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ENERGY DRINKS AS A POTENTIAL HEALTH RISK FOR CHILDREN AND ADOLESCENTS

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Abstract

The aim of this article is to present the phenomenon of the increase in the consumption of energy drinks particularly among children and adolescents and to show their negative health effects.

In the education process, the young generation is to acquire the necessary knowledge about health, its conditions and threats, as well as develop the ability to use this knowledge in everyday life to know, want and be able to enhance their own health and that of other persons and to improve the quality of life. Therefore, in education, physical education teachers who are prepared for this function play a special role in the health education of students. Their task is education in the field of healthy lifestyle, transferring knowledge about the adverse consequences of one's behaviour and related health threats, including sensitizing children and adolescents to the negative effects of drinking energy drinks, as well as building health awareness of students and shaping a sense of responsibility for one's own health.

Key words: *health behaviours, energy drinks, health promotion, health risk*

Introduction

Energy drinks, as a popular source of caffeine, constitute a group of food products characterized by a very dynamic and systematic increase in sales. They enjoy growing popularity not only among adults, but above all among children and young people. They appeared in Poland in the 1990s and have since then become common drinks consumed particularly in the group of teenagers. Currently, due to their increasing popularity, their abuse is a significant public health problem.

Energy drinks can be divided into two groups: isotonic and energetic. Isotonic beverages are used for regeneration during or after intense physical exercise. They balance the level of water and electrolytes lost by the body as well as supplementing them with vitamins and minerals and to a small extent with carbohydrates. On the other hand, energy drinks have a different effect and are often confused with isotonic beverages. They are intended for stimulating the body, for increased effort, and their main ingredient is caffeine. They cause mood improvement, increase in vitality, give a feeling of greater physical and mental efficiency, but also may have negative effects [12]. This work focuses on the second group of these beverages.

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The main ingredients of energy drinks

Energy drinks mainly contain caffeine, which is intended to stimulate the body. The other ingredients, such as guarana, taurine, inositol, carbohydrates, B vitamins, glucuronolactone or ginseng, are supposed to enhance caffeine or eliminate the negative effects caused by the forced stimulation of the body [4]. Energy drinks are also sweetened with various types of glucose-fructose sugar or

sucrose, considered to be a fast source of energy (the amount of sugar is between 1g and 43g in 237ml, which corresponds to 10 teaspoons) [23]. According to specialists, popularizing energy drinks containing caffeine is harmful because it causes an increase in sugar consumption among young people, who are the largest group of consumers. According to statistics, as many as 25% of teenagers drink up to three cans of this type of drink every day. Keep in mind that energy drinks contain a high sugar content, and up to every third child in Europe suffers from overweight or obesity. A 250 ml energy drink can contain up to 27 grams of sugar and 80 mg of caffeine.

According to the recommendations of the World Health Organization (WHO), adults and children should receive no more than 10 percent of their daily energy from sugars, so no more than 50 grams a day. Experts emphasize that caffeine should not be promoted in food for children and adolescents. Regular drinking of energy drinks may cause headaches and problems with falling asleep [11].

Caffeine is the most common stimulant used in energy drinks. It belongs to the alkaloid group. It occurs in the leaves of tea and Ilex paraguariensis (Yerba mate), coffee and cocoa seeds and in over 60 species of other plants. In plants, it plays the role of a natural pesticide and acts paralyzingly and insecticidally on many pests. Energy drinks contain from 32-48 mg of caffeine in 100 ml. Thus, a 250-ml can may contain between 80-120 mg of caffeine. For comparison, a cup of coffee contains on average 50 mg of caffeine, a cup of soluble coffee from 70-100 mg [4], a glass of tea from 10-50 mg, and a can of cola 40 mg [18]. Caffeine intoxication may be caused by the intake of 500 mg of this substance, which translates into drinking 5 cans of energy drink. The lethal dose of caffeine for an adult is 200-400 mg / kg.

After taking 10-12 grams of pure caffeine or drinking 30 litres of energy drinks, death may occur. In energy drinks apart from caffeine, guarana is also often present, which is a rich source of caffeine, so that one can of energy drink can contain up to 300 mg of this substance [4]. The strongest energy drink sold in Poland is CocaineStimulation, which contains twice as much caffeine as other beverages of this type. The dose of caffeine in this product is 64 mg per 100 ml [17].

