

Health Effect and Population Health Concerns of Energy Drink Consumption in the Youth

Sarab Dalaf Khalaf, Sheerin Farouq Shaker, Duaa. N. Abdul Hameed, SabaIzz al-din, Noor Ahmmad

Tikrit University, Collage of Science

ABSTRACT

Until the present time, little research and studies have exposed the physiological or synergistic effects of the individual amounts that are used in the manufacture of energy drinks. Moreover, the results that were reached through the experimental studies were not comprehensive and sometimes contradicted each other, as some studies showed an improvement in the state of mental attention, reaction times, and focus when consuming energy drinks. While some other studies showed no improvement compared to taking caffeine or glucose alone, one of the 14 studies showed a significant effect of a whole mixture of energy drinks compared to the effect of glucose, caffeine, and herbs alone. That the mixture led to enhanced cognition while individual ingredients did not work on it, the combination of caffeine and Taurine may work on a marked decrease in heart rate at the beginning, and in this study measured both urea, uric acid, total protein, triglycerides, cholesterol, and sugar and found an increase in all measured parameters except sugar.

Introduction:

The most important component contained in these drinks, as it was found that these drinks consist of caffeine, which increases blood viscosity and raise the percentage of fat and sugar in the blood. increases heart rate and contraction force And taurine works on the entry of water, potassium, sodium, and calcium into the cells, protecting the heart during hard exertion, and regulating the heartbeat. Glucuronolactone, which is believed to be a substance that improves memory and mental focus, as a stimulant, and relieves depression. Vitamin B, which the body needs in small amounts to produce energy

It also contains guarana, whose stimulant effect is believed to be stronger than caffeine and ginseng, which is believed to regulate sugar and cholesterol. These drinks contain sugars added to energy drinks to give them sweetness and as a source of energy, as well as phosphoric acid, which gives them a taste close to lemon.

Energy drinks are stimulants and not a source of energy, as they depend on a strong alert to the body, including the stimulant substances and herbs they contain. Energy drinks contain many substances of unknown or unclear effect, and the safety of their use has not yet been proven. Mixing the ingredients of energy drinks came in an unjustified and understandable way in terms of synergy or antagonism in terms of effect between their components, as they were added without knowing the permissible daily doses of some of them. Energy drinks affect many organs of the body directly and indirectly. One study found that within 70 minutes after consumption, the heart rate returns to normal and blood pressure increases. Similarly, taurine slows the heartbeat in the cerebral ventricular system of mice. In humans and animals, taking taurine for long periods may cause hypoglycemia.

It also increases the risk of coronary heart disease. During animal experiments, taurine was also shown to have some anticonvulsant effects, and epilepsy events. Although taurine has also been

associated with the regulation of osmotic pressure, detoxification, and bile acid excretion, caffeine stimulates renal filtration Glomerular and inhibits sodium reabsorption within the renal tubules.

Energy drinks can be consumed by an individual through a variety of sources away from water. Choosing the right fluids, the time of consumption, and the integrative tests are considered important matters for complete health, especially in young people or younger age groups. Previous studies have stated: "The daily consumption has increased to provide an indicative guide on health benefits, nutritional benefits, and risks related to classifications." The term "energy drinks" refers to those drinks that contain caffeine with some other substances such as the plant stimulant guarana, simple sugars, glucose, fructose, galactose, sucrose, and amino acids. Although the contents are not specified, the amount of energy in these drinks is reached through the well-known caffeine. The concept should not be confused with energy drinks and sports drinks such as Gatorade, which are intended to replenish electrolytes, sugars, and other nutrients, and are usually equal concentrated solutions containing the same amounts as in the human body's ⁽³⁾

Energy drinks appeared in Austria ' The year 1987 AD and the first type of it was the type that carried The sign of the two red bulls fighting each other More than 170 species have been put on the market, and the number is increasing rapidly and continuously, targeting the existing age group between (18-30) years. It spread greatly and enormously all over the world in a few years and doubled its sales by 130% in the United States alone and reached sales in 2005 to 1 - 83 billion dollars .

Energy drinks are defined as carbonated or non-carbonated drinks that contain a mixture of stimulants, sugars, and the extracts of many natural herbs, and they are classified within so-called functional foods.

It contains many components: caffeine, taurine, glucose, nolactone, and carnitine. Herbal extracts (guarana and others) Vitamins (Pantothenic) C - B complex - Niacine Sugars (glucose) or artificial sweeteners (aspartame - sorbitol etc.) phosphoric acid. Carbonated water and artificial or natural colorings and flavors may contain mineral salts, antioxidants, and many other compounds. By Commercial Product (Bonci,2002).

