

ENERGY DRINKS AS A RISK FACTOR FOR STUDENTS' HEALTH

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SUMMARY. Actuality. Within the past years energy drinks are becoming more and more popular in Ukraine among young people. But not everyone precisely knows which of them are useful, relatively edible or even dangerous for one's health.

Objective. Investigation of the prevalence of the energy drinks consumption among medical students and the impact on the physiological processes.

Methods. The following method were used: questioning, sanitary examination, hygienic experiment, and statistical methods.

Results. Every third respondent consumes energy drinks actively, and 12 % of them uses such drinks every day. Consumption of these drinks takes toll on the organism physiological processes and adaptive capacity, causes adverse reactions in cardio-vascular and digestive systems.

Conclusion. Consumption of energy drinks causes risk factors for health.

Key Words: energy drinks, risk factor for health, adaptive capacity.

Introduction. Energy drinks are non-alcoholic drinks that have the ability to stimulate the central nervous system of a person, increase their ability to work and may affect sleep [1]. They are a relatively recent invention of mankind, although their constituent ingredients have been used to stimulate the nervous system since ancient times. It is known from the literature that in the Middle East, in order to add strength and energy, people drank coffee, in China and Asia — tea, in Africa — they ate cola nuts. In Siberia and the Far East was popular the lemongrass, ginseng. [2] Today, energy drinks are sold in each store, kiosk, bars, clubs, they can often be seen in the gym. Advertising represents them as a remedy for fatigue, which helps to conduct an active way of life, mental activity and sports. Energy drinks are very popular among young people and regularly consumed in 31 % of cases by 12–17-year olds and 34 % of cases by 18–24 year olds [3]. We found in previous studies that there are some students among our university who regularly eat fast food and use energy drinks at the same time. Now there is a heated controversy among scientists and the media about the real effect and side effects of these drinks. Some approve that their energy drinks do not differ much from any other carbonated beverage, others equate them in actuating force and addiction to drugs [4]. In our time energy drinks in Ukraine are freely available everywhere, but here there is an absence of

awareness-raising among young people about their effects, peculiarities of use and absolute contraindications to use. Therefore, few people really know what useful, doubtful or even dangerous influence they can have. The aim of the work was to investigate the prevalence of energy drink use among medical students and the impact of these beverages on physiological features of human life.

Methods: It was used the method of questioning, method of sanitary examination, method of hygienic experiment, statistical method.

The subjects of the research were 393 students of Zaporizhia State Medical University of 2–4 years of study.

Research was conducted in three stages. In the first stage, It was compiled the author's questionnaire for students. The questionnaire includes several blocks. The first block of questions was aimed at determining the level of students' knowledge about energy drinks. The next block is devoted to questions about finding out the features of consumption of these drinks among respondents. The next one is the discovery of volunteers to get detailed information and participate in the experiment. The second stage included the investigation of the impact of the 10 most popular energy drinks on organic products (milk, potatoes, egg white and yolk, chicken meat). The third stage is the hygienic experiment for the assessment of the effect of energy drinks

on the physiological features of a person on a student's group (arterial pressure, heart rate, frequency of respiratory movements, body temperature).

Results. At the first stage of the research, it was found that 71,2 % of respondents have in their environment people who use energy drinks. 38,4 % of the respondents use these drinks themselves. It is established that 51 % of respondents do not know the components of energy drinks, 66,4 % – do not know the rules of usage and 53,9 % do not know the contraindications to their use. One-third of students consider that energy drinks have a negative effect on their health, but they are having difficulty on explaining the mechanism of that effect. Half of the respondents use energy drinks only during the exam weeks or in the days of increased workload, 17,9 % – once a month, and 11,3 % – once a week [Fig. 1].

It should be noted that 9,9 % of students consume energy drinks every day. The effect of the drink is noticed by 36,4 % of students in 10–15 minutes, and 35,8 % in 30–40 minutes. In this case the duration of action is 2–3 hours. It is worrying that 12 % of students indicated that they are addicted to energy drinks and they feel it subjectively.

