

Investigating the effect of consuming soft drinks on the liver and kidney functions of a sample from the Iraqi community

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ABSTRACT: The study was conducted on a group of people who drink a lot of soft drinks (Cola, Pepsi) and coffee. It included 90 people, 30 people for each type of drink consumed, distributed equally between males and females, and a control group of 30 people who do not drink these drinks, and they are also distributed between males and females.

Blood samples were collected from students and laboratory analyzes were conducted to determine the effect of these drinks on liver function (Aspartate aminotransferase AST, Alanine amino transferase ALT, Alanine amino transferase ALP) and kidney (Serum Creatinine, Serum Urea). The results showed a significant ($P < 0.05$) increase in the liver enzymes of the students who consumed cola and Pepsi. It was AST (126.6 ± 0.523 U/I, 123.73 ± 0.83), ALT (U/I 73.3 ± 0.72 , 78.67 ± 0.7), and ALP (U/I) 201.8 ± 1.33 , 191.07 ± 0.35), respectively, compared with the control group (U/I 118.92 ± 1.08 , 54.9 ± 0.525 , 156.93 ± 1.77), respectively, and there were no significant differences ($P < 0.05$) in the value of cove intake for the three enzymes. under study compared with the control group. As for the value of urea and creatinine analyzes, it showed a significant increase ($P < 0.05$) in the urea value of the sample of cola and Pepsi drinkers, it was (mg/dl 37.13 ± 0.36 , 35.37 ± 0.51) compared with the control group (31 mg/dl). ± 0.39), and the results showed a significant increase ($P < 0.05$) in the value of glucose analysis for students who consumed cola and Pepsi, as it was (148.8 ± 1.57 mg/dl, 154.67 ± 0.89), respectively, compared with the control group, which was (126.3 ± 0.88 mg/dl). . We conclude that consuming soft drinks in excess affects high blood sugar, liver and kidney functions, and this negatively affects other vital activities in the body.

Keywords: Healthcare, soft drinks, sugar test, liver function, kidney function.

1. INTRODUCTION

Today, soft drinks have become one of the requirements of daily life, and the demand for them has become abundant due to the advertising and promotion of them, in addition to the industrial style of them, which makes them sweet in taste, palatable, and acceptable to many people, and the fact that their prices are appropriate and available to most of those who drink them. It has been noticed recently. The high demand for eating it and in different age groups and companies are quick to use unhealthy methods with the aim of making financial profit through them.

Soft drinks contain colored carbonic substances as well as a caffeine flavor. Sucrose is the main sweetening agent, which is a disaccharide that contains equal parts of the monosaccharide fructose and glucose [1, 2]. The presence of these compounds in drinks made them one of the causes of many diseases, and there are many studies that indicate this,

including a new study conducted by researchers from the American Tufts University, and published in the American Journal of Hepatology, that excessive soda consumption causes liver diseases as a result The accumulation of fat on it and in its cells, and the study included 2634 men and women, who were recording their daily consumption rates of soft drinks, and whether they contain caffeine or without, and using a CT scan that all participants in the study were subjected to, the amount of fat on the liver was examined, and it was found that Daily soda consumers have a 55 percent greater risk of developing fat in the liver, as well as in the accumulation of fat in liver cells. The consumption of soft drinks is associated with many diseases, including obesity, type 2 diabetes, osteoporosis, as well as tooth decay, and it has been shown to increase the risk of developing Metabolic syndrome [3]. These drinks also cause heart and blood vessel diseases [4]. It also affects kidney efficiency and increases the risk of kidney stones [5].

