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**DEPARTMENT OF DISEASE PREVENTION,
HEALTHY LIFESTYLE AND EPIDEMIOLOGY**

FUNDAMENTALS OF A HEALTHY LIFESTYLE

Study Guide for foreign citizens studying in English

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The Study guide for foreign students of medical universities with teaching in English, corresponds to the working programs of the discipline "Fundamentals of a healthy lifestyle" - the training manual is adapted to the previously published manual "Fundamentals of a healthy lifestyle". It includes practical questions for students to perform in the classroom, which touch on individual and social aspects of health and motivate students to healthy behavior. The main attention is paid to the elements of a healthy lifestyle, its categories that make up the quality of life, which are of a public nature, risk factors for diseases and measures to prevent their negative impact on the human body. The chapters consist of blocks of control tests and tasks for practical work and self-control of students on the topics under study.

This manual is designed to meet the requirements of work programs and is intended to ensure the educational process during practical classes and for independent training of students.

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FOREWORD

In order to emphasize the preventive direction of modern medicine, the World Health Organization introduced the term "*health promotion* " (health promotion) as a set of social, economic and other aspects of health aimed at improving the quality of human life.

However, health promotion is impossible without lifestyle changes. Being the main factor influencing health, lifestyle determines its condition by more than 50%. Therefore, the promotion of a *healthy lifestyle* is central to the promotion of health .

The concept of "healthy lifestyle" , first of all, is focused on a specific person. It involves identifying risk factors in an individual and developing specific programs to reduce potential harm to health, as well as changing the attitude of an individual to their own health and understanding health as a fundamental human value.

It should be noted that the science of a healthy lifestyle is relatively young, the main research in this area is carried out abroad. Therefore, in the Russian-language literature, the terminology and classifications used in this textbook are practically not settled.

The proposed training manual was compiled in accordance with the requirements of the Federal State Educational Standard 3+ HE in the discipline "Fundamentals of a Healthy Lifestyle" and includes sections on individual and social aspects of health and a healthy lifestyle, motivation for the formation of a healthy lifestyle, issues of medical examination of the population and health groups. The main attention in the training manual is given to a detailed consideration of individual factors of a healthy lifestyle with an emphasis on potential risk factors for the development of socially significant diseases and measures to prevent their negative impact on the human body. A separate section of the manual is devoted to the modern organizational, legal and functional foundations of the activities of health centers.

To improve the quality of mastering the discipline in the textbook, basic concepts are given, control questions for self-training and self-control from students are given, tasks for independent work during classroom classes are presented. All CHAPTER s in the tutorial are considered sequentially and are designed for step-by-step assimilation of the material.

This manual will allow students to systematize and concretize knowledge in the field of the basics of a healthy lifestyle, which will allow future specialists not only to follow a healthy lifestyle themselves, but also to contribute to its formation in patients.

TABLE OF CONTENTS

INTRODUCTION

A serious victory over many infectious diseases, which was marked by the first half of the 20th century, thanks to the development of methods of vaccination, and then the discovery of antibiotics, antiviral, antifungal and antiparasitic drugs, led to a significant increase in life expectancy.

However, the progress of medical science, along with the development of the benefits of civilization, brought to mankind new diseases, which, if they were known before, did not represent such a serious problem. We are talking, first of all, about non-communicable diseases (cardiovascular, endocrine, oncological, etc.).

The development of agriculture and the food industry has led to the elimination of hunger and, at the same time, to an increase in the availability of food, a decrease in their cost, the appearance of freeze-dried, processed foods. Overeating is no longer a rarity. Industrialization and urban climate change have led to a change in the ecological situation.

Thus, non-communicable diseases, being the reverse side of the development of human society, are often referred to as "diseases of civilization " . At the same time, the risk of their development is not the same, and depends not only on environmental, genetic factors, on progress in the field of medicine, but also on the behavior of a particular individual. That is why in recent years the paradigm of a healthy lifestyle has begun to take shape as an integral part of preventive medicine.

Like everything new, a healthy lifestyle is rooted in the deep past. However, the philosophy of a healthy lifestyle began to take shape only in the second half of the twentieth century. It has become clear that many non-communicable diseases are cheaper and easier to prevent than to subsequently treat. In addition, there is an idea of the paramount role of health saving of each individual in the prevention of non-infectious pathology. Therefore, a healthy lifestyle is a certain cultural tradition of society, which is widely instilled in many foreign countries.

The growing interest in this problem in our country is due to the fact that there has been an awareness of the health of the individual as one of the basic values of society, and the need to strengthen the preventive component of healthcare has been repeatedly noted in the speeches of the President of the Russian Federation and other top officials of the state. Of course, the prevention of many diseases is impossible without lifestyle changes. Therefore, the central point in the preservation and strengthening of both individual and public health is the creation and maintenance of motivation for the formation of a healthy lifestyle and commitment to a healthy lifestyle.

CHAPTER 1.
HISTORY OF THE DEVELOPMENT OF IDEAS OF A HEALTHY LIFESTYLE. MAIN INTERNATIONAL HEALTH ORGANIZATIONS

For a long time, ideas about a healthy lifestyle and disease prevention were primarily associated with hygiene. So, even in ancient Egypt, China, Greece, there was a set of household rules, largely fixed by religious laws.

Hippocrates pointed out that environmental conditions affect the development of diseases. He believed that the doctor should direct the regimen of a sick person in such a way that it would contribute to a speedy recovery. The birth of hygiene as a science is associated with the works of Hippocrates.

In ancient Rome, sanitation was of particular importance as a direction in the prevention of diseases. The quality control of products in the markets was introduced, water pipes were built, supplying entire cities with fresh water. Baths were actively built, and the cult of a clean body developed. In later times, wooden and earthenware was replaced by glazed ones, which was also a positive step in the field of sanitation.

The development of the Christian religion in the VI-XIV centuries. AD in Europe was accompanied by a decline in medical and preventive knowledge. The church urged to take care of the purity of the soul, not the body. In many ways, the neglect of elementary hygienic skills led to the development of epidemics of cholera, plague, and leprosy. It is characteristic that Paris in the Middle Ages was called "Lutetia" (literally - "the city of mud"). In it, as in other European cities, all sewage and garbage were dumped directly into the street.

In the XI century. AD Avicenna (Abu Ali Hussain ibn Abdallah ibn Sina) lived and worked in the Middle East in Persia, who summarized the works known to him in the field of hygiene and sanitation. He was the first to propose the use of physical exercises for healing and treatment. Avicenna researched a number of diseases related to sexual health. He first described both the beneficial and harmful properties of wine, proposed treatment with honey and vinegar.

The change in attitudes towards hygiene in Western Europe was associated with the development of capitalism in the 18th-19th centuries. At the end of the XIX century. hygiene began to develop as an experimental science. Thanks to the works of M. Petternkofer and A.P. Dobroslavin, there was an idea that "prevention is more profitable than treatment". The experimental hygiene was based on chemical, physical and biological methods of studying soil, water, air, working conditions, etc., which made it possible to experimentally substantiate hygiene standards and, in a practical way, consider the influence of environmental factors on health. F.F. Erisman at the end of the 19th century. became the founder of school hygiene. He came to Russia from Switzerland in 1869, and in 1896 he was forced to leave.

F.G. Krotkov did a lot for the development of military hygiene and radiation hygiene during the Great Patriotic War (1941-1945). He formulated the basic rules

for the sanitary well-being of troops.

In 1960-1970. Yu.P. Lisitsyn proposed the term "sanology" (health of healthy people).

In 1990, I.L. Brekhman suggested using the term "valeology" instead of "sanology". However, at present, the term “healthy lifestyle”, borrowed from foreign literature, is more often used.

Some authors believe that this term was first used by Academician of the Academy of Sciences of the Ukrainian SSR N.M. Amosov. He proposed a systematic approach to health, believing that it is promoted by a regime of limited physical activity.

MAIN INTERNATIONAL HEALTH ORGANIZATIONS

A number of international organizations deal with health issues. According to their organizational structure, they can be:

- Governmental - uniting various states at the official level. At the international level, such a role is played by organizations created under the UN.
- Non-governmental - uniting voluntary participants.

Table 1 shows only some of the organizations. The goals and objectives of these organizations are different. Among them, the main one is the World Health Organization.

Table 1. Selected international organizations working in the field of health.

Name of the organization	**Web site**	**The main goals and objectives of the organization related to health protection**
World Health Organization (WHO)	http://www.who.int	Program coordination in health care, generalization of world experience
United Nations for education, science and culture (UNESCO)	http://www.unesco.org	Skill building saving health student behavior
United Nations Children's Fund (UNICEF)	http://www.unicef.org	Children's health and rights
International labor organization (ILO)	http://www.ilo.org	Workers' health
Red Cross	http://www.icrc.org	Help for the victims during military conflicts and other emergency situations
World Medical Association	http://www.wma.net	Definition of medical standards activities
The World Bank	http://www.world-bank.org	Financing of projects related to health
Population Fund UN	http://www.unfpa.org	Ensuring the equal rights of men, women and children to a

		healthy life
Joint United Nations Program for HIV/AIDS (UNAIDS)	http://www.unaids.org	Prevention, treatment HIV/AIDS and control of the spread HIV/AIDS

The World Health Organization is the key international organization working in the field of health. She deals with issues of statistics in the field of health, generalization of world scientific research, cooperation in health protection, development of recommendations.

The history of WHO begins with the organization in 1839 of the Constantinople High Council of Health, which was in charge of controlling ships in the ports of Turkey to prevent the spread of plague and cholera. In 1851, the International Sanitary Conference on Quarantine in the Mediterranean was organized in Paris, in which Russia also participated. In 1902, the Pan American Sanitary Bureau (Washington, USA) was established, and in 1907, the Public Bureau of Hygiene for Europe (Paris, France). They were engaged in the dissemination of information about infectious diseases. In 1923, the International Health Organization of the League of Nations (Geneva, Switzerland) began to work.

As an independent organization, WHO was established in 1945 (the decision of the United Nations Conference), and in 1946 the charter of this organization was adopted. The date of adoption of the WHO Constitution (7 April) is celebrated as "World Health Day".

Thanks to the efforts of WHO, a campaign to eradicate smallpox was carried out (the last case was in 1981). The campaign to combat malaria has reduced the incidence by 2 times. An immunization program against the six most important infectious diseases has been organized. WHO is involved in the formation of primary health care services, medical schools, training courses.

The WHO representative office is constantly operating in Russia, the office is located in Moscow.

Control questions for self-study:

1. *What science is considered the original for the category of medicine "healthy lifestyle"?*
2. *Which of the ancient scientists first spoke about hygiene?*
3. *Which international organizations deal with health issues ?*
4. *Who gave the name "healthy lifestyle".*
5. *What are the functions of the World Health Organization?*

CHAPTER 2

HEALTH. HEALTHY LIFESTYLE. HEALTHY LIFESTYLES AND DISEASE PREVENTION.

Health is a state of complete physical, mental and social well-being and not merely the absence of disease (according to the WHO Constitution)**.**

WHO proposes to distinguish between personal and public health.

Personal health characterizes the state of the individual. This expression implies that at some nearest period of time a person can be healthy and able to work. However, he is not guaranteed against diseases when conditions in his environment change.

Public health *is* the state of society as a whole. It is characterized by such indicators as birth rate, death rate, average life expectancy.

A healthy lifestyle is a way of life aimed at maintaining and improving people's health.

A healthy lifestyle means a change in the attitude of the individual and society as a whole to the state of personal (and through it, public) health. If an individual does not drink alcohol, does not smoke, does not use drugs, is engaged in physical culture, then his chances of getting sick are reduced. If society prohibits advertising of alcohol, tobacco, then their consumption decreases. If the state is engaged in the construction of sports facilities, promotion of active sports, then the number of people involved in physical culture is growing. Thus, only a combination of individual and social activities is able to improve both personal and public health.

Speaking about a healthy lifestyle, it should be understood that the problems of public (social) health in different countries are not the same, therefore, various measures may be required to address them.

The main objectives of programs aimed at promoting a healthy lifestyle are preventive.

According to the WHO definition, ***disease prevention*** is activities aimed at preventing diseases: the fight against risk factors, immunization, slowing down the development of diseases and reducing their consequences.

Table 2. Correlation between different types of prevention

	Individual	group	population
Primary			
Secondary			
Tertiary			

Medical prevention in relation to the population

(FORMS of prevention)

1) individual - preventive measures are carried out with individual individuals,

2) group - preventive measures are carried out with groups of people with similar symptoms and factors,

3) ***population (mass)*** - preventive measures covering large groups of the

population (population) or the entire population as a whole.

There are the following types of prevention:

1. Primary prevention - aimed at preventing the development of diseases in healthy individuals.

2. Secondary prevention - carried out in persons with risk factors in order to prevent the development of a certain disease, as well as in patients with the initial stages of chronic diseases, in order to slow down the progression of the disease, increase the remission period

3. Tertiary prevention - intended for patients with chronic diseases. In the stage of remission, it is carried out in order to reduce the number of relapses, their duration, severity, slow down the progression of the disease, and in the stage of exacerbation (manifestation). The main task of tertiary prevention is the speedy recovery of patients and social adaptation.

Control questions for self-study:

1. Define the term "health".
2. What types of health do you know (according to WHO)?
3. Define the term "healthy lifestyle".
4. Define the term "prevention"
5. Types of medical prevention?
6. Forms of medical prevention?

CHAPTER 3. *ELEMENTS OF A HEALTHY LIFESTYLE. HIERARCHY OF HEALTHY LIFESTYLE ELEMENTS. MOTIVATIONS UNDERLYING THE FORMATION OF A HEALTHY LIFESTYLE.*

The formation of a healthy lifestyle consists of two main areas:

Table 3. Formation of a healthy lifestyle

Creation and development of positive factors for health	Overcoming Risk Factors
• physical activity, • environmental literacy • rational (balanced) nutrition, • compliance with the rules of personal hygiene • vaccination • family planning (desired child at the right time), • timely medical examination	• hypodynamia • environmental pollution • malnutrition • bad habits • stress • self-medication

Experts identify the following main elements of a healthy lifestyle that can be arranged in a hierarchy:

The main elements of a healthy lifestyle include:

- rational (balanced) nutrition;
- optimal physical activity (movement, strengthening exercises);
- hygiene measures (personal and public hygiene, sex education, family planning);
- giving up bad habits (alcohol, smoking, drugs);
- prevention of infectious diseases (vaccination, hardening, environmental awareness)
- rehabilitation measures (recovery after diseases, stress prevention)

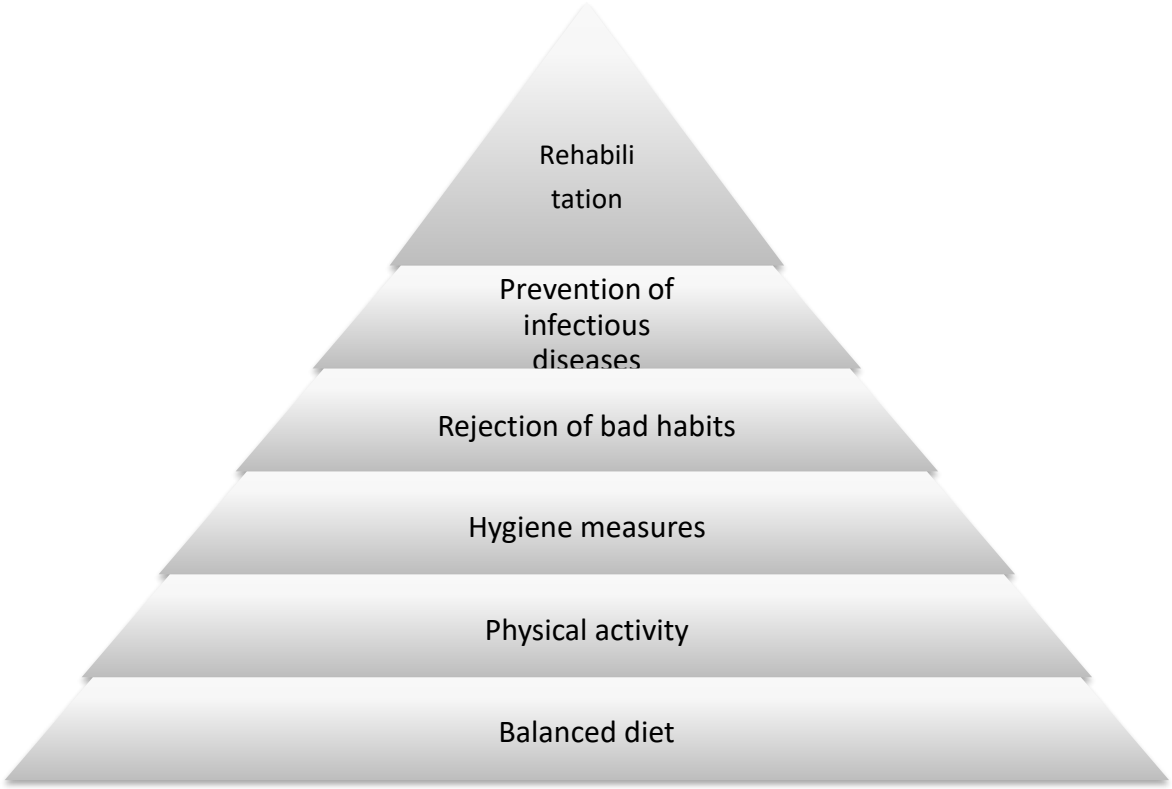


Figure 1. Hierarchy of elements of a healthy lifestyle

Motivation for health is the motivation for actions that have as their goal the maintenance of health or its improvement. The problem is that it is difficult for a person to want to be healthy if he is healthy at the moment and does not experience any discomfort.

Types of motivation for the formation of a healthy lifestyle:

☺ *Self-preservation motivation* .

No special activity is required here. The goal is to keep what is already there. You simply do not take those actions that can harm your health.

☺ *Motivation to prevent disease.*

We suffer when we are sick. We have to go to the clinic, take medicine, put up with some physical limitations, spend time on medical procedures, etc. All these activities

are not pleasant and the desire to avoid them is often a powerful incentive to lead a healthy lifestyle.

☺ *Motivation to maintain efficiency and the possibility of self-improvement.*
The disease is a serious obstacle to study and career. An employer is more likely to hire and promote a healthy person than someone who has health problems.

☺ *Motivation for the pleasure of feeling good.*
It takes place when a person enjoys his healthy state, his ability to improve physically, go in for sports, dance, etc.

☺ *Motivation for the possibility of sexual realization and obtaining full-fledged offspring.*

☺ *Motivation for obedience to ethno-cultural requirements.*
Almost all ethno-cultural traditions are based on the observance of healthy lifestyle factors, and attributing oneself to a particular culture requires obligatory observance of these traditions.

Control questions for self-study:

1. *What elements of a healthy lifestyle do you think are the most important? (Hierarchy)*
2. *What elements of a healthy lifestyle do you know?*
3. *What are the main directions of a healthy lifestyle?*
4. *Define the concept of "health motivation"*
5. *What types of motivations underlie the formation of a healthy lifestyle?*

CHAPTER 4. *QUALITY OF LIFE. FACTORS AND CONDITIONS DETERMINING THE HEALTH OF THE POPULATION.*

Quality of life is a concept that is broader than just material security. The term was originally proposed by sociologists, and then moved to medicine. From the point of view of medicine, the quality of life depends not only on the state of health, but also on the ability to communicate, psychological and social status, freedom of activity, the presence of stress, leisure activities, the level of education, and access to social assistance.

The term "quality of life" was first introduced by J. R. _ Elkkinton in 1966. The growth of interest in it is largely due to the dissatisfaction of the population with the level of services provided. The doctor should not only treat or prevent the disease, but also improve the quality of life of the patient.