According to the questionnaire, 10 of the most popular energy drinks were selected for the second stage of the study - an assessment of their

impact on organic products. It has been established that the selected drinks have caused irreversible changes. After adding energy drink to the milk there was a change in the color of the milk to pale pink, yellow, or yellow immediately. Almost all of energy drinks caused the processes of protein denaturation and after five minutes in half of the samples there was only a sip-like mass. Only one sample did not change. In reaction with egg white all of energy drinks produced mucous inclusions and soft cheese substitution with the shape of flakes or granules, the liquid portion of the protein was separated in 5 minutes after mixing. One third of the samples marked the appearance of fetid odor. During the addition of energy drinks to egg yolk, all the samples immediately formed clots and after 5 minutes in five samples there was the consistency gelatinous appearance, in four – was liquid with impurities in the form of grains, in one sample – the appearance of liquid similar to sour cream. In reaction with chicken nine of ten energy drinks painted meat in their own color, in one sample – the color change occurred only on the edges and changes in the structure of meat were not recorded. In other samples, the following changes were observed: half of the samples covered with mucus, the other four the structure of meat was decomposed. Row potato pieces have undergone major changes only under the influ-

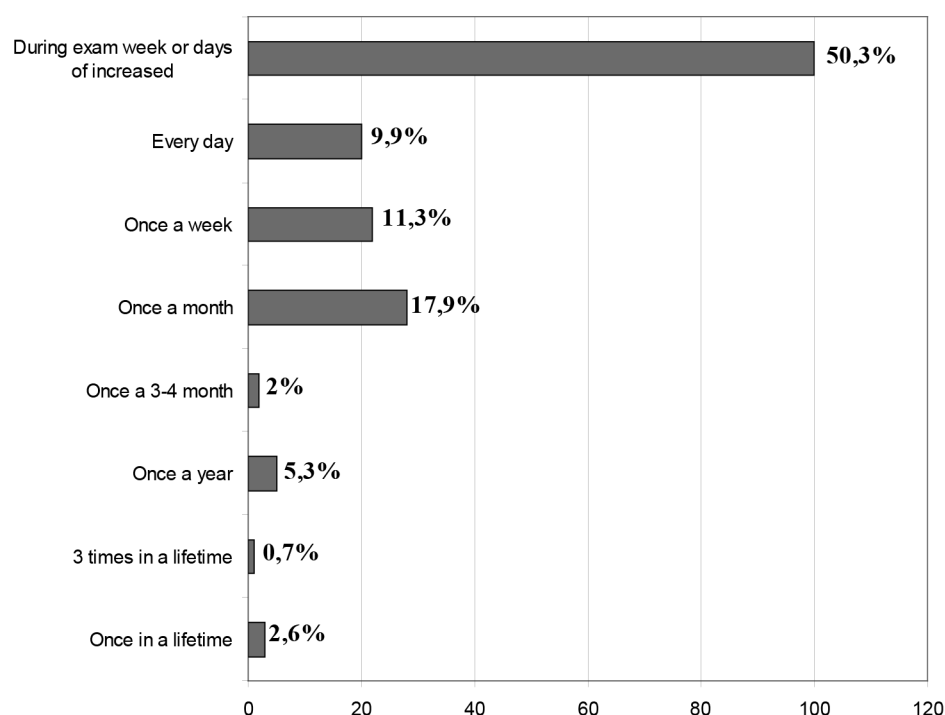


Fig. 1. The frequency of consume of energy drinks by students

ence of 2 energy drinks — in 15 minutes after mixing the potatoes were swollen and had smell of vinegar. Other samples except one painted potatoes in their own color. In general only one of the samples almost did not have a harmful effect, therefore, it was chosen for the third stage of the research.

We formed a pilot group of volunteer students, each of whom received a memorandum of rules and contraindications for the use of energy drinks. Students who had no diseases and had average physical development rates were selected. The average values of their physiological parameters in quiet state were: the blood pressure — $125/75 \pm 3,1$ mm Hg, heart rate — $78 \pm 1,5$ beats/min., frequency of respiratory movements — $18,5 \pm 2,2$ min. The participants were acquainted with the way and rules of the experiment, confirmed that they had no contraindications, and signed an informed agreement to participate in the research.

Students had to use 1 can of energy drink (250 ml) per day for 10 days and fix physiological changes and estimate the intensity of their activities in the diary of observations. Every day we contacted the participants and received information about their condition and progress of research. They also had the opportunity to ask any question and get an explanation.