In addition to causing and delaying bone formation and fracture, it affects blood serum, urinary urination, and calcium metabolism, causing hypocalcemia [6]. A study was conducted on 40,000 men and it was found that those who drank an average of one sugary soft drink per day had a 20% higher risk of heart attack, death, or a heart attack than men who rarely consumed sugary drinks [7]. Soft drinks consist of carbohydrates, water, phosphorus, caffeine and sugar in the form of sucrose and some other chemicals in the form of preservatives and some flavorings and colorings [8]. Some of them are free of it and its main slogan is known as Diet Cola. Diet cola consists of carbonated water, caramel color, sucralose, phosphoric acid, potassium benzoate, caffeine, citric acid, natural flavor. Despite concerns about the compounds used in the production of these drinks, it was deliberately Manufacturers use an alternative sweetener, aspartame [9].

Pointed out [10] that soft drinks cause gout and cancers, as these high sugar-sweetened drinks increase the risk of developing this disease, and carbonated water may infect the body with many types of cancers because it contains sodium benzoate and cyclohexane artificial sweeteners and other harmful substances, the reason for the reduction of mineral metabolism is the intake of large amounts of phosphate as exogenous phosphate, which inhibits renal enzyme, hyduoxylase, and reduces the formation of vitamin D.

Soft drinks are the main cause of high sugar, as there are indications that the consumption of soft drinks containing sugar is linked to obesity, because it contains a high percentage of fructose. Soft drinks consist mainly of pure water, artificial additives and refined sugar, and this means that the nutritional value in them is non-existent and the calories increase through the percentage of refined sugar present in them, so they lead to weight gain, and sugar-free soft drinks (diet In fact, they contain aspartame, an artificial sweetener that is low in calories. Although aspartame does not contain high calories, it makes a person feel hungry and crave food [11]. As for coffee, it is a drink made from roasted coffee seeds, and it grows in more than 70 countries, and it is said that green coffee is the second most traded commodity in the world after crude oil, and coffee is a drink that is commonly consumed all over the world, in the United States more than 50% of Americans consume coffee on a daily basis [12].

Because it contains caffeine, coffee can have a stimulating effect on humans, and today coffee is considered one of the most widespread and popular drinks all over the world [13]. Coffee is made from the coffee tree, which is an evergreen tree with red-colored fruits when ripe, and contains ingredients that may be harmful to health, such as caffeine. However, one of the latest scientific researches indicated a decrease in the percentage of people with type 2 diabetes among those who drink coffee, especially coffee without coffee, and caffeine [14]. As for coffee, its effects on health vary between positive and negative effects, and based on the data currently available, there is not enough evidence to encourage coffee consumption or to encourage abstinence from it, Genetic factors, sex, age and environmental factors [15].

Studies show that consumption of up to 400 mg of caffeine is safe for most adults [16]. Moreover, coffee consumption is associated with lower mortality.

Population studies in Italy, Japan and the United States [17] reported an inverse relationship between coffee consumption and serum alanine levels, and in a study of 2000 patients aged 65 years, it was noted that ALT values were 10% lower in those who drank three or more cups per day [18] . Some studies have also found a statistically significant decrease in the risk of dying from liver cancer in people who drink one cup or more of coffee per day.

Drinking coffee [19] was also associated with a strong inverse relationship with the incidence of cirrhosis. Drinking coffee is also associated with a lower risk of oral [20] and pharyngeal cancer [21] and liver cancer. As for the damage caused by coffee, it reduces the absorption of iron [21-33].

Mother drinking coffee may contribute to iron deficiency anemia in her and her infant. Coffee also hinders the absorption of some drugs, for example, coffee can reduce 60% of the absorption of the drug alendronate, which is used to treat osteoporosis. It also hinders the absorption of levothyroxine, which is used in the treatment of hypothyroidism. Therefore, the study aimed to identify the effects of consuming soft drinks frequently on the health of the human body in general, and to try to show the negative effects on the various functions of the body.

