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INFLUENCE OF CHRONOTYPE ON INTENSITY OF METEOPATHIC REACTIONS IN YOUNG PEOPLE

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Abstract. *The article features the influence of chronotype on intensity of meteopathic reactions in medical students. Importance of chronotypes and biological rhythms and their influence on human organism is pointed out. The stages of biological rhythms study are mentioned. The problem of weather sensitivity, its peculiarities, manifestations and risk factors are noted. Research of interrelation of meteopathic reactions and chronotype in young people on example of medical students is presented. research showing that meteosensitivity level depends on person's individual chronotype. People with mixed chronotype showed average ability to adapt to weather changes with insignificant physiological and psychic state variations. Greater disposition to health changes was determined in young women in comparison with young men. People with moderately morning chronotype showed the minimal level of meteopathic reactions that can be explained by greater stability to stress. Necessity of continuation of research of chronotypes and weather sensitivity relations is proved.*

Keywords: *chronotype, biological rhythms, meteopathy, meteopathic reactions, weather sensitivity, medical students.*

Introduction. Each person starting from the moment of his birth has so called "biological clock" that determines one's psychological and physiological state. It was already found out that more than 400 of various physiological parameters in human body change their activity according to time of day. Therefore, those biological rhythms are the base of adaptive mechanisms allowing adequate adjustment of human organism to changes of environment, and simultaneously they are important criterion of one's body current functional state [1]. Biological rhythms determine individual style of life that provides the best possible adaptation for every person. As modern university student has an outrageous informational, psychic, and emotional load for achievement of best positive adaptive result and success in studying and future profession it's necessary to form a style of life according to individual biological clock, i.e. chronotype.

The history of chronotypes starts from 1970-s when a specific circadian gen *Per* was found in *Drosophila melanogaster* [3]. From that starting point up to current moment research of chronotypes remains one of the most interesting and important problems all over the world. For example, in Scientific center of clinical and experimental medicine of Novosibirsk, Russia, the research of interrelation between chronotype and psychic and emotional stress stability in uncomfortable climatic conditions was carried out [2]. In Pedagogical university of Moscow the influence of biorhythms and chronotype on effectiveness of training process and competition results of biathlon athletes was studied. In Grodnensk State university, Belarus, chronotypes of students were connected to their quality of sleep and nutrition regimen [4]. In 2017 Nobel Prize in physiology was awarded to Jeffrey Hall, Michael Rosbash and Michael Young for research of molecular mechanisms of circadian rhythms regulation [6]. Existence of huge variety of organism's parameters influenced by circadian rhythms and their relation to one's adaptive ability in conditions of constant changes of environment provides interest to that topic together with absence of detailed data in many questions.

Simultaneously, another important factor well-known because of changing of human body physiological functions is weather sensitivity or meteopathy. Problem of weather sensitivity is known from ancient times, when Hippocrates counted it as one of factors on which physiological functions and human health depend [7]. Even though weather factors have general character and act on all people, individual reaction of each person can vary greatly, as from minimal changes not even sensed by oneself that is within the ranges of physiological norm up to appearance of meteopathic reactions of different intensity. Those meteopathic reactions may include changes of general state, mood, working ability, disorders of usual biological rhythms, exacerbation of chronic diseases. In modern world, the

quantity of meteosensitive people is quite high and increases annually, especially in well-developed countries, giving the percentage of 10 to 90% depending on availability of many factors [5].

The aim of current study was to research the chronotype that provides adequate level of body's physiological functioning, meteosensitivity that is influenced by chronotype and other factors, and their interrelation with purpose to understand their mechanisms of influence on physical, psychic, and emotional state of human.

Research results and their discussion. Students of 2nd course of medical university, 102 in total (68 young women, 67%, and 34 young men, 33%) were participating in current research. All examined people gave their written informational consent for participation. Study of individual chronotype was based on questionnaire for daily rhythms determination MEQ by J. A. Horne and O. Ostberg. Weather sensitivity and intensity of meteopathic reactions was determined by «Meteo-Q».

Results of research showed that according to chronotype 59% (39 people) of examined young women have mixed type. Meteosensitivity study in them determined that value of mood and behavior changes were 6,5 that is average. Changes of physiological functions and general organism's state was 6,2 that exceeds the normal range. 38% of female students had moderately evening chronotype; in them behavior and mood changes were 6,46 that's also within physiological norm, however, changes of physiological parameters were higher constituting 6,38. Moderately morning chronotype included only 3% of examined young women and they had the least number of complaints related to weather changes, average value was 4,0. Physiological changes in them were also minimal with index of 1,5 that's greatly lower than moderate value.

In male students mixed chronotype also prevailed, however, lesser number of them pointed out mood and behavior changes showing the value of 3,4. State of health also wasn't significantly influenced resulting in index of 2,6 that's on the border between low and average. Moderately evening type was determined in 38% of examined young men, moreover, even regarding significant changes of mood with value 5,38, no great health changes were noticed – index was 2,5 that's below average. Only 2,9% of examined young men belonged to moderately morning chronotype.

Conclusions. Influence of changes of weather conditions on human body may greatly change its functioning. Those changes may start from insignificant mood variations and result in serious disorders of nervous, cardiovascular, digestive and other visceral systems. The number and intensity of manifestation of meteopathic reactions depend on various factors including age, gender, style of life, peculiarities of nutrition, availability of chronic diseases, etc. Current research showed that meteosensitivity level also depends on person's individual chronotype. Mixed chronotype provides average ability to adapt to weather changes, thus both physiological and psychic state vary within the average level. However, young women have greater disposition to health changes. The minimal level of meteopathic reactions was determined in people with moderately morning chronotype, that can be explained by greater stability to stress. Research of chronotypes and weather sensitivity should be continued aiming to explain all possible mechanisms of their influence on human body functioning that are still not fully known.

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