According to the diaries of the observation, it was found that the participants' blood pressure during the experiment increased an average at 12 ± 2 mm Hg. In general, the increase of pressure up to the limit was observed at 16,7 %, the maximum recorded pressure was 145/100 mm Hg. The average increase in heart rate on average was $20 \pm 1,4$ beats/min, tachycardia higher than 90/min after consume was registered in 50 % of participants. Maximum registered heart rate is 104/min. The average growth of the frequency of respiratory movements was $3 \pm 1,1$ movements/min., Maximum recorded — 24/min. At the same time, the respiratory movements more than 20 after the use of energy drinks had 40 % of participants. In the first 5 days — the maximum in physiological parameters occurred in 30–40 minutes after using the energy drink, and the restoration of the features to the initial values occurred in 2–3 hours on average. Since the sixth day participants already needed from 3 to 5 hours on the restoration of physiological features in 30 %. Also, these students were more susceptible to external stimuli.

Students evaluated the subjective changes in the nervous, mental and physical state during research on a 5-point scale. So, they rated the quality of sleep on average by 3,5 points, the average sleep duration was 7 hours. However, it should be noted that in 20 % of participants there was a tendency to reduce the time of sleep every next day. Physical activity was evaluated on average by 4,2 points, and on the last day of tests, 90 % of the participants rated their physical activity by 5 points. The average success of the training during the experiment did not change and was at 4,5 points. Overall health on average was rated by 3,8. It got better in 30 percent eventually and 70 percent felt that the overall health gradually deteriorated.

Almost all participants, from the 6th day of the experiment, have felt the side effects: headache, sleep disturbances, increased excitability and irritability, heart pain, tachycardia, dry mouth, pain in the epigastric area, increased sweating and others [Fig. 2].

In our opinion there are related to the effect of cumulation in the daily use of the drink. Therefore, in order to avoid the deterioration of the health of the participants it was decided to stop the experiment.

Discussion. In this research it was found that there is a tendency towards a wide application of energy drinks among young people, and the students of the ZSMU are not an exception. Ukrainians currently have access to energy drinks everywhere, but few people are considering whether to drink these drinks impartially without risk to their own health. More than half of respondents do not know the exact composition of energy drinks, the rules of consume and contraindications to use.

The results of the study showed that energy drinks really has an effect on the work of the cardiovascular system and the nervous and psychic state of young people, increasing the level of blood pressure, heart rate and worsening a quality of life and sleep time. The amount of side effects indicates the complex effect of energy drinks on the gastrointestinal tract, urinary system, and others. However, it has been proven that these drinks have the most impact on the cardiovascular system [5]. So, some energy drinks can affect the electrophysiological activity of the conduction system of the heart, increase overload of the heart and precede the ischemic processes of the myocardium. Increasing the

