

A Literary Review On Potential Health Risks Of “Soft Drinks”

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ABSTRACT

Soft Drinks are carbonated water, sugar, and flavoring. Non-alcoholic beverages have less than 0.5% alcohol. Caffeine, coloring, and preservatives are also possible. Millions prefer soft drinks over water. In the 17th century, the first Western soft drinks were honey-sweetened water and lemon juice. Soft drinks are nutrient-free. Soft drinks mostly include filtered water and white sugar. In 2009, Sri Lankans consumed 62 million liters of carbonated soft drinks, and 82% of the population drank sugar-sweetened soft drinks, according to a 2012 survey. Soft drink intake is connected to obesity, diabetes, bone loss, osteoporosis risk, high blood pressure, acid reflux, metabolic syndrome risk, liver damage, digestive issues, dehydration, asthma, and aggressive behavior. This literature review investigated soft drink health impacts. The World Health Organization, scientific papers, and the internet provided soft drink hazard information. Thus, soft drink use endangers future generations.

KEYWORDS: Non-alcoholic carbonated drinks, flavored soft drinks, possible health hazards, usage.

1. INTRODUCTION

Soft drinks (SD) are flavored carbonated beverages (FCB) manufactured from water, carbon dioxide, flavorings, nutritional or non-nutritional sweeteners, and other approved food ingredients. Carbon dioxide effervesces all

carbonates. Other ingredients include sugar, acids (citric, malic, and phosphoric), fruit juice, stabilizers, flavorings, and colors. Sweeteners include diet drinks, juices, sugar, and high-fructose corn syrup. Some sodas contain caffeine. Soft drinks must have less than 0.5% alcohol by volume to be non-alcoholic. Carbonated soft drinks include 10–11% sugar, 0.3–0.5% citric acid, flavoring, coloring, and chemical preservatives.

Different places call the same flavored carbonated drink by different names. Flavored carbonated beverages are termed "pop" in certain parts of the US and Canada, "soda" in others, "coke" in others, "fizzy drinks" in England, "minerals" in Ireland, and many more names worldwide.

Essence-flavored, fruit-based, and diluted soft drinks are the most popular types.

Soft drinks are a mainstay in many contemporary diets across the world because they provide hydration, energy, micronutrients, an alternative to alcoholic beverages, quick thirst relief, and salt and energy replenishment. Corn syrup and refined cane sugar provide most soda calories. Carbonated soft drinks often contain too much sugar. According to the World Health Organization (WHO) Guideline 2015 on free sugars, one can of sugar-sweetened soda contains around the maximum 25-50 grams per day. Limiting sweets, especially sugary beverages, may help people lose weight and avoid obesity.

The Global Soft Drinks report-2008 reported 552 billion liters of soft drinks consumed in 2007, or 82.5 liters per person. This market was 36.8% carbonated soft drinks. Sugary beverage consumption has increased over the previous few decades, according to the Global Burden of Disease research.

In 2009, Sri Lankans consumed 62 million liters of carbonated soft drinks, while 82% drank sugar-sweetened soft drinks weekly or more often. By 2010, people used 11.4 gallons per year, up from 9.5 in 1997. From 1997 to 2010, low- and middle-income countries consumed 54% of worldwide soft drink consumption. Singh and colleagues estimated that sugary drinks caused 178 000 global diabetes and cardiovascular disease deaths in 2010.

The carbonated soft drink industry in Sri Lanka is one of the fastest growing, especially among the country's well-

educated youth (Sri Lankans drink 21 bottles per year, while Indians drink 5 and Pakistanis drink 17), with 62 million liters consumed annually. Sugary drink consumers may have poor diets. Soft drinkers may want junk food. The study investigated how soft drinks could harm healthy people.

2. METHODOLOGY

Information on the soft drinks was collected from several sources, including the World Health Organization, scholarly journals, and the internet.

3. LITERATURE REVIEW

3.1. History

Any liquid manufactured specifically for human consumption is a beverage. Human culture values beverages. In the 17th century, the first Western soft drinks were honey-sweetened water and lemon juice. In 1676, Paris' Compagnie de Limonadiers won soft drink dominance. Late 18th-century scientists made progress replicating naturally carbonated mineral waters. Joseph Priestley invented carbonated water in 1767. Manchester pharmacist Thomas Henry was the first to offer medicinal artificial mineral water in the 1770s. "Impregnating Water with Fixed Air" was his 1772 essay. Late 18th-century Swedish scientist Jöns Jacob Berzelius pioneered flavoring carbonated water with spices, juices, and wine. In 1783, Geneva's Schweppes Company started selling carbonated water.