The main factors determining why people drink coffee are its taste and stimulating effects. Caffeine has no nutritional properties, but it can produce addiction effects, felt after 6-18 hours from the last dose. We can distinguish both positive and negative effects of caffeine. Positives include: stimulation of the central nervous system, delayed mental and physical fatigue, acceleration of mental reactions, increased aerobic capacity, improved reaction time, affecting complex cognitive processes, it may alleviate some effects of sleep deprivation, and improves the coordination of thoughts and memory [13]. In the case of excessive consumption of caffeine, undesirable effects may occur that are individual for a given individual and are conditioned by age, sex, weight, metabolism, as well as the daily dose of caffeine consumption, the blood pressure and the addiction to drinking coffee. The main consequences are: stimulation of the heart rhythm, respiration and central nervous system, heart disease, hypertension, lowering bone density and osteoporosis, increased gastric acidity, epigastric pain, nausea, heartburn, gastroesophageal reflux disease. Excessive consumption of caffeine may cause difficulties with getting pregnant and pregnancy risks, and adversely affect people with glaucoma or ocular hypertension [13]. A person who has taken too much caffeine may experience anxiety, nervousness, insomnia, tremor, tachycardia, and psychomotor agitation [19]. In the case of discontinuation of energy drinks, condition of disorder, anxiety and depression, memory and concentration disorders [13,17], as well as fatigue and weakness, dehydration, tachycardia, stiffness and muscle aches, vomiting, nausea and abdominal pain, inability to focus, insomnia and headaches. There may also be convulsions, heart palpitations, psychotic symptoms, such as hallucinations, and even death in some cases [3].

Especially dangerous is the effect of caffeine on children. Apart from the increase in blood pressure, it may cause disorders of brain development, change in mood, irritability, anxiety and may affect the quality and length of

sleep. Excessive consumption of energy drinks can also lead to disorders of brain development, increased risk of addiction to alcohol and other psychoactive substances and mental disorders [17].

Guarana is an extract from a plant known for its highest caffeine content. Its grains contain even three times more caffeine than coffee (1 g of guarana contains about 40 mg of caffeine) [4]. It has a stimulating, strengthening and anti-fatigue effect. Energy drinks contain no information about the caffeine content in guarana added to the drink. As an addition to this kind of beverages, guarana can be dangerous because it increases the total caffeine content. Guarana overdose is manifested by: strong psychomotor agitation, cardiac acceleration, diarrhoea, vomiting, and even cardiac arrhythmias [13].

Taurine is used as an additive in energy drinks, sports nutrition and baby porridge. It affects the production of hormones responsible for burning and excretion of fats. It participates in metabolism, regulates the work of the heart, and stimulates muscle work. During exercise, it reduces the excretion of serotonin, which means that fatigue is not felt and the body can work longer, which can be dangerous for the circulatory system. Taurine plays an important physiological role, which includes modulation of the calcium ion (Ca2 +) concentration, has antioxidant properties, is a neurotransmitter and neuromodulator, is responsible for osmoregulation, participates in the formation of bile acids, stabilizes cell membranes and regulates phosphorylation of proteins [28].

Glucuronolactone, glucuronic acid, as a natural compound from the group of carbohydrates, is formed in the liver from glucose. In food rarely found, the best source of this compound is wine. In energy drinks it usually occurs at the amount of 25-240 mg / 100 ml. This compound helps to fight stress, fatigue, it reduces drowsiness, stimulates alertness, concentration, and shortens the reaction time. It has the properties of physical regeneration, it accelerates the excretion of harmful, endogenous and exogenous metabolic products, increasing energy levels and endurance as well as preventing the accumulation of fat due to over-stimulation of insulin [8].

Inositol is generally classified as B group vitamins. However, technically it is not a vitamin because this compound is produced in the body. Its presence has been shown in the brain, in the liver and kidneys. It also circulates in the blood, from where it is taken up by cells. Inositol is a phospholipid component. It contributes to the metabolism of fats and cholesterol, has a calming effect, improves mental fitness and well-being. It occurs in plant and animal products: milk, meat, fruit (melons, citrus), vegetables (especially legumes), in cereals and nuts. In energy drinks, it is usually present in an amount of up to 20 mg / 100 ml. The daily requirement is estimated at 500-1000 mg. In combination with vitamins PP and B6, it positively affects cardiac function, cerebral and peripheral circulation [8].