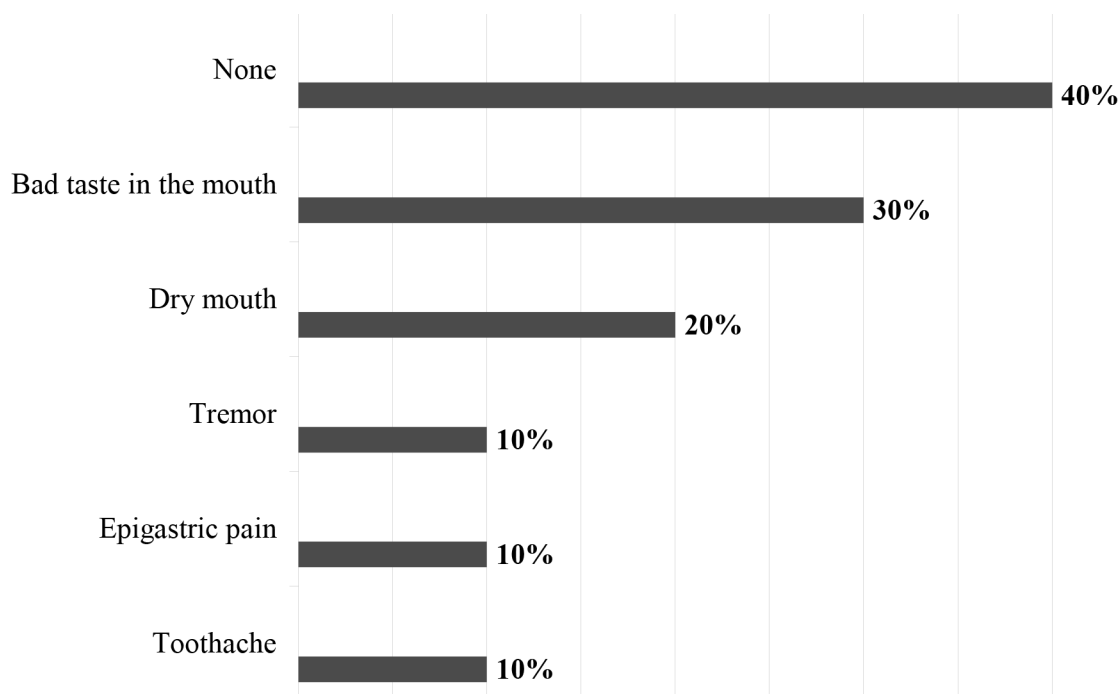


Fig. 2. The side effects of energy drinks after 6 days consume during the research

activity of the vasopressor system and, consequently, the disturbance of vessels trophic may further lead to kidney diseases, acute cerebrovascular accident, and the development of arterial hypertension.

The change of physiological activity was estimated by the respondents themselves, but there are many researches that energy drinks lead to the functional and structural changes in organs and systems [6].

In order to objectively and comprehensively evaluate the effect of these beverages on the human body, it is recommended to conduct an experimental study using daily blood pressure monitoring, electrocardiography and biochemical blood analysis. It can provide in the future a comprehensive analysis of the effects of the per-

manent use of energy drinks and finally resolve a question of their benefits and harm.

Conclusions

1. Every third student of our university is an active consumer of energy drinks, while most of them have very limited knowledge about the influence of these drinks on the organism, its features and rules of its consumption. Almost every 10th has an addiction to these drinks.

2. Energy drinks have sour pH and lead to structural changes in organic products.

3. Even with strict adherence to all rules of admission, energy drinks leads to the strain of adaptive capacity of the body and can cause adverse reactions from different organs and systems. That is why consumption of energy drinks can be considered as a risk factor for health.

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ЕНЕРГЕТИЧНІ НАПОЇ ЯК ФАКТОР РИЗИКУ ДЛЯ ЗДОРОВ'Я СТУДЕНТІВ

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РЕЗЮМЕ. Актуальність. За останні роки в Україні енергетичні напої набувають все більшої популярності серед молоді. Проте мало хто насправді знає, який з них корисний, умовно їстівний або навіть небезпечний для здоров'я людини.

Мета. Вивчення поширеності споживання енергетичних напоїв серед студентів-медиків та їхнього впливу на фізіологічні процеси.

Методи. У роботі використано такі методи: анкетування, гігієнічного експерименту та статистичні методи.

Результати. Встановлено, що кожен третій студент ЗДМУ є активним споживачем енергетиків, а 12 % серед них щодня вживають дані напої. Навіть за суворого дотримання усіх правил споживання ці напої здатні негативно впливати на адаптивні можливості організму, а також викликати побічні реакції з боку нервової, серцево-судинної систем та шлунково-кишкового тракту.

Висновок. Споживання енергетичних напоїв є фактором ризику для здоров'я.

Ключові слова: енергетичні напої, фактор ризику для здоров'я, адаптаційні зміни організму.

ЭНЕРГЕТИЧЕСКИЕ НАПИТКИ КАК ФАКТОР РИСКА ДЛЯ ЗДОРОВЬЯ СТУДЕНТОВ

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РЕЗЮМЕ. Актуальность. За последние годы в Украине энергетические напитки приобретают все большую популярность среди молодежи. Однако мало кто на самом деле знает, какой из них полезен, условно съедобный или даже опасный для здоровья человека.

Цель. Изучение распространенности потребления энергетических напитков среди студентов-медиков и их влияния на физиологические процессы.

Методы. В работе использованы следующие методы: анкетирование, гигиенического эксперимента и статистические методы.

Результаты. Установлено, что каждый третий студент ЗГМУ является активным потребителем энергетиков, а 12 % из них ежедневно употребляют данные напитки. Даже при строгом соблюдении всех правил потребления эти напитки способны негативно влиять на адаптивные возможности организма, а также вызывать побочные реакции со стороны нервной, сердечно-сосудистой системы и желудочно-кишечного тракта.

Вывод. Потребление энергетических напитков является фактором риска для здоровья будущих врачей.

Ключевые слова: энергетический напиток, фактор риска для здоровья, адаптационные изменения организма.

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