Energy drinks are stimulants and not a source of energy, as they depend on the intense alertness of the body, including the stimulant substances and herbs they contain. Energy drinks contain many substances of unknown or unclear effect, or the safety of their use has not been proven yet. Mixing the components of energy drinks came in an unjustified and understandable way in terms of synergy or antagonism in terms of effect between their components, and they were added without knowing the permissible daily doses of some of them. Energy drinks affect many parts of the body directly and indirectly. Energy drinks are addictive.⁽¹⁶⁾

The previous effects may often appear after consuming two packages of energy drinks, namely: high blood pressure, rapid heartbeat, and an increase in the strength of its contractions. increased blood flow to the muscles, a pale face and cold extremities. increased acidity in the stomach and irritation of its walls. An increase in blood viscosity and an increase in its osmotic pressure and PH value to become acidic, severe stimulation of the nervous system, which may lead to insomnia and high blood sugar. The occurrence of fatigue and nausea. electrolyte disorders Increased urination and dehydration^(17)Chronic abuse of energy drinks leads to addiction that reduces self-reliance and couples activity and vitality to what an energy drink can do The effects of the stimulant and the symptoms of addiction to energy drinks are similar to the symptoms of addiction to caffeine (headache - anxiety - tension insomnia - feeling the desire to drink another bottle.

In addition to the previous effects, children (less than 16 years old) show the following symptoms as a result of chronic consumption of energy drinks as a result of their high sensitivity to caffeine: Excessive movement. Lack of sleep Poor focus and irritability, Habituation and addiction (I feel like something is missing without the energy drink.) Diarrhea, heart disturbances, and bed-wetting ⁽¹⁸⁾.

Material and Methods

Perform a glucose test:

A blood sample is taken from the vein of the person whose blood sugar is being measured, then placed in a centrifuge tube and left to clot, and the device is rotated to separate the plasma so as not to affect the sugar concentration in the sample. After that, 1 mL of the prepared solution (the regulator) is added to 10 microliters of The patient's blood serum is at room temperature for ten minutes in the incubator at a temperature of 37 °C, and the colorimeter is set at a wavelength of 500 nm to read the glucose level ⁽¹⁹⁾.

Cholesterol test:

The test is performed simply by drawing a blood sample, often in the morning after a night when the patient was fasting, and then the blood sample is taken for the necessary laboratory tests, where 1 ml of the prepared solution (regulated) cholesterol analysis is placed 10 micro from the patient's blood serum at room temperature and read by the wave spectrometer at 500nm With the device set to zero(20).

Triglyceride test:

When performing a triglyceride test, the individual needs to fast from food and drink, except for water, for 9–12 hours before the test. When performing a triglyceride analysis, the laboratory specialist takes a blood sample from one of the veins in the arm using a small needle. After the needle is inserted into the vein, a small amount of blood will be collected in the test tube to be examined later, where 1 mL of the prepared solution (the regulator) is added. to 10 micro liters of the patient's blood serum at room temperature and the reading is done by a 500nm wavelength spectrometer. With the device set to zero (21)

urea test:

Performing a BUN analysis by drawing a blood sample from one of the veins in the arm of the individual using a small needle, and after inserting the needle into the vein, a small amount of blood is collected in the test tube for later analysis, whereby 1 mL of the prepared solution (the regulator) is taken. It is placed in an unused test tube in advance. We take 10 microliters of the patient's blood serum at room temperature for 5 min, and the reading is done by a 600nm wavelength spectrometer after the device is set to zero (22)

UricAcid test:

We take 1ml of the prepared solution (the regulator) and put it in an unused test tube, take 20 microliters of the patient's blood serum and put it at room temperature for 5 or 10 minutes For the interaction to take place, the reading is done by a 520nm wavelength spectrometer after the device is set to zero (23)

protein test:

The mechanism of performing a protein analysis in the blood is done by taking a blood sample from the vein of the patient by tying the patient’s hand with a rubber band, which increases the speed of blood flow in this area and thus the vein becomes more visible so that blood can be drawn from it easily. After that, the patient’s hand is sterilized in the place to be pricked with the needle, and then the needle is inserted into the patient’s vein and the tube connected to its end is filled with blood, where 1 ml of the prepared solution (organized) is placed for this examination, and 20 microliters of the patient’s blood serum is added, and the reading is done by a device spectrometer 500nm waveform is after zeroing the device (24).