According to WHO recommendations, the following main criteria are used to assess the quality of life:

1. *Physical* - strength, energy, fatigue, pain, discomfort, sleep, rest.
2. *Psychological* - positive or negative emotions, thinking, learning,

memorization, concentration, self-esteem, appearance, experiences.

3. *Level of independence* - daily activities, performance, dependence on drugs, treatment or someone's care.
4. *Life in society* - personal relationships, the social value of the subject, sexual activity.
5. *Environment* - well-being, safety, life, security, accessibility and quality of medical and social security, accessibility of information, the possibility of obtaining knowledge and obtaining qualifications, leisure, ecology.
6. *Spirituality* - personal and religious beliefs.

There is the International Society for the Study of Quality of Life (http : www . isoqol . org). In Russia, the leading organization for the study of the quality of life is the International Center for the Study of the Quality of Life (http://quality-life.ru) .

The use of quality of life criteria in modern medicine can be explained using A. Maslow's pyramid (Fig. 1)

According to A. Maslow, there is a hierarchy of human values: without satisfaction of the lower level, it is impossible to satisfy the next one. Medieval medicine could only satisfy the physical needs of individuals. For example, to contribute to the preservation of life in extreme situations. Medicine of the late XIX - early XX century. due to the development of vaccination, it made it possible to feel safe in the face of epidemics. Modern medicine offers the services of aesthetic dentistry, plastic surgery, etc. It should be noted that A. Maslow believed that the hierarchy of needs is not fixed and depends on the individual characteristics of the individual.

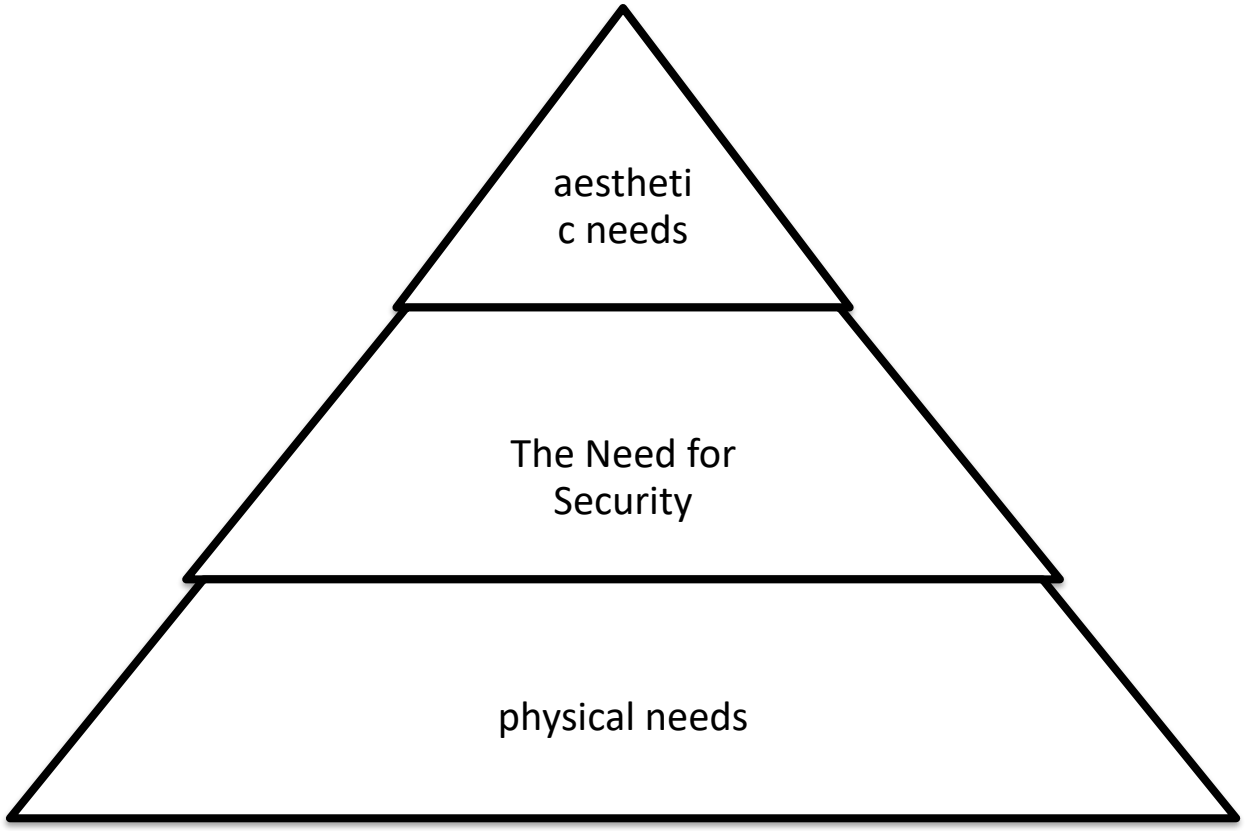


Fig.2 Pyramid A. Maslow

FACTORS AND CONDITIONS DETERMINING THE HEALTH OF THE POPULATION.

Calculations based on data on the incidence of the population show (Yu.P. Lisitsyn) that the first place among the factors that determine health is occupied by ***lifestyle*** . The proportion of health risk factors associated with lifestyle is 50-55%. Approximately 15-20% are occupied by ***hereditary factors*** and ***environmental pollution*** , and 10-15% are accounted for by the work ***of health authorities and institutions (services)*** . We can talk about an impact of 10-15%, meaning only medical care for the sick, and with fairly well-funded health care systems.

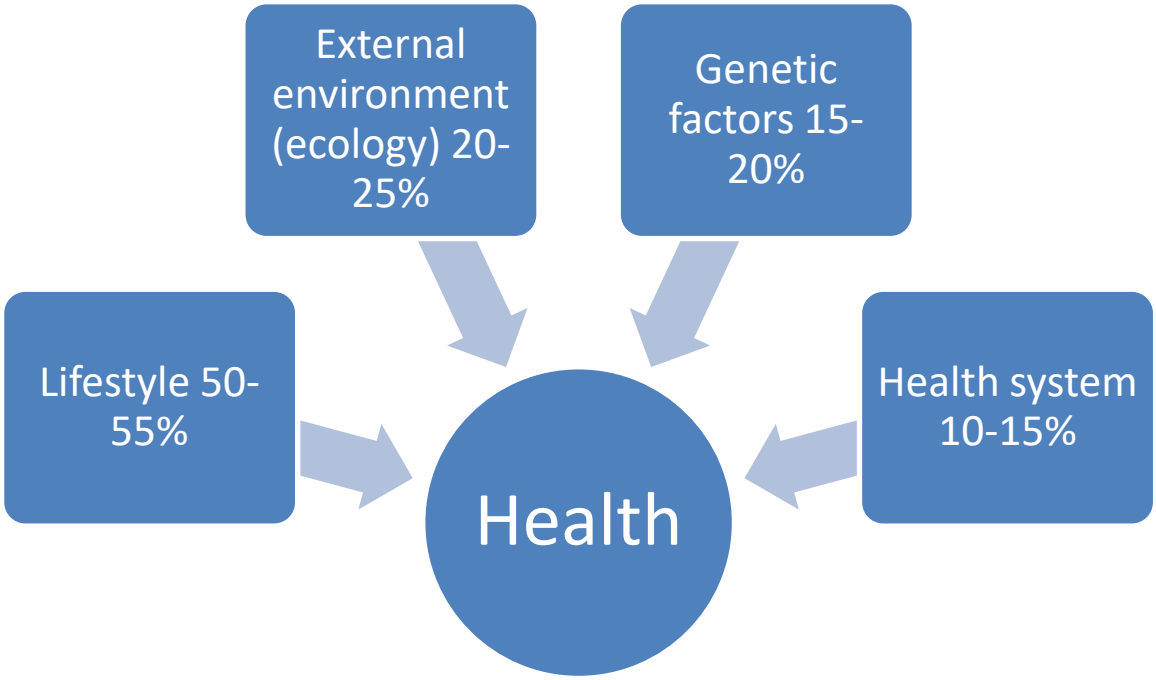


Figure 3. Factors and conditions that determine the health of the population.

Table 3. Grouping of factors determining morbidity

Category factors	Example of risk factors	Share %
Lifestyle	Bad habits: smoking, drinking alcohol, using drugs Unbalanced diet stressful situations Harmful working conditions Low physical activity (physical inactivity) Low cultural and educational level	50-55
External environment	Pollution of air, water, soil with carcinogens and other harmful substances Abrupt changes in the state of the atmosphere Increased heliocosmic, radiation, magnetic and other radiations	20-25
Genetic factors	Hereditary predisposition to certain diseases	15-20
healthcare	Ineffectiveness of preventive measures Poor quality and untimely medical care	10-15

Definitely, we can only say that the impact of lifestyle on health is 2-2.5 times higher than other factors. Thus, according to WHO, 80% of cases of diseases

of the cardiovascular system and type 2 diabetes, as well as about 40% of cases of malignant neoplasms, can be prevented by modifying the lifestyle of the population and reducing the influence of risk factors.

Control questions for self-study:

1. What is quality of life?
2. What criteria includes quality of life, according to WHO?
3. What does Maslow's A-Pyramid lifestyle criteria look like?
4. Factors and conditions that determine the health of the population.
5. What is the role of lifestyle impact on health?
6. Give examples of risk factors that are related to the image life?
7. Give examples of risk factors that are related to external her environment?

CHAPTER 5. *RATIONAL NUTRITION IS THE BASIC ELEMENT OF A HEALTHY LIFESTYLE. BODY MASS INDEX*

1. Rational nutrition - nutrition that provides energy body needs and a balanced intake of nutrients.

Nutrients (nutrients) needed by the body can be *divided* into several groups:

major substances (macronutrients) - contained in large quantities: proteins, fats, sugars;

minor substances (micronutrients) - contained in small quantities: vitamins, minerals;

dietary fiber - cellulose, pectins, etc.;

water;

optional substances (not necessarily contained in food): bioflavonoids, polyphenols, etc.

The body's need for nutrients is determined by genetic factors and varies depending on age, physical activity, and other factors. Therefore, any tables indicating recommended levels of nutrient intake should be considered as indicative only.

Any deviation from a balanced diet can be called *irrational nutrition.*

customary to distinguish the following ***types of malnutrition*** :

malnutrition (malnutrition) - low intake of all nutrients and insufficient intake of calories from food;

unbalanced nutrition - a disproportionate intake of nutrients necessary for the body with adequate calorie content of food;

overnutrition (overeating) - excessive intake of nutrients in the body.

malnutrition is now relatively rare. It has been proven that poor nutrition is the cause of major non-communicable diseases (WHO, 2004):

- cardiovascular diseases;
- type 2 diabetes;
- some types of neoplasms.

Also, malnutrition is significantly associated with the development of caries and osteoporosis. With a high degree of certainty, it can be argued that irrational nutrition leads to the appearance of excess body weight. Probably, the development of many diseases of the gastrointestinal tract is associated with poor nutrition.

On the basis of research conducted in Russia, recommended levels of nutrient intake have been developed and approved (2004). This document has no analogues in world practice and serves as an important tool for specialists, which allows them to navigate the recommended daily dosages of nutrients.

2. Balance of energy and body weight, dietary requirements

The food that an individual consumes is converted into energy as a result of chemical reactions. This energy is used in the following ways:

- maintaining a constant body temperature;
- implementation of all biological functions and biochemical processes; performance of mechanical work by muscles;
- digestion and assimilation of food.

It should be noted that it is impossible to clearly delineate the direction of energy expenditure. Thus, heat is generated during exercise. It should also be borne in mind that part of the energy in the process of chemical transformations is dissipated in the form of heat.

It is very important for the body to maintain a zero energy balance (Fig. 4.). The energy balance means the difference between the consumed and expended energy:

Energy balance=energy input-energy output

With a zero energy balance, the body mass of an organism does not change. With a negative energy balance, the body weight of an individual decreases (Gurr M., 1998). With a positive energy balance, body weight increases according to the ratio:

Incoming energy \u003d energy expended + excess body weight

Incoming energy	=	**Consumable energy**	→	**Body mass constant**
Incoming energy	<	**Consumable energy**	→	**Body mass decreases**
Incoming energy	>	**Consumable energy**	→	**Body mass increases**

Figure 4. Energy balance and body weight

The extreme degree of increase in body weight is manifested in the form of ***obesity*** .

For rational nutrition, it is necessary not only to maintain a zero energy balance, but also the correct diet. The following are the main ***DIET REQUIREMENTS*** :

- *meals should be four to five times a day;*
- *it is necessary to exclude long breaks (more than 4-5 hours) between meals;*
- *energetically with breakfast it is necessary to receive approximately 25% of food, with lunch - 35%, dinner - 15% and 25% - with other meals it is impossible;*
- *Eat just before bedtime (1 hour or less).*

3. Determination of body mass index

- **BMI (body mass index)** - characterizes the body weight per unit of its surface. BMI is calculated as the ratio of weight in kilograms to height in meters squared. **BMI** (kg / m ^{2}) \u003d weight of a person in kg / his height in m ^{2} . Lack and excess of BMI can lead to the development of diseases (Table 4).

Table 4. Classification *of body weight in adults and the incidence of chronic noncommunicable diseases in adults*

Classification	**BMI, kg / m ^{2}**	**The likelihood of developing diseases**		
		Cardiovascular	**bronchopulmonary**	**Endocrine**
Insufficient body mass	<18.5	Low	increased	low
Norm	18.5 - 24.9	Low	low	low
Overweight	**>25.0**			
Pre-obesity	25.0 - 29.9	Medium	low	low
Obesity I degree	30.0 - 34.9	Increased	low	average
Obesity II degree	35.0 - 39.9	Significantly increased	possibly increased	increased
Obesity III degree	>40.0	Significantly increased	increased	significantly or significantly increased

There are automatic methods for assessing the energy needs of the body. They are implemented in scales, which, simultaneously with body weight, measure

the electrical resistance of the body and calculate the ratio of adipose and muscle tissues (bioimpedancemetry). This method seems to be the most convenient for practical purposes.

Test questions:

1. *Define healthy eating?*
2. *What are the basic principles of rational nutrition?*
3. *How is energy balance related to body weight?*
4. *What are the dietary requirements?*
5. *What are the main mistakes in nutrition?*
6. *What ways do you see to overcome them?*

CHAPTER 6. *MAIN NUTRIENTS. BASIC PRINCIPLES OF ORGANIZATION OF RATIONAL NUTRITION. PYRAMID OF NUTRITION*

1. Key Nutrients

Rational nutrition should cover the energy and plastic needs of the body. In other words, the food consumed should provide a zero energy balance and contain all the nutrients the body needs.

The main sources of energy for the body are proteins, fats and carbohydrates. The optimal ratio of proteins: fats: sugar to meet the energy needs of the body should be approximately equal to 1:1:4. It should be borne in mind that the calorie content of 1 g of carbohydrates is 4 kcal, and fat - 9 kcal. Thus, at the same weight, carbohydrate-containing foods are less caloric than fatty foods.

No single food product contains all the nutrients the body needs. Therefore, WHO recommends diversifying the diet as much as possible. According to experts, the daily menu should contain at least 15-17 items of food, and the weekly menu should contain 32-34. The daily menu should contain at least 400 g of fruits and vegetables and no more than 10 g of salt

1.1. Proteins

The main ***functions of proteins*** in the body include:

1) *plastic function* ,
2) *energy function - providing up to 15% of energy metabolism,*
3) *the formation of hormones and enzymes,*
4) *transport function*
5) *fertile function,*
6) *hereditary function*
7) *immune function - the formation of antibodies,*
8) *maintenance of oncotic pressure,*
9) *participation in deamination reactions.*

Proteins are made up of amino acids, which are divided into:
a) interchangeable - can be synthesized in the body from other amino acids;
b) essential - cannot be synthesized from other amino acids.
Proteins that contain all the essential amino acids are called *complete proteins.*

It is generally accepted that the human body must receive complete proteins every day. An example of such proteins are: meat, poultry, fish. In recent years, recommendations for daily protein intake have been revised downward. It should be about 0.8 g / kg of human weight. Meat protein intake of more than 80 g/day is associated with a high risk of colon cancer (CINDY, 2000).

European experts (Gurr M., 1998) recommend people over 45 years of age to abandon the daily consumption of meat and poultry, replacing them with fish. From our point of view, this recommendation is not related to the properties of fish protein, but to the following facts:

- ✓ usually fish is less nutritious than meat and poultry;
- ✓ as a rule, fish contains less fat than meat and poultry;
- ✓ fish is a source of calcium and phosphorus;
- ✓ fish is a source of omega-3 acids, which, according to some studies, can prevent the development of atherosclerosis.

With a lack of protein, protein starvation develops, manifested by a decrease in body weight, a decrease in immune defense, and the development of edema. An excess of proteins in food leads to the development of putrefactive processes in the intestines.

1.2. Fats

Dietary fats are a mixture of various triglycerides. Triglycerides are made up of the trihydric alcohol glycerol to which three different fatty acids are attached.

Fatty acids - linoleic and linolenic - are indispensable, as they are not synthesized in the human body. Of these, other fatty acids are formed in the body, as well as a large group of highly active metabolic regulators (prostaglandins, thromboxanes, leukotrienes). Fats are carriers of fat-soluble vitamins A, E, D , and K.

To avoid weight gain as a result of excessive fat intake, no more than 20-25% of the body's energy needs should be covered by fat. However, the complete elimination of fats from the diet is impossible, given

functions fats in the body.
1) are an important source of energy,
2) are part of the cell membrane,
3) provide absorption of fat-soluble vitamins,
4) improve the taste of food,

In addition, cholesterol, which is part of fats, is responsible for tissue turgor, hormone synthesis.

Meanwhile, excess body weight is a risk factor for the development of type 2 diabetes mellitus, cardiovascular disease and some other chronic non-communicable diseases.

An excessive increase in body weight is mainly due to an increase in the proportion of adipose tissue in the body, which is 85% fat.

Fat intake is especially closely associated with the development of atherosclerosis. The basis of the pathogenesis of atherosclerosis is the imbalance of blood lipoproteins. Atherosclerosis is the leading link in the pathogenesis of stroke, coronary heart disease, and other cardiovascular diseases. Lipoprotein balance and blood cholesterol levels are determined by dietary fat intake. Lowering blood cholesterol levels and normalizing the balance of lipoproteins reduces the risk of developing coronary heart disease in healthy individuals (primary prevention) and in people who have previously had a myocardial infarction (secondary prevention).

In recent years, nutritionists in a number of countries have considered the issue of the negative impact of ***trans-fatty*** acids on the human body. Such acids are usually abundant in prepared foods, in particular, in fast food restaurants. Trans fats can form during cooking (frying).

WHO proposes to limit the intake of saturated *fatty acids* and *trans fatty acids* as much as possible, replacing them with unsaturated fatty acids as much as possible.

1.3. Carbohydrates

The main ***functions of carbohydrates*** in the body are as follows:

1) *are a source of energy - up to 56%, participate in the synthesis of non-essential amino acids,*

2) provide the activity of the nervous system (lecithin and glucose),

3) glucose is involved in the synthesis of glucuronic, hyaluronic acids and CoA .

Sugars are chemically classified as simple carbohydrates. They are sweet nutrients found in fruits, unripe vegetables. Sugars are also added to food during cooking. When organizing a balanced diet, sugars should be the main source of energy.

Monosaccharides are usually crystalline solids, readily soluble in water, and have a sweet taste. The main representatives of the group are glucose, fructose and galactose.

Glucose - grape sugar, widely distributed in nature, found in fruits, especially grapes, as well as seeds, green parts of plants, berries, honey. Some experts believe that excessive glucose intake may be one of the causes of diabetes.

