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## INFLUENCE OF PHYSICAL ACTIVITY ON ORGANISM'S ADAPTATION TO CHANGES OF WEATHER CONDITIONS

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**Abstract.** *The article features the role of physical activity for maintenance of person's health and its influence on organism's adaptive abilities. The modern concept of health is presented. Statistical data regarding pandemic of physical inactivity is included. The economical aspect of increased physical inactivity is mentioned. The level of meteosenstivity as one of signs of worsening of organism's adaptive abilities is explained. The article includes original research results regarding prevalence of physical inactivity in young people and its connection to intensity of meteopathic reactions on example of students of Kharkiv National Medical University. The connection between physical activity level, adaptive potential and meteodependence was established. Increase of meteopathic reactions intensity according to level of physical inactivity was determined.*

**Keywords:** *health, adaptation, adaptive abilities, meteopathy, meteosenstivity, meteopathic reactions, healthcare.*

During the last century the concept of health changed. At first health was determined as absence of diseases, however, it didn't reflect fully the state of the organism. Later health was seen as physical, intellectual and social wellness and the modern concept states that it is the dynamic well-being that includes not only everything mentioned earlier, but also constant work of each person aimed at maintenance and improvement of his state. Currently human health includes 7 dimensions – physical, intellectual, emotional, social, spiritual, professional or career and environmental health [5]. The real, full well-being is possible only if all those dimensions are interacting and integration into one whole, and each human has the responsibility to take care of each of them simultaneously.

Maintenance, development and improvement of health dimensions, especially in conditions of their constant interaction when deterioration of one of them leads to changes of the others, are a quite complex task for a person. It becomes even more difficult due to peculiarities of modern life when people have constant deficiency of time or its limit. However, with aim of maintenance of all types of health, increase of quality of life and personal satisfaction with one's state there is a simple, but effective solution – regular physical activity. No program of treatment or prevention with help of drugs can compare with adequate physical activity [5]. Regular physical activity is associated with decreased risk of development of many chronic states and dangerous diseases including obesity, diabetes mellitus type 2, cardiovascular diseases and psychic disorders [6]. Such way of health maintenance is simple, low-cost and effective, however at the current moment in the world the pandemic of physical inactivity is registered leading to increase of rate of chronic diseases and early mortality [2]. According to statistics of WHO, about 25 % of adults and more than 80 % of adolescents in the whole world have insufficient physical activity, thus proving the necessity of its research and creation of effective methods of its intervention [4, 6].

Besides negative influence on human health, physical inactivity largely influences the economics of countries all over the world. Deterioration of health increases the rate of cases of temporal or permanent disability that leads to growth of amount of money spent by government for social support programs. Moreover, early mortality leads to decrease of people of working age that also influences the economics of the country. In case of chronic diseases, cost of treatment in Ukraine laces a burden on patient household, aggravating his distress and health problems [7]. Quite often the vicious cycle appears – with the aim to increase his prosperity a person starts to work more increasing his stress level and sedentary hours that leads to insufficient physical activity and increase of risks of chronic diseases needing treatment expenditures.

Sedentary behavior itself becomes a great problem as the most professions with good job opportunities require sitting at the working place for many hours. Results of numerous researches show that high amounts of sedentary behavior have been associated with increased risks of several chronic conditions and mortality. Direct relation between duration of sitting time and risk of follow-up

all-cause mortality was determined [3]. However, the same studies indicated that negative influence of daily sitting can be decreased or fully negated by adequate level of physical activity.

Physical inactivity has numerous negative effects on human organism decreasing its adaptive abilities and creating the base for development of pathological conditions. Among signs of decreasing adaptive abilities of an organism, one of the first is appearance of meteopathic reactions – specific symptoms manifesting during changes of weather conditions. Meteorological factors constantly influence the human organism therefore, any change of weather conditions leads to appearance of adaptive reactions. If organism's adaptive abilities are sufficient, those reactions don't cause any worsening of person's physical or psychic state, representing physiological meteosensitivity. However, if changes of weather conditions lead to deterioration of person's health causing manifestation of morbid symptoms, such person can be called meteopathic or meteodependent [1]. Level of physical activity is one of the main factors that determine organism's adaptive abilities in general and intensity of meteoreactions in particular, thus growth of physical inactivity all over the world contribute to increase of number of meteodependent people. According to statistical data, in economically developed countries about 38 % of men and 52 % of women are meteodependent [8]. Such data proves the importance of research of physical inactivity and meteodependency and their interrelation.

Current research was carried out in 80 students of 2<sup>nd</sup> course of Kharkiv National Medical University aged 17-21, among them 35 men and 45 women. All examined people gave their informed written consent for participation in research. Levels of physical activity and meteosensitivity were determined with help of questionnaires; level of physical state (LPS) was calculated using equation by E.A. Rogova; adaptive potential (AP) was evaluated with help of Baievskiy equation.

According to frequency and intensity of physical activity based on WHO recommendations all examined people were divided into 3 groups. Group 1 consisted of people with high level of physical activity (32 % of examined), group 2 included people with moderate physical activity (35 %) and group 3 – with low physical activity (33 %). Thus, 33 % of examined young people have insufficient physical activity that increases risk of pathological states development in future. Calculation of LPS showed that in group 1 all people had high LPS; in group 2 9 % had high LPS, 55 % - above average and 36 % - average. In group 3 40 % had LPS above average, 40 % - average and 20 % - low. Physical state of the organism directly depends on physical activity level of the person, thus proving its insufficiency. AP in all examined people of group 1 was satisfactory; in group 2 in 18 % of examined AP was on the border between satisfactory and exertion of adaptive abilities; in group 3 55 % of examined were close to exertion. Such results serve as a proof of influence of physical inactivity on adaptive abilities of the organism – high level of physical activity is associated with satisfactory adaptive abilities, when physical inactivity is one of factors leading to their exertion. According to results of meteosensitivity study, in group 1 10 % had high level of it, 60 % - moderate and 30 % - low level. In group 2 30 % had high level of meteosensitivity, 50 % - moderate and 20 % - low. In group 3 people with high meteosensitivity level prevailed (50 %), 40 % had moderate and 10 % - low level of meteosensitivity. Therefore, intensity of meteopathic reactions gradually increases according to level of physical activity – in group with high physical activity the intensity of those reactions is minimal and in group with low physical activity – maximal.

The results of the study proved the existence of the problem considering physical inactivity in young people. The peculiarities of studies in medical university especially during first 3 courses related to high amount of sedentary time during classes and home preparations lead to insufficient level of physical activity. That fact becomes the basis of health worsening starting from university years and aggravating in future. Physical health deteriorates accordingly to level of physical activity that is shown in level of physical state, and influences the state of the whole organism as all 7 dimensions of health are constantly interacting. Adaptive abilities of the organism worsen due to physical inactivity that's shown in decrease of adaptive potential and may lead to their exertion and even failure, causing development of pathological conditions. Level of meteosensitivity can be regarded as one of signs of insufficient physical activity as it was determined that intensity of meteopathic reactions rises based on level of physical activity and adaptive abilities. Thus, research of meteosensitivity as a diagnostic tool for physical inactivity and organism's adaptive abilities evaluation has a great significance for prevention of chronic diseases development. However, current situation with physical activity even among young people is dangerous and needs to be solved as soon as possible, proving the necessity to continue invention, development and introduction of physical activity programs all around the world.

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