Carbohydrates (saccharides, sugars) are organic compounds, mainly of vegetable origin. Chemically, carbohydrates are divided into simple (monosaccharides: ribose, monosaccharides, simple sugars) and complex (disaccharides, oligosaccharides, polysaccharides). Monosaccharides include ribose, arabinose, glucose, fructose, galactose, mannose, and disaccharides: sucrose, lactose, maltose, trehalose. From the nutritional point of view, carbohydrates are divided into digestible (monosaccharides, disaccharides, polysaccharides) and non-absorbable.

Carbohydrates are the main energy substrate and source of energy in the process of cell oxidation (burning 1 g of carbohydrates provides 4.1 kcal). The energy obtained allows stabilization of body temperature, the work of the internal organs and physical activity. Glucose is essential for the brain, spinal cord, erythrocytes, muscles, intestines and heart. Carbohydrates also regulate the mechanisms of feeling hunger and satiety, participate in the burning of fats from foods, control the function of the colon, affecting the level of glucose and insulin in the blood, as well as the intestinal epithelium. They are found in cereal products, fruits, vegetables, legume seeds, potatoes, milk and milk products, refined sugar, honey, confectionery products and sweetened beverages, including energy drinks [10].

The consumption of excessive amounts of sugars affects the occurrence of overweight and obesity, insulin resistance, diabetes, metabolic syndrome, cancer, non-alcoholic hepatic steatosis and caries. The reason for this is the increase in the consumption of sucrose and simple sugars derived from sweets and confectionery, sweetened beverages and highly processed foods. For Polish people over 1 year of age, the recommended daily intake of carbohydrates is 130 g per day. Carbohydrates in the daily diet should constitute 45-65% of total energy from food, and 10% of energy should not exceed those from simple sugars [10]. Consumption of one glass of an energy drink provides the organism of an adult with 29% of the daily requirement for carbohydrates and constitutes 76.5% of the recommended daily amount of simple sugars, based on the dietary formula of 2000 calories [7].

Vitamins from group B are responsible for the metabolism of fats, proteins and carbohydrates, support brain function, eliminate fatigue, stimulate and counteract nervous disorders [13,27]. They are added to energizing beverages for example to colour the substance (vitamin B2 - E101) or to demonstrate the health-promoting effect of the drink on the body. They are often added in amounts exceeding the recommended daily allowance (RDA). The wrong information is also often put on the label, which understates the amount of ingredients or does not present the full content of the substances contained in the drink [13].

With excessive intake of vitamin B1, you may experience dizziness, hypersensitivity, muscle twitching, arrhythmia and may also experience allergic reactions. However, an excess of vitamin B2 may cause nausea and vomiting, B5 - a significant upset of the digestive system, diarrhoea, allergy symptoms, B6 - decreased muscle coordination, muscle weakness, unsteady gait, degeneration of the nervous tissue, tingling sensation. This vitamin has an adverse effect on the presence of amino acids in blood, and can result in B12- allergic symptoms, nosebleeds, and in exceptional situations, anaphylactic shock. If a large amount of vitamin PP (niacin, nicotinic acid) is ingested, liver damage, arrhythmia, burning and itching of the skin, elevated blood glucose levels, headaches and pains, vomiting, or orthostatic hypotension may occur [12].

In order to highlight and promote the product, manufacturers of energy drinks attract customers' attention by adding biologically active substances, as well as herbal extracts, to increase their effectiveness and attractiveness. The addition of L-carnitine is to help burn fat and maintain good condition; it also eliminates free radicals, supports vitality, slows down the aging process and accelerates the regeneration of the body after increased physical activity. Japanese ginkgo slows down the aging process, prevents atherosclerosis and the deterioration of intellectual and mental abilities in older people. Excessive amount may cause stomach upsets, headaches and dizziness. Ginseng is designed to improve the ability to remember, endurance of the body and resistance to stress. In people who abuse ginseng, so-called ginseng syndrome may appear (drowsiness, weakness, skin changes, headaches, diarrhoea), as well as cardiac arrhythmia, insomnia, allergic symptoms [12]. The above-mentioned substances used rationally, particularly in the form of fruit and vegetables or in the form of dietary supplements or medicines under the supervision of a physician do not pose a health risk. On the other hand, consumed in excess, for example in the form of energy drinks, they may have serious health consequences. Therefore, the use of these beverages should be controlled and information about possible undesirable effects should be presented on the packaging.

