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EVALUATION OF METEODEPENDENCE AND METEOSENSITIVITY ON HUMAN AS HEALTH INDICATOR OF THE SOCIETY

In the article the analysis of the development of meteodependence reactions among adolescents, young adults in Cherkasy by age and sex is carried out, the weather conditions that lead to the development of meteoreactions and conclusions about the extent of meteodependence among the population are found.

Keywords: meteodependence, meteosensitivity, meteopathia, weather, population.

Problem formulation. The impact of weather and climate on human health has been known for a long time. In ancient times, the world-famous "father of medicine" Hippocrates gave assessing the impact of seasonal weather and different geographical factors on the course of disease and the general state of health. But the researchers note, this problem has attracted in the last decades of the 20th century. According to the experts, the global problem of humanity in the third millennium – the problem of preserving the gene pool and human health in the face of deteriorating living environment. And one of the factors of this deterioration is changing climatic conditions on the planet, including global warming, which leads to an increase in the frequency of adverse weather conditions, which in turn leads to an aggravation of pathological conditions of the world's population

Analysis of the recent researches and publications. Study on meteosensitivity man devoted their study on meteosensitivity engaged Bezugla (1980) [1], Bocşa (1980) [2], Mazuryn (1990) [5], Solymene W. (2003) [8], Mileykovskiy (2007) [6]. In the works of these scholars the meteorological factors that provoke meteosensitivity are selected, the medical classification of weather meteosensitivity is given, degree and a number of prevention measures meteosensitivity are defined and health meteosensitive people are improved. Particularly relevant for today is the problem of meteosensitivity for urban residents due to the rapid growth of the degree of urbanization. Research degree of influence of climate on health of Cherkasy never carried out

because the solution of this problem and are dedicated to our research.

The relevance of the article is that the phenomenon of meteosensitivity is very common among the population. According to the medical service, in the world about 20% of meteosensitive people are healthy and 70% of people are suffering from certain chronic diseases, mostly overweight and endocrine disorders during puberty, pregnancy and menopause, head injuries, flu, sore throat, pneumonia and others [3; 4].

The aim of our study is to evaluate the prevalence of the phenomenon of meteosensitivity, description of weather factors that provoke meteodependence and develop the ways to overcome these reactions. The main objectives of the study are to find out the essence of the concept of "meteosensitivity" and "meteopatia", track and analyze the weather conditions affecting the development of meteodependence, analyze climatic conditions that provoke increased sensitivity of Cherkasy population, identify the degree of weather reactions in adolescents students and adults, draw conclusions about the dynamics of changing weather reactions with age, develop recommendations for reducing the impact of meteosensitivity on health.

Scientists claim the fact that the first meteodependence reaction, in particular, among different age groups of residents of Cherkasy on changing weather conditions was investigated.

The main methods of research are theoretical methods (analysis of published data and statistical comparison, generalization of the results) and empirical methods (psychological, ver-

bal-communication, survey methods, questionnaire), their ordering and analysis.

Psychological verbal-communication studies were conducted using questionnaires among students of 9th–11th grades (98 persons), students (89 persons) and adults aged from 28 to 40 (234 persons). Total – 421 investigated person.

Results. The dependence of the health on the weather and other natural disasters has been noticed the ancient doctors, but doctors study the problem started much later. Diagnosis "meteosensitivity" appeared recently, a few decades ago and is defined as painful reaction to changing weather conditions (rain, snow, approaching cyclone or anticyclone, magnetic storms, solar flares and more) and other environmental factors [3; 9]. The human body responds not only to the same weather as its abrupt changes and ailments associated with it, usually starting 1–2 days before and can last for another 4 days, and for the most part, it depends on the person, their age, physique, trauma, presence of chronic diseases and even temperament. Weather factors act in different ways: through the skin, for example, affect the temperature, humidity, wind, sunlight, atmospheric electricity, radioactivity; through the lungs perceived temperature, humidity, wind, clean air, its ionization; vision, hearing, smell, taste are noise, smell, temperature, chemical composition of air. Human organism reacts to the weather changes in the restructuring of all biological systems, but these reactions are not regarded by doctors as a serious problem. Meteosensitivity is really dangerous if in response to atmospheric changes occur in the body pathological reactions, aggravated chronic diseases, starting unexpected disruptions in the heart, stomach and lungs. These manifestations may occur before the weather changes as alarm reaction. This dangerous time period get three or four days before and a few days after the changes [1; 3]. Contribute meteosensitivity increased overweight and endocrine disorders during puberty, pregnancy and menopause. Increased meteosensitivity can suddenly occur after head injuries transferred influenza, tonsillitis, pneumonia. Some people it "passed" even heredity [4]. In healthy people, the weather changes are accompanied by accelerated production of hormones, platelet count in blood clotting, enzyme activity. These changes are a kind of defensive reaction to adverse conditions, such as in patients restructuring body's response is delayed or does not occur

