

JEL Classification: D 81; K 32; O 13; O 28

UDC 502/504:613.7

DOI: 10.30857/2415-3206.2018.2.10

## SOCIO-ENVIRONMENTAL RISKS OF HUMAN HEALTH

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### **Introduction and purpose of the study.**

Analysis of statistical data, dynamics of absolute and integrated indicators of anthropogenic and technogenic loading on the environment indicates that the ecological situation in Ukraine can be characterized as a crisis. In Ukraine, the ecological crisis is unfolding in the context of limiting natural resources, economic instability, exacerbating social and political problems, the lack of moral foundations in many members of society, and the intensive pollution of the human environment by negative factors, including mutagens and teratogens. Taking into account the above, the urgency of the problem of the interconnection of the environmental state of the environment and the state of health of the population is increasing.

**The hypothesis of scientific research.** It is anticipated that the poorly investigated are the social consequences of environmental threats and challenges, and the state of social consciousness in the field of the environmental paradigm of health is not sufficiently taken into account.

The purpose of this study is to analyze the impact of negative environmental (anthropogenic) factors on the basic indicators of public health and the means of their elimination and minimization through bioprophylaxis and the formation of ecological consciousness.

**Methods of research:** theoretical analysis, synthesis, comparison and comparison in order to determine the state of disclosure of the research problem in the scientific literature, quantitative indicator of the state of health of the population – health index, study of expert surveys.

**Results:** the risks of negative environmental impact on human health are disclosed. The dependence of health and the environment on certain indicators is shown. The relationship between ecological factors and the development of modern diseases is revealed. The group of diseases related to the environmental impact have been analyzed. The leading role in etiology and pathogenesis of diseases of heredity and the state of the environment has been determined.

**Conclusions:** The current ecological crisis in Ukraine is related to the influence of the complex of environmental and professional-production factors in combination with stress, neuro-psychological overloads. Today, there are many environmental challenges and threats that cause deterioration of physical and mental health, threatening the nation's gene pool. The deterioration of the environment leads to an increase in ecologically dependent chemical pathology and the emergence of new ecologically conditioned diseases.

**Keywords:** ecology, health, ecological risks, diseases, heredity, bio-prophylaxis.

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## СОЦІАЛЬНО-ЕКОЛОГІЧНІ РИЗИКИ ЗАБЕЗПЕЧЕННЯ ЗДОРОВ'Я ЛЮДИНИ

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**Вступ і мета дослідження.** Аналіз статистичних даних, динаміки абсолютних та інтегрованих показників антропогенного і техногенного навантаження на навколишнє природне середовище свідчить про те, що екологічну ситуацію в Україні можна охарактеризувати як кризову. В Україні екологічна криза розгортається при обмеженні природних ресурсів, економічній нестабільності, загостренні соціальних та політичних проблем, відсутності моральних основ у багатьох членів суспільства, інтенсивного забруднення середовища існування людини негативними чинниками, в тому числі мутагенами і тератогенами. З огляду на наведене, актуальність проблеми взаємозв'язку екологічного стану зовнішнього середовища та стану здоров'я населення зростає.

**Гіпотеза наукового дослідження.** Передбачається, що малодослідженими є соціальні наслідки екологічних загроз і викликів та недостатньо враховано реальний стан суспільної свідомості в сфері екологічної парадигми здоров'я.

**Метою даного дослідження** є аналіз впливу негативних екологічних (антропогенних) факторів на основні показники здоров'я населення та засобів їх усунення і мінімізації шляхом біопрфілактики і формування екологічної свідомості.

**Методи дослідження:** теоретичний аналіз, синтез, порівняння та зіставлення з

метою визначення стану розкриття проблеми дослідження у науковій літературі, кількісний показник стану здоров'я населення – індекс здоров'я, вивчення експертних опитувань.

**Результати:** розкрито ризики негативного впливу довкілля на здоров'я людини. Показано залежність здоров'я і стану навколишнього середовища за певними показниками. Розкривається взаємозв'язок між екологічними факторами і розвитком сучасних хвороб. Проаналізовано групи захворювань, що пов'язані з дією навколишнього середовища. З'ясована провідна роль в етіології і патогенезі захворювань спадковості і стану навколишнього середовища.