The dynamics of the sales phenomenon

The energy drinks industry is growing dynamically on a global scale, and their sales in the years 2008-2012 increased by as much as 60%, in 2012 it was estimated at 12.5 trillion dollars [3]. In 2015 the value of sales of these beverages globally amounted to over 38,208 million euros, and in the European Union 7,129 million euros.

By contrast, in Poland, the value of sales is 308 million euros, which is 4.3% of the EU market value. In the countries of the European Union, the largest consumer of this drink is Great Britain, which generates consumption of 25% of the value of the EU market. A report prepared by the international network of

KPMG auditing and consulting companies in 2016 "The market of non-alcoholic beverages in Poland" also shows the increase in the sales value of these beverages. In 2015, the value of the energy drinks market in Poland amounted to nearly PLN 1.3 billion, and it is forecast that by 2020 this value will have increased to PLN 1.8 billion [2].

The data provided by Nielsen company is confirmation of the announced forecasts in Poland. It is based on the analysis of the 12-month sales trend according to which the sales value of the energy / sport drink category amounted to nearly PLN 1.52 billion (MAT: May 2018) and thus advanced by two positions on the list of the largest categories of FMCG (Fast Moving Consumer Goods) in relation to the previous year [21].

The largest distribution channels for energy drinks are discount stores (65%), supermarkets (55%), hypermarkets (51%), grocery stores (44%) and gas stations (28%), liquor and wine-confectionary stores (7%), and online shops (2%); that is off-trade sales. On the other hand, clubs, discos (4%), mass events or time points (4%), pubs, bars, cafes (3%), restaurants (2%), hotels (1%) (on-trade) have a lower percentage of sales. [2].

The research carried out in selected European Union countries shows that the average European male drinks on average 2.9 liters of energy drink a year, spending 11 euros. The average Pole spends 8 euros each year, purchasing over 3 liters of energy drink. The biggest consumers are the British, who buy over 8 liters of this drink, paying over 30 euros. The lowest sales of energy drinks occur in Romania, Ukraine and Italy, with Italians spending more money on them [2].

The results of the European Food Safety Authority (EFSA) survey conducted in 2011 in 16 European Union countries show that energy drinks are consumed by 68% of adolescents aged 10-18 years, 30% adults and 18% of children under 10 years of age. However, consumption of this type of drinks among young people in individual countries is differentiated, as in Greece, 48% of adolescents declared that they consume this drink, while in the Czech Republic this was as much as 80%. According to the respondents, consumption among children in Greece was 6%, and among children from the Czech Republic as much as 40% [3].

Marketing, which is mainly aimed at young and active people, has a significant impact on the demand for consuming these drinks. New products appear on the market all the time, and manufacturers use appropriate marketing techniques to increase the number of customers. In 2012, companies spent 282 million dollars on advertising [19].In trying to reach the consumer, they advertise the product by only showing the benefits of consuming energy drinks such as: increase in mental and physical performance related to, among other areas, the practising of competitive sports such as: cycling, snowboarding, skiing and climbing, as well as greater endurance, weight loss, good fun and even as a legal alternative to drugs. Attractive packaging is created, and the price of the product is lowered to reach people with limited financial resources, especially young people. The information about the content of caffeine and its side effects is often omitted, while new attractive names to encourage young people to buy energy drinks are invented and created. Sports competitions are also sponsored as well as the use and offering of free samples, and advertising on social media.

Various efforts are also used to encourage the consumption of large amounts of these drinks, increasing their capacity to 1 litre or through the creation of products which cannot be resealed after being closed; therefore, the consumer is forced to drink the whole beverage in a short time. Producers take into account the needs of today's consumers who have an excessive number of duties and live quickly, offering them not only energy in the form of drinks, but also ice cream, chewing gums, or yoghurts with a high content of stimulants, which help to reduce fatigue and enable participation in further activities [19].