Discussion results:

Estimation of glucose, cholesterol, fat, urea, uric acid, and protein levels:

The study shows a significant increase in protein, uric acid, triglycerides, and cholesterol. The effect of energy drinks on the body functions of most energy drink users compared to healthy people is shown in the following table:

groups	Glucose	cholesterol	Triglyceride	urea	Uric Acid	total protein
healthy	86.7±20.2	168.9±94.1	9.05±89.2	4.11±36.7	0.53±4.68	0.75±6.93
addicted	77.3±17.8	83.2±96.3	33.1±180.8	5.04±40.8	1.97±9.39	4.01±10.1

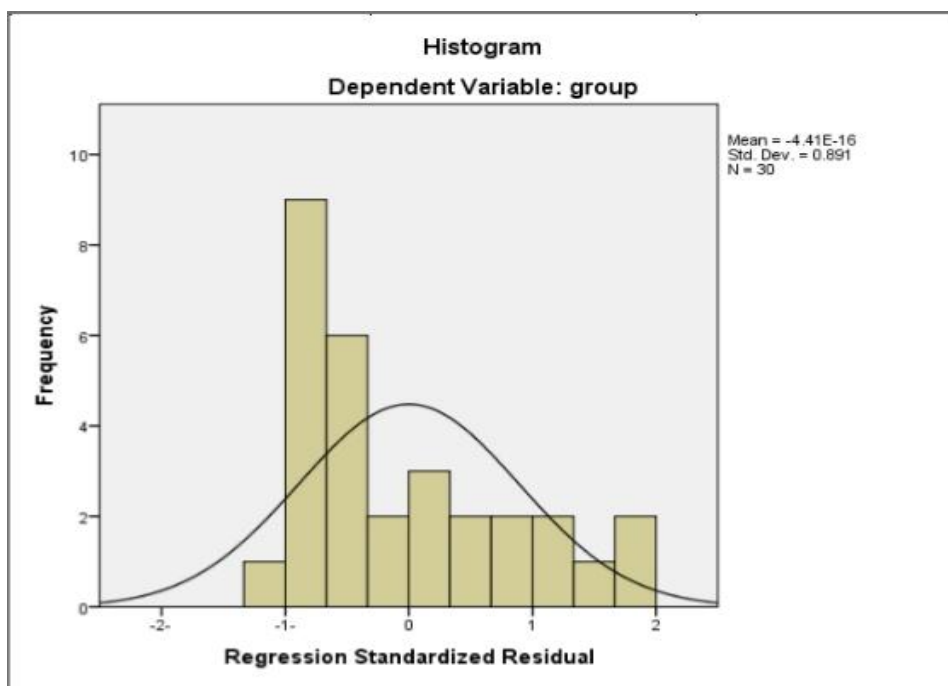


Figure (1-1) shows the increase in the studied parameters

Research indicates that there is a slight change in the level of sugar in the blood, and it was found in most addicted people, that the level of sugar is in a state of decline compared to healthy ones. This is because the taurine present in the components of the energy drink reduces the level of sugar in the blood according to the period in which he was taking it (15), The second reason is the rise in glucose in the blood, which calls for a high percentage of the hormone insulin, which transports sugar to the cells. If the amount of glucose consumed is over and the insulin is still high, it will transfer more sugar from the blood to the cells, causing a decrease in the level of sugar in the blood, thus leading to inactivity (12). There was also an increase in the level of triglycerides and cholesterol in addicted people compared to healthy people

Because the ginseng in one of the components of the energy drink is responsible for regulating cholesterol (11). Also, vitamin B, which is contained in one of the components of the energy drink, causes an increase in cholesterol. Caffeine in it is one of the causes of high fat, and the high protein content is due to the presence of caffeine in the energy drink, which causes blood viscosity, and then the protein content will increase (4). Taurine is one of the components of the energy drink. It is also a non-essential amino acid that the body can manufacture and that people who are addicted to it will have more proteins in their bodies because taurine is more than the natural limit in the body

It was also found that there is an increase in the percentage of uric acid among addicted people, due to the increase of one of the salts in the body. Through research, it was found that taurine, which is found in energy components, is responsible for transporting water, potassium, sodium, and calcium to cells, and when these salts exceed the normal limit, depending on the period of use of the energy drink, especially sodium salts, this is a sufficient reason for the rise in the proportion of uric acid

This leads to a deficiency in kidney functions, including high urea, and this was observed during the study. There is a slight change in the percentage of urea, and this eventually leads to the formation of kidney stones (6).

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