**Висновки:** сучасна екологічна криза в Україні пов'язана із впливом комплексу екологічних та професійно-виробничих факторів у поєднанні зі стресовими, нервово-психічними перевантаженнями. На сьогодні існує багато екологічних викликів і загроз, що спричиняють погіршення показників фізичного й психічного здоров'я, загрожують генофонду нації. Погіршення стану навколишнього середовища призводить до зростання екологічно залежної хімічної патології і виникнення нових екологічно зумовлених захворювань.

**Ключові слова:** екологія; здоров'я; екологічні ризики; хвороби; спадковість; біопрфілактика.

**Formulation of the problem.** XXI century is characterized by an increase in the impact of anthropogenic factors on human. The emergence of new technologies, sources of energy and materials, the introduction of the latest advances in science and technology have led to global changes in society. On the one hand, the improvement of technologies and the growth of production contribute to more complete satisfaction of people's needs, increase of comfort, production of food products, etc. On the other hand, air, earth and water are polluted, forests are being destroyed, ozone layer of the Earth diminishes, thousands of new chemical compounds appear, which undoubtedly negatively affects people's health, reduces life expectancy, endangers human existence biological species.

**Analysis of recent research and unresolved part of the problem.** In the national scientific literature, the questions devoted to the influence of environmental factors on human health were considered in a number of publications of such scholars as O.I. Timchenko, E.M. Omelchenko, O.V. Linchak, O.P. Vitovska, V.G. Bardov, V.I. Fedorenko, S.I. Garkavy, S.V. Vitrischak, E.M. Belitskaya, A.I. Horova, I.V. Sergey, Yu.V. Bardik, O.O. Bobylova and others.

Over the past few years, a number of studies have been conducted at the Kyiv National University of Technologies and Design devoted to the analysis of the health of student youth and its environmental dependence. In particular, in scientific research A.M. Serdyuk, O.I. Timchenko, O.V. Linchak, V.V. Elagina and others. reveals the genetic effects of the influence of the changed human environment on the process of reproduction of the population of Ukraine. Researchers in the field of medical ecology of the Kyiv National Medical University named after O.O. Bogomolets – V.G. Bardov, V.I. Fedorenko, S.V. Vitrischak, L.P. Kozak and O.L. Savin reviewed issues of ecology and human health, identified environmental problems and analyzed environmentally dependent and environmentally-prone diseases. Medical-ecological problems in modern conditions and their influence on the level of morbidity of the children population are covered in the study of S.N. Vaduz and O.E. Fedortsiyava.

Despite a large number of publications devoted to ecology and human health, to date, some aspects of this scientific problem have not been adequately investigated. In particular:

– poorly investigated are the social consequences of environmental threats and challenges;

– the actual state of social consciousness in the field of the environmental paradigm of health is not sufficiently taken into account.

The purpose of the paper is to analyze the impact of negative environmental (anthropogenic) factors on the main indicators of public health

and the means of their elimination and minimization through bio-prophylaxis and the formation of ecological consciousness.

**Research results.** The analysis of sources and literature from this problem shows that among the factors determining the level of morbidity, the state of the environment takes about 20%. At the same time, according to the WHO data, taking into account the current ecological stress associated with the impact of a complex of environmental and occupational factors in combination with stress, neuro-psychological overload, the majority of diseases are the main source of these diseases – up to 70–80%. Social factors and environmental factors do not act in isolation, but in combination with biological (including hereditary), which determines the dependence of human morbidity, both on the influence of the environment in which it is located, and on the genotype and biological laws of its development. Finding the exact contribution of a factor to the etiology of the disease is often a rather difficult task, since more than 200 genes that control the susceptibility of a person to the diseases associated with the influence of environmental factors [4, p. 119; 5, p. 319]. In recent years, anthropogenic pressure on the environment in many regions of the country is hazardous to health. Depending on the intensity of the environmental factors on health, distinguish zones of emergency ecological situation and the zone of ecological disaster. The ecological condition of such zones is estimated by a set of indicators, in particular, according to the structure of the morbidity of the adult and infant population, mortality, the frequency of birth defects, genetic disorders, violations of the immune system, the concentration of toxic substances in various biological human environments, etc.