Philadelphia and New York merchants sold carbonated water in the early 19th century. US temperance advocates also promoted mineral water, both natural and artificial. In the 1830s, New York City's John Matthews and Philadelphia's John Lippincott mass-produced soda fountains.

British refreshment kiosks began selling carbonated lemonade in 1833, while R. White's Lemonade debuted in 1845.

A drugstore owner in Lisbon Falls, USA, invented the first commercial soft drink, "Moxie," in 1884. Coca-Cola and Pepsi-Cola followed with almost identical products. Over the last century, soft drinks have grown from being sold in pharmacies to a \$60 billion worldwide industry producing 1

billion liters. Production and marketing innovations caused these changes. In 1892, William Painter invented the "Crown Cork Bottle Seal" to preserve carbonation.

Early 20th century bottled soda sales soared. In the late 20th century, canned soft drinks gained market share. In the 1920s, soda machines were popular. In 2000, Americans consumed more than 600 (8-oz or 240 mL) carbonated soft drinks per year, up from 90 in 1942.

Bottle and contents grew. Pre-1950s soft drink bottles were 6.5 ounces. In the 1950s, soft drink manufacturers experimented with larger containers, and by 1960, the 12-ounce can was ubiquitous in grocery stores. Early 1990s plastic bottles were 20 ounces. Contour-shaped plastic bottles now hold 1 liter.

3.2 Health hazards of soft drinks

Soft drinks include harmful substances such carbonated water, high-fructose corn syrup (sugar), aspartame, sodium benzoate, phosphoric acid, citric acid, and caffeine. Sugary beverages are the major reason Americans eat so much sugar daily. A 12-ounce Coke has 140–150 calories and 35–37.5 grams of sugar. SSB intake is linked to obesity, diabetes, CHD, and other NCDs with cardiometabolic mortality.

Caffeine activates the brain's reticular activating system in carbonated beverages. Coffee overconsumption causes sleeplessness, anxiety, and psychomotor agitation. Sugar and caffeine diuretic. Caffeine diuretics increase urination. The kidneys are losing water to flush out additional sugar from the high sugar intake. Caffeinated sodas increase thirst.

Aspartame is the most toxic artificial sweetener, over 200 times sweeter than table sugar, and has over 92 health risks. Methanol, phenylalanine, and aspartic acid make aspartame. Aspartame causes insomnia, headaches, epileptic episodes, neurotoxicity, and memory loss. These chemicals become harmful when accumulated. After consumption, it produces carcinogens formaldehyde and formic acid.

Sodium benzoate may induce DNA damage and hyperactivity, according to Sheffield researchers.

Los Angeles, Philadelphia, and Miami school systems have banned or highly limited soft drink sales. California banned school soda sales in 2005.

The high concentration of sugar and acids, which may cause dental caries and tooth destruction, may raise the risk of type 2 diabetes and obesity. Sugary soft drinks' detrimental effects on oral health and general health have been mitigated by manufacturers and governments. Schools might ban soft drink sales, control advertising, change ingredients, and tax sugary beverages.

Scientists have found several ways soft drinks may affect health. The next sections expand on these themes.

3.2.1 Obesity and weight-related diseases

Obesity has become a global health problem in recent years. The World Health Organization and Scientific Advisory Committee on Nutrition recommend limiting free sugars to 5% of total energy. The obesity epidemic may be linked to sugary soft drink consumption. Sugary soft drinks have contributed to certain populations' rising weights and calorie consumption. Obesity may cost individuals, families, and the healthcare system. This doubles the risk of type 2 diabetes, cardiovascular disease, and early mortality.

Sugary beverages are a major cause of obesity. A typical 20-ounce beverage has 240 calories and 15–18 teaspoons of sugar. 64-ounce fountain colas may have 700 calories. Consuming this "liquid candy" does not make people feel full or lower their meal consumption. Most people don't realize that drinks include calories. If you drink one 330 ml sugary beverage a day, you'll gain almost 1 pound every month.

According to many studies, each can of soda increases obesity risk by 1.6. A high-quality study found that reducing sugar-sweetened drink consumption helped obese teenagers lose weight. Sugar-sweetened and sugar-free drinks were compared to children's body weight during 18 months. 641, generally normal-weight youngsters were randomly assigned 250 ml (8 oz) daily portions of a sugar-free, artificially sweetened beverage (sugar-free group) or an equivalent sugar-containing beverage (sugar group) delivering 104 kcal. The research found that replacing sugary beverages with zero-calorie ones helped healthy children lose weight and fat.

Even individuals with a genetic predisposition to fat had higher BMIs if they drank sugary drinks, according to a 33,097-person study. Reducing sugary drink intake may prevent genetic obesity. However, sugary drinks may exacerbate inherited obesity.

