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ВЛИЯНИЕ ЭЛЕКТРОННЫХ СИГАРЕТ НА ОРГАНИЗМ ЧЕЛОВЕКА. ИХ ВОЗДЕЙСТВИЕ НА СТУДЕНТОВ УГМУ

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Аннотация

Введение. В статье рассмотрены механизмы действия электронных сигарет на дыхательную систему человека, влияние химических элементов состава электронной сигареты на организм, изучены и проанализированы заболевания дыхательной системы, вызванных испарением электронных сигарет и методы их диагностики. **Цель исследования** – изучить влияние испарения электронных сигарет на дыхательную систему и организм человека, методы диагностики болезней, изучить и выявить влияние электронных сигарет на студентов УГМУ в возрасте от 18 до 25 лет. **Материалы и методы.** Используются теоретические и эмпирические методы исследования: опрос студентов УГМУ, анализ полученной информации, изучение научной литературы, обобщение, сравнение и систематизация данных. **Результаты.** Курение электронных сигарет способствует ухудшению общего самочувствия человека, развитию респираторных заболеваний, образованию злокачественных опухолей. У студентов УГМУ, курящих электронные сигареты, проявляются симптомы: одышки, тошноты, проблемы с дыханием и пищеварением, тревожное состояние, помутнение сознания, периодический кашель, учащенное сердцебиение и никотиновая зависимость. **Обсуждение.** Люди, которые часто вдыхают в себя аэрозоль электронных сигарет, получают большие дозы химических веществ, содержащихся в жидкости для этих устройств. Они оказывают токсичное действие на структурные элементы организма человека. **Выводы.** Вещества в электронных сигаретах накапливаются в организме человека. Испарения электронных сигарет вызывает заболевания, связанные с дыхательной системой, сердечно-сосудистой системой.

Ключевые слова: электронные сигареты, дыхательная система, диагностика.

THE EFFECT OF ELECTRONIC CIGARETTES ON THE HUMAN HEALTH. THEIR IMPACT ON USMU STUDENTS

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Abstract

Introduction. The article discusses the mechanisms of action of electronic cigarettes on the human respiratory system, the influence of the chemical elements of the composition of an electronic cigarette on the body, studied and analyzed diseases of the respiratory system caused by the evaporation of electronic cigarettes and methods for their diagnosis. **The aim of the study** – to analyse the effect of electronic cigarette evaporation on the respiratory system and the human body and methods for diagnosing diseases, to study and identify the effect of electronic cigarettes on USMU students aged 18 to 25 years. **Materials and methods.** Theoretical and empirical research methods are used: a survey of USMU students, analysis of the information received, the study of scientific literature, generalization, comparison and systematization of data. **Results.** Smoking electronic cigarettes contributes to the deterioration of the general well-being of a person, the development of respiratory diseases, the formation of malignant tumors. USMU students who smoke electronic cigarettes show symptoms of shortness of breath, nausea, breathing and digestion problems, anxiety, clouding of consciousness, periodic coughing, heart palpitations and nicotine addiction. **Discussion.** People who frequently inhale e-cigarette aerosols are exposed to high doses of the chemicals found in e-liquids. They have a toxic effect on the structural elements of the human body. **Conclusions.** Substances in electronic cigarettes accumulate in the human body. Vapors of electronic cigarettes cause diseases associated with the respiratory system, cardiovascular system.

Keywords: electronic cigarettes, respiratory system, diagnosis.

INTRODUCTION

An electronic cigarette is an aerosol vaporizing device. The aerosol contains nicotine, propylene glycol, carcinogens (nitrosamine) and metals, glycerin, flavors and other substances. It usually contains accumulators or tobacco heating systems that deliver nicotine and salt-containing elements through the respiratory tract to the lungs.

The aim of the study – to study the manifestation of symptoms in USMU students aged 18 to 25 who smoke electronic cigarettes, to analyze the effect of electronic cigarette components on the human health, to consider diseases caused by chemicals in electronic cigarettes and their diagnosis.

MATERIALS AND RESEARCH METHODS

Theoretical and empirical research methods are used: survey of USMU students, analysis of the information received, the study of scientific literature, generalization, comparison and systematization of data.

THE RESULTS OF THE RESEARCH

Substances delivered to the lungs through smoking an electronic cigarette are in high concentration for the human body, which leads to diseases of the respiratory and cardiovascular systems. Diagnosis of diseases caused by smoking electronic cigarettes is difficult due to the similarity of symptoms of diseases with symptoms of various respiratory tract infections.

As a result of a survey of USMU students aged 18 to 25 in the amount of 132 people, aimed at determining the most common symptoms when using electronic cigarettes, the following data were revealed: nicotine addiction in 33 students (61.1%) is the main symptom. Next in prevalence are shortness of breath, occasional cough, nausea, and palpitations, each these symptoms are present in 15 students (27.8%). Breathing problems and blurred consciousness have 24 people (22.2%). 9 students (16.7%) face anxiety, 6 people (11.1%) face digestive problems. Aggressive state of the respondents was not detected (0%).