It is possible to establish the dependence of health and the environment on certain indicators. As noted by such researchers in the field of hygiene, as V.G. Bardov, V.I. Fedorenko, E.M. Biletska, S.S. Garkavy, A.M. Grynzovsky, a quantitative indicator of the health status of the population in the zone of environmental monitoring is the health index. Given the full well-being of the environment, the generalized health index is about 65–70%. An integral indicator of health is the adaptive capacity of the human body. For a man who is not adapted to fluctuations in the parameters of abiotic factors, typical manifestations are changes in his physical and mental health. Thus, the level of adaptation to environmental conditions, pre-morbid and pre-pathological changes, ecological pathology, ecological nosology can be an indicator of the state of the environment [5, p. 306].

The WHO European Center for Environment and Health recommends the main groups of indicators for assessing the link between the environment and the health of the population and the development of appropriate information systems: health status (mortality, morbidity, prevalence of diseases); physical environment (indicators of the state and influence) – provision of housing, the

quality of drinking water and atmospheric air, radiation, noise; working conditions (influence of factors on the body); health protection (regulatory quality of food products); health services [6, p. 38].

When investigating the influence of environmental factors on health indicators, the following schemes should be observed: 1) factor of the environment – health indicator; 2) factor of the environment – a complex of indicators of health; 3) complex factors – health indicator; 4) a complex of factors – a complex of indicators of health.

Analyzing the influence of negative environmental (anthropogenic) factors on the basic indicators of health of the population, one can distinguish the following directions:

- at the somatic level – deterioration of health as a result of unfavorable anthropogenic ecological situation, unfavorable conditions of labor activity;
- at the mental level – the deterioration of health due to prolonged social and environmental tensions, stressful situations caused by man-made accidents and catastrophes;
- at the social level – the discrepancy between the volume and quality of available medical services and the real state of health of the population caused by the impact of anthropogenic ecological situation; the deterioration of demographic indicators – a decrease in the duration and quality of life, a decrease in fertility, an increase in morbidity and mortality.

Actually environmental (the most important anthropogenic) factors can be represented, on the one hand, in the form of complex phenomena (environmental risks), and, on the other hand, mainly as objective indicators of the quality of the environment. In particular, environmental risks should include: anthropogenic environmental disasters; increase of socio-technogenic load on nature (accumulation of waste, pollution of air, water, soil, etc.); uncontrolled negative consequences of biotechnological and genetic engineering developments; the presence of radiation contamination; global climate change; destruction of biosystems under the influence of anthropogenic pollution; reduction of the territory of biological nature reserves and recreational zones, etc. In any case, to identify the interconnections of environmental factors and the health of the population, it is necessary to include in the scope of the analysis the following social consequences of environmental challenges, such as: the growth of diseases and mortality in ecologically unsuccessful territories; job cuts and lower incomes in such industries as agriculture, fisheries, hunting, forestry, tourism; loss of recreational areas, damage to the usual types of recreation and leisure; impairment or alienation of land and real estate as a result of deterioration of the environmental situation or natural and man-made disasters and environmental disasters, etc.

Considering the problem of the influence of environmental factors on the health of the population within the framework of the general socio-ecological approach, one cannot ignore the real state of social consciousness in the field of environmental problems. According to the generalized results of author's expert surveys in recent years, experts recognized the most urgent for the population of large cities the following environmental risks: the quality of drinking water (60–70% of experts); climatic features of the year (30–40%); food safety (50–55%); sanitary condition of the district of residence (40–45%); state of water resources (rivers, lakes) – 60–65%; air pollution (65–70%); soil contamination (55–60%); increased noise level (30–45%); aesthetic state of the environment of the place of residence (40–50%), etc. [4].

