



**NEGATIVE CONSEQUENCES IN THE CARDIOVASCULAR SYSTEM  
UNDER THE INFLUENCE OF ENERGY DRINKS**

<sup>1</sup> To'xtayeva N. X.

<sup>2</sup> Bolqiyev S. A.

<sup>3</sup> Eshbekova L. SH.

<sup>4</sup> Hamdamov A.I.

<sup>5</sup> Nazirov N. R

1. TTA 2-sonli ichki kasalliklar propedevtikasi kafedrasining dotsenti,  
t.f.d nigora321@mail.com , +998901281831
2. TTA davolash fakulteti talabasi, samandar.  
balqiyev@gmail.com, +998941910107
3. TTA davolash fakulteti talabasi,  
eshbekovalobar14@gmail.com, +998883250819
4. TTA davolash fakulteti talabasi,  
hamdamovahr07@gmail.com, +998945274642
5. TTA davolash fakulteti talabasi,  
dr\_muhammad98@mail.ru ,+998978137813

**ABSTRACT**

This article details the effect of one of the most popular non-alcoholic beverages on the functioning mechanism of the heart, muscle contraction power, pulse, blood composition. Due to an increase in energy drink consumption over the past decade, the number of energy drinks consumers has also increased significantly among those who turn to emergency calls. That is, an increase in the number of drinking poisoning, arrhythmia, blood pressure and heart rate occurs. We did research among our peers in order to track these effects.

**KEYWORDS**

Energy drinks, caffeine, taurine, Cardiovascular Effects Arrhythmia, adrenaline, Baum and Weiss Research, Sugar, Insulin, Red Bull.

**Introduction**

(Matthew 24:14; 28:19, 20) Today, the consumption of energy drinks (EI) has increased dramatically around the world. Today, we can also see a sharp increase in the consumption of energy drinks (EI) in the country. We know that consuming more than normal energy drinks is harmful to human health. We conducted patient examinations in the cardiology and cardiovascular departments of the Tashkent Medical Academy multidisciplinary central clinic. In the screening work, we divided 35 patients with heart arrhythmia and myocardial infarction into patients younger than 40 and older than 40 by age range. We found that 6 of the separated patients had myocardial infarction and 2 had heart arrhythmia. When we looked at the history of the disease of these patients, we found that they consume a constant EI. We found that 6 of our patients smoke along with their EI consumption, and the other 2 patients

consume EI when they are nervous. Of the 6 patients diagnosed with myocardial infarction, we can see that 1 in 1 is female and 5 are male. So EU consumption is more pronounced in men than in women.

Energy drinks (EI) adversely affect the cardiovascular system. This adverse effect occurs at the expense of the biologically active substances contained in them. Now let's stop talking about energy drinks.

One of the most important subcategories of non-alcoholic beverages is energy drinks (EI). Indeed, the popularity of the EU has increased significantly since it was introduced around 1960 (1) and this was found to be one of the fastest growing segments in the small category beverage industry<sup>(2)</sup>. Most EIs are targeted at age categories 18 to 34, with consumption frequency of 1-4 pcs per month and approximately half of "EU users" consuming EI while engaging in or operating high levels of mental activity<sup>(3)</sup>. To date, there are many and diverse EIs on the market, with more than 200 brands in the US alone<sup>(4)</sup>. Early in the 21st century, there was an early exasperation about the safety of EIs, as they would lead to cardiovascular complications<sup>(5)</sup>, which led to trade restrictions and even bans in some European countries<sup>(6)</sup>. Although these restrictions were lifted<sup>(7)</sup>, Lithuania became the first European state to ban the sale of EI for minors.<sup>(8)</sup> Currently, the EUROPEAN Union considers banning the sale of EI for a layer of people younger than 18. There are no studies on the sale, purchase and consumption of energy drinks in Central Asia, especially in Uzbekistan. This can lead to various negative consequences in the future.