Most young people use energy drinks because of the prevailing fashions or in the hope that they will help them achieve better results in studies, sport and other aspects of life. However, their effect is short-lived, they will not improve our condition or make us feel rested. The feeling of tiredness and fatigue

returns quickly. They certainly do not replace sleep and rational rest [27].

A frequent selection criterion when purchasing an energy drink is its specific taste, which is difficult for the consumer to distinguish from other brands of this type of products. Although 47% of consumers are loyal to the preferred brand, manufacturers often use various methods that include the addition of an extra ingredient, e.g. a fruit aroma to change taste. Marketing treatments also involve enriching the composition by adding vitamins, microelements or other guarana ingredients, ginseng that can distinguish a given product and convince the consumer about the suitability of this drink in stimulating and regenerating the body. An effective method used by producers to distinguish a product and strengthen a given brand is to use a supporting brand strategy through celebrity endorsement and recommendations. It is used both by market leaders and smaller producers trying to find consumers. The most common supporting brands are the names of well-known athletes; that is personal brands. In trying to identify with their idol, customers buy and consume the advertised product, in order to improve their image and attractiveness in their environment. So far, producers have used the names of people from the world of sport such as: Dariusz Michalczewski, Mike Tyson, Bruce Lee, Robert Lewandowski, Jakub Błaszczykowski, Mamed Khalidov, Mariusz Pudzianowski, Przemysław Saleta, Adam Małysz, and even recently the disco-polo singer Zenon Martyniuk. The largest energy drinks company in the world with 70% share in the global market is Red Bull. It has built its position thanks to promotional activities consisting in sponsoring sports events and athletes or acting as the organizer of events. Red Bull was a sponsor of a Formula 1 team, the Dakar Rally team. During the event "Red Bull Stratos", it used the name of parachutist Felix Baumgartner, who in 2012 jumped from the stratosphere while beating four world records. The action was broadcast in the media, making the parachutist famous and at the same time strengthening the position of the Red Bull brand, which has become a trendsetter, crossing barriers and creating new challenges. Similarly, another brand of energy drinks, Monster, used sponsorship of moped sports disciplines through the well-known motorcycle road racer Valentino Rossi. The Monster brand sponsored the Motocross World Championship and Motorcycle World Championships, strengthening its market position. The use of marketing and promotional methods has turned out to be very effective because energy drinks are products that evoke strong emotions, are associated with the manifestation of lifestyle choices and belonging to a social group [15].

Social consequences

The dynamic growth of energy drinks consumption is a threat to public health, especially for young people. According to nutrition specialists, consuming this type of drink is harmful, especially for children and adolescents because the young body has fewer opportunities than an adult to safely assimilate and remove ingredients contained in energy drinks.

The consumption of energy drinks among youth is associated not only with potential health risks, but also with risky behaviours; among others, seeking strong impressions, smoking and the use of other harmful substances, getting drunk, depression or injuries that require treatment [3,9]. Consumption of energy drinks raises serious safety concerns. In 2007-2011, the number of visits to emergency departments related to the use of energy drinks doubled, and in 2011, 1 in 10 people who consumed them required hospitalization [20].

Undesirable effects of energy drinks occur in 80% of teenagers and 77% of students. 31.2% of respondents complained about insomnia and trouble falling asleep, 30.1% on heart rate and feeling of palpitations, 27.1% were irritated, agitated and anxious, and 18.2% had dizziness [16].

Unlike hot coffee or tea, energy drinks can be drunk at a gulp. Caffeine is therefore absorbed faster, which can result in overdose. In many countries, deaths have also been reported from heart failure or hospitalization due to convulsions that were associated with excessive consumption of energy drinks. WHO experts claim that: "Because the sale of energy drinks is rarely limited by age criteria - unlike

alcohol and cigarettes, and there is evidence that these beverages have a negative impact on children, their future consumption may pose a serious public health problem". This risk can be minimized by introducing appropriate legal regulations: setting an acceptable limit of caffeine in one portion of beverages available on the market, limiting the possibility of selling energy drinks to children and adolescents, and obliging producers of these beverages to responsibly advertise their products [3].