It should be noted that a large number of monosaccharides are found in carbonated drinks. It can reach 40 g per 100 ml. Quite often, monosaccharides are added in large quantities to lactic acid products to improve their taste. Monosaccharides can be used in the preparation of sauces. Buns in fast food restaurants often contain monosaccharides.

Fructose is a fruit sugar found in the free state in honey, fruits, berries, seeds, green parts of plants. In the liver, fructose is converted into glucose, so its use by patients with diabetes cannot be unlimited. Fructose is less likely to cause caries than glucose.

Disaccharides . The most important in human nutrition are sucrose, lactose and maltose. Sucrose is the most well-known and widely used ordinary sugar in nutrition and the food industry. Lactose is milk sugar, composed of galactose and glucose residues. Promotes the absorption of calcium in the gastrointestinal tract.

1.4. Alimentary fiber

According to the chemical structure, dietary fibers are carbohydrates. Dietary fiber stimulates the motility of the small and large intestines.

Foods rich in dietary fiber usually require more thorough and longer chewing than foods low in fiber. In the stomach, dietary fiber swells and contributes to the rapid formation of a feeling of satiety. Therefore, it is easier to limit calorie intake by increasing the amount of dietary fiber in the diet.

Epidemiological studies show that dietary fiber pectins lower postprandial glucose levels. There is also limited evidence that pectins can lower blood cholesterol levels (Gurr M. _ I , Asp N. _ G. , 1994).

Low dietary fiber intake is considered a risk factor for the development of cardiovascular disease (Kritchevsky D , Bonfield C. , 1995).

From food rich in dietary fiber, absorption of minerals occurs better. Phytic acid, which is part of the fibers of cereals, increases the absorption of iron and zinc. The content of phytic acid can be increased during the cooking process, during the fermentation of the dough.

Part of the dietary fiber is resistant to the action of enzymes of the gastrointestinal tract. Such fibers are called *indigestible.* Indigestible dietary fiber has no energy value, but they are the main stimulators of colonic motility.

A large number of indigestible dietary fiber is found in whole grains, bran. When the grains are destroyed, the content of indigestible fibers decreases.

Dietary fibers that break down in the gastrointestinal tract are called *digestible.* They are broken down to mono-idisaccharides and in this form are absorbed into the blood. The absorption of monosaccharides from digestible dietary fiber occurs more slowly than from dietary monosaccharides. Therefore, in diabetes, it is often recommended to replace monosaccharides with dietary fiber.

The daily intake of dietary fiber in the European Union is at the level of 20 g.

WHO recommends increasing fruit and vegetable intake to 400 g/day. According to experts, the average consumption of vegetables and fruits by Russians is about half of the recommended norm.

Because in the process of cooking, partial destruction of dietary fibers may occur, then at least half of the vegetables and fruits are recommended to be consumed raw. At the same time, it is recommended to eat bread with every meal

1.5. Vitamins, minerals and optional nutrients

The most important essential nutrients are vitamins and minerals. They are involved in the functioning of enzymes. Since most vitamins are not synthesized by the human body, insufficient intake of ***vitamins*** with food leads to deficiency states.

Avitaminosis is understood as a deep deficiency of one or another vitamin with a detailed clinical picture of the state of insufficiency . *Hypovitaminoses* include states of moderate vitamin deficiency with nonspecific manifestations.

Usually, a deficiency of vitamins and minerals develops with their lack in food. Vegetables and fruits contain more vitamins than other foods. The storage and cooking process can adversely affect the vitamin content. There is no single food product that contains all the vitamins and minerals. So, potatoes are rich in vitamin C, but poor in iron; grain products contain iron, but not vitamin C. Therefore, the diet should be as diverse as possible.

Drinking water is an important source of ***minerals .*** With a lack of minerals in the water, serious diseases can develop. Thus, iodine deficiency is associated with endocrine disorders, fluorine deficiency - with an increased risk of developing caries.

A large number of regions of the Earth and the Russian Federation are characterized by iodine deficiency. WHO recommends introducing iodized salt into the diet in all iodine-deficient regions (Krasnodar Territory).

Facultative nutrients are sold as dietary supplements. Many of the optional nutrients are thought to contribute to protection against cancer (William GM , 1992).

Among the facultative nutrients , *antioxidants play a special role* . A number of studies show that antioxidants reduce the risk of developing cardiovascular disease. Some experts conclude that antioxidants lower blood cholesterol levels.

The use of antioxidants significantly reduces the likelihood of developing cancer of the lung, gastrointestinal tract, cervix, prostate, breast, ovary (Block Getal ., 1992). At the same time, vegetables, fruits and greens are the main source of antioxidants (Table 5). In addition, vegetables and fruits contain magnesium, which reduces the risk of developing hypertension.

β -carotene also have antioxidant properties .

Table 5. Some sources of antioxidants (Langseth L. , 1995)

Food	Antioxidants
Legumes	Isoflavones, phenolic acids
Tea (black, green)	Polyphenols, catechins
Coffee	Phenolic esters

Red wine	Phenolic acid
Rosemary, sage, herbs	carnosic acid
Fruit	Bioflavonoids, chalcones
Onion garlic	Quercetin, kaempferol
Olives	Polyphenols
Corn, rapeseed, sunflower, soy	Phytosterols
Onions, lettuce, tomatoes, peppers, citrus, soy	Flavonoids
Citrus, cherry	Terpenes

1.6. Water and salt

Water is the main component of the body. Its share fluctuates throughout life and is about 75% of body weight for a newborn and 55% for the elderly.

The main biochemical reactions in the body take place in water. For their normal course, an important factor is the presence of some dissolved minerals in the water, the main ones being sodium, chlorine and potassium.

Water can be formed as a result of a number of biochemical reactions. However, it is synthesized too little to ensure all the vital functions of the body, so its constant intake is necessary. A person can live for several days without water.

There is equality between the inflow and outflow of water. The removal of water is determined by the ambient temperature and the intensity of physical activity. According to WHO recommendations , sufficient water intake is 30 ml times 1 kg of body weight / day. for an adult. In hot climates, this value should reach a higher amount.

Water enters the human body not only as a drink. Part of the water comes from food, while fresh vegetables and fruits are richer in water than meat and fish dishes.

During the heat, with intense physical work, vomiting, diarrhea, not only water is lost, but also minerals. Therefore, it is important to replenish not only water, but also minerals.

Water requirements vary by individual. Thus, diet influences water consumption. For example, with an increased intake of proteins, a large amount of water is required for their digestion.

Water consumption is regulated by the feeling of thirst, which depends not only on water loss, but also on the concentration of minerals. If a person sweats profusely, then pure water cannot quench the feeling of thirst. In this case, you need to add salt to the water or drink juices. However, it should be remembered that many ready-made juices contain sugar.

The formation of a feeling of thirst may be disturbed in old age. Therefore, older people are usually advised to regularly drink small amounts of water, regardless of the appearance of thirst.

It takes some time to quench the feeling of thirst. Therefore, the rapid use of water can lead to its excessive intake in the body.

Of particular importance for the human body is the intake of salt with various drinks and foodstuffs. A direct relationship has been shown between salt intake and the risk of developing cardiovascular disease.

Recent recommendations recommend maintaining a salt intake of 5-8 g/day. A diet with less than 5 g of salt (the *salt-free* diet) may be recommended for individuals with other risk factors for cardiovascular disease.

It is recommended to limit salt intake. Soy sauce, herbs, spices can be used to add flavor to food. It is also recommended to replace table salt with iodized salt. This is due to the almost universal distribution of iodine deficiency in drinking water. Iodine deficiency makes it impossible to synthesize thyroid hormones. Depending on age, this results in:

1) during pregnancy - to miscarriage;

2) in early childhood - to a lag in mental and physical development;

3) in adolescence - to a lag in the intellectual sphere;

4) in the adult period - to increased fatigue.

Dietary iodine intake is the only proven way to prevent iodine deficiency. At the same time, iodized salt is the most studied substance for such prevention.

2. ***Basic principles of rational nutrition***

Since the composition of most foods is known, it is possible to balance the intake of key nutrients. By diversifying the diet, it is possible to choose it so that it meets the principles of rational nutrition. However, the balance approach is extremely cumbersome and difficult to implement in practice (Table 6).

Table 6 .. Example of calculating the balance of the diet

Product	The weight, G	calories, kcal	Proteins / fats / carbohydrates, G	The content of vitamins and micro-elements, which)
Monday				
Breakfast				
Egg	fifty	35	2.5/2.5/0	A, D, E, Fe, Mg, Cu

Dinner				
Total for Day				
Tuesday				

The second approach is based on the division of food by color. The color scheme is reminiscent of a traffic light. Green color depicts the products of the main diet recommended for daily use, yellow - those whose use should be limited, red - it is better to avoid. Graphically, this approach is depicted in the form of a "nutrition pyramid".

The Nutritional Pyramid illustrates both the variety and the ratio of foods that are essential for a healthy diet. Products from the green layers should be consumed daily. Cereal products: bread, pasta, brown rice, etc. should form the basis of the diet. The daily intake of vegetables and fruits should be at least 400 g.

Food items marked in yellow are needed in limited quantities. Their excessive consumption can lead to the development of chronic non-communicable diseases. It is preferable to replace meat with fish and dairy products that contain calcium.

Foods marked in red are high in energy and low in vitamins and minerals. From the point of view of the prevention of chronic non-communicable diseases, it is better to exclude these products from the diet. Only limited use is possible.

The nutritional pyramid is most appropriate for use in health promotion programs. The information presented graphically is well visually perceived.

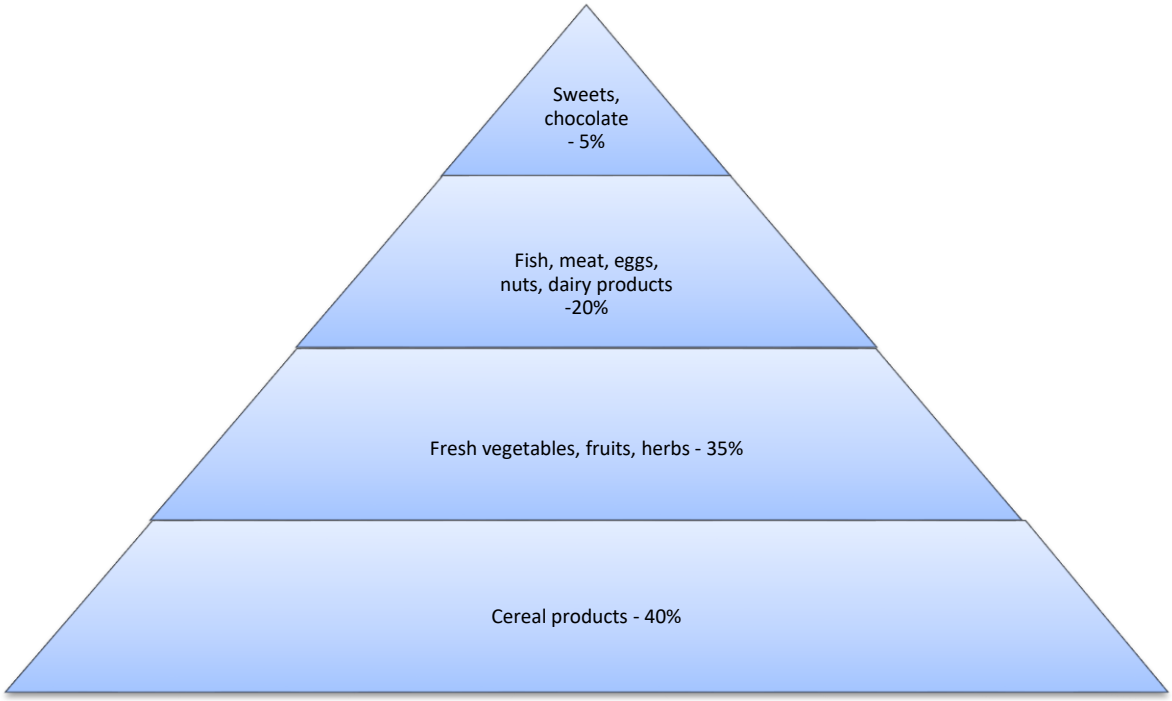


Figure 6. Food pyramid.

The verbal description of the pyramid of rational nutrition is formalized in the form of the principle "12 steps to a healthy diet" (WHO, 2005):

1. It is necessary to consume as many different foods as possible, most of which are of plant origin. Food products should not cause the development of allergies.
2. Bread, cereal products should be consumed several times a day.
3. Fresh vegetables and fruits should be consumed daily several times a day. Preferably grown in the area of residence. The daily intake of vegetables and fruits should be at least 400 g.
4. Daily moderate physical activity is required.
5. Daily fat intake should not exceed 30%, while fats of vegetable origin are preferable.
6. It is necessary to replace fatty meat and meat products with lean meat, poultry, fish or legumes.
7. Milk and dairy products that are low in fat and salt should be consumed.
8. Choose foods that are low in sugar. You need to limit your intake of sugar and sugary drinks.
9. No more than 1 teaspoon (6 g) of salt per day should be consumed. Replace table salt with iodized salt.
10. It is necessary to limit the consumption of alcohol to 20 g in terms of pure alcohol.
11. It is necessary to ensure the safety of food preparation. Food must be prepared in a hygienic manner. Frying should be avoided. Optimal cooking -

steam, microwave, boil. Cooked food should be stored in the refrigerator, and it is better to eat it fresh.

12. It is necessary to ensure breastfeeding of newborns at least up to 6 months, but less than 4 months.

According to the World Health Organization (WHO)

More than 1.4 billion adults aged 20 and over are overweight.

Of these, over 200 million are males and nearly 300 million are females.

Overall, more than 10% of adults are obese.

In 2019, more than 40 million children under the age of 5 were overweight or obese

Test questions:

1. *What do you know about nutrients?*
2. *What should be the ratio of proteins, fats and carbohydrates in daily diet?*
3. *List the main functions of proteins.*
4. *List the main functions of carbohydrates.*
5. *List the main functions of fats.*
6. *Why is frequent consumption of fast foods bad for health?*
7. *Why are trans fats the most unhealthy?*
8. *What is the purpose of the nutritional pyramid?*
9. *What avitaminosis, hypovitaminosis do you know?*
10. *What are the components of the principle "12 steps to a healthy diet", according to WHO.*

CHAPTER 7 . *PHYSICAL ACTIVITY AND HEALTHY LIFESTYLES*

Physical inactivity is a lack of physical activity. Currently, there is an increase in hypodynamia and related pathologies. With physical inactivity, metabolic changes occur that lead to obesity, sexual disorders, insomnia, as well as deadly diseases: arterial hypertension, coronary heart disease and stroke.

Hypodynamia is regarded as a "disease of civilization".

The mechanization of labor, the development of means of transportation have reduced the need for daily physical activity.

Lack of physical activity leads to serious costs to the health care system.

Physically active people, compared with those leading a sedentary lifestyle, have a lower risk of developing chronic degenerative diseases, coronary heart disease, arterial hypertension, stroke, and osteoporosis. There is limited evidence that exercise can reduce the risk of colon cancer.

According to international recommendations, several types of physical activity are distinguished (Table 7). At the same time, physical inactivity is the most significant risk factor for the development of chronic infectious diseases.

It has been demonstrated that physical activity reduces the risk of developing cardiovascular diseases, while the preventive effect of walking is comparable to that of other types of physical activity.

Physical activity can reduce the concentration of glucose in the blood and increase the sensitivity of tissues to insulin. Based on the results of epidemiological studies, it can be assumed that physical activity reduces the risk of developing type 2 diabetes. Some experts estimate that the risk of developing type 2 diabetes is reduced by about 6% for every 500 kcal expended per week through physical activity.

Physical exercise stimulates the musculoskeletal system and delays the age-related process of bone mass thinning.

However, in women up to five years after menopause, there was no association between fracture risk and physical activity. In the later post-menopausal period, daily walking reduced the likelihood of developing a hip fracture by 18%.

Table 7. ***Classification of types of physical activity (according to International Physical Activity Prevalence study)***

The presence of hypodynamia	**Type of physical activity**	**Criterion**		
		Work	**daily walking**	**Physical education in free time**
There is	Physically inactive persons	Sedentary or home work	Less than 30 minutes	Missing
	Low level of physical activity	Sedentary or home work	30-60 minutes	Missing
Not	Average level of physical activity	Mostly associated with walking	Any	Missing
		Any	60-90 min	
			Any	20-40 min/day 1-4 days a week
	High level of physical activity	hard physical work	Any	Any

		Any	Over 90 min	
			Any	20-30 min/day or more, 5-7 days a week

Regardless of its intensity and duration, exercise contributes to energy expenditure. Thanks to them, it is easier than with the help of a diet to achieve a negative energy balance, i.e. help control body weight. It has also been proven that people with low physical activity are more likely to increase their weight in the next ten years than those who lead an active lifestyle.

The risk of developing myocardial infarction is reduced by three to four times in men consuming 2000 kcal / week. on physical activity, compared with those leading a sedentary lifestyle.

In the elderly, physical activity contributes to endurance. In addition, exercise stimulates appetite, which is important for most older people, who are characterized by its decrease.

New research on the use of moderate physical activity in rehabilitation and treatment is constantly emerging. Moderate exercise lowers blood pressure in hypertension. Thanks to the appointment of physical exercises, the rehabilitation of patients with myocardial infarction is accelerated.

However, it should be borne in mind that excessive or improperly selected physical activity adversely affects the state of the body. It can lead to injury. Therefore, persons with physical inactivity are recommended to increase physical activity gradually, starting from 5-10 minutes / day, depending on the physical performance of the individual, so that the load does not cause discomfort.

Physical education starts from childhood. In this period, the organization of mass sports events, the use of visual agitation tools that promote the need for movement are effective as health promotion programs. An important role in shaping the physical activity of children and adolescents is played by the state policy, which determines the accessibility of sports facilities.

For middle-aged and elderly people, individual conversations about the need to lead a more active lifestyle are an effective method of improving health if hypodynamia is detected. At the same time, it should be remembered that a change in physical activity entails a change in the prevailing stereotypes of behavior, therefore additional physical activity should be recommended as carefully as possible. In addition, physical exercises must be selected individually, taking into account the interests and capabilities of the individual.

Physical culture and sports during the period of growth and development largely determine the constitutional features of an adult.

However, the constitution of a person, in addition to hereditary factors, is influenced by lifestyle and environmental factors. The physical condition of an adult depends on the mode of physical activity and the nature of nutrition. With aging, the morphological and functional indicators of physical development undergo involution.

Therefore, optimal physical activity in all periods of life is one of the most important factors for a healthy lifestyle.

Physical activity should be selected individually, under the supervision of a specialist: a physiotherapy doctor or a sports doctor.

Physical education can have various goals: increase the amount of muscle mass, reduce the amount of subcutaneous fat, correct posture, improve well-being. Based on the purpose of the classes, personal characteristics, a set of exercises is selected.

Rational construction of physical activity.

The correct construction of physical activity allows you to increase work efficiency and reduce injuries and the risk of developing diseases of the musculoskeletal system. During OFC classes, three periods are distinguished in changes in the functional state of the human body: pre-start (typical for professional athletes), main (period of work) and recovery.

In the pre-start state, which occurs several minutes or hours before the start of the competition, the heart rate, systolic and minute volume of blood circulation increase, blood pressure rises, pulmonary ventilation, energy consumption, and body temperature increase. Pre-launch changes in functions are conditioned reflex, accelerate the processes of development and prepare the body for the upcoming load.

The working period begins with a warm-up. Warm-up is a complex of special procedures of special exercises performed before a workout or competition and helps to speed up the process of working out and increase efficiency.

Warm-up is general and special. The general warm-up consists of exercises that can increase the excitability of the central nervous system, body temperature, and activate the oxygen transport system. The special part of the warm-up in its structure should be as close as possible to the nature of the upcoming activity.

