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EFFECTS OF SMOKING AND ALCOHOL ON THE HUMAN BODY AND PHYSICAL EFFORT

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According to the World Health Organization, cigarette and alcohol consumption are one of the leading causes of illness, disability and death worldwide, the life expectancy of regular consumers of these products being drastically diminished in many situations. Diseases caused by the consumption of these "drugs" and exposure to cigarette smoke are some of the most serious and can affect both the internal organs and the whole body. This material manages to capture some of the most important negative effects that alcohol and cigarettes have on the human body and their implications from the perspective of physical effort. The fundamental role of this material is given not only by the presentation of the effects on the body and physical effort, but also by its raising awareness regarding the negative impact that smoking and alcohol create in the personal-social entourage of the consumer.

Keywords: physical effort; alcohol; smoking; physical exercise; cigarettes; effect.

The society in which man carries out his activity and lives is an inexhaustible resource of stimuli that subject him to social adaptations and re-adaptations but also to behavioral changes. It is not always that these changes have a positive role on the body, as they cause disturbances to the normal functionality of the body. Interestingly, we expose ourselves to such disturbances, in many situations, voluntarily and consciously (for example, ingestion of foods containing preservatives and chemical compounds, cigarette and alcohol consumption, etc.) but also involuntarily (for example, passive smoking).

Living in this society based on a consumption of a whole range of products, more quantitative than qualitative, inevitably, attention will also be directed to alcoholic beverages and/or cigarettes. "What if I tried?" "What happens if I drink a glass or smoke a cigarette?" "Nothing" is the answer given to these questions, in most situations. From this answer to forming a habit and causing an addiction to be created from consuming these two products is just one step. The result of addiction and individual consumption of alcohol and cigarettes, combined with each other or with other products that can harm the human body, will eventually be found in the appearance of harmful effects on the functionality of the human psyche and physique.

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According to the World Health Organization (WHO), cigarette consumption tends to become the main cause of global mortality, a situation that can be avoided by precise and enforceable policies and measures taken by the responsible institutions in each country. It is estimated that there are over one billion smokers worldwide, most of whom are in countries with developing economy, almost three times more than in developed countries. Considering population gender, men are the most numerous when it comes to smoking. The same organization states that, annually, more than 4,2 million people die because of it. More than one million are Europeans.

Romanians are no exception to cigarette consumption. During the period 2011-2018, Romania registered an increase of almost 15% in the number of smokers, mainly due to the explosion of this vice among young people and women. In Romania, it is estimated that there are over 4,3 million daily smokers, of which men are almost double the number of women who smoke.

Out of the total number of people diagnosed with lung cancer, according to the specifications of the Romanian Society of Pneumology, approximately 89% are or have been smokers who have recently quit. The same society also states that more than 42,000 deaths recorded annually are due to cigarette consumption. This consumption causes more deaths annually than obesity, traffic accidents, alcohol consumption, suicide and drug consumption together.

In terms of alcohol, there are more than 3,3 million deaths worldwide each year, of which more than two-thirds are, in this case also, men. In Romania, according to the World Health Organization, in 2016, of the more than 11,000 people who suffered from alcohol consumption, more than half of the cases resulted in deaths. At the European level, Romania ranks ninth in alcohol consumption per capita and tenth in the world[1].

Effects of smoking on the human body and physical effort

Even if, at the global and national level, there is a policy to raise awareness, prevent and combat the negative effects of cigarette consumption, the population is exposed to this vice, from a very early age. Teenage can also be marked by the onset of cigarette consumption, with multiple motivations. The onset of smoking can be found in reasons such as rebelliousness, the need to stand out and to be recognized in the social environment where young people carry out their main activities, curiosity, the need for acceptance in groups with common passions and interests, the tendency not to be derided by the group which one belongs to and, sometimes, even out of obligation.

We are all aware that the main residue of cigarette burning, smoke, is a real storehouse of toxic substances (over 500 substances), some being demonstrated to have a carcinogenic effect (tar, nitrosamine, zinc oxide, benzene, etc.), others being poisonous (carbon monoxide, nicotine, cyanides, etc.). Whether it is one or the other, all these substances affect the great functions of the body, the great systems of the body, the internal organs, putting human life at risk.

