRODUCTION

A carbonated beverage or an effervescent drink may be a nonalcoholic drink that ordinarily contains water, a sweetener, corrosive and a seasoning ingredient. The term “soft” is owing to the absence of alcohol, not like its presence in exhausting drinks [1]. Carbonation may be a term accustomed establish the dissolution of greenhouse emission gas in water utilizing pressure and temperature [2]. The effervescent drinks are the third most consumed beverages, across the globe [3].

Artificial carbonation was invented by Joseph Priestly, in 1767. First commercial production of carbonated drink was in Switzerland, in 1783. It was mineral water [4].

Carbonated drinks are consumed worldwide [5] and the majority of the people drink them daily, making them the easiest source of energy intake. Given the high consumption of these drinks, the scientific community is concerned about their impact on health [6]. An association between carbonated drinks and obesity or the metabolic syndrome has been hypothesized, however conjointly, dental, pneumonic or cardiovascular diseases are associated with their consumption [6]. This review provides information concerning the consequences of carbonated drinks on health. This information can be used for lifestyle changes, relating to the frequent consumption of carbonated soft drinks.

## HEALTH EFFECTS OF CARBONATED SOFT DRINKS

### Effects on the Gastrointestinal Tract

Different teams have proposed a negative impact while others

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have depicted advantageous impact while expending carbonated refreshments under various conditions [7].

When talking about the impact of carbonated drink on human wellbeing, more explicitly, its impact on gastrointestinal tract carbonation is of main concern. Carbon dioxide occurs normally in the body as the result of breath altogether cells. Be that as it may, as bicarbonate it has different jobs in the human body including influencing blood's pH balance, adds to vasodilation, aggravation and tissue recovery and the stimulus of relaxation [7-11].

When the bottle is opened most of the carbon dioxide escapes, and very little amount reaches the digestive tract. Indeed, even the visual picture of the rises in the drink apparently connected with wonderful responses recently experienced with that equivalent can alter gastrointestinal observation [12-14].

### Esophagus

The connection between carbonated soft drink consumption and esophagus is said to the matter of gastroesophageal reflux disease (GERD). The most common indication of GERD is heartburn [15].

Carbonated beverages have distinctive properties that may worsen gastroesophageal reflux diseases such as a large amount of acidity and carbonation [16].

Numerous carbonated drinks have acidic pH and result in GERD like symptoms [17, 18].

### Effects on Oral Health

The excess drinking of carbonated soft drinks harms the teenage population because it contains no vital nutrients and harms their general and oral health. The ingredients involve in

carbonated soft drinks are phosphoric acid, sugar, caffeine, coloring and seasoning agents. Phosphoric acid is the active ingredient in these drinks. The acidic pH of phosphoric acid is a smaller amount than 3 that is the same as ethanoic acid. Makers add an oversized quantity of sugars in these drinks therefore so it does not taste like acid. In order to keep water sterile, a high concentration of phosphoric acid is added which makes the pH of drink acidic. Regular use of soft drinks (1-5L/wk.) makes the teeth soft [19].

### **Tooth Erosion**

Soft drink contains sugars as well as various natural acids and they are involved as an extraneous reason in the development of dental erosion [20].

Dental erosion isn't a disease and it's not caused by a microorganism. It happens when an acid dissolves the exhausting tissue of the tooth. Phosphoric acid is principally found in soft drinks, while citric acid in lemon and lime tasteful drinks. Any of this acid will erode tooth enamel. Dental erosion by acidic carbonated drinks seems to be growing drawbacks [21].

All soft drinks and drinks tested had acidic pH: 1.8-3.5 which is lower than the integral pH of tooth enamel and soft drinks with lower pH precipitated extra enamel dissolution [22].

Anecdotal proof exists that the regular propensity for rinsing carbonated beverages around the mouth before gulping can also enlarge the chance of erosion [23].

Calcium in saliva works to remineralize the teeth once exposure to the touch of wearing acid however with the inflated consumption of drinks it's not enough. Folks typically consume drinks over the course a daily which implies acid floods into the mouth anytime you are taking a sip of the drink, these attacks will twenty minutes and this method begins once more anytime a sip is taken [24].

### **Effects on Bone**

Carbonated soft drinks are particular might be related to lower bone mineral density. Caffeine component is present in most of the soft drinks and this component indistinguished as a hazard factor for osteoporosis [25-27].

Phosphorus is an imperative supplement for bone health. The excessive dietary phosphorous has adverse effects on bone health [28]. Phosphorus is consumed in the form of phosphoric acid in soft drinks [29].

Soft drinks have phosphoric acid that allows inhibiting calcium absorption and contributing to an imbalance that causes a lack of calcium [25]. In wealthy western population, consumption of carbonated soft drink is very popular Especially in youth [30] Small scales studies specify that high consumption of carbonated soft drink especially soft drinks decrease bone mineral accumulation and rise fracture risk

[30-33].