After a properly conducted warm-up, the period of working-in begins - a period of increasing efficiency. With exercises of the same nature and power, the faster the training, the higher the level of training. After a period of working-in during long-term aerobic work, a steady state sets in, during which the performance and indicators of physiological functions that provide oxygen transport change insignificantly. Lactic acid does not accumulate in the muscles, which ensures that the acid-base balance is maintained. However, under the influence of prolonged or intensive work, fatigue can occur. Fatigue is a temporary functional state of a person, which leads to a decrease in work efficiency, increases the risk of injury.

Water procedures

Water procedures not only have hygienic properties, but also contribute to relaxation after physical education and sports.

The shower has a thermal and mechanical effect on the body. The intensity of exposure is determined by the force of mechanical action and water temperature. A hot shower increases the intensity of metabolic processes, can help reduce the

intensity of pain in the muscles. A warm shower has a calming effect. A cold shower improves the tone of the cardiovascular and muscular systems. A contrast shower is an effective restorative remedy.

Baths promote relaxation and recovery, so they are recommended before bedtime. The duration of the bath is 10-15 minutes. An additional relaxing effect can be achieved in the jacuzzi bath and by spraying aromatic substances.

Linking exercise with nutrition

Physical activity alone is not enough to combat hypodynamia; a combination of physical activity and rational nutrition is necessary. Carbohydrates are the most important source of energy that comes from food.

When food enters the body, there are three main uses for glucose:

- Glucose is oxidized for energy;
- When the amount of glucose exceeds the amount needed for energy, it is converted into muscle and liver glycogen;
- When the glycogen depot is saturated, glucose is converted into fats, which are deposited in fat cells.

WHO global strategy for physical activity and nutrition

Formulation of the problem:

1. Insufficient physical activity and malnutrition are leading causes of non-communicable diseases, including cardiovascular disease, type 2 diabetes, certain types of cancer, and osteoporosis. Insufficient physical activity leads to a significant share of the global burden of disease, death and disability.

2. The main burden of noncommunicable diseases occurs in developing countries, where those affected are, on average, younger than those in developed countries. The rapid decline in physical activity due to progress further exacerbates the situation.

3. An integrated approach to correcting reduced levels of physical activity can help reduce the burden of chronic noncommunicable diseases.

4. The experience of a number of countries shows that the structure of unhealthy behavior and related diseases is laid down in the most affluent sections of society. However, over time, all of the major risks of chronic infectious diseases tend to cluster in the poorest communities and become an important contributor to social class inequalities.

5. In all countries, the underlying determinants of infectious diseases are the same. They include reduced levels of physical activity. Of particular concern is the reduced physical activity of children and adolescents.

6. Diet and physical activity affect health both together and separately. Physical activity is the main means of improving the physical and mental health of the individual.

Opportunity: There is a unique opportunity to formulate and implement an effective strategy to decisively reduce mortality and morbidity through increased physical activity.

Goal and objectives: The overall goal and objectives are to improve the health of the population. The global strategy has four main objectives:

1. Reducing risk factors for chronic noncommunicable diseases resulting from unhealthy diets and physical inactivity.

2. Increasing general awareness and understanding of the role of diet and physical activity as determinants of public health and the positive potential of preventive interventions.

3. Encourage the development, strengthening and implementation of global, regional, national and community policies and action plans to improve diet and physical activity.

4. Collection of scientific data and monitoring of major impacts on diet and physical activity, supporting research in a wide range of relevant areas.

Basis for action:

1. Data show that people can remain healthy beyond the age of seventy with an optimal diet, regular physical activity, and abstinence from tobacco.

2. The individual is encouraged to maintain an adequate level of physical activity throughout life. Physical activity is a key determinant of energy expenditure, which is essential for energy balance and weight control.

Therapeutic exercise (LFK)

Exercise therapy is a method that uses the means of physical culture with a therapeutic and prophylactic purpose for a faster and more complete restoration of health and prevention of the development of diseases. Usually exercise therapy is used in combination with other treatments. The active factor of exercise therapy are specially organized types of exercise.

There are the following main *types of exercises in exercise therapy* :

1. Gymnastic exercises are performed from a certain starting position, with a certain speed, amplitude, and repeatability. According to the effect on muscle groups, gymnastic exercises are divided into exercises for the muscles of the neck, arms, trunk, abdominal wall, pelvic floor, etc. According to the methodological orientation, gymnastic exercises can be aimed at endurance, coordination, stretching, etc.

2. Static exercises are carried out by tensing certain muscles, holding dumbbells, balls, kettlebells, own weight, etc. Static exercises contribute to the development of strength and endurance of muscles, prevent the development of their atrophy after injuries, during immobilization.

3. Stretching exercises are used in the form of various movements in the joints, followed by fixation of the joint in the extreme position.

Used to relieve fatigue, with contractures, increased muscle tone.

4. Relaxation exercises are used to reduce muscle tone (for example, in case of injuries).

5. Ideomotor exercises are performed mentally, they give instructions to perform the movement of an immobilized limb (gypsum, immobilization).

6. Passive exercises are performed by a physical therapy doctor without the efforts of the individual. They are used to stimulate the restoration of muscle activity.

7. Breathing exercises contribute to the excitation and strengthening of the respiratory function. They help to strengthen the chest, strengthen the respiratory muscles, and eliminate congestion in the lungs.

8. Corrective exercises contribute to the correction of posture and figure.

9. Hydroxynesotherapy - exercises in water. Warm water can make it easier to exercise when your joints are less mobile.

Professional sports and health

Currently, all over the world, increased attention is paid to the health of athletes and the influence of professional factors on it. The influence of professional sports on the cardiovascular, respiratory and musculoskeletal systems is widely known.

Many factors have been noted that **negatively** affect the condition of the skin during sports: infectious agents, mechanical damage, as well as psycho-emotional factors that are especially active during competitions. An integral part of professional sports is the frequent change of geographical and climatic zones, which also has a negative effect on the human body.

Depending on the specialization, athletes train in various, sometimes extreme conditions. A feature of water sports is the daily long stay of an athlete in the water, skin contact with chemical agents that are added to the water for cleaning and disinfection.

The applied chemicals can destroy the lipid barrier of the skin, thereby facilitating the penetration of chemical compounds through the skin and cause prolonged exacerbations of the skin pathological process, increased itching and other manifestations of dermatosis, and the development of skin dysbiosis.

Swimmers swallow, on average, 10-15 milliliters of water while overcoming a distance in open water, which can lead to infection.

Sports facilities include the use of public locker rooms, showers and saunas, fitness equipment and sports equipment. This contributes to the direct or indirect transmission of pathogens of bacterial, fungal and viral diseases. The development of dermatosis can be associated with both infection with fungal microflora and changes in the levels of normal bacterial microflora.

To achieve high results, professional athletes perform excessive physical activity that goes beyond the body's adaptation, leading to the development of chronic physical stress, overload. Increasing competition in elite sport provokes the use of illegal drugs (doping).

DOPING

Dopings are a group of substances used to artificially increase the physical performance and endurance of athletes or sports animals. The first doping control program was developed by UNESCO in 1952.

According to international norms and regulations, up to. Athletes may be subject to doping control during and after the competition. The result is considered positive if prohibited substances or their metabolites are found in the studied biological fluid (blood, urine). In some cases, athletes are forced, for medical reasons, to take drugs that are prohibited or their analogues. In such a situation, the team doctor must record the medical indications and inform the regulatory authorities.

Physical education is an integral part of a healthy lifestyle.

Test questions

1. List the main positive aspects of the influence of physical culture on health.
2. What is the importance of water procedures after physical culture and sports?
3. What are the basic principles of prescribing physical exercises do you know?
4. How does exercise affect body weight?
5. What are the main provisions of the WHO global concept in the field of physical culture?
6. How do professional sports affect health?
7. What is called doping?

CHAPTER 8. STRESS, ITS CAUSES, IMPACT ON THE ORGANISM, WAYS TO REMOVE STRESS

Mental health (spiritual, sometimes **mental** health), as defined by *the World Health Organization* , is a state of well-being in which a person can realize their own potential, cope with the normal stresses of life, work productively and fruitfully, and contribute to their society.

Stress, its causes, effects on the body .

Stress (eng. " ***stress*** " - tension) - a state of the body that occurs as a result of intense or prolonged exposure, regardless of their qualitative nature, and is characterized by the tension of non-specific adaptive mechanisms. The concept of "stress" was introduced in 1936 by the Canadian pathophysiologist Selye (N. Selye). Stress can be triggered by cold, heat, exercise, emotional stress, pain, and other stimuli. Such concepts as "cold stress", "gravitational stress", "heat stress" testify only to the nature of the influencing factor.

According to Selye's theory, any influencing factor causes both specific reactions due to the qualitative characteristics of this factor, and non-specific, or stress, reactions associated with the emergence of a state of stress.

A set of the same type of stress reactions can manifest itself at the level of the whole organism (general adaptation syndrome) and within the tissue damaged

by the influencing factor (local adaptation syndrome).

Stress reactions are aimed at increasing the body's resistance to any influences and are protective and adaptive in nature. In their implementation, i.e. in the development of the general adaptation syndrome, activation of the hypothalamus-pituitary-adrenal cortex and excitation of the sympathetic nervous system are of primary importance. Under the influence of factors that cause stress, neurosecretory cells of the hypothalamus produce corticoliberin, which stimulates the secretion of adrenocorticotropic hormone from the pituitary gland, which causes the secretion of corticosteroids.

The main manifestations of the general ***adaptation syndrome*** are due to the hypersecretion of these hormones, as well as hormones - mediators of the sympathoadrenal system that affect the production of glucose and fatty acids, protein metabolism, the immune system, the activity of the heart and blood vessels, ion metabolism, etc. Some hormones contribute to the creation of an inflammatory barrier to the spread of a pathogenic factor, while others suppress inflammation, limiting the pathogenic consequences of the inflammatory focus itself. The balance of the effects of hormones of both groups provides the best resistance to the influencing factor.

General adaptation syndrome, non-specific in origin, however, is quite specific in its manifestations and mechanism of development.

It begins ***with the anxiety stage*** , during which, in response to the initial shock (according to Selye's terminology), the body's general defenses (*anti-shock*) are mobilized, which is mainly associated with an increase in the flow of energy substrates (glucose and fatty acids) to the tissues. As a result, the so-called ***catabolic phase*** of stress is formed.

The second stage of the general adaptation syndrome is the stage ***of resistance,*** during which the body acquires resistance not only to the influencing, but also usually to other factors (*cross- sensitization*). With a very intense or prolonged effect on the body, as well as with the initial weakness of the protective mechanisms, the final stage of the general adaptation syndrome develops - the stage of exhaustion, ending in the absence of therapeutic measures with the *death of the body* .

Local adaptation syndrome has the same stages as the general one, but manifests itself mainly in the form ***of inflammation*** . The severity of the local adaptation syndrome largely depends on the general adaptation syndrome.

General and local adaptation syndromes are of great clinical importance.

Repeated stressful influences, on the one hand, have *a training effect* , on the other hand, they can *deplete the body's defenses* , as a result of which even weak stimuli cause the development of serious diseases. With inadequacy of stress reactions, so-called ***adaptation diseases may appear*** , when the adaptive reaction of the body acts as a pathogenic factor (for example, inflammatory changes in the joints, eye tissues, hypertension, neuropsychiatric disorders). An excess of steroid hormones with frequent and intense stress can contribute to the occurrence of

lesions of the gastrointestinal tract (steroid ulcer). Under different conditions, the same stress reactions can have beneficial effects.

Factors influencing the final manifestations of both general and local adaptation syndrome are called ***conditioning*** (conditional).

EMOTIONAL stress is a state of tension of the physiological functions of the body, caused by prolonged exposure to an emotionally significant stimulus for the individual.

The main ***cause*** of emotional stress is the so-called conflict situations in which a person or animal, for one reason or another, cannot satisfy the leading vital social or biological need for a long time. This leads to the formation of continuous emotional arousal of a negative nature.

The danger of a prolonged negative emotional state lies in the fact that the complex of excitations formed in the central nervous system begins to exert continuous downward influences on somatovisceral functions in a neurohumoral way. If, during short-term emotional reactions, altered physiological functions quickly return to their original level due to self-regulatory mechanisms, then under conditions of stress, long-term and growing overloads lead to irreversible changes in individual links of self-regulation of a particular function.

The failure of a particular function and the development of the corresponding disease are due to a ***genetic predisposition*** and their selective involvement in emotional arousal.

Clinical observations and experimental data show that the development of emotional stress in a conflict situation in different individuals can go in different ways. In cases where there are genetic or acquired resistance mechanisms, stress does not lead to cerebral, somatic, or visceral disorders. In other cases, either disorders can develop predominantly in the activity of the central nervous system in the form of neuroses, or visceral disorders in the form *of coronary heart disease, arterial hypertension, lesions of the gastrointestinal tract* , etc. In certain cases, there may be a combined impairment of cerebral and visceral functions.

A kind of emotional stress is ***EXAM stress*** .

REASONS for it are:

- intense mental activity;
- load on the same muscles and organs due to prolonged sitting;
- violation of sleep and rest;
- negative experiences

Exam stress symptoms can be divided into four groups:

1. PHYSIOLOGICAL SYMPTOMS

- increased skin rash
- headache
- nausea
- "bear disease" (diarrhea)

- muscle tension
- deepening and rapid breathing
- rapid pulse
- fluctuations in blood pressure

2. EMOTIONAL SYMPTOMS:

- feeling of general malaise
- confusion
- panic
- fear
- uncertainty
- anxiety
- depression
- depression
- irritability

3. COGNITIVE (INTELLECTUAL) SYMPTOMS:

- excessive self-criticism, comparing one's preparedness with others in a unfavorable light for oneself
- unpleasant memories of past exam failures (one's own or others')
- imagining the negative consequences of failing an exam (expulsion from a university, deprivation of a scholarship, etc.)
- nightmares
- memory impairment
- decreased ability to concentrate, distraction

4. BEHAVIORAL SYMPTOMS:

- the desire to do any other thing, just not to prepare for the exam
- avoiding any exam reminders
- decrease in efficiency in studies during the examination period
- engaging other people in anxious conversations about upcoming exams
- increased consumption of caffeine and alcohol
- sleep deprivation loss of appetite

Stress resistance is the ability to overcome difficulties, suppress one's emotions, understand human moods, showing restraint and tact.

Stress resistance is determined by a combination of personal qualities that allow a person to endure significant intellectual, volitional and emotional stress, due to the characteristics of professional activity, without any particular harmful consequences for the activity, those around him and his health.

Remedies for stress

- Dynamism of installations
- The ability to overestimate what could not be achieved

- Objectification of stress
- The habit of relaxation
- Discrete Communication

Anti-stress relaxation
(recommended by the World Health Organization)

- Lie down (in extreme cases, sit down) more comfortably in a quiet, dimly lit room; clothing should not restrict your movements.
- Close your eyes and breathe slowly and deeply. Inhale and hold your breath for about 10 seconds. Exhale slowly, watch the relaxation and mentally say to yourself: "Inhale and exhale, like an ebb and flow." Repeat this procedure 5-6 times. Then rest for about 20 seconds.
- With an effort of will, contract individual muscles or their groups. Hold the contraction for up to 10 seconds, then relax the muscles. Thus, walk all over the body. Repeat this procedure three times, relax, give up everything, don't think about anything.
- Try as concretely as possible to imagine the feeling of relaxation penetrating you from your toes, through your calves, thighs, torso of your head. Repeat to yourself: "I calm down, I am pleased, nothing disturbs me."

Test questions for self-study

1. *Define the term mental health.*
2. *What is called stress?*
3. *What types of stress do you know?*
4. *What is the impact of exam stress on the body of an individual?*
5. *Means of protection from emotional (mental) stress?*
6. *How do you try to avoid stressful situations?*
7. *Describe the anti-stress relaxation recommended by WHO.*

CHAPTER 9. *ADDICTIVE DISORDERS. NON-CHEMICAL ADDICTIONS: PATHOLOGICAL GAMBLING, INTERNET ADDICTION.*

Addiction *(dependence) - an obsessive need felt by a person for a certain activity.* Addiction from the English word add, which means to add, attach, add; addiction - addiction, addiction, addict - a drug addict.

Classification of addictive behavior. There are several classifications of addictive behavior, most of them are based on the type of addictive agent (object, type of activity, relationship), through which mood changes and escape from reality are carried out. All types of addictions are divided into two large groups: chemical and non-chemical, there is also an intermediate group that combines the properties of the first and second.

Classification of addictions (Ts.P. Korolenko and N.V. Dmitrieva) :

- *Non-chemical addictions (behavioral, non-substantial):* gambling (addiction to gambling), Internet addiction, love addiction, sexual addiction, relationship addiction (codependence), workaholic addiction, shopping (addiction to spending money), urgent addiction, etc.
- *Chemical addictions (substantial, physical):* alcoholism, drug addiction and substance abuse.
- *Intermediate group:* addictive overeating (bulimia), addictive fasting (anorexia), orthorexia.

Pathological gambling.

Pathological attraction to gambling (gambling) according to the ICD-11 classification "consists in frequent repeated episodes of participation in gambling, which dominates the life of the subject and leads to a decrease in social, professional, material and family values, due attention is not paid to duties in this area .

The most characteristic signs for gambling include:

1. Constant involvement, increase in time spent in the game situation.

2. Changing the circle of interests, the displacement of the previous motivations for the game, constant thoughts about the game, the predominance and imagination of situations associated with game combinations.

3. "Loss of control", expressed in the inability to stop the game, both after a big win, and after constant losses.

4. States of psychological discomfort, irritation, anxiety, developing in relatively short periods of time after the next participation in the game, with an insurmountable desire to start playing again. Such states in a number of ways resemble the states of withdrawal in drug addicts, they are accompanied by headache, sleep disturbance, anxiety, low mood, impaired concentration.

5. Characterized by a gradual increase in the frequency of participation in the game, the desire for ever higher risk.

6. Periodically arising states of tension, accompanied by a game "drive", an overcoming desire to find an opportunity to participate in a game of chance.

7. A rapidly increasing decline in the ability to resist temptation. This is expressed in the fact that, having decided to stop once and for all, at the slightest provocation (meeting with old acquaintances, talking about the game, the presence of a gambling establishment nearby, etc.), gambling resumes.

The next component of the syndrome of psychophysical dependence is the syndrome of physical dependence. Physical attraction comes to replace the obsessive (i.e., obsessive thoughts) and is manifested by an irresistible desire for the process of the game, and in terms of severity it reaches the level of vital desires and even suppresses them, i.e. the need for food, sleep, normative sexuality is blocked. At the same time, the struggle of motives disappears, the patient's consciousness is completely absorbed by the game situation.

Internet addiction is a *pathological, irresistible craving for the use of Internet resources.*

The medium that supports the existence of the Internet is called cyberspace.

The diagnostic criteria for this disorder generally correspond to the criteria for non-chemical addictions of the American psychiatric classification DSM - IY :

A. Computer use causes distress;

C. Computer use is detrimental to physical, psychological, interpersonal, family, economic or social status.

Orzack M. _ He singled out the ***psychological symptoms*** characteristic of Internet addiction:

- good health or euphoria at the computer;
- inability to stop;
- increase in time spent at the computer;
- neglect of family, friends;
- feeling of emptiness, depression, irritation NOT at the computer;
- lying to employers or family members about their activities;
- problems with work or school.

Physical symptoms of internet addiction:

- carpal tunnel syndrome (tunnel lesion of the nerve

trunks of the hand, associated with prolonged muscle strain and fixation of the wrist);

- dryness in the eyes;
- migraine-type headaches;
- back pain;
- irregular meals;
- neglect of personal hygiene;
- sleep disorders.