An extremely interesting element, with negative effects on the body, should be mentioned regarding hemoglobin[2] and carbon monoxide. There is an extremely strong connection between the two of them, in terms of their association. They combine approximately 200 times better compared to the oxygen-hemoglobin bond. Thus, carbon monoxide reaches the blood faster than oxygen, the concentration of carboxyhemoglobin being approximately 1% in a non-smoker and with values of 5%-25% in a cigarette consumer. The result of the association of carbon monoxide with hemoglobin and its transport in the body produce a series of negative effects on the body, two of which being sufficient to indicate its harmful nature: "due to its association with hemoglobin, over time, it will become unable to carry oxygen, which will negatively affect the body's respiratory capacity, cells, human physical performance; another effect, this time chronic, consists in destroying the inner layer of blood vessels, an important fact for the exacerbation of cardiovascular diseases"[3].

Another element of cigarette smoke that negatively affects the human body is nicotine. Out of the total amount of smoke, only 30% of it reaches the mouth. As a result of the particular way of smoking, of this percentage, values between 5% and 95% of the total inhaled nicotine may reach the bloodstream, under the conditions of air retention. It should be noted that a dose of nicotine with values between 40-50 mg causes death for an adult. In children, only 10 mg is sufficient[4]. Specifically, to reach this amount, an adult must consume approximately 20-40 cigarettes in a time interval of 90-180 minutes.

In low concentrations (approximately 1 mg of absorbed substance), nicotine can be an exciting factor or a stimulant of the central nervous system, leading to a – reduced, it is true – increase in an individual's chances of achieving more intense physical exertion than without it. Nicotine also stimulates the body's wakefulness.

However, the presence of nicotine in the body in large quantities and for a long period of time materializes in the increase of chances of adverse effects in the human body. Of these, I mention only a few, that I consider very important from the perspective of body function:

- nicotine is a trigger and a stimulant for adrenaline, having the effect of accelerating the heart rate and increasing blood pressure. The smoke of a single cigarette is enough to increase the heart rate by up to 20 beats per minute.
- another effect is that of vasoconstriction[5] of blood vessels. It can be a determining factor for the occurrence of vascular spasms (the smoke of a single cigarette lowers the temperature of the extremities of the body (fingers, nose, ears) with values between 0,6-3,8 degrees). Vasoconstriction, along with other cardiovascular diseases developed in the body, can lead to myocardial infarction.
- high heart rate combined with vasoconstriction leads to structural changes in the walls of blood vessels and to circulatory disorders[6].

• nicotine reduces "expiratory volume and causes a deterioration of alveolar gas exchange processes, a decrease in respiratory flow, an increase in the oxygen requirements of the muscles"[7].The cause of such effects is the decrease in the degree of permeability of the membranes of the pulmonary alveoli due to the "attachment" of cigarette smoke substances to them.

• Following the reduction in the amount of oxygen in the blood, there are negative changes in the metabolism of lipids in the body, changes that occur in a fairly short time when there is an increase in free fatty acids[8], but also some long-term changes in terms of decreasing good cholesterol (HDL) and increasing total cholesterol.

From the point of view of the influences of smoking on physical exercise, the carbon monoxide-hemoglobin combination reduces the amount of oxygen necessary for the muscles to perform effort; nicotine and carbon dioxide contribute to blood coagulation, as it becomes more viscous, it favors the accumulation of fat on the blood vessels, thus creating a predisposition to reduce the amount of blood that can reach the organs and muscles. These two elements lead to the limitation of the amount of oxygen and blood rich in nutrients necessary for muscle contractions to support and perform physical efforts, either intense and short-term, or long-term, but of low or moderate intensity.

