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THE DEPENDENCE OF THE DEGREE OF METEOSENSITIVITY ON THE STATE OF THE CARDIORESPIRATORY SYSTEM AND THE PRESENCE OF PREPATHOLOGICAL CHANGES IN THE BODY IN MEN AND WOMEN

PhD Dunaeva O. V., PhD Korovina L. D.

Ukraine, Kharkiv, Kharkiv National Medical University

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ABSTRACT

The article is devoted to a comprehensive study of the dependence of meteosensitivity on the autonomic balance of the body, as an indicator of prenosological conditions in young men and women of the second year of Kharkiv National Medical University. With the help of a meteoathic questionnaire (METEO-Q), the level of meteosensitivity was determined by psycho-emotional and physiological parameters. The vegetative Kerdo index and the Hildebrant index were calculated.

It was found that the greater the level of meteorological dependence, the greater the vegetative Kerdo index and the Hildebrant index, which is accompanied by parasympathotonia in men and sympathicotonia mainly in women. The presented data demonstrate the dependence of the cardiovascular and respiratory systems and their interrelations on meteosensitivity. The degree of meteosensitivity (meteo dependence) of the body as an indicator of its adaptive reserves is directly dependent on the state of health and the presence of pre-pathological changes in the body.

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Introduction. Since the human being exists in close interaction with the environment, he reacts to varying degrees to all sorts of weather changes. The severity of the reaction depends on the general condition of the body, lifestyle, age and the presence of diseases. Meteorological dependence causes not only the development of pathological disorders in organs and systems, but also pronounced functional tension of the body, which is caused by the action of adverse factors [1]. It is known that the effectiveness of the body is mainly determined by the coordinated work of functional systems of blood circulation and respiration. Therefore, the effect of meteosensitivity on the cardiovascular and respiratory systems can be determined using the Hildebrant index, and the vegetative provision can be determined by the Kerdo index, which allows integrative comparison of the body's functional capabilities [2].

In the scientific literature, many works are devoted to the study of meteosensitivity. However, the study of the dependence of the degree of meteosensitivity on the state of the cardiorespiratory system and the presence of prepathological changes in the body in people of different sexes is not well understood, so this topic is quite relevant.

The aim of the study was to study the dependence of meteosensitivity on the vegetative balance of the organism, as an indicator of the prenosophical conditions of second-year students of the Kharkiv National Medical University.

Results of research. The study involved 50 second-year students of KNMU aged from 17 to 20 years, of which 25 men (50%) and 25 women (50%). All subjects gave voluntary consent to participate in the experiment. The level of meteorological dependence was determined using a meteoropathic questionnaire (METEO-Q). Depending on the level of meteorological dependence, students were divided into 4 groups - with pathological, high, medium and low levels of psychological (Q1) and physiological (Q2) meteorological dependence. Heart rate (HR), respiratory rate (RR) and blood pressure (BP) were measured using the Korotkov method at rest.

The Kerdo autonomic index characterizes the ratio of the activity of the sympathetic and parasympathetic autonomic nervous system in regulatory processes under conditions of physical exertion, psychoemotional stress and different health conditions of the subjects, therefore, can be used to assess and predict prenosophical disorders in the state of the body. The vegetative Kerdo index was calculated using the formula: $VKI = (1 - DAP / HR) \times 100\%$. With a normal ratio of the activity of the sympathetic and parasympathetic systems in regulating the work of the heart (eutonia), the Kerdo index values are in the range of 0-1%.

With its increase, the predominance of sympathetic influences of the autonomic nervous system was noted; a negative coefficient value was observed with an increase in the tone of the parasympathetic division. Significant deviations of this index (more than 30%) indicate the inability of the cardiovascular system to ensure an adequate level of adaptive capacity of the organism.

This is a factor in the development of the prenosophical state of health of the subjects. The Hildebrandt index is calculated as the ratio of heart rate to the frequency of respiratory excursions per minute, the formula: $Q = HR / RR$. Normally, in a healthy person, this index varies from 2.8 to 4.9, which indicates the normal interconnection in the cardiorespiratory system. When reducing it, we can talk about the autonomic regulation disorder in the direction of parasympathicotonia, and with its increase – in the direction of sympathicotonia, which indicates inconsistency in the activity of the cardiovascular and respiratory systems [3].

As established by A.A. Vasilkov (1999) there is a direct connection of the Hildebrandt index with the level of blood pH. According to A.A. Vasilkov, the maximum permissible ratio of HR / RR should be in the range from 3.5 to 6.5, since a further increase in the indicator indicates the overvoltage of cardiorespiratory systems, an increase in metabolic processes, which leads to a state of acidosis and can lead to the development of various diseases [4].