## **The overall impact of energy drinks on hemodynamics**

In young and healthy people, the consumption of EIs showed that 29% of people had neurological changes, and 52% of people had cardio-and cerebrovascular changes. Recent studies have confirmed that consuming 1 box of sugar-supplied EI (355 ml of drinking volume) can lead to an increase in workload to the heart, which is confirmed by increased blood pressure and heart rate. Acceptance of EI did not lead to a deterioration in microvascular endothelial function in response to acetylcholine, indicating that at least a violation of endothelial function in the microvasculature was incorrect to take into account the effects of EI on blood pressure-raising<sup>(9)</sup>. This study's interesting and seemingly novel finding is that EIs decreased brain blood flow rate and increased blood flow in the brain, or cerebrovascular resistance. This process can partly be explained by an increase in respiratory frequency.<sup>(9)</sup>

## **Effects of Caffeine**

The main concern about the use of EIs is with the potential effects of their content on caffeine and blood pressure. Caffeine, the main active metabolite in EIs, activates the sympathetic nervous system and acts as an antagonist of the adenosin neuromodulator<sup>(11)</sup>. Since adenosine functions are mostly inhibitory, caffeine stimulates and exacerbates the sympathetic effects resulting in increased blood pressure<sup>(12)</sup>. This is due to the fact that caffeine blocks the enzyme phosphodiesterase, which breaks down sAMF and causes it to accumulate in cells. sAMF is a secondary transmitter through which various physiologically active substances are performed primarily adrenergic effects. Thus, the accumulation of sAMF results in a similar effect to adrenaline. Caffeine has an effect on other organs and systems along with the heart. There are both beneficial and harmful aspects of caffeine to the body.

**Beneficial effects of caffeine.** Caffeine is a natural refreshing agent that can be obtained from various sources. Some of the benefits of caffeine include: Stimulating effects: Due to the refreshing effects of caffeine on the brain, a person may feel more refreshing and energetic. Therefore, people prefer to consume caffeine. Increased concentration: Caffeine increases focus and memory by producing chemicals that enhance brain activity.

**Harmful effects of caffeine.** Excessive caffeine intake can create different approach effects in most people. These are sleep problems: Caffeine can cause insomnia by blocking sleep signals in the brain. Consuming large amounts of caffeine before bedtime can lead to insomnia and poor sleep. Irritability and anxiety: Caffeine has a refreshing effect on the nervous system and can show signs of irritability and anxiety when overfeeding. Boosting heart rate: It can increase the risk of heart attacks by increasing the rate of heart rate due to the effects of caffeine on adrenaline. Caffeine increases blood pressure and can cause high blood pressure. Diarrhea: Caffeine can increase the risk of diarrhea by stimulating the intestines. Thirst: Caffeine can cause thirst by boosting the release of water from the body.

## Daily Caffeine Content

The amount of caffeine intake per day can vary depending on a person's age, gender, weight, state of health and resistance to caffeine. However, the maximum milk caffeine consumption for normally healthy adults is 400 milligrams. The amount is about 4 cups of coffee or 10 cups of tea.

Pregnant women usually need to consume less than 200 milligrams of caffeine per day. The amount of caffeine consumed by children and adolescents may vary depending on their age and weight.

## Taurinning 2015

Taurin is a sulfokislota produced by cysteine amino acids in the body. Taurine is often called sulfur-containing amino acids, and the molecule does not have a carboxyl group. It has a small amount in the tissues and bile of animals and humans. It is used as a food supplement or as a medicine. Derived from the Latin word taurus (bull), because it was first obtained from bull bile by German scientists Friedrich Tiedemann and Leopold Gmelin in 1827. Taurin is part of saffron acids (taurochol, taurodeoxychol), which contribute to the emulsion of fats in the intestines, and improves energy and metabolic processes. In the central nervous system, it acts as an inhibitory neurotransmitter. 100 mg of caffeine and 1,000 mg of taurine did not change the average arterial blood pressure in 45 minutes after consuming, but increased blood pressure after 70 minutes of memory testing after constant intake. The Baum and Weiss study (10), which compared the effects of 500 ml Of Red Bull EI on taurinated or taurine-free heart rate and stroke volumes to heart rate before and after exercise, showed that the EI had significantly improved the contractibility of the left atrium. Post-exercise recovery period. The fact that this heart effect, which leads to an increase in vascular volume, was not observed with non-caffeine drinks, and the authors stated that taurine alone or in combination with caffeine was responsible for an increase in the stroke volume (10). Taurine-added substances (caffeine, drugs) have been found to pass through the hemato-encephachaly barrier without difficulty. It was also found that taurine deficiency was associated with decreased sensitivity of the heart muscle to  $Ca^{2+}$  and decreased organ inotropic ability [13]. Increases the physical performance by improving blood supply to the remaining organs, in particular the musculatum system. Interestingly, the concentration of

taurine in the left ventricle muscles of patients who died from chronic heart failure was found to be higher than in patients who had died for other reasons and did not have heart pathology<sup>[14]</sup>. Taurine, in fact, may have an inotropic effect that can illuminate the negative effects of energy drinks on the cardiovascular system, the study shows.