Combating this vice and preventing cigarette consumption, implicitly its effects on our body, can be achieved through: "education in all educational structures in the country (primary and secondary schools, universities, etc.), in order to reduce the number of potential smokers; banning commercial agents from owning and marketing cigarettes or their substitutes near educational structures; enforcement of and compliance with the existing laws on combating and preventing the negative effects of smoking; a total ban on smoking in public spaces and in the vicinity of educational institutions; within the limits of possibilities and technological developments, the reduction of the quantities of harmful substances in cigarettes; aggressive advertising campaigns and highlighting the negative changes that smoking has on the body"[9].

Cigarette smoke, with the toxic and carcinogenic substances in its composition, is one of the main causes for the emergence and development of some of the most serious human diseases, some of them even causing death. Diseases developed as a result of cigarette consumption do not affect only a part of the body. They can include all the major functions of the body, in some cases even generalizing at the level of the whole body. In this presentation I will list only some of them, that are most relevant for this cause-effect relationship of cigarette consumption: "diseases of the cardio-respiratory system (lung cancer, myocardial infarction, peripheral vascular diseases, stroke, favoring the emergence of a series of diseases of the respiratory system – flu, pneumonia, etc.), changes of the skin system (skin appears older), reproductive system dysfunction (erectile dysfunction, impotence, high risk of infertility in women), miscarriage and deficiencies of the fetus and, later, the newborn, sudden death or shortening of life by up to 10 years in the case of a lifelong smoker"[10].

Decreasing the number of cigarettes consumed or giving up this vice completely is, first and foremost, an exercise of self-control, a manifestation of personal will in removing a harmful factor for the body. Quitting cigarette consumption, from my point of view, can be achieved by two approaches: the first – directly quitting smoking and using a firm attitude related to this consumption, the second – gradually quitting and reducing cigarettes, going through several phases of consumption, less and less quantitative.

Regardless of the way we approach to reduce or stop cigarette consumption, an essential contribution is the knowledge and awareness of their effects on the body. Along with this knowledge, the following can also be helpful: finding a sufficiently strong motivation to give up cigarettes (reasons such as those related to the health condition of the consumer, the financial situation and the expenses incurred as a result of this consumption, etc.); removing from the private environment the products that facilitate smoking and direct attention and thought towards it (ashtrays, lighters, tobacco pipes, pictures of cigarette packs, tobacco pipes, cigarettes, etc.); real support from family and acquaintances; drug treatment; rational consumption of healthy products as substitute for cigarettes; giving up products that require cigarette consumption until the complete disappearance of this "demand" of the body (coffee, for example); consuming foods and beverages that contain very low doses of nicotine in order to combat this

addiction in stages; carrying out sports activities. It is known that physical exercise alleviates the "craving" for nicotine. The long-term benefits as a result of quitting smoking are summarized in Figure 1.

I mentioned earlier that alcohol can positively influence the human body, or from this point of view the vital condition for determining the appearance of beneficial effects must be taken into account: *its rational and moderate consumption.* What can this

Figure 1 *Benefits of quitting smoking*[11]

Effects of alcohol on the human body and physical effort

If, previously, we presented a stringent problem, quite pressing on the smoking population as well as on some of those who do not have this habit (to be understood as passive smokers), in this part we will focus on addressing another product that, along with cigarettes, causes the death of millions of people each year: alcohol.

Adults and, unfortunately, more and more young people have turned alcohol consumption into an element that leads to the rapid change in the human general condition, into an element of connection between mental and physical changes and real life, a factor that generates negative but also positive influences on the body. The onset of this gesture, to consume alcohol, has as substrate, in most situations, real life and the feelings it offers, the reasons being extremely diverse: happiness and sadness can be clothed or stifled by alcohol, driving away the feeling of loneliness and alleviating this feeling, joy, curiosity, the need for socialization, stimulation of courage and partial cancellation of fear, access to a certain social group, partial reduction of stress, irritability, celebration, imitation of the behavior of those in the immediate vicinity and, last but not least, habit.

condition mean? It all comes down to the amount and content of pure alcohol in that amount. The recommendations, in the vast majority of studies and data provided by the WHO, have as upper limit the following figures: 350 ml of beer (5%) or 120 ml of wine (12%) or 50 ml of spirit drink (40%). It is not to be understood that all this may be consumed daily. Another type of recommendation considers only pure alcohol in the drink, as follows: for men it can reach a maximum of 30 g of pure alcohol, while for women this maximum threshold is only 15 g. Moderation and rational consumption of alcohol can lead to "reducing the risk of diabetes emergence and development; reducing the chances of a stroke; lowering the amount of bad cholesterol (LDL) and increasing the good cholesterol (HDL); increasing the blood coagulation time – this effect can prevent or even stop a possible myocardial infarction"[12].