The indicator of meteorological dependence Q1 was determined by the presence of changes in the psychoemotional state in accordance with changes in weather conditions (atmospheric phenomena, changes in latitude, temperature fluctuations, changes in seasons, etc.).

As a result of the research, it was found that among men 49% of respondents had a low level of meteorological dependence on psychological indicators ($Q1 \leq 2$), in which the Kerdo vegetative index (VKI) was 0.05% - this is the normal stable state of the cardiovascular system (eutonia).

The Hildebrandt Index (HI) was 3.14 c. units, which is also within the normal range. 31% of the students had the average level ($3 \leq Q1 \leq 5$): VKI was -1.2%, which indicates parasympathicotonia. The Hildebrandt index was 4.38 c. units.

Men with a high level of meteorological dependence Q1 ($6 \leq Q1 \leq 8$) - 20% showed the following: VKI – -16%, which indicates hyperparasympathicotonia. The Hildebrandt index was 6.14 c. units, which exceeds the upper threshold of the norm by 25.3%. The presented data demonstrate the dependence of the cardiovascular and respiratory systems and their interrelations on meteosensitivity. The survey of students showed that 80% of them have problems with the gastrointestinal tract (increased acidity and gastritis, etc.).

The results obtained are consistent with data from other researchers, who confirm that the majority of patients with peptic ulcer are vagotonic, have bradycardia, and increased acidity of gastric juice. And the vegetative Kerdo index in most patients with peptic ulcer is in the area of negative values [5].

The indicator of meteorological dependence Q2 characterizes physiological abnormalities, the degree of connection between symptoms and climatic changes, the presence of pronormal symptoms, anxiety, disturbance. A low level of physiological meteorological dependence ($Q2 \leq 2$) among men had

70% of students, for whom the VKI was 0% (norm); the Hildebrand index was 3.53 c. units (norm). The average meteorological dependence of Q2 ($3 \leq Q2 \leq 4$) among men was 30%, VKI was -10% (expressed parasympathicotonia), Hildebrand index was 6.24 c. units, which is 27% higher than the norm.

The findings suggest that in men, even the average level of meteosensitivity leads to disruption of the coordinated interaction of the cardiovascular and respiratory systems. Among women, a low level of psychological meteorological dependence Q1 is found in 33% of female students ($Q1 \leq 4$), the VKI was 0.03%, and the Hildebrand index in them is 3.97 c. units. The average level of Q1 ($5 \leq Q1 \leq 7$) was 41.7% of women. In this group, the VKI was -4%, which indicates parasympathicotonia. Hildebrand index – 4.07 c. units. 16.6% of women with a VKI of 26% (sympathicotonia) had a high level of meteorological dependence of Q1, the Hildebrand index was 6.14 c. units, which is 25% higher than the norm. It was established that 8.3% of women had a pathological level of meteorological dependence ($Q1 \geq 11$), VKI was 34% (hypersympathicotonia), while the Hildebrand index was 6.44 c. units, while the excess of the norm was 31.4%. 29.2% of female students had a low level of physiological meteorological dependence ($Q2 \leq 3$) among women, VKI – 0%, Hildebrand index – 4.09 c. units. Among women with an average level of meteorological dependence Q2 ($4 \leq Q2 \leq 6$), which was 29.2%, VKI – 16%, the Hildebrand index was 4.79 c. units. A high level of Q2 is set in 25% of female students ($7 \leq Q2 \leq 10$), VKI – 24%, while the Hildebrand index was 4.85 c. units.

Students who had a pathological level of meteosensitivity ($Q2 \geq 11$) – 8.3%, VKI – 36%, Hildebrand index was 8.45 c. units, which indicates hypersympathicotonia. The presence of high and pathological meteorological levels with hypersympathicotonic VKIs and a high Hildebrand index, which is almost twice as high as normal, indicates inconsistencies in the intersystem interaction of the cardiovascular and respiratory systems, the predominance of the sympathetic nervous system in these groups. The above data suggests that meteo-dependence (meteosensitivity) is manifested with functional overstrain of the body and hidden pathological disorders in organs and systems. This prenosological state of the body, which is manifested in an increase in the level of meteosensitivity, can lead to disruption of both the cardiorespiratory system and other systems, especially the digestive one [6].

Conclusions. 1. It has been established that the greater the level of meteo dependence, the greater the vegetative Kerdo index and the Hildebrand index, which is accompanied by parasympathicotonia in men and sympathicotonia mainly in women. This indicates a discoordination in the vegetative provision of cardiorespiratory relationships.

2. The degree of meteosensitivity (meteo dependence) of the body as an indicator of its adaptive reserves is directly dependent on the state of health and the presence of pre-pathological changes in the body.

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