Table 1. - An example of a table

An example of a column heading	Column A (t)	Column B (t)
And an entry	1	2
And another entry	3	4
And another entry	5	6

2. MATERIALS AND METHOD

2.1. SAMPLE COLLECTION

120 blood samples were collected from people (males and females) who drink soft drinks on a daily basis, as 10 ml of venous blood was drawn from people who drank soft drinks, coffee and other people as a control group. It was placed in white plastic tubes and left at room temperature for (30) minutes until the blood coagulated, then it was centrifuged at a speed of (3500) rpm for (15) minutes to obtain serum, which was placed in clean plastic tubes. It is tightly closed and kept in the freezer at a temperature of (-20) °C until it is used to conduct biochemical tests.

2.2. BIOCHEMICAL TESTS

1. Estimation of the activity of AST, ALP and ALT transaminase enzyme in blood serum.

The enzyme was estimated in blood serum according to what is reliable from the manufacturer, RANDOX, of UK origin, and according to the following equation:

$$\text{Concentration of AST (U/L)} = \text{A sample} / \text{A standard} * \text{C standard}$$

where C. standard: represents the standard enzyme concentration, A: represents the absorbance

2. The concentration of creatine, glucose and urea in blood serum was estimated according to what is reliable from the manufacturer Linear Chemicals, originating in Spain, and according to the following equations, respectively:

$$\text{Creatinine C. (mg/dl)} = (\text{A2} - \text{A1}) \text{ Sample} / (\text{A2} - \text{A1}) \text{ Standard} * \text{C. Standard}$$

where C. standard: represents the standard enzyme concentration

$$\text{Concentration of Glucose (mg/dL)} = \text{A sample} / \text{A standard} * \text{C standard}$$

where C. standard: represents the standard enzyme concentration, A: represents the absorbance

$$\text{Urea (mg/dl)} = (\text{A sample} / \text{A standard}) \times \text{Standard Concentration}$$

3.2. STATISTICAL ANALYSES

Statistical analysis was conducted for all the studied samples using the SPSS statistical program, where the ANOVA test was conducted to determine the significant differences between the studied treatments, and the Tukey's range test for individual comparisons between the averages of each treatment and another, and the differences were considered statistically significant and significant if they were ($P < 0.05$).

3. RESULTS AND DISCUSSION

In this study, the effect of soft drinks and coffee on various body functions, especially on liver and kidney functions, was identified by knowing the levels of some substances in the body, as shown in Figure 1, where the results showed that there were no significant differences for all control samples in relation to the analyzes that were conducted on them. The study showed that samples collected from addicts to cola coca drink found a significant increase in their serum compared to control samples for ALT enzyme (126.6 ± 0.01) mg/dl and the same was true for Urea (37.13 ± 0.36) mg/dl, Glucose (148.8 ± 1.57) mg/dl. As for creatinine, there was no significant increase in it (0.4080 ± 0.0224) mg/dl.

As for those who drank soft drinks from Pepsi, there was also a significant increase in GOT, GPT, and ALP (123.73 ± 0.83 , 154.67 ± 0.89 , 191.07 ± 0.35) U/l, respectively, and Urea, Glucose was (78.67 ± 0.7 , and 35.37 ± 0.51) mg/dl, respectively. As for creatinine, there was no significant increase in it as well (0.4233 ± 0.0187) mg/dl. As for coffee, the percentages did not increase in all samples taken, respectively.

Twenty-four female albino rats (*Rattus norvegicus*) were randomly assigned to six groups of four animals: two control groups (groups 1-2) were fed regular pellets and one group Coca-Cola (groups 3-4) were fed a standard diet of pellets and were given (2 ml Coca Cola) once a day; the seven groups (groups 5-6) were fed the standard pellet regimen and given seven doses (2 ml) once a day and treatment continued for two weeks and four months All treatments are given by mouth, using the cardiac puncture technique to take blood samples after 2 weeks and 3 months to measure liver function tests, malondialdehyde (MDA), glutathione (GSH), and lipid profile, in addition to the histological study of liver tissue. ALT, AST, and ALP activity were significantly elevated in the animals. who drank doses of Coca Cola and Seven up daily for 4 months. The results show an increase in ALT, AST indicating that liver function is impaired

and these effects can be traced back to the effect of the sugars, acids, caramel and caffeine found in the SD soda of these drinks., agree. Our results are in line with another study they found that ingesting SD causes liver injury and thus increased liver enzyme activity (ALT and AST activity).