[2]. The main meteorological factors that provoke meteosensitivity are: temperature, pressure, humidity, direction and velocity of air, magnetic storms. This is due to environmental degradation, increased meteosensitivity significant impacts on human health. On the weather changes the human body reacts in the restructuring of all biological systems, is a kind of defensive reaction, the body is some correction in the production of hormones, blood flow rate, enzyme activity, the ability of the blood to thicken and more. Young and healthy people easily adapt to such conditions, so almost no experience weather changes, due to the high level of compensatory-adaptive mechanisms of the organism [7; 8].

But chronically ill people in a few days to watch the weather change appearance metotropic reactions disease will get worse and cause undesirable changes in health and spirits. Sharp fluctuations in temperature, atmospheric pressure, humidity, strong wind, magnetic storms, etc. can hamper progress or even cause the failure of adaptive-compensatory processes and give rise to pathological conditions. One of the key indicators in this case is to reduce the temperature, which leads to chill. About 80% of patients with different diseases react to volatility forecast exacerbation. The most crucial parameters are headache, unstable blood pressure, joint pain, diffused attention. And often, these symptoms are observed during warming in [7].

Strong wind irritates skin receptors, causing excitation of the nervous system, and ischemic heart disease may strokes. Fluctuations in atmospheric pressure reduce blood oxygen saturation, provoke spasm of blood vessels and mechanically irritate nerve endings. From these oscillations patients often suffer from cardiovascular disease and lung problems. Humidity affects the sweat and heat exchange. People, who are especially sensitive to humidity, suffering from hypertension and atherosclerosis, some of them even change the look – pale skin of the face. Solar activity and magnetic storms also accompanied in some people a headache and chronic exacerbations. An effect of magnetic storms on the body is already apparent during 1–2 days before the weather changes.

Continued instability of weather adversely affects the body – mind suppresses, reduces efficiency and causes strain nervous system. The sudden cooling or warming is dangerous for people with heart failure and circulatory system

problems they feel fatigue, insomnia is developing [6].

Life in cities or rural areas also affects the level meteosensitivity. Meteopatic citizens often complain because increased electromagnetic waves that are in an urban environment, affecting receptors causing activation of hormones that trigger other reactions, changes in metabolism, metabolism and production of enzymes and others. [4]. Air temperature – is the most important element of meteorological forecast, which significantly affects its other characteristics (pressure, humidity, etc.) And combination of them determine the human health [1]. The temperature is periodic daily and annual variability caused by diurnal and seasonal variations in the height of the sun and solar radiation flux in specific geographical latitudes. Apart from periodic, none periodic temperature change is caused by advection of air masses and as the pressure field.

Air pressure is characterized by frequent non-periodic oscillations are related to changes in the weather. From changes in atmospheric pressure affects primarily, high blood pressure. But even completely healthy people may experience such changes. The mobility of air (wind) – a direction and speed of air. How meteorological element that forms the weather, wind arising from changes in atmospheric pressure, which contributes to the displacement of air flow from areas of higher to lower pressure areas. At low temperatures the wind increases heat dissipation, which leads to chill. The lower the temperature, the worse the effect of wind carried the body. In the hot season the wind increases evaporation and leather feel better. Weak wind has a tonic and stimulating effect. Strong wind tedious, irritating the nervous system, difficult breathing.

As the temperature of the moisture contained in the air condenses and forms a fog. It is also possible the mixing of warm moist air from dry. Damp air, increasing the temperature affects the body. The most favorable to the human condition achieved with 50% humidity, temperature – 16–18° C and wind speed up (in vivo) 7 m/s. Given the increase in humidity, which prevents evaporation, heat is transferred hard (conditions suffocation), amplifies the impact of cold (wet-freezing conditions). Cold and hot dry climates transferred more easily than in a wet [1; 2].