Energy drinks can be drunk by healthy adults in reasonable amounts, for example in situations where they are unable to rest before the physical or mental effort that awaits them. However, a much better solution than drinking energy drinks is to drink medium strong coffee. Certainly, drinks should be avoided by people with high blood pressure, children, pregnant and breastfeeding women, people with diabetes, neurological disorders and liver problems. Energy drinks do not have a great nutritional value because they provide only 2-3% of the daily intake of calories, so their function is limited to stimulating psychophysical activity rather than providing energy.

The main consumers of energy drinks are pupils and students, long-distance drivers, sales representatives, representatives of business professions, people working on night shifts and representatives of the uniformed professions. They are common in pubs and discos as an addition to drinks [13]. Children and adolescents reach for energy drinks in every possible situation: before classes, before physical activity, the disco, parties, tests, long hours of using the Internet or computer games, on excursions, performing sport activities, and even at home while doing everyday duties [19]. An energy drink becomes a drug for them after exhausting activities or a sleepless night because they think that it is an easy way to regenerate their body.

In America, energy drinks are the most popular drink among teenagers and young adults right after multivitamins. The greatest number of energy drinks is consumed by people aged 18-34, while nearly one third of adolescents aged 12-17 drink them regularly [20].

Studies conducted in Italy among pupils aged 11-13 show that the consumption of energy drinks increases with age. 6.2% of sixth grade students drink energy drinks at least once a week, while among eighth graders this percentage increases to 16.5%. Consumption of energy drinks less often than once a week was declared by 18.6% pupils aged 11, and the percentage among students aged 13 increased to 50.4%. These studies show that successful marketing strategies for the producers of energy drinks increasingly reach younger customers, in particular children of school age. Also in the older age group, energy drinks are very popular because as many as 31% of people aged 12-17 drink these beverages regularly, aged 17-29 the studies showed that 30.6% used energy drinks occasionally, 14.2% monthly, 14.9% weekly and 2.6% daily [5].

Research carried out among Polish students shows that 70% of students (almost 65% of social science students and 75% of students from technical faculties) consume energy drinks [14]. Other studies carried out in 2015, among students aged 18-28 from Wrocław universities, show that over 80% of respondents declare that they have consumed these beverages, while more than half of them admit that they consume them occasionally. The more often the respondents consumed energy drinks, the more side effects they felt, including heart palpitations, sleep disturbances, hand tremors and abdominal pain. With the increase in the frequency of consumption, the need for their regular consumption also increased, which is related to the occurrence of caffeine, which has an addictive effect.

In the case of energy drinks consumption the reasons why young people reach for them are very significant. Students deciding to consume this drink are mainly driven by the desire to increase energy (68.3%) and reduce drowsiness (55.5%). Also, the specific taste of the drink is very important for them, as 42.6% of the surveyed students declared. On the other hand, trend, fashion or marketing have the least importance for them [22].

From the research carried out among junior high school students (11-16 years old) and high school students (16-17 years) the most

common reason for using energy drinks was their taste (45%), which may indicate that these beverages are treated as refreshing drinks, which have beneficial effects on the body. Among the studied group, energy drinks also help improve sports performance and learning or improve well-being. On the other hand, advertising is very important, which for 50% of the youth is by far the most common source of knowledge [4].

Mixing energy drinks with alcohol is especially dangerous. Alcohol mixed with an energy drink is absorbed faster which accelerates intoxication but also poisoning. Among some people it may also increase the level of aggression. Unfortunately, drinks consisting of these ingredients are very common in clubs and discos. A European Food Safety Authority (EFSA) study found that over 70% of young adults aged 18-29 mix energy drinks with alcohol. The consumption of this kind of drink is riskier than drinking alcohol itself, because it can cause faster alcohol intoxication and lead to poisoning. People feel less drunk although they drink more alcohol mixed with an energy drink than pure alcohol. The combination of caffeine and alcohol accelerates diuresis and leads to faster dehydration of the body, and can also cause dangerous fluctuations in blood pressure, dehydration, insomnia, insulin resistance, stimulation of the heart, headaches and neurological disorders.