There are the following ***forms of communication*** on the Internet:

- teleconference, chat (meaning IRC - Internet Relay chat)
- “multi-user dimension” (MUDs)
- correspondence using e-mail (e - mail).

Like other chemical and non-chemical addictions, different forms of Internet addiction can pass one into another and coexist in various combinations. Another important aspect related to Internet addiction should be highlighted. These are the serious dangers that children and teenagers can face while online :

- exploitation of trust in children: they can be seduced into committing

indecent acts;

- access to pornography;
- content sites with bomb-making instructions or

narcotic substances;

- Passion for games with violence increases the aggressiveness of children.

Control questions for self-study:

1. *What is addiction?*
2. *Classification of addictive behavior?*
3. *What is pathological gambling?*
4. *List the stages of gambling.*
5. *What are the criteria for internet addiction?*
6. *List the symptoms of internet addiction.*
7. *What are the dangers that children and teenagers can face while online ?*

CHAPTER 10

INTERMEDIATE ADDITIONS: FOOD ADDICTIONS (BULIMIA NERVOUS, ANOREXIA NERVOUS). ORTHOREXIA. PREVENTION MEASURES

Food addictions.

An intermediate link between non-chemical and chemical addictions are food addictions, which have three forms - addictive overeating (bulimia nervosa), starvation nervosa (anorexia) and orthorexia.

Bulimia nervosa (binge eating disorder) *is characterized by recurring bouts of overeating, the inability to go without food even for a short time, and an excessive preoccupation with controlling body weight.*

Those. there is an ambivalent attitude towards food intake: the desire to eat a large amount of food is combined with a negative, self-deprecating attitude towards oneself and one's "weakness". Addiction to food occurs when food is used in the form of an addictive agent, using which a person leaves the subjective reality that does not suit him. At the moment of irritation, dissatisfaction, failure and boredom, there is a desire to “seize” the trouble, using the process of eating for this. At the same time, there may be a desire to delay the process of eating in time, by eating food slowly, or by using a large amount of food. This escape from reality can be quite an effective way to control your mood, thus provoking the rapid formation of addiction.

Anorexia nervosa (addictive starvation) *is a disorder characterized by deliberate weight loss caused and maintained by the individual himself.*

The mechanism of emergence of addiction to starvation can be explained by two reasons. The medical option is due to the use of unloading diet therapy, which has been used in patients with very different disorders. The phase of entering the hunger zone is characterized by the difficulty associated with the need to cope with appetite. After some time, a change in state occurs, new forces appear, appetite disappears, mood rises, physical activity increases, hunger is easily tolerated, neurotic disorders either lose their relevance or disappear. This state is maintained for a certain time and gradually a person is removed from it. Some patients tend to continue this condition, because. it suits them, because they like what is happening

subjectively. Repeated fasting is rarely repeated in a hospital setting, it is carried out independently. At the level of euphoria achieved as a result of fasting, there is a loss of control and the person continues to starve even when fasting becomes life-threatening. He develops hyperactivity and a feeling of weightlessness, but he loses his critical assessment of his condition.

In addition to ***the medical*** option of fasting, there is also a ***non-medical*** option. This option is beginning to be closely interested in connection with the increase in this kind of fasting in countries with a high standard of living. Starvation is usually recorded among teenage girls who are brought up in fairly well-to-do and outwardly prosperous families. Fasting begins with limiting the amount of food taken, often a special scheme is devised. One of the psychological mechanisms that provoke starvation is the desire to change oneself physically, to look "better", in accordance with the image advertised in the media. A certain image of a female figure is advertised with an emphasis on underlined thinness. Girls are indirectly (with a predominant effect on the sphere of the unconscious) instilled with a feeling of hatred for their "non-thin" physical body, the need to be independent of family pressure and be able to defeat "lower physiological instincts", limiting themselves to food as much as possible.

Diagnostic criteria for anorexia nervosa are:

1. Reducing by 15% and maintaining a reduced level of body weight or achieving a body mass index of 17.5 kg / m ^{2} (the index is determined by the ratio of body weight in kilograms to the square of height in meters);
2. Distortion of the image of your body in the form of fear of obesity;
3. Intention to avoid food that can cause weight gain.

Another mechanism that "starts" fasting and is of great importance is the independent setting of the task of overcoming oneself and the emergence of a feeling of self-satisfaction and pride from its implementation.

Addictive fasting can lead to the symptom of loss of control. Starving people lose their critique of their real state, they do not see that weight loss is becoming catastrophic, that they look terrible, and what they consider "slenderness" is already cachexia (exhaustion). Loss of control leads to a complete blockade of the ability to objectively assess what is happening. The process of fasting is accompanied by mental changes that lead to a change in the perception of the reality of oneself and the world around.

A psychotherapist dealing with the correction of addictive starvation and overeating cannot expect to achieve success without understanding the characteristics of family dynamics, clarifying the psychosocial factors that provoke the development of the process. Changing interpersonal processes in the family, eliminating frozen stereotypical patterns in the communication of its members is a necessary link in the correction, along with stimulating the personal development of the addict. Correction of addiction to food proceeds slowly. The addict must be taught to be confident in his strengths and abilities, he must gradually overcome the inferiority complex and distrust of himself. Emotional support of relatives,

friends and acquaintances, their sympathetic, warm attitude has a positive meaning and should be used as an important element in the correction of the addictive process.

Orthorexia.

In 1997, Dr. Stephen Bratman first used the term "orthorexia" ("Ortho" - correct, Greek). *Orthorexia is a pathological fixation on proper nutrition, and it is classified as a mental illness.*

Orthorexics who are obsessed with eating healthy, worrying more about the quality of their food than the quantity, are constantly refining their diets based on their personal idea of what foods are truly “clean.” Any products containing pesticides, herbicides, artificial additives are often discarded, while the diet varies from person to person. Many orthorexics, for example, eat only raw fruits and vegetables, or are vegetarians, fruitarians, or, for example, eat only yellow-colored foods. As a result, psychopathic personality changes occur with the formation of overvalued ideas up to delusional formation. And as a consequence, this behavior leads to exhaustion of the body and disruption of social adaptation.

WHO has expanded the list of mental illnesses requiring immediate medical attention. Vegetarianism and a raw food diet are added to it, which, according to the classification of mental disorders, are included in group F63.8 - "other disorders of habits and drives." WHO noted that a person needs good nutrition (man is an omnivore), i.e. to support normal life, he needs a balanced diet, consisting of both plant and animal foods. From our point of view, it would be appropriate to include separate meals in this group.

Control questions for self-study:

1. *What types of addicdions are intermediate?*
2. *What is called bulimia nervosa?*
3. *Diagnostic signs of anorexia nervosa?*
4. *What types of anorexia nervosa do you know?*
5. *What types of orthorexia do you know?*

CHAPTER 11.
CHEMICAL ADDITIONS. ALCOHOL AND RELATED PROBLEMS

Traditionally, in most countries of the world, strong alcoholic beverages were not consumed, which to a certain extent was associated with concern for the health of the population. In antiquity, they drank only diluted wine and only on holidays. In ancient Rome, alcohol was allowed from the age of thirteen. In Russia, alcoholic drinks were made from honey and bread and were very expensive. Only a few centuries ago, mankind learned how to produce cheap alcohol, cheap alcoholic drinks began to appear. Modern technologies make it possible to quickly and inexpensively produce strong alcoholic beverages, which leads to mass

alcoholization of the population not only in our country, but also in the world.

First of all, drinking alcohol affects the central nervous system. Ethyl alcohol destroys nerve cells, as a result of which the volume of the brain decreases, the psyche changes. Ultimately, there is a mental destruction of the personality.

Alcohol acts on the hypothalamic centers of positive emotions, causing an improvement in mood. At the heart of irritation of nearby centers (thirst, hunger, sexual behavior, etc.) is a change in the structure of human behavior after taking alcoholic beverages.

The impact of alcohol on the central nervous system during its single use is staged. The first stage is the stage of excitement, it is characterized by a surge of strength, talkativeness, increased gesticulation. The second stage is braking. It is characterized by depression of brain activity, fatigue, irritability. Strong alcoholic drinks (stronger than 9-15%) cause irritation of the mucous membranes of the gastrointestinal tract. With their regular use, there is atrophy of the papillae of the tongue (which is accompanied by a loss of taste sensations), atrophy of periodontal tissues, and ulceration of the mucous membranes. Under the influence of alcohol, the secretory activity of the stomach is disturbed.

With chronic alcohol use, the activity of the liver is disrupted. 98% of alcohol and its metabolic products are neutralized in this organ. The use of alcohol leads to an increase in the size of hepatocytes, the accumulation of fat droplets in them. Fatty hepatosis precedes the development of cirrhosis of the liver.

Alcohol is a pancreatic poison. Drinking large amounts of alcohol can lead to the development of acute pancreatitis. Chronic alcoholism is accompanied by chronic pancreatitis.

Alcohol causes kidney damage. It stimulates the excretion of glucose, protein and other beneficial substances through the kidneys. The products of alcohol metabolism cause inflammation of the kidney tissue. Especially dangerous for the kidneys are fusel oils and alcohol surrogates (brake fluid, technical alcohol, cosmetics, etc.), which can cause necrosis of the cells of the renal tubules, kidney failure.

The products of alcohol metabolism are partially excreted through the lungs, causing damage to them. Fusel oils are especially dangerous for the lungs. The products of alcohol metabolism and fusel oils affect the trachea and bronchi, causing inflammation.

Alcohol is a poison for the cardiovascular system. It causes "washout" of electrolytes from the myocardium, as a result of which its functioning is disrupted. As a result of this action, as well as toxic damage by the products of alcohol metabolism, arrhythmias, heart failure, and cardiomyodystrophy develop. In the blood vessels, alcohol (especially in large doses) can contribute to the development of atherosclerotic plaques and blood clots.

Alcohol also adversely affects the endocrine glands. In chronic alcoholism, partial atrophy of the adrenal cortex develops. Alcohol disrupts the production of sex hormones, reduces the fertilizing ability of spermatozoa.

Alcohol is a good solvent. It easily penetrates into cells and tissues with a large amount of fat. Therefore, chronic alcoholics are underweight. However, with a single use, alcohol does not contribute to weight loss, because. is extremely high in calories.

The effect of alcohol on pregnancy

In utero alcohol exposure leads to a range of problems, from congenital malformations to neurological disorders in the newborn. The nature of the effects of alcohol during pregnancy was first described by Lemonnier in France in 1968 and named by Jones in 1973 ***"fetal alcohol syndrome" (PAS)*** . The amount and duration of maternal alcohol intake has a direct impact on the severity and extent of physical and neurological signs associated with PAS. Drinking moderate amounts of alcohol leads to a more "milder" syndrome called **the *fetal alcohol effect (FAE)*** .

It is estimated that a expectant mother's daily consumption of 150 ml of pure alcohol (2-3 times 150 ml of vodka or whiskey) leads to the fact that 1/3 of the children will have fetal alcohol syndrome (FAS), 1/3 will have some toxic prenatal effects and 1/3 will be normal children. Babies born to late-stage alcoholic mothers are most likely to develop PAS, but any pregnant woman, young or old, is at risk if she drinks during pregnancy.

Although the consequences of alcohol exposure to the fetus are well recognized, the mechanisms of their formation under the influence of alcohol penetrating the placenta and (or) its metabolites are not precisely known.

Mechanisms of the influence of alcohol on the fetus:

1. Ethanol accumulates in the amniotic fluid and is present there even when it is no longer present in the mother's blood. This means that once taken alcohol has a long-term effect on the fetus.

2. The use of alcohol by the expectant mother during the first trimester of pregnancy can lead to significant and often recurring problems in the learning and behavior of the newborn child.

3. Post-natal environmental conditions may alter how alcohol affects the fetus .

Complications of pregnancy. When a future mother drinks alcohol, the risk of miscarriage increases by 2-4 times.

Effects of alcohol on the fetus.

Fetal alcohol syndrome is characterized by a triad: growth retardation, mental retardation, and specific facial features of the newborn. In fact, alcohol is the most recognizable and preventable cause of mental retardation, occurring at a rate of 17/1000 live births (compared to 1.3/1000 for Down syndrome).

PAE and PAS are a consequence of the effect on the fetus of alcohol consumed by the mother. The severity of their manifestation depends on the sensitivity to alcohol of the embryo. The effects of PAS do not decrease over time, although the specific manifestations change as the child grows older. Attention

impairment, hyperactivity, which occurs in 75-80% of patients with PAS, poor adaptive and social skills lead to learning difficulties. Although developmental disorders such as microcephaly and short stature tend to persist as a child matures, specific facial features become more difficult to recognize over time.

Even in the absence of these overt signs, prenatal alcohol exposure can adversely affect fetal development. Behavioral characteristics of a child with PAE, including stubbornness, aggressiveness, hyperactivity, and sleep disturbances, may reflect either a lesser effect of alcohol on the fetus, or a lesser sensitivity of the fetus to the effects of alcohol.

The mother develops a withdrawal syndrome within 48 hours of stopping alcohol use, with an increased risk of preterm birth in addition to the typical symptoms. The effects of alcohol withdrawal on the fetus are not entirely clear. The safety of using disulfiram (Antabuse) during pregnancy has not been established.

Finally, it is important to know that alcohol can enter the baby's body through breast milk.

Medicines containing ethyl alcohol

A number of medicines contain ethyl alcohol as a stabilizer, preservative or solvent. In order to correctly calculate the daily amount of alcohol consumed, it is necessary to know these drugs and take into account the amount of ethyl alcohol contained in them.

Ethanol metabolism

Getting into the human body, ethyl alcohol not only has an exciting and emotional effect, but, being a xenobiotic, undergoes biotransformation. There are two alternative pathways for ethanol metabolism.

1. Metabolism involving *alcohol dehydrogenase* - normally this is the main metabolic pathway for alcohol, it includes two stages:

1) *oxidation to acetaldehyde.*

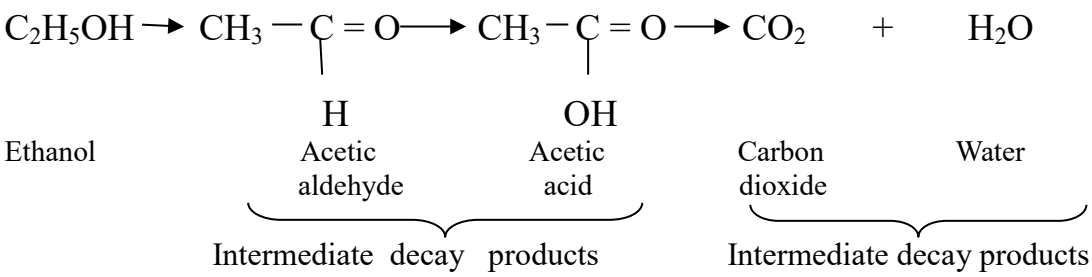
By slowing down the rate of oxidation of ethyl alcohol, resistance to alcohol decreases.

Individuals with genetic low enzyme activity quickly become intoxicated. On the contrary, with increased activity of the enzyme, a person cannot get drunk even with a significant amount of alcohol drunk.

The resulting acetaldehyde is largely toxic, therefore, the faster the second stage of ethanol metabolism proceeds, the less pronounced its toxic effect.

With the accumulation of acetaldehyde during its slow oxidation, the development of intoxication in hangover syndrome is associated. In adolescents, enzymatic oxidation of acetaldehyde is practically absent, so even small amounts of alcohol can cause poisoning.

The transformation of alcohol in the body



2) *conversion to acetic acid under the influence of acetaldehyde dehydrogenase.*

When the rate of the process slows down, intoxication is observed, which is all the more pronounced, the more the process is slowed down.

The ability to block acetaldehyderogenase is the basis for the treatment of alcoholism with disulfiram or cyamide ("torpedo"). However, other drugs also have similar properties, for example, chloramphenicol, metronidazole, griseofulvin, cephalosporin antibiotics, therefore, when they are used simultaneously with alcohol, toxic reactions may develop.

2. Oxidation involving cytochrome P450. Cytochrome P450-2E $_1$ is an inducible enzyme; its induction is observed under the influence of ethyl alcohol. Chronic alcohol intake leads to the activation of this enzyme. With its participation, carcinogens are formed from carbon tetrachloride, gasoline, nitrosamines, paracetamol.

The rate of alcohol metabolism involving alcohol dehydrogenase is determined at the genetic level. So, in most Europeans, the activity of alcohol dehydrogenase is low, so they quickly get drunk and do not suffer from a hangover syndrome. In Russians, the rate of oxidation of ethyl alcohol to acetaldehyde is high, and the subsequent metabolism is relatively low. Therefore, it is difficult for a Russian to get drunk, but a hangover proceeds with severe intoxication. In Mongoloids, the activity of alcohol dehydrogenase and acetaldehyde dehydrogenase are approximately the same, i.e. there are no natural mechanisms for "braking" drunkenness, therefore, if the Mongoloids begin to drink, then, as a rule, they become an easy drinker.

Principles of alcoholism treatment

Alcoholism treatment begins after detoxification therapy. There are three main methods of treatment:

1. The use of antabuse-like substances ("torpedoes"). Such substances in the form of a capsule are sutured to the patient. Drinking alcohol even in small amounts after such an operation leads to the development of a strong intoxication syndrome.
2. The use of psychotherapeutic techniques ("coding"). The effectiveness of coding

in cases where it is carried out against the will of the patient has not been shown.

3. Appointment of antagonists of opiate receptors.

Test questions:

1. *How does alcohol affect health?*
2. *How alcohol affects pregnancy*
3. *How is ethanol metabolized?*
4. *What are the basic principles of alcoholism treatment?*
5. *What is your personal relationship with alcohol?*
6. *Can drinking alcohol cause death?*
7. *What are the features of the action of the enzyme alcohol dehydrogenase on people of different nationalities?*

CHAPTER 12.
SMOKING TOBACCO (NICOTINE) AND ITS HARM TO HEALTH

Smoking: statistics and risks.

According to WHO, 1.3 billion people in the world are dependent on tobacco. This results in 6 million deaths each year, more than 5 million of which are tobacco users and ex-users and more than 600,000 deaths among non-smokers exposed to second-hand smoke.

The physical and chemical mechanism of smoking is that air is sucked in through the ignited and slowly smoldering tobacco. The oxygen contained in the inhaled air, passing through the layer of smoldering tobacco, intensifies its combustion, and all these combustion products, together with the rest of the air, enter the lungs.

In tobacco smoke, in addition to addictive nicotine, there are more than 4,000 chemicals, more than 200 of which are dangerous to the body, and more than 40 are carcinogens, such as carbon monoxide, ammonia, radioactive substances (polonium-210), lead, bismuth, arsenic, hydrocyanic acid, hydrogen sulfide, formaldehyde, etc. In regular smokers, the risk of developing cardiovascular diseases (myocardial infarction, stroke, obliterating endarteritis) is 3 times higher, and the risk of developing bronchopulmonary diseases (COPD, emphysema, tuberculosis) is 10 times higher than non-smokers. Smoking increases the risk of diseases of the gastrointestinal tract (gastric ulcer, esophagitis), reproductive system (decreased fertility, placental abruption, premature birth), intrauterine death, diseases of the oral cavity (leukoplakia, gingivitis), other organs and systems (early menopause, osteoporosis, cataracts, premature aging).

Smoking and pregnancy

Substances that make up inhaled cigarette smoke affect fetal development as follows:

- nicotine causes constriction of blood vessels in the placenta and thereby reduces the delivery of oxygen and nutrients to the fetus;
- carbon monoxide reduces the oxygen capacity of the blood of the mother and fetus, binding to hemoglobin at the site of oxygen attachment;
- polycyclic aromatic hydrocarbons contained in cigarettes alter the metabolism of exogenous organic compounds by the placenta and fetus.