3.2.2 Diabetes

Weight and obesity are risk factors for several chronic diseases, including diabetes, cardiovascular disease, and cancer. Type 2 diabetes mellitus, a global public health issue, has increased rapidly with obesity due to soft drink use.

Prospective evidence for metabolic syndrome and type 2 diabetes mellitus is the strongest link between soft drink usage and health. One 8-year study of 91249 women indicated that those who drank one or more soft drinks per day were twice as likely to develop diabetes mellitus as those who drank less than one per month.

Diabetes is linked to all weight gain. Soda increases weight and strains sugar metabolism. In 1980, 6.6 million Americans had type 2 diabetes; in 2010, 20.8 million had.

3.2.3 Effect on dental health

Carbonated SDs have been shown to harm dental health because to their acidity and low calcium and fluoride content. Soft drinks include carbonic, phosphoric, malic, and citric acids, all of which destroy the environment. Acidic sodas cause tooth decay.

Scientists say fizzy drinks may triple cavity rates. Studies have connected soft drink usage to tooth cavities. Soda is worse for teeth than sweets because of its acidity. Children with dental caries are more likely to consume soft drinks between meals.

Dental caries, a complicated disease, may be prevented by saliva flow, composition, fluoride exposure, sugar consumption, and excellent oral hygiene. Tooth erosion, a rising issue in many cultures, is affected by solution mineral concentration, titratable acidity, and pH. The oral environment and soft drink may affect tooth tissue solubility. Mouth pH below 5.5 degrades enamel. Most soft drinks (excluding bottled waters) have a pH of 2.5 to 3.5, while carbonated beverages and fruit juices average 3.44.

A 350-ml can of ordinary carbonated soft drink has 40 grams of sugar, making it cariogenic. Acidic drinks may erode the protective mineral coating of your teeth, making them more susceptible to cavities and tooth sensitivity. Severe tooth surface loss (TSL) from dental erosion may cause tooth sensitivity, eating and drinking problems, and aesthetic dissatisfaction in children and adults.

3.2.4 Behavioral aggression

Sugary beverages were a major behavioral risk factor for the 1990–2016 increase in global attributable fatalities and DALYs. Increased teenage carbonated soft drink use has been related to aggression, depression, and suicide.

High quantities of coffee may cause anxiety, restlessness, aggression, headaches, and sadness in healthy people. Regular 500–600 milligram (mg) caffeine overdose may produce anxiety, nausea, vomiting, seizures, and cardiovascular issues.

Suglia S. F., et al. (2013) linked young children's soft drink use to aggression, withdrawal, and focus problems. Twenty U.S. communities examined 3,000 five-year-olds. After adjusting for mother sadness, paternal jail, and domestic violence, soft drink intake was still linked to aggression. They also discovered that youngsters who drank four or more soft drinks daily were more likely to quarrel, harm property, and attack others.

Solnick S. J. and Hemenway D. (2014) used the Youth Risk Behavior Survey to examine the relationship between soft drink consumption and violent, depressive, and suicidal behavior in US teens. They found that drinking more soft drinks is connected to fighting, despair, and suicide attempts.

3.2.5 Soft drinks related to bone density and bone loss

High soft drink consumption reduces milk consumption, which lowers calcium and magnesium intake and increases osteoporosis and fracture risk. Phosphoric acid imbalances the calcium-phosphorus ratio and the body's acid-base, which may lead to poor bone density, osteoporosis, and fractures. Fung T.T., et al. (2014) discovered that postmenopausal women who consumed more soda had a greater risk of hip fracture.

Soft drinks, especially those without calcium, increase the risk of osteoporosis. Poor bone calcification is linked to children's soda use. In the 1950s, youngsters drank three glasses of milk for each soda or juice. Three sodas and one milk today. Osteoporosis threatens 44 million Americans' health. Other experts believe that colas' acidity encourages calcium loss, weakening bones. Most experts believe that soda replacing milk is the real issue.

One study revealed that lowering SD intake by 4 ounces increased milk consumption by 1 ounce per day.

Soda is especially harmful to children's bones. A cross-sectional observational research (n=1335) of 12–15-year-old boys and girls found that higher carbonated soft drink consumption was related with decreased bone mineral density. Soda intake is negatively connected to milk consumption, which is inversely related to vitamin D, B6, B12, calcium, protein, and other micronutrients, according to 88 studies. Colas and other sugary beverages dilute calcium and may cause bone loss due to phosphorus.