Scientists in the field of medical ecology share the diseases related to the environmental impact of the two groups: 1) ecologically dependent – diseases of a non-specific nature, arising and the background of the changed environment. At the same time, environmental factors provoke pathogenetic mechanisms of the disease and complicate its course. As a result, there is an increase in the overall morbidity, cardiovascular, cancer, endocrine, childhood, pathology of pregnancy, violations of fetal development, etc.); 2) ecologically-conditioned – a disease of a specific nature, when the ecological factor is the etiological factor of the disease (endemic diseases, natural-focal diseases, infections, diseases caused by the action of harmful chemicals, radiation, biological allergens) [3, p. 320].

It should be emphasized that in the level of danger to human health in the first place are chemicals – heavy metals (mercury, lead, cadmium, zinc, copper, arsenic), chlorinated hydrocarbons, dioxins, nitrates, nitrites and nitro compounds, asbestos, pesticides, radionuclide, medicines (antibiotics, synthetic chemical compounds), biological factors used in industrial production. The ingestion of these substances in the human body is a risk factor for the development of various pathologies, the growth and complication of various diseases [1, p. 34; 5].

The leading role in the etiology and pathogenesis of diseases belongs to heredity and the state of the environment. Harmful chemical factors contribute to the emergence of new mutations, which are the cause of cancer and other diseases. In particular, the total number of diseases associated with genetic changes, pathology of pregnancy and developmental defects has increased several times over the past few years [2; 3; 6].

Scientific research has revealed a close relationship between environmental pollution and the prevalence of premature infants, malformations in children and chromosomal diseases, allergic pathology, anemia, mental retardation and abnormal behavior and children, their physical development. In children living in areas of environmental disaster, there are congenital malformations, recurrent bronchitis, allergic diseases, nephropathies, decreased IQ, bronchial asthma,

immunodeficiency states, endocrine pathology, neuropsychiatric diseases, cancer pathology, etc. [5, with. 322].

To date, there are many ways to eliminate and prevent environmental threats and challenges. A significant place among them is the moral-ethical and environmental paradigms of health, according to which health – is a matter of personal and social choice of moral values, the relationship between man and the environment, the attitude to his health. Human consciousness should be aimed at preserving the environment and its health, control and responsibility for its own health. A person can only be healthy in a healthy environment. Prevent professional and ecological pathology of anthropogenic origin is possible by eliminating or limiting the flow of harmful substances into the environment. To date, preventive measures have been developed to prevent ecologically caused pathology by increasing the resistance and mobilizing adaptive reserves of an individual's organism or population to various harmful environmental factors. Such preventive measures in the scientific literature are indicated by the term - biological prevention. It is aimed at correction of pre-nosological states. Bio-prophylaxis should be harmless to the body. They affect general (non-specific) or specific biological mechanisms for a particular chemical, taking into account the mechanism of action. In non-specific bio-prophylaxis, the effect is realized by increasing the adaptive reserves of the body. Correction of the donor forms of ecologically conditioned states may be non-pharmacological and with the use of pharmacological preparations, biological protectors, etc. Non-drug methods, in particular, include magnetotherapy (enhances transmembrane transport of ions), normobaric interval hypoksytherapy (activates oxidative-reduction processes), metered physical activity, etc. From biological treads, biological regulators of plant or animal origin, natural or synthetic antioxidants (phytoadaptogens – ascorbic acid, tocopherol, selenium, melatonin, etc.), adaptogens of animal origin – ginseng, eleuterococcus, echinacea, pantocrine, apilac, enterosorbents, pectin, etc.) are used.

**Conclusions and suggestions for further research.** The current environmental crisis in Ukraine is associated with the impact of a complex of environmental and professional-production factors combined with stress, neuropsychiatric overloads. Today, there are many environmental challenges and threats that cause deterioration of physical and mental health, threatening the nation's gene pool. The deterioration of the environment leads to an increase in ecologically dependent chemical pathology and the emergence of new ecologically conditioned diseases. Environmental education, aimed at the formation of ecological consciousness, starting with pre-school age and application of means of bio-prophylaxis, should be an important place in the prevention of ecological challenges and threats.

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