Even if alcohol causes the appearance of positive effects on the body, unfortunately irrational consumption creates premises for affecting both the internal organs and the whole body, which will inevitably lead to the emergence and development of certain diseases, some of them resulting in the death of the person concerned.

The effects of alcoholic beverages can be observed a few minutes and even hours after starting consumption, being well known: reduced ability to think logically, impaired quality of the visual apparatus, impaired distributive attention, decreased ability to segmental physical coordination, inability to maintain body balance, reduced possibilities of spatial and temporal orientation, nausea and vomiting, coma, death.

"In the long term, diseases of the digestive system can emerge (for example, cirrhosis – with its most often fatal effect, ulcer, gastritis, cancer, pancreatitis, etc.), diseases of the respiratory and circulatory systems (tuberculosis, myocardial infarction, stroke, hypertension, increased heart rate), central nervous system (dementia, aggression, alcoholic insanity, depression, etc.), diseases of the reproductive system (reduction to the disappearance of libido, impotence, sterility, etc.), diseases of the osteoarticular system (decreased functional capacity of the muscles, a factor conducive to the emergence and development of osteoporosis), death"[13].

Unfortunately, these effects do not only target man as a distinct, anatomical and functional entity. The effects of alcohol consumption are also found on other levels, where it creates a series of shortcomings, negatively influencing the development of the social life of the consumer but also their economic evolution. Alcohol consumption is a determining element for poor work organization, for favoring the occurrence of individual labor disputes, activity disruption and non-compliance with tasks at work, indifference, diminished sense of responsibility, lack of interest in carrying out household chores, neglect of children and family, contradictory social tendencies, for social self-exclusion. The effects of alcohol consumption can be found very well synthesized in Figure 2.

The effects of alcohol consumption on the body are directly proportional to the concentration of alcohol in the drink itself, the amount in the bloodstream and in the metabolization process, the amount of enzymes genetically present in the body that contribute to alcohol decomposition. The effects are caused by a series of elements, of which I mention:

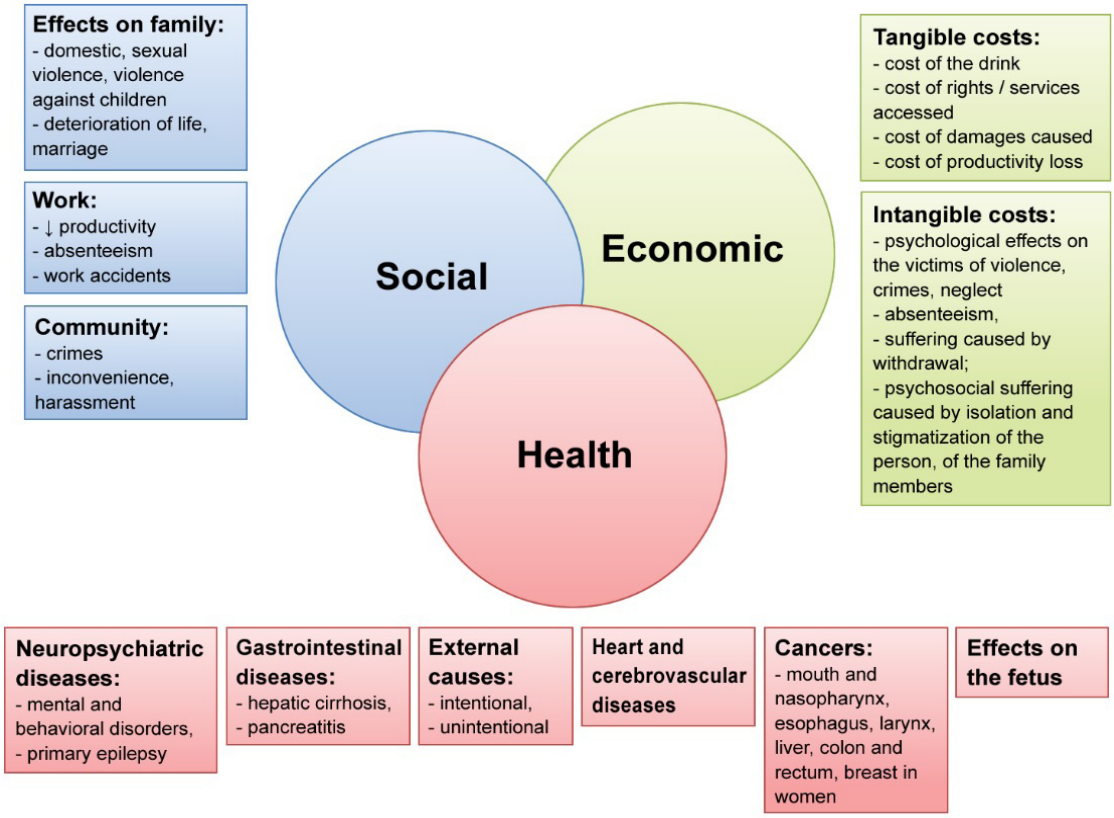

Figure 2 *Effects of alcohol consumption*[14]

- the amount of alcohol ingested – a larger amount will lead to increasing the level of its concentration in the body and blood circulation. Such increase will intensify the particular symptoms

of this type of consumption. An amount of alcohol with a blood alcohol index between 3,5-5 per thousand can also be a cause for death;

• alcohol concentration – a drink with a lower alcohol concentration compared to a strong alcoholic one (with a concentration between 40°-50° or above 50°) will cause less intense effects, the period until the onset of the particular symptoms of alcohol consumption being higher, the specific signs being partially visible or impossible to identify.

• the time elapsed from the first *sip* until its passage into the blood. The same amount of alcohol passes into the blood faster when consumed *on an empty stomach*, compared to the state in which it is ingested after a high-fat meal. Alcohol is metabolized in a proportion of 90% by the liver, the remaining 10% approximately being eliminated by the kidneys and lungs. The absorption of alcohol in the blood occurs immediately after ingestion, along almost the entire length of the digestive tract.

• speed and time elapsed for the elimination of alcohol from the body – "the speed rises to 0,1 g per kilogram of body weight per hour in men and 0.085 g per kilogram of body weight per hour in women. The decrease in blood alcohol levels occurs linearly, depending on time, amounting to approximately0.15 per thousand/hour"[15].

• body mass and the amount of water in the body – a person's higher body mass decreases the possibility of increasing the blood alcohol index compared to a person with a lower mass, mainly due to a high dilution body volume.

• the habit of consuming alcohol – an individual who develops this type of totally unhealthy behavior leads to decreased sensitivity of the central nervous system, the main symptoms specific to alcohol consumption being more difficult to develop.

Considering the practice of various sports as performance or leisure activities, carrying out physical education training activity, the effects of alcohol consumption are also present in this field, negatively influencing the performance of practitioners. Among the most important effects I mention the following:

• increasing of the time until the onset of the motor reaction, as a result of the occurrence of an external or internal stimulus – this is because alcohol acts as a blocker making it "impossible to suddenly increase muscle permeability to sodium"[16]. Sodium is an essential mineral with an important role in the excitability and achievement of muscle contractions, and implicitly in the regulation of muscle activities.

• diminishing the possibility of the human body to perform coordinated movements, either segmentally or as a unitary whole. Alcohol is a disruptive factor for all motor control centers in the brain. It acts as a barrier between the command received from the motor centers and the performance of the motor action or gesture itself.

• "restricting certain metabolic processes – alcohol reduces or may even stop metabolic processes by which glucose can be synthesized from non-carbohydrate resources (for example, lactic acid), extremely important for developing and maintaining muscle effort. Reducing or preventing the re-synthesis of glucose in endurance (long-term) efforts can lead to the development of hypoglycemia, a factor conducive to the occurrence of situations that can degenerate and endanger human life"[17].