A few observational works detailed that soft drinks is harmful to adolescent girls' bone health but not to boys. Such an affiliation might be mostly credited to the relocation of milk and other calcium rich substances or the immediate impact of soft drink elements (phosphoric acid, citric acid and caffeine) on bone [34].

### **Effect on Kidneys when Rehydrated with a Soft Drink**

The imbalance intake of food and beverages, even plain water, can have adverse effects on the health of a person. The degree of renal injury is affected by the type of fluid taken as the hydrant after one hour of exposure to heat stress [35]. In their experiment, Garcia-Arroyo *et al.* (2016) gave the rats either plain water or 11 % fructose-glucose solution, which has similar concentration to that of the soft drinks, for two hours after the exposure to heat stress.it was observed that the activation of vasopressin and Aldo-reductase pathways and enhanced renal oxidative stress, leads to the renal inflammation in the experimental group of rats. It was found that cyclic dehydration causes renal injury. However, the renal injury is found more in the group drinking 11 % fructose-glucose solution than those drinking plain water, during the immediate rehydration period. Thus, an important message from this paper was that, after being dehydrated, the fluid of preference for rehydration should be plain water and not a sugar drink [35, 36].

### **ROLE IN NON-ALCOHOLIC FATTY LIVER DISEASE**

Non-alcoholic fatty liver disease (NAFLD) is the continuous delivery of free fatty acids to the liver from the visceral fats or from the inflated activity of fatty food [37]. Today, NAFLD is a vital rising health issue. Many liver diseases, such as simple fatty liver (steatosis), nonalcoholic steatohepatitis (NASH) and cirrhosis, also come under the category of NAFLD [38]. It also results in obesity and many other health-related problems such as cardiovascular diseases, diabetes, and hypertension [39]. These diseases are collectively known as metabolic syndrome. It is observed that 70% of patients with liver disease have metabolic syndrome and 30% of patients with metabolic syndrome have liver disease [40]. Today, two types of soft drinks are being used; regular soft drinks which are sweet with sugar (fructose) and diet soft drinks which are sweet with non-caloric sweet (aspartame) [41]. Fructose is sweet and cheap, therefore, it is used in commercial drinks and sweets [42]. Worldwide, soft drinks are the leading cause for added sugar in the diet. Recent studies suggest that intake of fructose through soft drinks increases the risk of obesity, induced insulin resistance and other diseases [42-44].

### **ROLE IN PANCREATIC CANCER**

Sugar-sweetened soft drinks are a great source of absorbable sugars and can be related to an extended danger of obesity and diabetes. Diabetes mellitus and a food regimen high in sugar

load are both important risk factors leading to biliary tract cancer [6, 45]. Biliary tract cancers include tumors of the bile ducts inside and outdoor the liver, as properly as gallbladder cancer. Little is known about the motives of biliary tract cancer, however rising evidence indicates that excess body weight [46] and type 2 diabetes [47] may increase the risk of biliary tract cancer. Moreover, potential studies have discovered a sturdy high-quality association between fasting blood glucose concentration and the danger of biliary tract cancer and gallbladder cancer [48]. The basic mechanisms that might link increased blood glucose concentration to gallbladder cancers are still unclear, but growth-promoting consequences of insulin and insulin-like increase factors are possible mechanisms [49, 50].

### ROLE IN HYPERTENSION

Hypertension or high blood pressure is a long-term medical condition in which the blood pressure in the arteries is continuously increased. Internationally, hypertension is a common health problem. Internationally, in the grownup population, 26 percent of people are reported to have high blood pressure. Obesity, low physical activity, high consumption of alcohol, high sodium intake, and low potassium intake are the well-known risk factors for hypertension [51, 52]. Some animal studies have reported on the role of sex hormones in developing hypertension as a result of sugar-sweetened beverages consumption [53], so it might be possible as with humans. Even though recent studies have reported associations between hypertension and high consumption of sugar-sweetened beverages [54, 55], it is still unclear whether the association between sugar-sweetened beverages consumption and risk of hypertension is caused by the sugar-sweetened beverages per se, or through some other mechanism [56].

### ROLE IN CARDIOVASCULAR DISEASES

The most common cause of death worldwide is cardiovascular disease. There is an interest to control its risk factors, in order to reduce its effects [57]. Increased consumption of sugar-sweetened beverages, often sweetened with sugar (fructose) has been associated with rising obesity rates which may lead to cardiovascular diseases [58, 59].

### CONCLUSION

Our diet becomes part of our body. It is necessary to see what we are eating and drinking. It is necessary to shift lifestyle towards more healthy choices. The amount and frequency of consumption of carbonated soft drinks can be reduced in favor of healthy choices such as water, milk and natural juices.

### LIST OF ABBREVIATIONS

GERD = Gastroesophageal Reflux Disease

NAFLD = Non-Alcoholic Fatty Liver Disease

### CONFLICT OF INTEREST

Declared none.

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