The symptoms are explained by the presence of chemical elements in the electronic cigarettes.

DISCUSSION

Consider each component of liquid for electronic cigarettes and its effect on the health.

With constant inhalation of an aerosol with propylene glycol, irritation of the mucous membrane of the respiratory tract occurs, which leads to a feeling of dryness and sore throat; increases the risk of spreading respiratory diseases; the formed formaldehydes contribute to the occurrence of malignant tumors and cancer.

Glycerin in gaseous form absorbs and retains water in tissue cells, which leads to dryness in the mouth, throat, redness and swelling, discomfort in the chest due to the drying of the mucous membrane of the lower respiratory structures. With constant smoking of electronic cigarettes, glycerol in high concentrations through the alveoli enters the human circulatory system and penetrates into the cells of the body by diffusion. Dehydration begins in the cells, which can lead to loss of consciousness and metabolic disorders throughout the body.

Nicotine, getting into the respiratory system, causes a prolonged narrowing of arterioles and capillaries. Prolonged vasoconstriction in the lungs leads to disruption of normal gas exchange in them and to hypoxia. Nitrosamines are highly soluble in water, respectively, when they enter the body through the respiratory system, they quickly penetrate into all tissues and biological fluids. The action of this substance has a cumulative effect, which subsequently leads to the emergence of malignant tumors.

The metals that make up the liquid for electronic cigarettes exceed the allowable values by dozens of times. So, for all analyzed brands of liquid, the average concentrations (SD) ranged from 4.89 (0.893) to 1970 (1540) μg/l for lead, from 53.9 (6.95) to 2110 (5220) μg/l for chromium and from 58.7 (22.4) to 22600 (24400) mcg/l.) μg/l for nickel. Manganese concentrations ranged from 28.7 (9.79) to 6910.2

(12,200) μg/l. Marked differences in nickel and chromium concentrations within and between brands of fluids have also been found, which may be associated with heating elements [1].

Based on the above data, it can be concluded that an increased concentration of heavy metals affects the human body. So, a high lead content leads to dysfunction of the genitourinary system, the nervous system; anemia. Chromium, under constant exposure, accumulates in organs, and when exposed to nicotinic acid and other amino acids, it forms resistance to glucose. Manganese is a weakly toxic element, but in the form of a permanganate ion, it has an oxidizing effect in the cells of the body.

Acrolein stimulates the nasal cavity, damages the lungs and inner walls of blood vessels, and is a major factor in cardiovascular disease. Chronic inhalation of acrolein inhibits the circulation of endothelial progenitor cells and promotes the development of atherosclerosis, which accelerates the rate of aortic sclerosis by 1.6 times [2].

As a result of the action of these substances, a person who smokes electronic cigarettes is more prone to respiratory diseases and has reduced immunity.

Cardiomyocytes and endothelial cells, as well as lung cell structures in vapers are largely damaged due to the evaporation of e-liquid from e-cigarettes. This results in oxidative stress and inflammation comparable to tobacco smoke [3].

Due to the rapid development of the electronic cigarette industry, new diseases are emerging that are specific only to vapers.

Vaper disease (EVALI) has become a common disease among e-cigarette smokers. The main symptoms: shortness of breath, fever, vomiting - in 83%. Cough-75%.No lethal outcomes were found, 69% were hospitalized for hypoxemic respiratory failure [4]. Diagnosis of EVALI is hampered by the similarity of symptoms and examination methods with a pulmonary infection. Predominantly, computed tomography of the chest demonstrates bilateral ground-glass pathological changes in the lung tissue, mainly in the lower lobes of the lung.

Less common is popcorn lung disease (bronchiollitis obliterans). Caused by diacetyl, which is part of the flavorings in e-liquid. Promotes inflammation, scarring and constriction of the bronchioles. The clinical picture is an increase in shortness of breath, dry cough and general intoxication of the body. Diagnostic methods include computed tomography; functional tests: spirometry, body plethysmography; bronchoscopy.

Currently, the methods of complete treatment of diseases have not been fully investigated, and are not applied in practice. Treatment is carried out only by relieving symptoms.

CONCLUSIONS

1. Having studied the materials, we can draw conclusions about the negative impact of electronic cigarettes on the human respiratory system, and the body as a whole.

2. Common symptoms in USMU students aged 18 to 25 are nicotine addiction, shortness of breath, nausea, heart palpitations, occasional cough. The presence of symptoms is explained by the action of chemical elements on the human health.

3. The action of high concentrations of chemicals such as propylene glycol, glycerin, nicotine, heavy metals and carcinogens can affect the formation of malignant tumors, the development of inflammation of the respiratory tract and lungs, chronic diseases of the respiratory system and general dehydration of the body.

4. The clinical picture of diseases caused by electronic cigarettes often coincides with the symptoms of various infections of the respiratory system. For the correct diagnosis of the disease, it is necessary to use computed tomography, bronchoscopy. Currently, treatment is only aimed at relieving symptoms.

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Аннотация