Soft drinks cause severe damage to the liver, which is followed by an increase in AST, AL T, and recent reports have shown that heavy soft drinks are associated with low calcium, changes in liver enzymes, and cirrhosis. The high level of ALP indicates the possibility of gallstones, as indicated that ALP is present in the tissues of the bile duct, so any obstruction to the access of bile juice from the liver to the gallbladder occurs as a result of the formation of gallstones due to the increase of this enzyme, as shown in the Figure 1.

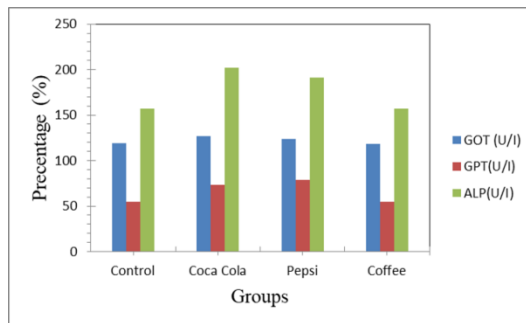


FIGURE 1. - The effect of consuming soft drinks and coffee on liver function for students of the Department of Life Sciences

As it was found from the high glucose in this study, it was found to have a close relationship with diabetes, and the consumption of soft drinks may affect insulin resistance, the metabolism of fats and carbohydrates, and the change in hepatic fat, and thus an increase in the level of insulin in the body.

Consuming large amounts of sugar in the body leads to an increase in blood sugar levels. In addition, many drinks contain high-fructose corn syrup as the main sugar component, which in turn may harm the pancreas and lead to fluctuating blood sugar levels, as these work Alcohol causes type 2 diabetes. As for the high level of urea, it indicates an imbalance in kidney function. The higher the percentage of drinking soft drinks, the greater the chance of developing kidney disease, because it contains a high percentage of phosphorous acid that changes the composition of urine. It also harms the internal organs of the human body, as it is the cause of chronic kidney disease. Studies have shown that the consumption of soft drinks delays the elimination of Methotrexate, which is a major cause of acute renal failure.

The increase in Alkaline phosphatase is an indicator of bone diseases and its increased levels are due to the presence of caffeine in soft drinks, as soft drinks contain phosphoric acid, which is a highly toxic acid and interacts with oxidized blood. Phosphoric acid is usually used in manufacturing industries to produce water

When pure water is produced, calcium, magnesium and ions are removed from hard water. The same applies to the human body, where this acid removes bone calcium, which causes fragility as shown in Figure 2

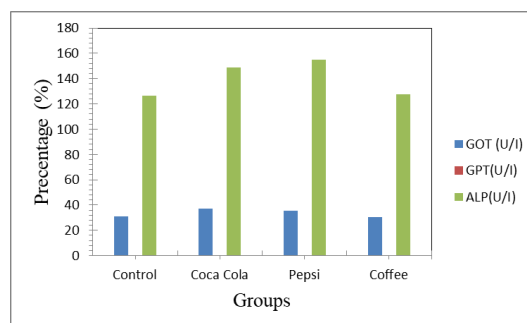


FIGURE 2. - The effect of consuming soft drinks and coffee on kidney function and the level of sugar for students of the Department of Life Sciences

4. CONCLUSION

Through the results, it was found that there is an effect of these drinks on liver functions through the increase in the values of its enzymes, and a clear effect on health in general, and the increase in the value of urea among students of the Department of Life Sciences compared with the control group, and there were no significant differences in the value of creatinine for students who drank soft drinks. We recommend that we should focus on conducting other analyzes to clarify the effect of soft drinks, avoid consuming soft drinks of all kinds, limit the manufacture of these drinks, find alternatives to them, and impose strict control on the manufacturers of them.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest

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