3.2.6 Kidney stones

Sugar-sweetened sodas increase kidney stone risk due to their acidity, radical mineral imbalances, and fructose content, which increases calcium, oxalate, and uric acid excretion. Calcium from bones neutralizes soft drink acidity. Two or more phosphoric acid-rich colas per day raise the risk of kidney stones and chronic renal disease.

Shuster J. et al. (1992) evaluated the risk of renal stones in 1009 men aged 18–75 who drank 160 ml of soft drinks daily. Half eschewed carbonated drinks, while the other half recorded their soft drink use. Males who quit soft drinks had a 6.4% higher chance of a three-year kidney stone-free period.

3.2.7 Soft Drink Consumption and Energy Intake

Several studies have demonstrated that soft drinks may increase calorie intake above what could be explained by their consumption due to their high glycemic index.

3.2.8 Soft Drink Consumption and Milk and Calcium Intake

Most sugary soda calories are useless. Soft drink usage was linked to poor milk, dairy, calcium, fruit, and dietary fiber intake, which worsened diets.

Many studies relate soft drink use to poor milk and calcium intake. Calcium, especially from dairy products, maintains bone health and density throughout life. L. R. Vartanian et al. (2007) found that consuming less soda leads to 0.25 ounces more milk per day. In other words, the same study showed that calcium intake was negatively associated to soft drink consumption, indicating that reducing soft drink consumption by one 16-ounce serving per day would increase milk consumption by 4 oz. Two other studies by Whiting S.J., et al. (2001) and McGartland C., et al. (2003) found that teenage girls with high carbonated soft drink consumption had reduced bone mineral density.

3.2.9 Soft drinks associated with asthma and COPD

Shi Z. et al. (2012) and Al Ibrahim A. et al. (2019) found that soft drink drinkers were more likely to have asthma and COPD.

3.2.10 Increased hypertension and Heart burn

Experts say fructose, particularly in fizzy drinks, raises blood pressure. acid reflux.

3.2.11 Heart attack

Fung T.T., et al. (2009) studied over 90,000 women and found that those who drank more than two sugary drinks daily had a 40% higher risk of heart attack or death from heart disease than those who seldom did. De Koning L., et al. (2012) observed that men who consumed one can of sugary beverage per day were 20% more likely to suffer a heart attack or die from one.

3.2.12 Effect on reproduction

CSDs hinder reproduction, study shows. Long-term treatment of coca-cola and pepsi-cola lowered ovarian weights, hindered ovarian cortex thickness, and altered follicle and oocyte development in 150 female non-cycle mice.

3.2.13 Harmful Effects on Liver

Excessive soft drink usage is linked to liver cirrhosis, similar to chronic alcoholics.

3.2.14 Soft drink consumption and gout

In a 22-year study of 80,000 women, Choi H.K., et al. (2010) found that women who consumed one can of sugary drinks per day had a 75% higher risk of gout. In a 12-year study of 46 393 men, Choi H. K. and Curhan G. (2008) discovered that men who consumed these drinks more often were more likely to acquire gout.

3.2.15 Cell damage

SDC-exposed Wistar rats had oxidative stress, metabolic problems, and gene expression changes. Oxidative stress is a major contributor to aging and chronic diseases. Free radicals and ROS may damage cellular lipids and induce peroxidation.

Sugary drinks raise overall and breast cancer risk. In bone marrow cells of Wistar rats, Düsman e., et al. (2013) found that cola and grape-flavored soft drinks were cytotoxic and mutagenic.

3.2.16 Sleep pattern

Soft drink and other liquid users skew young. Students' sleep patterns and quality suffer. According to Chaput J. P., et al. (2018), frequent use of soft drinks and other liquids is linked to earlier bedtimes and lower sleep duration in children.

3.2.17 Attention deficit Hyperactivity disorder

30% of kids' sugar comes from fizzy drinks. Sodium benzoate preserves many foods and beverages. Soda and fruit juice increase ADD risk in kids. Mice were tested for neurotoxicity from sodium benzoate at various concentrations. Sodium benzoate significantly decreased glutathione (GSH) and elevated malondialdehyde (MDA) in the brain, impairing memory and motor coordination. These findings show that short-term sodium benzoate exposure might produce brain oxidative stress and memory impairment in mice.

3.2.18 Use as a Pesticides

Coca-Cola has been tested against oil stain, paint, and tile grout cleaners. The Center for Science and the Environment

(CSE), one of India's leading voluntary agencies, analyzed samples from 12 soft-drink manufacturers in 2003 and found that all of them contained residues of 4 toxic pesticides and insecticides, which farmers have used due to their low cost compared to conventional pesticide brands.

4. CONCLUSION

The results suggest that soft drinks in general pose a health risk to humans and should be avoided for the sake of future generations.

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