Smoking during pregnancy increases the risk of complications, especially the risk of preterm birth; 14% of all births occurring before 37 weeks of gestation are caused by expectant mothers smoking during pregnancy.

Smoking during pregnancy causes characteristic fetal disorders:

- lower birth weight is associated with lower infant survival during the first year of life;
- nicotine can cause atrophic and hypovascular changes in the villi of the placenta, worsening uteroplacental circulation, which leads to slower fetal growth;
- nicotine accumulates in breast milk. Therefore, the toxic effect on the child's body manifests itself after his birth;
- increased levels of ***thiocyanate*** in the body of the expectant mother can contribute to slower fetal growth, its metabolites can interfere with the metabolism of vitamin B_{12}, cause degenerative nerve damage and alter thyroid function;
- exposure to smoke in infants may make them more prone to respiratory infections and lung damage in the future.

The effect of nicotine on those around the smoker

Passive smoking is a condition where non-smokers are forced to breathe in tobacco smoke from smokers. A smoker harms not only his own health, but also the health of others. This has to be constantly encountered on the streets and indoors, in restaurants, nightclubs, cars.

When smoking in the ambient air, levels of carbon monoxide are formed that exceed the permissible concentrations. Non-smokers may experience asthma attacks, develop allergies, and exacerbate the course of coronary heart disease due to fumigation by smokers. Children of smoking parents are more susceptible to respiratory diseases than children of non-smokers. In particular, in such children, the frequency of bronchitis and pneumonia doubles.

Polonium, radioactive lead and bismuth in tobacco smoke are dangerous not only for those who smoke, but also for everyone who breathes this smoke, especially children.

With mass distribution, smoking becomes a socially dangerous phenomenon. After all, smokers poison the atmosphere, increase the concentration of carcinogens in the air, and contribute to the frequency of fires. Non-smokers are forced to breathe poisoned air. But the main risk factor is psychological. Many,

looking at others, obeying the herd mentality, begin to smoke. A smoker, having got into a smoking company, takes out a cigarette and lights up for the company.

Headache, dizziness, palpitations, fatigue are common complaints of non-smokers who have to stay in smoky rooms for a long time. Therefore, measures against smoking in public places are necessary.

The WHO tobacco control policy consists of two main areas:

1. ***Smoking prevention.*** The basis of prevention is education. Work for the future.
2. ***Smoking cessation*** among smokers.

In addition, WHO proposes to raise taxes on the circulation of cigarettes, to introduce restrictions on their advertising, sale and use.

Nicotine replacement therapy. .

The main mechanism of action of nicotine replacement therapy is the delivery of free nicotine into the arterial blood, which, by binding to nicotinic receptors, stimulates the release of dopamine and, as a result, alleviates withdrawal symptoms. The content of nicotine in arterial blood in this case reaches only 50% of the level relative to its content when smoking. In addition, the patient ceases to receive toxic, carcinogenic and toxic substances of tobacco smoke. To these doses of nicotine addiction does not develop, but depletion of nicotinic receptors develops, and nicotine dependence is reduced completely. As the degree of nicotine dependence decreases, the patient reduces the dose of drugs.

NRT has two components:

1. ***Basic therapy*** , which is prescribed for continuous use. Its goal is to maintain the concentration of nicotine in the patient's blood at the usual level in the first weeks in order to exclude the appearance of withdrawal symptoms. Then the level of basic therapy is gradually reduced until it is completely canceled.
2. ***Additional intake*** of nicotine-containing drugs (NSPs) upon the onset or intensification of withdrawal symptoms, as well as upon the onset of a situation that habitually causes the patient to smoke.

To increase the effectiveness of therapy for high and very high degrees of nicotine addiction, it is recommended to use combinations of nicotine-containing drugs (patch + chewing gum or patch + inhaler). In this case, the use of the patch provides a constant level of nicotine in the blood, and additional forms of nicotine-containing preparations allow you to increase the level of nicotine if necessary and overcome the acute desire to smoke. Complementary therapy may be given longer than basic therapy and last more than 6 months according to the needs of the patient. NRT can be used for temporary smoking cessation (air travel, hospital treatment, being in places where smoking is prohibited).

Reception of nicotine-containing preparations begins from the day of quitting smoking. In the event of a relapse of smoking, the started course of treatment ends, the mistakes made are analyzed and a new course is planned.

The recommended doses of nicotine-containing preparations do not cause serious adverse effects. NRT can be used with virtually no restrictions, but patients with unstable heart disease, pregnant women, and adolescents should take this therapy under medical supervision. A contraindication to the use of nicotine-containing preparations may be hypersensitivity to nicotine or other components of the preparations.

The technique of taking nicotine-containing drugs.

Nicotine chewing gum is available in two doses - 2 mg and 4 mg with mint and fresh fruit flavors. The reception of chewing gum consists in its slow periodic chewing for 30 minutes.

Nicotine is removed from the inhaler into the oral cavity using sucking movements (2-3 movements). The inhaler has cartridges in a dose of 10 mg. The cartridge is used several times and refilled in the inhaler for a maximum of a day.

The patch is recommended to be applied to an intact, clean and dry area of \u200b\u200bthe skin and change the patch site daily. There are 24 hour patches that deliver a maximum dose of 21mg of nicotine per day, and systems that stick for 16 hours that deliver a maximum dose of 25mg of nicotine. The patch is stuck on immediately after waking up and peeled off before going to bed, because. Patients usually do not smoke at night and nicotine intake at night can disturb the patient's sleep.

Weight gain

Smoking cessation, the gradual elimination of symptoms of chronic tobacco intoxication are accompanied by an improvement in taste sensitivity, appetite, normalization of the secretion of the digestive glands, which generally leads to an increase in food intake and, consequently, weight gain.

This can be avoided if you follow some simple dietary advice: avoid overeating, follow the basics of a balanced diet, food should contain a large amount of vitamins, mineral salts, trace elements. Recommended: increased intake of sources of vitamin C (rose hips, black currants, green onions, cabbage, lemons, etc.), vitamin B_1 (coarse bread, cereals), vitamin B_{12} (green peas, oranges, melons), vitamin PP (beans, cereals, yeast, cabbage, dairy products, potatoes), vitamin A (vegetables, especially carrots), vitamin E (wholemeal bread, vegetable oil, green vegetables, wheat germ).

In order to prevent the recurrence of smoking, the doctor should actively continue the psychotherapeutic influence on the patient, involve his microsocial environment in the sphere of influence. Autogenic training, expansion of physical activity has a good effect. Pharmacotherapy such as varenicline, bupropion (slows weight gain), or nicotine gum can help relieve symptoms .

Electronic cigarettes (electronic nicotine delivery systems).

Electronic cigarettes are devices in which, instead of burning the tobacco

leaf, a solution is evaporated for its subsequent inhalation. Cigarettes have been developed to replace conventional cigarettes and outwardly practically do not differ from them. 19 types of electronic cigarettes were tested, the manufacturers of which claim that they are safe for health.

The main components of the solution, in addition to nicotine, are propylene glycol, with or without glycerin, and flavoring agents.

Propylene glycol is a colorless liquid that tends to accumulate in the body, causes allergic reactions, irritation and promotes the appearance of abscesses, causes disruption of the liver and kidneys.

Half of the cigarettes tested were found to contain various forms of the carcinogen ***nitrosamine*** , which can cause cancer in humans. Despite claims by manufacturers, ***nicotine*** is actually present in electronic cigarettes. Laboratory analysis of samples of electronic cigarettes also revealed the substance ***diethylene glycol , an*** ingredient in antifreeze.

Therefore, health care professionals should not recommend this product as electronic cigarettes contain carcinogens and toxic substances.

In the process of smoking, often a smoker who switched from conventional cigarettes to electronic cigarettes lacks the sensations that he received by inhaling tobacco smoke. Trying to achieve the same sensations, many smokers try to increase the strength of the liquid in order to get the desired "hit in the throat", which leads to an overdose of nicotine with all the accompanying symptoms - dizziness, headache, nausea, increased salivation, abdominal pain, diarrhea and severe general weakness. .

Emissions of total suspended particles (TSP) from an e-cigarette are about 60 μg/m ^{3} , 10 to 15 times lower than conventional cigarettes. E-cigarettes, compared to conventional cigarettes, have a lower density (from 6 to 21 times less) for each of the different PM fractions (PM1, 2, 5, 7, 10). However, these levels are still slightly higher than the values given in the WHO Outdoor Air Quality Guidelines.

"An electronic cigarette will not serve you well!" - such a statement was published by WHO.

The FDA has urged Americans to refrain from using electronic cigarettes, reports WebMD . According to the organization's experts, the use of these devices is not a safe alternative to smoking.

Therefore, e-cigarettes, after short-term use, have immediate adverse physiological effects that are similar to those seen with tobacco smoking. The long-term effects of e-cigarette use are not well understood, are potentially adverse, and merit further research.

Hookah

Many smokers consider hookah to be harmless. However, hookah smoke is just as harmful to health as cigarette smoke, because it contains the same toxic substances - ***nicotine*** , **tar** and various ***carcinogens*** . Compared to cigarette smoke,

hookah smoke has elevated levels of ***arsenic*** , ***chromium, and lead*** . Scientific evidence shows that hookah smokers have higher levels of ***carboxyhemoglobin*** than cigarette smokers. Researchers from the University of Izmir (Turkey) found that those who smoke only hookah have a 30% lower lung capacity, while those who smoke both hookah and cigarettes have a 40% decrease in lung capacity. Smoking hookah causes the same diseases as cigarettes.

The main advantage of a hookah is that the smoke passing through the water hardly escapes and therefore remains relatively clean. However, hookah smokers still pollute the air with tobacco smoke when exhaling, and therefore it is better to avoid rooms where hookah is smoked.

Test questions for self-study

1. *Write the effect of nicotine and other components of tobacco smoke on the organs and systems of the human body .*
2. *What mechanisms underlie nicotine addiction?*
3. *What are the principles of tobacco dependence treatment?*
4. *What drugs are used to relieve withdrawal symptoms when quitting tobacco?*
5. *Does the WHO recommend e-cigarettes as an alternative to smoking cessation?*
6. *What substances are present in hookah smoke?*
7. *List the toxic and carcinogenic substances contained in* electronic cigarettes?

CHAPTER 13.
NARCOTIC SUBSTANCES AND THEIR IMPACT ON HEALTH. DRUG ADDICTION AND ITS TYPES

A psychoactive substance (surfactant) is understood to mean any chemical substance capable of changing mood, physical state, self-perception and perception of the environment, behavior or other psychophysical effects desirable from the consumer's point of view, and with systematic use - mental and physical dependence.

Characteristics of the main narcotic drugs .

1. Opiates - natural alkaloids of the opium poppy Papaver somniferum , found in the sap and other parts of this plant. From the opium poppy, several dozen alkaloids of various chemical structures.

Their effect on the body is mediated by interaction with opiate receptors in the brain and spinal cord, as well as the intestines and some other organs. The term “opiates” defines precisely those opium poppy alkaloids that belong to the group of narcotic analgesics and have a noticeable addictive potential.

1.1 *Opioids* are substances that act on the body like opiates ("like opium"). The

action of opioids on the body is also mediated by interaction with opiate receptors. However, unlike opiates, there are no opioids in the opium poppy. Opioids can be obtained from opiates as semi-synthetic products (ethylmorphine, heroin, etc.). They can also be created from substances of a non-opium nature as a result of complete chemical synthesis (promedol, methadone, tramadol, etc.))..

1.2. Morphine is extracted from opium and enters the illegal market in the form of a preparation of various degrees of purity and content of the active ingredient.

Its various types are known: raw morphine, purified morphine and medical morphine.

1.3. Heroin is diacetylmorphine, the most dangerous drug, classified abroad as a "heavy" drug. Produced in clandestine laboratories from morphine (or any morphine-containing raw material).

1.4. Codeine is a semi-synthetic opium alkaloid that is part of a number of antitussive and analgesic drugs.

The ways in which opioids are used are quite varied. Opium is commonly smoked, morphine and heroin are most commonly used as a solution for subcutaneous and intravenous injections, and the powdered form of heroin is smoked and inhaled (sniffed). Intravenous use accounts for about 80% of total heroin use, while intranasal use accounts for about 15%. Codeine is usually taken by mouth.

1.5. Fentanyl (FNT) is an opioid, its biological action is similar to that of opiates. FNT is a highly effective synthetic narcotic analgesic (100 times stronger than morphine), introduced into clinical medicine as an intravenous anesthetic for pre- and post-operative medication.

1.6 Methadone is a synthetic opioid. Differing from morphine in chemical structure. It has a very similar effect on the human body. The study of methadone began in 1946, when it was found to be a narcotic analgesic. For some time, unlike morphine, methadone is effective when taken orally.

1.7. Tramadol, tramal (TRM) , according to the currently accepted classification, is not a drug and is classified as a potent drug. TPM is a synthetic opioid with agonist-antagonist properties, a moderately potent centrally acting analgesic. Like codeine. It is widely and effectively used for pain relief in therapy and surgery, in particular for coronary, oncological and orthopedic pain. In the early stages of the study of TRM, when the opioid mechanism of analgesic action was established, it was referred to as narcotic analgesics. However, further research and clinical experience have shown a low incidence of opiate-type side effects.

2. Cannabinoids, cannabiols are obtained from the ubiquitous wild-growing hemp (Cannabissativa - cannabis).

Due to its psychoactive properties, it has been used for a long time for treatment, as well as for achieving a special ecstatic state as a euphoriogenic and hallucinogenic agent. The main active ingredient is tetrahydrocannabinol (THC). The finished product is marijuana, hashish, hash oil.

2.1. Marijuana - dried leaves, plants, abroad are classified as "light" drugs, in contrast to "heavy" ones (heroin). The content of THC in marijuana reaches 13-15%. It should be borne in mind that *marijuana is very* ***conventionally*** *a "soft" drug* - more than 90% of those who used it later switched to "hard" drugs.

Marijuana has a stimulating and sedative effect on the body, supplemented at higher doses with hallucinogenic effects, affects thinking ability, understanding, abstract thinking, learning, and short-term memory.

2.2. Hashish is a green, dark brown or black resin produced by cannabis during a certain growing season. The content of the main surfactant is usually about 2%, but can reach 9-10%.

2.3. Hash oil is a concentrated dark liquid and viscous extract of cannabis plant material or resin with a THC content of 10 to 30-60%. Used when smoking (smoke inhalation) using marijuana cigarettes.

Hash oil is added to both regular tobacco cigarettes and marijuana cigarettes or smoked using small glass pipes. Oral consumption is also known (chewing, in the form of tea leaves or as a food supplement).

3. Cocaine is an alkaloid isolated from the leaves of the coca bush (Erythroxylumcoca) containing 1% cocaine.

This powerful central nervous system stimulant is able to change consciousness, relieve fatigue and stimulate the work of various body systems. Cocaine is listed under the UN Narcotics Convention.

"Street" forms of cocaine often contain impurities of other substances, such as various sugars, as well as cheaper drugs and drugs: stimulants (amphetamine, caffeine), local anesthetics (lidocaine, procaine), etc. The cocaine content may be less than 10%. Cocaine acts directly on the brain, especially on the limbic system, which contains the centers responsible for the state of instinctive pleasure. Cocaine produces a euphoric effect by blocking dopamine reabsorption, and repeated use of cocaine can deplete the supply of dopamine, causing the "withdrawal" felt towards the end of the drug's effects. This also explains the development of a physical addiction to cocaine.

Cocaine (cocaine hydrochloride) is used intranasally (inhaled or drawn in through the nose), by intravenous and intramuscular injections, smoking (rarely), orally sublingually, vaginally, rectally (rarely). For smoking, coca paste (mixed with tobacco or marijuana) is more often used, as well as "crack" (cocaine base) is smoked using special pipes, home-made primitive devices or cigarettes with the addition of tobacco or marijuana or "speedball" (a mixture of cocaine and heroin). When smoking and intravenous administration, cocaine is absorbed quickly. Peak plasma concentration is quickly reached, but also rapidly decreases. At the same time, intranasal and oral administration gives similar plasma concentration profiles: the maximum is reached in about 30-60 minutes. With intranasal administration, the action occurs faster, and its duration reaches 60-90 minutes. The oral route of administration is characterized by a slow development of effects and a much weaker intensity. Cocaine is a lipophilic compound that easily crosses

the blood-brain (BBB) and placental barriers.

4. Other stimulants, including caffeine, are substances that have the ability to intensify mental activity, eliminate physical and mental fatigue. The most famous black market stimulants are amphetamine and methamphetamine.

4.1. Amphetamine (AMP) has long been widely used both in therapy and for non-medical purposes. It was synthesized in 1887. As an analogue of ephedrine, a plant alkaloid isolated from the herb Efhedra vulgaris , and immediately became known as an inhalation drug for bronchial dilatation, in particular in the treatment of bronchial asthma.

The psychoactive properties of AMP became known only by 1927, and since then it has been used as a CNS stimulant, to suppress appetite, to treat hyperkinesia in children and narcolepsy.

However, as a result of almost 30 years of observation, conclusions were drawn about the formation of dependence on AMP and the severe consequences of its long-term and regular use (high risk of cerebral hemorrhage, increased blood pressure, cardiac arrhythmias, paranoid psychosis). When the ability of the AMP group to induce an immediate and powerful euphoric effect after intravenous administration was discovered, they were assigned to the main classes of drugs.

4.2. *Methamphetamine (MAF)* has been used since 1919. As an analeptic for alcohol, barbituric or drug intoxication (to overcome the state of stupor), during surgical operations to maintain blood pressure during anesthesia. AMP tablets are taken by mouth orally. Powdered AMP and MAF are inhaled through the nose or administered intravenously as a solution.

4.3. *Methylenedioxy derivatives of amphetamine* - *MDMA (ECSTASY)* - between similar in structure stimulant amphetamine and hallucinogens of the mescaline group - methoxy derivatives of amphetamine. MDMA has become widespread in many countries, including Russia, because of their ability to cause mild euphoria. Sociability and sociability are increasing, which makes MDMA attractive for young people (at parties and discos).

5. Hallucinogens (HCH) - substances that cause disturbances in the perception of the real world, especially light signals, smell, taste, as well as distortion in the assessment of space (direction, distance) and time. Under the influence of GCH, visualization of color and sound can occur, according to subjective reviews, you can “hear” color and “see” sounds. Large doses cause visual hallucinations and visions.

A common feature of HCHs is their ability to change mood and patterns of thought. They cause a state of CNS excitation leading to a shift in consciousness, usually to euphoria, but sometimes to severe depression or an aggressive state.

The most dangerous consequence of the use of GCG is a violation of the ability to *reason logically* . Which leads to inadequate decisions and accidents. An acute state of restlessness, agitation, and insomnia usually lasts until the remedy wears off. Sometimes depression and "depersonalization" are so great that they lead to suicide. For a long time after elimination from the body, " flashbacks " can

be felt - small repetitions of psychedelic effects, such as intensification of color perception, observation of the movement of fixed objects, confusion in the identification of objects.

The most well-known GCH are: lysergic acid diethylamide (LSD), psilocybin and psilocin mushrooms, phencyclidine (PCP), methoxy derivatives of AMP (mescaline group).

HCH is subdivided into serotonergic hallucinogens: LSD; mescaline; psilocybin / psilocin (their effects are explained by the influence on the metabolism of serotonin in the brain), and dissociative anesthetics - phencyclidine (PCP) and its analogues, including the anesthetic ketamine used in medicine, which act mainly on glataminergic receptors.

5.1 Psilocin and psilocybin are orally active hallucinogens extracted by drug addicts from certain types of mushrooms, their use is widespread in the northern regions of the European part of the Russian Federation. Psilocybin and its dephosphorylated analogue, psilocin, were first isolated from the Psilocybe and Stropharia mushrooms found in Mexico, Cambodia, and Thailand. Psilocybin is also synthesized in clandestine laboratories.