Depending on the severity of reactions, there are three degrees of meteosensitivity: self meteosensitivity (slight deterioration of health,

not confirmed by other studies and analyzes); meteodependance (changes in blood pressure, cardiac arrhythmias, seen on the cardiogram and other symptoms meteosensitivity); meteopatia, which is divided into four types: brain (headaches and dizziness, noise in my head, etc.); cardiac (heart pain, respiratory failure); undefined type (patients can not accurately describe their condition. They feel pain in the joints, bones, muscles, malaise, and weakness) [5; 9].

The specific climatic conditions of Cherkasy and their changes promoted research into their effects on meteosensitive people. When analyzing the number of days of bad weather conditions were taken into account that for a comfortable well-being, it is necessary that pressure was 750 mm Hg, and the temperature drop was less than 6 degrees respectively. To investigate the adverse weather conditions data used Cherkasy Regional Center for Hydrometeorology. As a result, it was found that the number of days in Cherkasy, adverse for people with meteorological reactions for the period during 2010–2014. Fluctuates in the range from 188 to 238. Most days, the adverse weather conditions for the observed winter and the least – in summer, and may not be available in summer days with high or low pressure, as it was in the summer of 2012–2014. The second largest number of unfavorable days occupies spring, when there is the greatest number of days with unfavorable temperatures (tbl 1).

Analysis of the number of days with adverse weather events (such as uncomfortable humidity, direction and velocity of air) for the period of 2010–2014. (fig. 1) showed that most of those days was in 2012 and 2013 (108 and 109 days, respectively), the lowest – in 2011 and 2014 – 97 and 85 days.

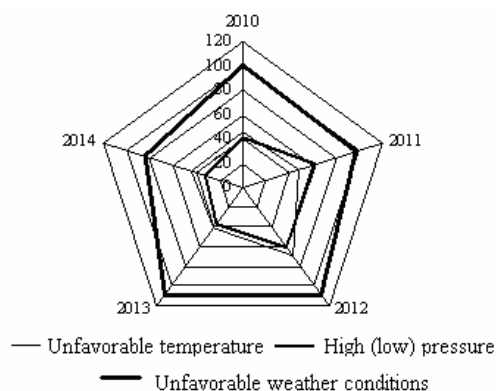


Fig. 1. Dynamics of days with adverse weather events over the period of 2010–2014

Table 1

Number of adverse weather events in Cherkasy in 2010–2014. Days

Year	Season	Unfavorable days	Unfavorable temperature	High (low) pressure	Unfavorable weather conditions
1	2	3	4	5	6
2010	winter	67	20	13	34
	spring	48	9	10	29
	summer	35	10	2	23
	fall	38	7	16	15
In general:		188	46	41	101
2011	winter	71	8	23	40
	spring	51	17	14	20
	summer	34	11	1	22
	fall	52	12	25	15
In general:		208	48	63	97
2012	winter	91	12	29	50
	spring	67	26	13	28
	summer	30	14	0	16
	fall	50	18	18	14
In general:		238	70	60	108
2013	winter	74	8	23	43
	spring	50	15	7	28
	summer	24	9	0	15
	fall	49	9	17	23
In general:		238	41	37	109
2014	winter	38	6	11	21
	spring	56	19	6	31
	Summer	35	13	0	22
	Fall	32	6	15	11
In general:		161	44	32	85

Due to the bad weather conditions survey data for Cherkasy between 2010 and 2014 it was found that children of school age were less meteorosensitive than adults because teens were more prone to emotional and positively respond to changes in natural phenomena, than to suffer from them. Most of none meteorosensitive students (68%); 28% still have some meteoropatic reaction with 28%, and only 4% of students are in need of correction and have meteorosensitive body. Regarding gender indicators, the more sensitive among school children were girls (57%). Meteoropatic analysis showed that girls are also more meteoropatic than boys, which affects their mood changes, increased sensitivity. Among students that are meteoropatic girls turned 59%. As for the part of students who have not seen the reaction of the weather, they are respectively 56 % boys and 44% girls. Consequently, most teens do not have,

depending on weather conditions. Analysis of the degree weather reactions among students from 16 to 27 years showed that the degree of expression with age meteorological reactions change. While among students meteorosensitive were 4%, among them students have 6% of meteoropatic reaction, among students observed in 28%, and among students – 29%, respectively none meteorosensitive students were 68% of students – 65%.