## The effect of sugar

It can be assumed that sugar contained in the EU can affect the cardiovascular system, since eating food calories is usually accompanied by increased heart rate<sup>(15)</sup> and ventilation rates<sup>(16)</sup> of the lungs. Recently, a study of a group of scientists showed that consumption of 500 ml of water, including fructose (60 or 30 g), glucose (60 g) or sucrose (60 g), increased heart rate after 60 minutes; reducing the overall peripheral resistance of sucrose and glucose, and as a result of which the heart's blood driving was relieved, on the contrary, fructose showed the ointment to increase overall peripheral resistance<sup>(17)</sup>. In addition, they observed that changes in heart rate were time dependent, only to see significant increases after 45 minutes of consumption and the highest values in 120 minutes<sup>(18)</sup>.

## Endothelial dysfunktsiya

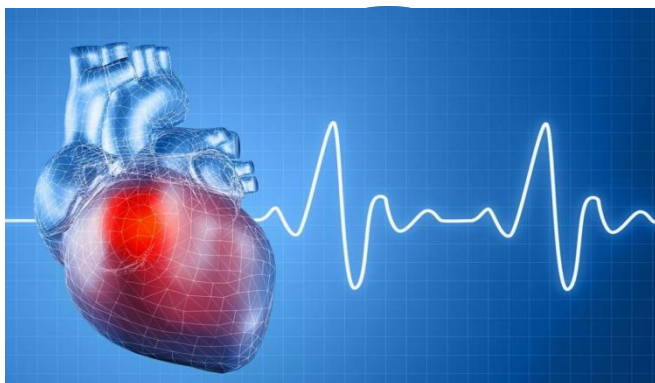
An additional explanation of the observed differential effects of fructose and glucose relative to general peripheral resistance and changes in blood pressure may be due to differences in endothelial function. Increasing blood flow of skeletal muscles is an important physiological function of insulin<sup>(19)</sup> observing impaired endothelial function in human obesity and Category 2 diabetes, both of which are cases of insulin resistance. Because of the limited release of insulin, eating fructose can lead to microvascular endothelial dysfunction, which helps increase blood pressure. One study compared the hemodynamic effects of fructose, glucose, and sucrose and did not reduce microvascular endothelial function (58) under acetylcholine mediation. Similarly, Bidwell Vs. State of Etc.<sup>G</sup> observed that the blood flow in the wrist was not lower than that of a drink containing only glucose in response to a drink containing both glucose and fructose (ratio of 45:55).

## The effects of energy drinks on heart rhythm and the causes of arrhythmia

**Arrhythmia** (Greek. *a* - denial supplement and *rythmos* - rhythm) is a violation of rhythmic activity that occurs during the normal functioning of the heart. Arrhythmias can occur in sinus bradycardia, sinus taxicardium, sinus arrhythmia, trembling arrhythmia, abdominal trembling arrhythmia, and other types. The main problem that arises is an increase in loading in the muscles as a result of an uneven heartbeat and subsequent heart failure.

Energy drinks are closely associated with the following causes of heart arrhythmia.

1. *Breakdown of the balance of electrolytes in the blood:* Energy drinks are rich in various electrolytes, such as cations such as potassium, magnesium and calcium. They can lead to a breakdown or change in the electrolyte balance, which leads to restricting normal heart movement.



2. *Changes in the amount of adrenaline and noradrenaline*: Changes in the chemical modifications inside energy drinks can lead to an increase in the level of adrenaline and noradrenaline. These hormones have a profound effect on heart function and lead to an increase in arrhythmias.

3. *Formation of cardiomyopathy*: The effects of unlimited energy drinking can lead to the formation of cardiomyopathy, which can lead to short-term heart changes and increase the risk of increasing arrhythmias.

## Summary

In a nutshell, energy consumed more than each norm is harmful to your health. Because there are no known norms for consuming energy drinks and their effects are not fully and thoroughly studied, it is recommended that you consume them in small quantities or not eat them altogether. We consider it beneficial for you to reduce your energy drink consumption due to the potential risk of developing some diseases that may be causing you, endangering your health, and your risk of contracting the aforementioned cardiovascular system diseases.

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