5.2. Phencyclidine and related compounds. Which by chemical structure are derivatives of cyclohexyl-piperidine. This group includes a medical anesthetic drug - "ketamine", which also has hallucinogenic properties.

PCP together with ketamine constitute a group of dissociative anesthetic hallucinogens, the effect of which on the human body is determined by interaction with glutaminergic receptors.

PCP was synthesized as a drug for intravenous anesthesia in the second half of the 50s in the USA and introduced into medical practice under the name " Sernil ". Unlike opiates, it does not cause depression of cardiovascular activity or respiration. However, during clinical use, toxic side effects were identified, including postoperative hallucinations, agitation, mental disorders and depressive states, and despite good therapeutic properties, the drug was excluded from clinical practice.

5.3 Mescaline group (- comparative activity: mescaline - 1, LSD - 3000. Hallucinogens are usually taken orally, but PCP and dimethyltryptamine are usually smoked.

The primary source of these banned substances are clandestine laboratories. Hallucinogens cause a strong psychological dependence, in addition, their intensive use leads to gradual damage to the brain. Even compounds that are relatively safe from the point of view of toxicology, when used, cause great problems for the individual and society with their asocial and suicidal manifestation. The most common hallucinogenic drugs at present are LSD and PCP, to which drugs made from hallucinogenic mushrooms are added in the northern regions of the Russian Federation.

5.4. LSD is an extremely powerful hallucinogen that was especially popular in the 1960s and is regaining popularity today. It is obtained from lysergic acid, a

substance extracted from ergot (Ergotfungus) that grows on rye. LSD was first synthesized in 1938, and for many years, due to its extremely high psychogenicity, it was used in the study of the mechanism of mental disorders.

The most commonly used carriers of this substance are: sugar cubes, stamps, pieces of filter paper, pharmacologically inert powders, which are then filled into empty gelatin capsules. As another common form of LSD, there are so-called pyramids (" windowpanes " or " pyramids "), for which LSD is introduced into a gelatin matrix and the hardened gelatin is cut into small pieces.

In the 1970s were the most common tablet forms of LSD in various sizes, shapes and colors. One type currently prevalent on the illicit market, called "microdot" , is a round tablet, approximately 1.6 mm in diameter, with a uniform dosage of 50-100 micrograms of LSD per tablet.

At present, the predominant types of LSD dosage forms are paper forms (stamps), small tablets like "microdot", and gelatin forms. The content of the active component in them is usually 50-100 micrograms of LSD. The onset of the hallucinogenic effect of LSD is 30-90 minutes after ingestion, the duration is from 2 to 12 hours. During this time, the ability to reason may be impaired, visual perception changes, and hallucinations occur.

General characteristics of analogue drugs and their components: Spice smoking mixtures, entheogens

The term "analogue drugs" is used to refer to substances that are abused. Which were designed to circumvent existing control measures, including those under the international drug control conventions. Often, these substances are made by slightly changing the molecular structure of controlled substances, resulting in a new substance with a similar pharmacological effect. They are easy to make , since instructions for their manufacture and descriptions of their pharmacological properties can often be found on the Internet.

In the past few years, a new class of substances that have been abused and require the attention of drug regulators have emerged: synthetic cannabinoid receptor agonists. These substances are added to herbal mixtures that are marketed under the brand name Spice. (Spice from English spice, spice) is a brand of herbal smoking mixtures with a psychoactive effect similar to that of marijuana, i.e. a kind of herbal mixture, which includes synthetic substances, entheogens (plants that contain psychotropic substances) and ordinary herbs. They can also be called smoking mixes, incense, aroma mixes, designer drugs, "bath salts", etc.

Spice mixtures have been sold in European countries since 2006 (according to some sources, since 2002-2004) under the guise of incense, mainly through online stores. In 2008, it was found that the active ingredient in the mixtures are not substances of plant origin, but synthetic analogues of tetrahydrocannabinol, the main active ingredient of marijuana.

Entheogen (Greek: "becoming" divine from within) is a class of plants used to achieve a state of altered consciousness. Entheogens were used by ancient

shamans to enter "mystical states" in which they "communicated with spirits and deities." In the modern world, this term combines a number of legal and illegal psychoactive substances of various kinds of action.

There is no simple chemical classification of entheogens, since various structural types of alkaloids, terpenoids, amino acids, and even coumarin are psychoactive.

Natural cannabinoids - tetrahydrocannabinoids - are contained in hemp leaves and are the main active psychotropic substance of this herb. The chemical constituent of marijuana,
△-tetrahydrocannabinol mimics a chemical in the central nervous system called anandamide. Unlike transmitters (chemical transmitters of impulses between nerve cells), which directly affect brain cells, anandamide is a neuromodulator. It combines the activity of several transmitters at once. If the brain is flooded with tetrahydrocannabinol, then exposure to anandamide temporarily "expands" (in fact, it simply distorts) the person's perception.

What makes the situation worse is that many transmitters, thanks to which thinking is carried out and a person feels good, are not ready for work at this moment. This happens for the reason that at this time fewer transmitters are produced in the brain than necessary. Thus, with a decrease in serotonin, GABA, dopamine and norepinephrine, stress and depressive states occur, an adequate perception of reality decreases with a quantitative disorder of short-term memory.

Tetrahydrocannabinol also lowers the level of acetylcholine in the brain, which is directly related to the processes of memorization and concentration.

Synthetic analogues of these substances have been developed in the USA by Professor John Hoffman . W. _ Huffman is an abbreviation of JWH in the name of cannabinoids - the initials of this scientist. The synthetic cannabinoid JWH -018, the exact chemical name is 1 -Pentyl-3- (1 - Naphthoyl) -Indole , acts on brain receptors and is superior in potency to hallucinogenic cannabinoids of plant origin from hemp.

JWH -018 chemical is **one** of many in a series of JWH compounds developed by chemist Hoffman at the University Science Laboratory in Clemson, USA.

The primary task of the scientist was the synthesis of analogues of THC (THC), the active component of marijuana. JWH - 018 received US patents.

Other scientists who studied the effect of a new psychotropic drug on brain receptors confirmed that the hallucinogenic effect of the synthetic cannabinoid JWH -018 was approximately 5-fold superior to that of conventional tetrahydrocannabinol.

When used, *dependence on it developed 2 times faster* . The effective dosage of JWH -018 when smoking is from 0.5 to 3 mg, when taken orally - from 3 to 10 mg. The psychoactive effect of smoking occurs much faster than smoking marijuana. This is due to the fact that when it enters the body, the substance is not metabolized.

The following plants can be attributed to entheogens: kat (hat, hut) (Cathaedulis), the active substances of which - cation and cathin - are included, respectively, in Schedules I and III of the Convention on Narcotic and Strong Substances of 1971.

Currently, khat is found in a number of biologically active food supplements. "Ayahuasca" is a drug made from plants growing in the Amazon in South America, mainly from the forest liana (Banisteriopsis caapi) and another plant rich in tryptamine (Psychotria viridis), which contain a number of psychoactive alkaloids, including DMT. Peyote cactus (Lophophora williamsii) and some other cacti contain mescaline; hallucinogenic mushrooms containing psilocybin and psilocin. Ephedra - contains ephedrine, which is part of a number of medicines and biologically active food supplements. "Kratom" is a plant native to Southeast Asia containing mitragynine; iboga, which contains the hallucinogen ibogaine and is native to western Central Africa. Datura varieties containing hyoscyamine (atropine) and scopolamine.

These compounds or their analogs are included in a number of medicines and biologically active food supplements. Salviadivinorum - a plant native to Mexico containing the hallucinogen salvinorin - A. Cola nut (Cola) - Coca-Cola used to be made on its basis, but now synthetic analogues are used in the manufacture of the drink. Guaranakatuaba, blue lotus, Hawaiian rose.

Examples of psychotropic effects: a leaf of sage predictors (contains the substance salvinorin, which is the strongest hallucinogen, users experience oneiroid hallucinations: "fly to other planets and fall into other worlds"). Hawaiian rose seeds (LSD-like effect: impaired perception, thinking, orientation in space, persistent depressive effect); leaves and flowers of the blue lotus (contain apomorphine, which is very close to ecstasy in terms of psychotropic effect). In the most popular smoking mixtures of aromatic smoking mixes Spice Diamond, Chilin, Zohai and Yucatan Fire, a high concentration of the synthetic cannabinoid JWH -018 was detected.

These smoking blends are manufactured in Northern Ireland by The Psyche Deli and are positioned as legal smoking mixtures of plant origin that do not give a positive result on drug tests - thanks to which they have gained immense popularity in many countries of the world, despite the fact that the spice-type product is sold to the end consumer at prices higher than for marijuana, bringing businessmen stable growing profits.

The use of spice smoking mixtures can lead to the following complications: uncontrolled penetration of smoking mixtures of substances poisoning the body with smoke can cause severe intoxication of the body - nausea and vomiting, heart palpitations and high blood pressure, spasms and convulsions, fainting and coma.

Local reactions of the body to spices occur due to the direct negative effect of smoke on the mucous membranes of the body. Almost all adherents of smoking mixtures of spice suffer from a constant cough, increased tearing, have a hoarse voice both during smoking and in between. The constant exposure of the smoke

mixtures to the mucous membranes causes the development of inflammation of the respiratory tract of a chronic nature. Chronic laryngitis, pharyngitis, and pneumonia often develop. Smoking spice mixtures can provoke the development of cancer of the oral cavity, larynx, pharynx and lungs.

The influence of smoke ingredients on the central nervous system causes addiction to the use of spice. The reactions of lovers of spice smoking mixtures from the side of the central nervous system are varied - it can be a state of euphoria, unreasoned hysteria or an explosion of laughter, coordination and orientation disorders, visual and auditory hallucinations, an absolute loss of the ability to control oneself and one's behavior.

These mental disorders can cause conditions when the behavior of the drug addict becomes dangerous for him and for others. There are a large number of cases when smoked people "went for a walk" from the last floor of a high-rise building or swam in icy water, committed traffic accidents while intoxicated.

Regular smoking of spice mixtures leads to irreversible destructive processes in the structure of the central nervous system. The attention and memory of the drug addict worsens, the bioactivity of the brain decreases, the number of depressive reactions increases, up to the development of active suicidal behavior. Spice smokers have a high risk of becoming disabled due to severe organic lesions of the central nervous system.

The Institute of Nutrition of the Russian Academy of Medical Sciences conducted a study of smoking mixtures. It has already been proven that the JWH - 018 contained in them and other substances such as blue lotus, soothsayer sage and Hawaiian rose lead to acute disintegrative and depressive psychoses. Patients with signs of spice poisoning are constantly coming to narcological and toxicological centers. Some patients are then admitted to psychiatric hospitals. After all, spice sometimes embodies the crazy dream of a drug addict: it “does not let go” (“it seems that the poison has been removed from the body, and a lot of time has passed, but the “lost roof” does not want to return to its place”).

In cases where no visible effects were found after smoking, the “magic mixture” causes infertility or offspring appear with many birth defects. This effect is little studied, but it is already clear that, like any other drug (and, most likely, much stronger), JWH -018 *increases genetic mutations. Russian scientists involved in new drug research already prefer to call spice a genetic weapon.*

Follow-up observation of drug addicts showed that the use of GOAspirit (Goa Spirit) leads to a large number of *deaths and severe brain damage.*

Test questions:

1. *What are psychoactive substances?*
2. *Describe the main psychoactive substances.*
3. *What are "Spices" and how do they affect health?*
4. *What are entheogens?*
5. *Is there a hereditary predisposition to drug use?*

6. *Does the "lightness" of narcotic drugs affect the time of emergence of dependence on them?*
7. *What comorbidities are inextricably linked to drug use?*

CHAPTER 14.
CHAPTER 14. TOXIC SUBSTANCES AND THEIR EFFECT ON THE HUMAN BODY. TOXICOMANIA AND ITS TYPES.

Toxic substances is a term used to refer to drugs, chemicals, or any substance that is poisonous and harmful to the body . The word "toxic" comes from the Greek word "toksikon", which was originally the name of a poison in which arrowheads were dipped.

Toxic substances are those substances that disturb the normal chemical balance or interfere with the chemical processes occurring in the body. Some of them can have a detrimental effect, disrupting or interrupting the vital functions of the body, causing illness and even death.

Intoxication - translated from lat. " ***in "*** - inside and " ***toxicon "*** - *venom* **,** as in "poison within". This is a violation of the body's function caused by toxic substances that have entered the body from the outside (exogenous intoxication) or formed in it (endogenous intoxication). Exogenous intoxication is often identified with the term "poisoning". Endogenous intoxication is referred to as "autointoxication".

Detoxification is the process of removing poison or eliminating the effects of poisoning from somewhere (for example, from the human body).

Who is the detox program for?

First of all, for those who used drugs, medications, for those exposed to radiation, for those who were associated with "harmful" production, for residents of large cities and environmentally unfavorable areas. In fact, this program is necessary for each of us, because. frankly, modern society is oversaturated with toxic substances.

The number of chemical compounds currently used in the national economy and everyday life is so large, and the nature of their biological action is so diverse that several types of poison classifications have to be applied. They are divided into two groups: *general,* based on some general principle of assessment, suitable for all chemicals without exception, and *special* , reflecting the relationship between individual physicochemical or other signs of substances and manifestations of their toxicity.

The most widely used *chemical* classification, which provides for the division of all chemicals into organic, inorganic and organoelement. Based on the accepted chemical nomenclature, the class and group of these substances are determined.

Of great importance for the prevention of poisoning is the *practical* classification of toxic substances. According to *the purpose of application* , there

are:

1) industrial poisons used in a work environment. For example, organic solvents (dichloroethane), fuels (methane, propane, butane), dyes (aniline), refrigerants (freon);
2) pesticides used to control weeds and pests of agricultural crops: organochlorine pesticides, for example - hexachloran, polychloropinene; organophosphorus insecticides - karbofos, chloroforce, phosphamide, trichlormetaphos-3, methylmercaptophos, etc.; organomercury substances - granosan; derivatives of carbamic acid - sevin, etc.

   Depending on the purpose of pesticides, there are: insecticides - destroying insects; acaricides - destroying ticks; zoocides - destroying rodents; fungicides - destroying fungal microorganisms; bactericides - destroying bacteria; herbicides - detrimental to plants, which include defoliants (for removing plant leaves) and desiccants (for drying them; repellents - repelling insects, etc.;
3) drugs that have their own pharmacological classification;
4) household chemicals (acetic acid), sanitation, personal care and cosmetics; care products for clothes, furniture, car, etc.;
5) biological plant and animal poisons, which are used in everyday life: food additives
6) are found in various plants and fungi (aconite, hemlock, etc.), animals and insects (snakes, bees, scorpions, etc.) and cause poisoning when they enter the human body.
7) chemical warfare agents (BOV), which are used as toxic weapons for the mass destruction of people (sarin, mustard gas, phosgene, etc.).

toxicological classification of substances is important .

Toxicological classification of TCW.

Toxic chemicals (TCS) are divided into 6 groups depending on the characteristics of their action on the human body and animals:

1) TXV of neurotoxic action (FOV, hydrazine, BZ , etc.);
2) TXV of cytotoxic action (mustard gas, lewisite, dioxin, etc.);
3) TCV pulmonotoxic action (phosgene, diphosgene, nitrogen oxides, etc.);
4) TCV of general toxic action (hydrocyanic acid, aniline, carbon monoxide, etc.);
5) TCV irritant (adamsite, C-es, C-ar, etc.);
6) Toxic technical liquids (YATZh) (dichloroethane, tetraethyl lead, etc.).

TXV can affect the body in a **drop-liquid** , **aerosol** and **vapor** state. The main methods of impact on the body during accidents are the droplet-liquid form (spills of the substance) and the vapor state (mainly due to the formation of a secondary cloud, that is, the evaporation of the substance from the spill area). The main use of chemical weapons is the creation of stable aerosols.

The damaging effect of TCM depends on the chemical properties that determine the possibility of its penetration, distribution and transformation in the body, the mechanism of toxic action. This makes it possible to justify the methods of antidote therapy, the choice of effective means of neutralization in the external environment (degassing).

TXV can cause damage to people, penetrating into the body through the respiratory system (**inhalation**), skin (**percutaneous**), mucous membranes, gastrointestinal tract (**alimentary**).

Substance abuse

Substance abuse *(Greek* ***" toxiko n"*** *poison* **,** - used to lubricate arrows, i.e. poisonous + " ***mania "*** - madness, insanity) - diseases characterized by a pathological addiction to substances that **are not considered as drugs** . There are no medical and biological differences between drug addiction and substance abuse.

Addiction to alcohol **is not classified** as substance abuse.

Substance abuse is most common among children, adolescents, boys and girls, mostly with low financial status.

The most commonly encountered substances caused by substance abuse.

Common: ***1) abuse of hypnotic drugs*** - derivatives of barbituric acid (barbituratism), many of the sleeping pills (etaminal-sodium, medinal) are classified as narcotic drugs.

Intoxication occurs after taking a double or triple dose of the drug. It is expressed in carefree gaiety with complacent sympathy for others, the desire to move, speak, in violation of coordination of movements, indistinct pronunciation of words. Then comes a deep sleep, after which lethargy, slowness, impaired thinking, nausea are noted.

Addiction is accompanied by an increase in drug intake, including daytime, an increase in daily doses; there is an attraction to intoxication. Gradually, the euphoric effect decreases, intoxication is characterized by irritability and anger .

Discontinuation of medication leads to anxiety, feelings of dissatisfaction, malice, and insomnia. There are twitching of the muscles of the body, pain in the abdomen and large joints. Psychosis and convulsive seizures are often noted.

Death can occur as a result of cerebral edema.

With chronic intoxication, the skin color becomes earthy, the face becomes mask-like, peripheral edema appears, wounds do not heal for a long time, and various diseases of the internal organs often develop. Changes in the psyche are expressed in the erasure of individual properties, moral and ethical degradation of the personality, the appearance of depressive states, weakening of attention and memory, slowing down of mental processes, dementia may develop.

Treatment is carried out **only in a hospital** (narcological or psychiatric). Doses of sleeping pills are reduced gradually; prescribe drugs that eliminate

insomnia and mood disorders; conduct restorative treatment with vitamins, piracetam, and insulin in small doses. Psychotherapy is aimed at changing attitudes towards the consumption of sleeping pills. The task of maintenance therapy, which is carried out in a narcological dispensary, is to eliminate mood swings and the resulting craving for sleeping pills.

Barbituro addicts often die from overdose of sleeping pills, as a result of suicide and from comorbidities.

2) TRANQUILIZERS (usually seduxen and meprobamate) when abused cause pleasant physical sensations, high spirits with restlessness; the gait at the same time becomes uncertain, the words are pronounced fuzzy.

With prolonged abuse, the initial effect decreases, patients are forced to increase the daily dose.

Discontinuation of tranquilizers leads to irritability, malice, headaches, leg cramps, insomnia, hand tremors, and impaired coordination and balance.

Chronic abuse causes a weakening of memory, a slowdown in mental processes, a narrowing of interests, a drop in efficiency, and sometimes seizures occur. Often there is a simultaneous abuse of tranquilizers and alcoholic beverages. At the same time, intoxication is deeper, changes in the psyche occur faster.