More sensitive of the students were girls (65%). Compared with adolescents, the proportion of meteorosensitive girls (65% vs. 57% of students). Similarly, changes with age and development of meteoropatic: 63% of women (compared to 59 % of high school girls) and 37% of boys (41% vs. students) have meteoropatic reaction. None meteorosensitive girls – 42% (44% of students), and 58% among boys (56% of students). The level

meteosensitivity of students compared with students has not changed.

Analysis of the degree weather reactions among adults aged 28 to 40 years showed that the severity with age of meteorological reactions increases. Thus, 60% of adults are meteosensitive (among students meteosensitive were only 4%), 32% – is meteorotropic (and students – 28%) and only 8% of adults are not depending on weather conditions. And among the school children of turned out – 68%.

As among students, meteosensitive men are more than women (62% vs. 57% girls). We can therefore conclude that the degree of age meteosensitivity among females is increasing. Women are not only meteosensitive in compari-

son with men, but they are also more meteorotropic. It should be noted that the degree of meteorotropic reactions sexes has not changed with age among girls meteorotropic students share was 59% and the boys – 41%. As among students, the proportion of adult males with no weather reactions is 58% (the students was 56%), and not sensitive to meteorological phenomena turned out 42% of women (girls – 44%).

Thus, among the main recommendations that can be used to reduce the level of meteosensitivity can be divided into the following groups: recommendations expressed in pathological conditions, i.e. meteopaliya is actually meteosensitivity and meteodependence, specific disease conditions (tbl 2).

Table 2

The main recommendations for reducing meteosensitivity

The development of meteosensitivity	Recommendations
Meteopatizm	The use of antispasmodic drugs that improve cerebral and coronary circulation
Meteodependence: -0 Warning neuroses and angina -1 Struggle with depression -2 Reduced pressure -3 With poor carrying sharp warming	Aromatherapy Peppermint, validol Adaptogens (lemongrass, Siberian ginseng), stimulators Poilvatamins, extracts of lemongrass, Eleutherococcus, strong tea Measures to saturate the body with oxygen, running, walking, breathing exercises, skiing, cold sponging
Actually meteosensitivity	Restorative measures, bath, sauna, gym, etc.

Conclusions. As a result of studies it was found that meteodependence in men and women are different: women are more sensitive to changes in weather conditions, both in teens and adults. With age, the degree of meteodependence in women increases. Crucial role in the increased response of women to weather factors play hormonal status, which in the female population is significantly different from men's. With age, they increased the dependence on meteorological conditions. If adolescents were 32% meteopatic and meteosensitive, and 35% among students, among adults the proportion of people with different reactions to the weather conditions was 92%. Moreover, the proportion of people aged meteosensitive increased in 15 times and meteopatic has not changed – 28% of teens, 29% of students and adults – 32%. Share none meteodependant people decreased 8.5 times (68% of teenagers

among students 65%, and 8% – in adults). Comparison of meteosensitivity among pupils and students showed that significant differences between age groups in terms of meteororeactions are not observed, but should pay enough attention to preventive measures fto avoid the development of meteorological responses with age.

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In conditions of human pressure of intensification on ecosystems components, microorganism resistance to unfavorable resistance of environmental decreases. Problem of meteosenstivity is sufficiently studied, but it is still relevant today, especially among urban residents, considering the rapid growth of the degree of urbanization of the population, so the diagnosis of human health must be taken into account the meteosenstivity of population. In this regard, there are often painful human responses to certain atmospheric phenomena that weaken the immune system and impair quality of life. There remains little known question of the degree of influence of climate of Cherkassy on health, since at present this research, according to the literature and Internet sources were not carried out. That is why the scientific novelty of the work is in that the weather reaction of Cherkassy citizens was investigated for the first time.

The objects of the study were meteotropic reactions and the subject of research – identifying of meteosenstivity of Cherkassy population. The main objectives of the study: to determine the nature and concept of meteosenstivity and meteopatia, to identify and analyze the weather conditions affecting the development of meteodependence, to identify the degree of weather reactions in adolescents and adults, to draw conclusions about the dynamics of changing weather reactions with age. In the article the estimated prevalence of the phenomenon of meteosenstivity in the regional terms is presented, the development of meteodependent reactions among adolescents, young adults and of Cherkassy by age and gender aspects is analyzed, the climatic factors that provoke the meteodependence and the ways of overcoming of these reactions are characterized.

Keywords: meteodependence, meteosenstivity, meteopatia, weather, population.

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