• decreased muscle performance – the influences mentioned above will have a negative finality on the performance of most muscle groups, body motor skills (strength, endurance, mobility, speed, skillfulness).

• increasing number of heartbeats (heart rate) – acceleration of the heart rate of the resting person occurs due to the vasodilating effect of alcohol. Alcohol consumption causes a dilation of the skin blood vessels. This dilation requires a higher blood flow than usual, the heart, in this situation, having to pump more blood. Or, the amount of blood needed for the vessels is supported by a higher heart rate than usual.

• creating predispositions for contracting certain diseases and infections – alcohol acting as a blocker and inhibitor of the body's defense processes, it limits the action of the body's immune system and its fight against pathogenic factors, this being an indirect cause with negative implications for the performance of motor actions and activities.

Conclusions

I presented a series of data indicating the nature of alcohol and cigarette consumption favoring the occurrence of important changes in the proper functioning of the human body. Both alcohol and cigarettes, but also their combination in the situation of simultaneous consumption, are the basis for

disorders of metabolic processes, dysfunction of internal organs, negative influences on the activity of the central nervous system.

Whether it is about immediate or long-term effects of alcohol and cigarette consumption, the consequences will be reflected for a long time on the human health condition. In the short term, the subtlety of simultaneous consumption, given that cigarettes act as a mild activator and alcohol as an inhibitor, premises are created for the consumption of a larger amount of alcohol (there is a sensation of not feeling drunk). In the long term, their combination and simultaneous or individual consumption will lead to a series of serious medical problems and various social issues, in the absence of control and reason.

NOTES:

1 http://apps.who.int/gho/data/node.sdg.3-5-viz?lang=en, accessed on 05.03.2020.

2 "A ferruginous organic substance which is the coloring matter of red blood cells and which, by its property of oxidizing and reducing itself easily, has a role in the respiratory process, spreading the inspired oxygen in the body", https://dexonline.ro/definitie/hemoglobina

3 G.C. Ciapa, *Guidelines and opportunities for the physical training of military personnel*, "Carol I" National Defence University Publishing House, Bucharest, 2019, p. 103.

4 G. Kuschinsky, Lullmann, *KurzesLehrbuch der Pharmakologie*, Thieme, Sttutgart, 1974, p. 285.

5 Diameter reduction of blood vessels.

6 K. Focke, *Auswirkungen des Zigarettenrauchens. Fur die Bundesregierungantwortet der Budesminister fur Jungend. Familie und Gesudheit dem Parlament*, Drucksache 7/2070 des DeutschenBundestages von 10.5.1974, p. 5.

7 J. Weineck, *Biologie du Sport*, Research Center for Sports Problems, Bucharest, 1995, p. 334.

8 They are associated with an increased cardiovascular risk.

9 G.C. Ciapa, *Guidelines and opportunities for the physical training of military personnel*, "Carol I" National Defence University Publishing House, Bucharest, 2019, p. 104.

10 *Ibidem*, p. 105.

11 www.formaremedicala.ro/educatie-pacienti/beneficiile-renuntarii-la-fumat (CO – carbon monoxide; MI – myocardial infarction; CVA – Cerebrovascular accident/stroke; COPD – Chronic obstructive pulmonary disease – Pathology of the lower respiratory tract, with high mortality rate).

12 G.C. Ciapa, *op.cit.*, p. 105.

13 *Ibidem*.

14 F. Furtunescu, A. Galan, C. Mihăiescu-Pinția, *Study on the economic impact of harmful alcohol consumption on the Romanian health system*, Bucharest, 2013, p. 24.

15 J. Weineck, *Biologie du Sport*, Research Center for Sports Problems, Bucharest, 1995, p. 338.

16 *Ibidem*, p. 339.

17 G.C. Ciapa, *Guidelines and opportunities for the physical training of military personnel*, "Carol I" National Defence University Publishing House, Bucharest, 2019, p. 106.

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