Treatment is carried out in a narcological or psychiatric hospital; usually begin with a gradual decrease in daily doses of tranquilizers; sleep and mood disturbances are eliminated with the help of antipsychotics. For restorative treatment, vitamins, piracetam, and insulin in small doses are used. When conducting maintenance therapy **in a narcological dispensary , neuroleptics, antidepressants are used;** reflexology is recommended. Those who abuse alcohol also undergo anti-alcohol therapy.

caused by ***3) CYCLODOL*** is less common than the above. In case of an overdose of this drug, unpleasant sensations in the body, nausea, and vomiting are noted. In the future, nausea disappears, unpleasant sensations in the body become pleasant, high spirits arise with a sense of contentment, attention and fine coordination of movements are disturbed, answers become inaccurate, statements are inconsistent; patients have dilated pupils. Then, against the background of clouding of consciousness, visual hallucinations appear.

With prolonged abuse, the euphoric effect decreases; to achieve it, the dose of cyclodol has to be increased several times.

When you stop taking the drug, irritability, malice, restlessness, pain in various parts of the body appear.

Chronic intoxication with cyclodol is characterized by mood disorders, decreased mental and physical performance, loss of interests, moral and ethical degradation of the individual.

Treatment is carried out in a narcological or **psychiatric hospital** ; antipsychotics are used to eliminate mood and sleep disorders; then a restorative treatment is carried out, with the help of psychotherapy, they seek to change the

patient's attitude to taking cyclodol.

who use ***4) VOLATILE SUBSTANCES*** (gasoline, acetone, toluene, perchlorethylene, stain removers, etc.) tend to achieve euphoria or hallucinations. These drugs in small doses, when inhaled, applied to the scalp or ingested, cause euphoria, unsteady gait, salivation and redness of the face, in large doses - visual and tactile hallucinations, impaired perception of one's own body and orientation in a particular environment, as well as incorrect behavior.

Chronic abuse leads to pathological addiction: lethargy, decreased interests and intelligence are noted. Especially dangerous is the abuse of volatile substances in childhood and adolescence.

Treatment is carried out in a narcological or psychiatric hospital; with the help of psychotropic drugs and physiotherapy. Using psychotherapy, they seek to change attitudes towards the abuse of volatile substances.

Test questions:

1. Define toxic substances?
2. What main groups of toxic substances do you know?
1. *Describe the effects of toxic substances on the human body.*
2. *Can we encounter toxic substances in everyday life?*
3. *What is the danger of toxic substances?*
4. *What is called substance abuse?*
5. *What is the difference between substance abuse and drug addiction?*
6. *What are the most common groups of substances used by drug addicts?*
7. *Where are drug addicts treated?*
8. *What are the main principles of treatment of such patients?*

CHAPTER 15.

PREVENTION OF SEASONAL INFLUENZA EPIDEMICS. INCREASING THE PROTECTIVE FORCES OF THE ORGANISM

Respiratory tract infections in the structure of infectious (parasitic pathology) occupy the first place. Among respiratory tract infections, influenza and other respiratory viral infections (ARVI) dominate, the share of which exceeds 80%. These infections have the greatest socio-economic significance, since during seasonal more than 50% of the able-bodied population is ill with them. The high incidence of SARS is associated with the exceptional ease of spread of viruses among susceptible contingents and in organized groups of people (children's preschool institutions, students, in transport, within the family).

The highest risk of complications during the period of seasonal influenza and ARVI is observed among the following vulnerable groups:

- children
- elderly people
- patients with various types of immunodeficiencies, bronchopulmonary diseases, kidney diseases, diabetes mellitus, cancer, hemophilia
- pregnant women.

Respiratory tract infections are classified as anthroponoses. source infection is a sick person, a carrier. Many respiratory tract infections are contagious at the end of the incubation period. The danger of patients as a source of infection in the prodromal period is great, much more than during the period of illness. The ease and speed of spread of the causative agent of these infections leads to a high level of morbidity in a susceptible community. The most affected age groups are children. The seasonal unevenness of the incidence of these infections is largely determined by the unequal opportunities for people to communicate during different seasons of the year.

In pregnant women, influenza and ARVI are the most dangerous, because. viruses can pass through the placental barrier, which can lead to miscarriage, abnormalities or fetal developmental delays.

Preventive and anti-epidemic measures for these infections are aimed both at the source of the pathogen, the mechanism of transmission, and at the susceptible contingent. The greatest epidemiological efficiency is achieved with a set of measures in relation to susceptible contingents, namely, during immunoprophylaxis.

Prevention and increase of the body's defenses

To date, a set of preventive measures to combat influenza and other acute respiratory viral infections has been developed and is being implemented annually. Prevention of influenza and SARS is carried out in the following areas:

specific prevention (vaccination);

non-specific prophylaxis (interferon preparations, interferon inducers);

emergency prophylaxis (intrafocal, with the use of antiviral chemotherapy drugs, interferons and fast-acting inducers of endogenous interferon with an immediate effect)

individual prevention (increasing the body's defenses)

Vaccination

Vaccination reduces the incidence of influenza many times over, its effectiveness is beyond doubt. Among the sick, unvaccinated people predominate, and in vaccinated people, the infection proceeds easily, the frequency of complications decreases.

There is a system of international monitoring of the variability of the virus, which makes it possible to annually determine which strains are relevant and should be included in the vaccine intended for immunoprophylaxis in the new season.

Pronounced anti-influenza immunity persists in the vast majority of those vaccinated for 1 year.

For immunization against influenza, three-component split inactivated vaccines are used containing purified hemagglutinins and neuraminidase of influenza viruses of subtypes A (H 1 N 1), A (H 3 N 2) and type B. An immunomodulator (polyoxidonium) is added to increase the immunogenicity of vaccines.

Vaccination is carried out in the autumn period (from the end of August to October inclusive). The National Immunization Schedule provides for an annual influenza vaccination from 6 months of age.

Nonspecific prophylaxis.

The means of nonspecific prevention of influenza include immunobiological preparations (IRS $_{19}$, ribomunil), interferon preparations and interferon inducers, antiviral drugs. Seasonal prophylaxis with the use of immunocorrective drugs is carried out in the pre-epidemic period in courses.

Methods and means are used to prevent infection: herbal adaptogens, vitamin complex preparations, homeopathic remedies, as well as hardening.

Of the vitamins, in recent years, special attention has been paid to vitamin D. It has been proven that it affects various parts of the immune system. Frequently ill persons have been found to be deficient in vitamin D, and its prophylactic use can reduce the frequency and severity of episodes of the disease.

interferon preparations.

The interferon system is the body's natural defense system. Its main role is to inhibit viral replication. Thus, the interferon system resists viral infections.

There are several reasons for the decrease in interferon biosynthesis:

- genetic (blood type II , Down syndrome)
- stress
- lack of vitamins and / or trace elements.

The appointment of interferon preparations plays the role of replacement therapy, which can be used both for the prevention and treatment of seasonal strains of the virus that caused the epidemic, which distinguishes interferon preparations from vaccines that are effective only against specific strains.

Since interferons are destroyed in the gastrointestinal tract, the main route of their administration is intranasal.

Emergency prevention of influenza is carried out during an epidemic rise in the incidence or in an epidemic focus (intrafocal prophylaxis) using antiviral chemotherapy drugs, interferons and fast-acting endogenous interferon inducers that have an immediate effect.

Individual prevention (increasing the body's defenses)

Personal and public hygiene measures. Pathogens remain active for hours and days in dusty, humid, warm and still air. The more intense the air exchange, the lower the concentration of viruses in the air, the lower the likelihood of infection. Therefore, it is necessary to *maintain optimal parameters of temperature, cleanliness and humidity* in residential and public premises, through frequent wet cleaning, using disinfectant solutions for objects of general contact use, regular ventilation of premises, control of air conditioning systems (timely cleaning of air filters)

The main methods of individual prevention:

Maintenance of general immune status:

- Proper balanced nutrition.
- Regular exercise, hardening;
- Compliance with the regime of the day (especially important is a good sleep).
- Vaccination (specific and non-specific).
- Prevention of stress, hypothermia.
- Vitamin therapy, immunomodulators, adaptogens.
- Avoid drying of the mucous membranes, use sprays to wash the nasopharynx.
- Use of personal protective equipment in public places, if necessary at home, if one of the family members is sick.

Gauze, cotton-gauze, as well as modern disposable masks made of non-woven materials are one of the most common ways to prevent ARI, cotton-gauze masks are recommended to be ironed intensively and changed at least every 3-4 hours, and modern disposable masks are changed every hour, and do not use twice!

- Personal hygiene. Hand washing is frequent and thorough. Regular disinfection.

The main symptoms of SARS are runny nose, cough, sore throat, headache, general weakness, fever. There may also be pain in the muscles, eyeballs, loose stools. All SARS are dangerous with complications, a person who carries SARS "on his feet" can die from serious complications of SARS and influenza, such as bronchopneumonia, pulmonary edema, heart failure. Therefore, with these symptoms of the disease, it is necessary to stay at home, in order to avoid complications. It is better to rest and be treated for three days than to get complications and lose a month.

Control questions for self-study:

1. Name the most vulnerable contingents for ARVI diseases.
2. What types of prevention are carried out with ARVI?
3. What measures does the specific prevention of ARVI include?
4. What activities include non-specific prevention of SARS?

5. What activities include emergency prevention of acute respiratory viral infections.
6. What activities include individual prevention of SARS
7. List the main methods of individual prevention of SARS.

CHAPTER 16. *SEXUALLY TRANSMITTED INFECTIONS, THEIR EFFECT ON THE HUMAN BODY. RISK FACTORS AND WAYS TO PREVENT SEXUALLY TRANSMITTED INFECTIONS*

According to WHO estimates, about 25 million new cases of sexually transmitted infections (STIs) are registered annually in the world. Ideas about these infections have undergone great changes in recent years, since the incidence rate remains quite high, and in some nosological forms, an increase in this indicator is noted, especially among people of reproductive age. Complications arising after STIs, such as: tubal infertility, stillbirth, miscarriages, abortions, congenital infections, chronic recurrent genital symptoms, malignant tumors of the genital tract, determine the socio-economic significance of this pathology. In this regard, it is necessary to realize the importance of STI prevention for the health of the nation as a whole.

Various reasons (risk factors) contribute to the increase in the number of STI patients in modern conditions:

- ✓ early onset of sexual activity;
- ✓ a large number of sexual partners;
- ✓ liberalization of sexual relations;
- ✓ refusal to use barrier methods of contraception;
- ✓ uncontrolled use of antibacterial drugs and self-medication, leading to an erased course of STIs;
- ✓ inefficient system of sex education;
- ✓ and other social factors (prostitution, drug addiction, alcoholization of the population, etc.).

At the same time, the absolute number of asymptomatic cases of STIs is not exactly known, and therefore the problem is underestimated. Consequently, such unidentified and unreported cases of diseases serve as a natural reservoir for the preservation and transmission of pathogens to sexual partners and newborn children.

A particularly high incidence rate was noted in the age group of 15-30 years. All diseases from the group of these infections are transmitted mainly through sexual contact, i.e. *the possibility of contracting an STI is real through unprotected sexual intercourse* .

STIs, which are caused by more than 30 different bacteria, viruses and parasites, are spread primarily through sexual contact, including vaginal, anal and oral sex.

Some STIs can be transmitted through skin-to-skin sexual contact. The organisms that cause STIs can also be spread through transfusions of blood products and tissue grafts. Many STIs, including chlamydia, gonorrhea, hepatitis B, HIV, HPV, HSV-2, and syphilis, can also be passed from mother to child during pregnancy and childbirth.

Registration of STIs, treatment of patients and identification of sexual partners are regulated by law.

Features of clinical symptoms of STIs.

When infected with an STI, clinical symptoms do not always appear immediately. Each infection from this group has its own duration of the "latent period" (incubation), during which there are no clinical symptoms, and the infected person continues to be sexually active, i.e. leads a habitual way of life and serves as a source of infection for his sexual partner. Even if the disease is manifest, clinical signs may not be very clear or disappear quickly.

These infections are characterized by polymorphism of clinical symptoms with a combination of a complex of syndromes.

Most often with STIs can appear:

- itching and pain in the urethra;
- symptoms and signs of urethritis, accompanied by discharge from the urethra and burning during urination;
- white, mucous, green, frothy, with or without odor, discharge from the urethra (urethra);
- frequent urge to urinate;
- acute orchiepindidymitis;
- balanitis;
- phimosis;
- dysuria;
- pain in the lower abdomen;
- pain in the groin;
- change in the nature of vaginal discharge;
- increase in body temperature;
- possible menstrual irregularities;
- petechial, pustular or polymorphic rashes;

STIs can have serious consequences beyond the direct impact of the infection itself:

- Some STIs can increase the risk of acquiring HIV by three or more times.
- Mother-to-child transmission of STIs can result in stillbirth, neonatal death, low birth weight, prematurity, sepsis, pneumonia, neonatal conjunctivitis, and birth defects. Syphilis during pregnancy results in approximately 305 000 fetal and newborn deaths each year and 215 000 babies born at increased risk of death due to prematurity, low birth weight or congenital disease.
- HPV infection is responsible for 530,000 cervical cancer cases and 275,000 cervical cancer deaths each year.
- STIs such as gonorrhea and chlamydia are major causes of pelvic inflammatory disease, poor pregnancy outcomes and infertility in both women and men.

Indications for testing for STIs:

1. STI-risk behavior, in particular: unprotected sex with a sexual partner who may have other sexual partners; especially with someone who has recently been diagnosed with an STI or who has reported suspicious symptoms.
2. Commercial sex (prostitution).
3. Suspicion of sexual abuse.
4. The presence of clinical symptoms (signs) indicating the likelihood of infection with an STI.
5. Planned instrumental manipulations in the cervix in women, in particular with artificial abortion, the introduction of intrauterine contraceptives or a planned in vitro fertilization procedure.

The clinical diagnosis must be confirmed by one or another method of laboratory diagnostics for the following reasons:

- asymptomatic forms of STIs are quite common and can only be excluded or confirmed using appropriate laboratory diagnostic methods;
- the diagnosis of HIV infection requires subsequent mandatory laboratory confirmation, as it has very serious consequences for patients, their sexual partners and / or children;
- to select the most rational etiotropic therapy, especially in cases where it is possible to determine the drug resistance of microorganisms;
- in order to decide on the need for additional testing (the so-called test for cure);
- to increase reliability in the registration of STIs and the submission of an emergency notification to the territorial centers of Rospotrebnadzor.

Prevention of STIs.

To reduce the incidence of viral STIs, it is recommended to use vaccines (for example, vaccines against hepatitis B, HPV), however, only primary prevention, aimed at improving the health literacy of the population, and forming a commitment to a healthy lifestyle, really restrains the spread of STIs.

The main efforts in the organization and implementation of primary prevention of STIs are aimed at the sexual education of young people. Building intimate relationships on the principle of mutual trust and respect, it should be remembered that if a person has more than one sexual partner, then he is at risk of contracting STIs. The more sexual partners, the higher the chance of contracting an STI. If one of the sexual partners has an orderly sexual life, and the other does not, then the likelihood of contracting an STI is high for both partners. Therefore , *the culture of sexual behavior, the use of condoms during each sexual intercourse, comes to the fore in prevention.*

Latex male or polyurethane female condoms not only protect against unwanted pregnancy, but also serve as a reliable barrier to prevent STIs!

In connection with all of the above, the STI prevention system includes the following areas:

- early, complete and active detection of STI patients;
- prevention of perinatal transmission of STI pathogens;
- decrease in the number of sexual partners;
- increasing the frequency of condom use and increasing their availability and promoting them;
- prevention of infection during transfusion of blood and its products (hepatitis B, C, HIV infection);
- development of means of specific prevention; organization and conduct of laboratory (serological, microbiological, virological, immunological) examination of certain population groups with risk factors for STIs;
- availability of anonymous testing for STIs;
- informing and educating the population about the leading ways and factors of transmission of STI pathogens, possible complications and consequences after the transfer of STIs.

Prevention of HIV infection in medical personnel. To prevent occupational HIV infection of medical workers, the following regulatory rules must be observed:

- when performing any manipulations of a medical nature, an employee of a healthcare facility must be dressed in a gown, cap, disposable mask (and, if necessary, goggles or protective shields), removable shoes, in which it is

forbidden to go outside the department, laboratories, manipulation rooms, etc.;

- all manipulations in which hands may become contaminated with blood, blood serum or other biological fluids should be carried out in double rubber medical gloves. Rubber gloves removed once are not reused due to the possibility of hand contamination. During operation, gloves are treated with 70% alcohol or any other disinfectant that has a virucidal effect;
- workers of all medical specialties must take precautions when handling cutting and stabbing instruments (needles, scalpels, burs, separation discs and stones for preparing teeth, etc.);
- in case of damage to the skin, it is necessary to immediately treat the gloves with a disinfectant solution and remove them, squeeze the blood out of the wound; then thoroughly wash your hands with soap and water under running water, treat them with 70% alcohol and lubricate the wound with 5% iodine solution. If your hands are contaminated with blood, you should immediately treat them for at least 30 seconds. swab moistened with a skin antiseptic approved for use (70% alcohol, 5% chloramine solution, iodonate, sterillium, octeniderm, octenisept, chlorhexidine, etc.), wash them twice with warm running water and soap and wipe dry with an individual towel (napkin);
- in case of contact with blood or other biological fluids on: mucous membranes of the eyes, they should be immediately washed with water or a 1% solution of boric acid; nasal mucosa - treat with a 3% solution of protargol; oral mucosa - rinse with a 70% alcohol solution or a 0.005% solution of potassium permanganate or a 1% solution of boric acid;
- in the presence of wounds on the hands, exudative skin lesions or weeping dermatitis, the health worker is removed from patient care and contact with care items for the duration of the disease. If it is necessary to perform work, all damaged areas must be covered with fingertips, adhesive tape, etc.;
- surfaces of work tables at the end of the working day (and in case of contamination with blood - immediately) are treated with disinfectants with virucidal properties. If the surface is contaminated with blood or blood serum, the procedures are performed twice: immediately and with an interval of 15 minutes;
- when infected material gets on the floor, walls, furniture, equipment, contaminated areas are poured with a disinfectant solution, then wiped with a rag soaked in a disinfectant solution. Used rags are thrown into a container with a disinfectant solution or into a tank for subsequent autoclaving;
- eating, smoking and using cosmetics is allowed only in isolated rooms specially designated for these purposes. All workplaces (for example, in a dental office) should be provided with a disinfectant solution and a first aid kit. To avoid infection of a medical worker and to prevent infection of patients during dental procedures, it is necessary to observe:

- thorough hand washing after examining each patient or each procedure where infected material has been handled;
- after high-risk procedures (parenteral procedures and those involving contact with severely ulcerated mucous membranes and skin), hands should be thoroughly washed using surgical cleansing solutions. In its absence, washing hands with soap and water, drying and treating with 70% ethyl alcohol;
- after procedures with an average and low degree of risk (contact with intact mucous membranes and skin), ordinary soap and water are sufficient;
- before work, it is necessary to wear safety glasses or plastic shields, a protective face mask;

- disposable gloves are required;
  - physicians with exudative skin lesions should not perform invasive procedures;
  - if a patient is suspected of having HIV infection, the dentist should wear a surgical gown and a cap that covers the hair;
  - when taking x-rays in the mouth, the same precautions must be observed;
  - special precautions are observed when handling sharp instruments (scalpel, disposable needles, burs, discs, endodontic instruments);
- use disposable instruments only once;
  - rinsing the patient's mouth before the procedure significantly reduces the number of microorganisms in aerosols dispersed during procedures; rinsing with only water reduces the number of microorganisms in aerosols by 75%, and the use of special mouthwashes by 98%;
  - a healthcare professional should treat blood and other body fluids as potentially infectious.

Control questions for self-study:

1. List the factors contributing to the increase in the number of patients with STIs.
2. List the clinical symptoms of STIs.
3. Name the indications for testing for STIs.
4. List measures to prevent STIs.
5. What measures are being taken to prevent HIV infection among healthcare workers?

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