In some EU countries, regulations regarding the sale of energy drinks have been introduced. In France, in 2013, a tax was levied on drinks containing a large amount of caffeine, and in order to put a particular energy drink on sale, accurate information about its harmfulness must be included on the label. In Hungary energy drinks are subject to a public health tax, and in Sweden some of these beverages are only available in pharmacies and selling them to children is prohibited [3]. Denmark and Norway forbid the distribution of energy drinks. The ban on the sale of energy drinks to children in the UK was also introduced by the British supermarket chains Waitrose and Sainsbury's Aldi, Asda and Tesco. Since March 2018 the Waitrose network, has decided that it will not sell energy drinks with high caffeine content to people under 16 years of age. In Lithuania, since 2015, the sale of this type of beverages to persons under the age of 18 is forbidden, as well as the promotion of energy drinks. Latvia also plans to introduce similar regulations [6].

In Poland, energy drinks are legal. In accordance with applicable legal regulations, the packaging of a drink with a high content of caffeine or foodstuffs with the addition of caffeine must be labelled with information (in the same field of vision as the name of the food) concernign its high caffeine content. It is not recommended for children, pregnant women and breast-feeding women. Despite the warnings on a can of energy drink - that it is a product for adults, not advised for children, has a high caffeine content - the growing popularity of these beverages among children and adolescents is becoming alarming [9]. The law limits only access to foodstuffs containing significant quantities of ingredients not recommended for the development of children and adolescents, including energy drinks in kindergartens and schools. Currently, the Ministry of Health does not carry out legislative activities restricting the sale of energy drinks to persons under the age of 18 outside the area of education system units.

The Ministry of Health fights energy drinks through educational activities that aim to raise the knowledge of Polish consumers as well as children and young people. The projects are also undertaken as part of the National Health Programme for the years 2016-2020 [24], pursuing the operational objective 1, under the title "Improving the methods of nutrition, nutritional status and physical activity of society". The most important activities undertaken by the Ministry of Health in recent years are: the establishment of the National Centre for Nutritional Education (NCEŻ), a platform that provides access to reliable information on food, nutrition and physical activity, the creation of an online dietary clinic providing every adult with a consultation, creating an application called "Zdrowice" promoting a healthy lifestyle among children and young people, i.e. a free game for smartphones with the Android system addressed towards children and youth, the

organization of nutrition workshops for persons responsible for implementing nutrition in the education system units and the organization of nutrition workshops for children and parents [26].

Summary

Counteracting the ever-increasing phenomenon of consuming energy drinks that have a negative impact on children and adolescents is difficult. In the future, their consumption may be a serious public health problem. It can be minimized by setting an acceptable limit of caffeine in one portion of beverages available on the market, limiting the possibility of selling energy drinks to children and young people, as is the case with cigarettes or alcohol, as well as obliging producers of these beverages to responsible advertising or even banning their products. Lack of proper legal regulations, easy access to energy drinks, everywhere and at any time, social consent in the use of these types of products, low social awareness about the consequences of consuming energy drinks and mixing them with alcohol, but above all marketing showing only the benefits of using these beverages, addressed mainly to an increasingly younger group of recipients, make it difficult to carry out activities that prevent a rapid increase in consumption.

Currently, the only effective action to reduce the consumption of this type of product is the multi-sectoral education of the public about the risks associated with the consumption of energy drinks. In the conducted research, many experts believe that there is an urgent need to increase knowledge, especially in the school environment among children, and adolescents, as well as teachers, parents or health professionals about the health risks of consuming energy drinks, among others, by introducing programmes to prevent the consumption of energy drinks and to inform them about possible health risks.

The best way to prevent diseases and various health problems is health promotion and health education. According to the new 2017 primary school core curriculum, health education is provided by physical education teachers within a specific thematic block called "health education". Physical education should include content about health and its diagnosis in the context of counteracting diseases associated with contemporary lifestyles, as well as raising the importance of an active and healthy lifestyle in order to maintain fitness and health for as long as possible [25].

Therefore, in education, physical education teachers who are prepared for this function play a special role in the health education of students. Their task is education in the field of healthy lifestyles, transferring knowledge about the adverse consequences of one's behaviour and related health threats, including sensitizing children and adolescents to the negative effects of drinking energy drinks, as well as building health awareness among students and shaping a sense of responsibility for one's own health. In the education process, the young generation is to acquire necessary knowledge about health, its conditions and threats, as well as develop the ability to use this knowledge in everyday life to know, want and be able to enhance their own health and that of other persons and to improve the quality of life. Therefore, health education should be conducted from the earliest years of life to shape pro-health behaviours and habits.

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