

Research of Functional State of Cardiovascular System in Young People in the Conditions of Karakalpakstan

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Abstract: *The article presents the results of studying the functional state of the cardiovascular system in young people living in the Republic of Karakalpakstan. Depending on the place of residence among young people of age groups, the maximum values for blood pressure values were found for people living in the southern and central regions of Karakalpakstan. Analysis of hemodynamic parameters and heart rate stability indicates the presence of certain gender and age differences in individuals with various types of autonomic load reactivity.*

Keywords: Karakalpakstan, hemodynamics, young people, environmental conditions, heart rate

1. Introduction

Currently, health problems are among the priority tasks of social and social development of any state, which determine the relevance and need to deploy appropriate scientific research and the development of methodological and organizational approaches to maintaining health, its formation and development. Adolescent age in the ontogenetic aspect is a period when human biological maturation ends and all morphological and functional indicators reach their definitive sizes. At this moment, the development of the interaction of various parts of physiological systems and the relationship of organs and systems is typical [1]. The regulation of physiological interactions in the body is based on the use of the minimum necessary number of bonds and coordination of interacting systems [4] and by improving the central mechanisms of somatic and vegetative control [2]. Therefore, the level of development of health during this period can serve as a control of the effectiveness of the entire system of hygiene measures carried out at the previous stages of ontogenesis in the existing way of life, and regulate further recovery activities [3, 4].

2. Material and methods

Blood pressure was measured by the auscultatory method of N.S. Korotkova. The duration of the heart cycle - heart rate (HR) - was determined using the electrocardiographic research method (ECG). Measurements of blood pressure (BP), systolic pressure (SBP) and diastolic pressure (DBP) were carried out at rest and during physical exertion. Physical exercise was performed for all subjects on a LifeFitness C3-5 bicycle ergometer (Hungary) at a speed of 35 km / h for 10 minutes and was dosed at the rate of 3.3 W per 1 kg of body weight.

We carried out the territorial differentiation of the Republic of Karakalpakstan: the northern regions - areas of high environmental risk - Muinak, Chimbaysky, Takhtakupyrsky and Kungradsky and the southern regions - areas with more optimal environmental living conditions - Amu Darya, Beruni and Ellikkalinsky. All examined athletes are indigenous to the above areas. In the process of work, a set of methodological techniques was used, which made it possible to carry out a comprehensive individual assessment of the functional state and physical development of each student.

3. Results and discussion

According to the studies, the systemic hemodynamics in the examined individuals do not go beyond the age standards of other regions of the country [4, 5]. The electrical activity of the heart in the examined individuals has no clinical manifestations and is characterized by relatively stable indices; for some characteristics of the ECG, age-related dynamics were noted [5]. Thus, according to specialists, in young men, at the end of adolescence, compared with 17 - 18-year-olds, while maintaining the duration of ventricular depolarization, the time for conducting excitation along the myocardium of the ventricles increases and the time of repolarization of the ventricles decreases, while the amplitude of the ventricular complex is higher by 16% ($p < 0.001$), however, these changes do not lead to clinical manifestations and can be considered normal options.

The analysis revealed that, depending on the place of residence (Fig. 1) in young men of age groups (21-22 years) in terms of values (systolic blood pressure), SBP, the maximum values were found in individuals living in the southern regions of Karakalpakstan, as well as in young men from the northern regions of the age of 22 years.

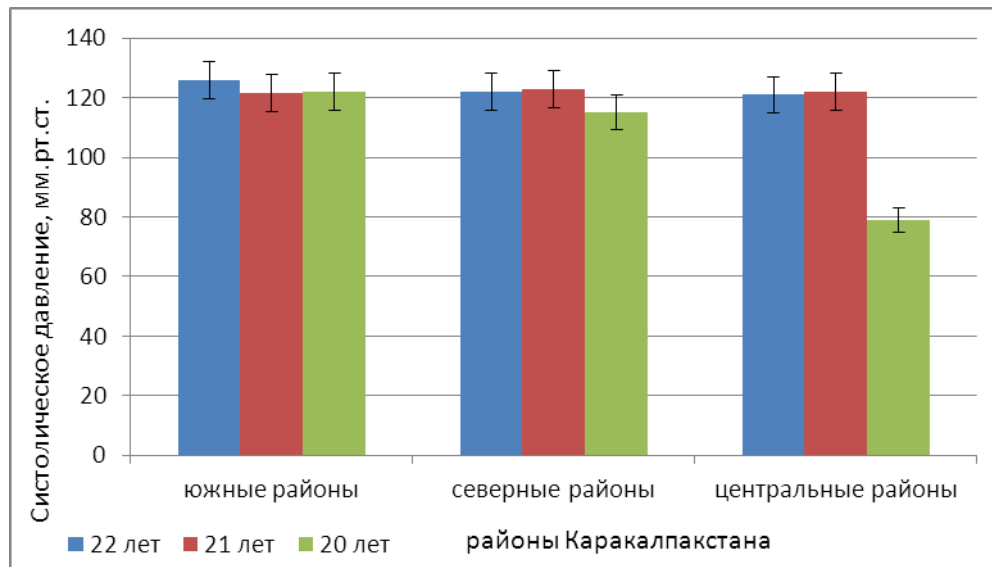


Figure 1: Dynamics of indicators of GARDEN (mm Hg) in young men living in Karakalpakstan depending on age

The minimum levels of SBP were found in young men of the younger age group (20 years) - 79 mm Hg. When comparing the results of diastolic blood pressure (DBP) in young men of different regions of the republic (Fig. 2), it was found that young men of the older age group (22 years old) showed the highest values in all three zones of the republic and ranged from 80-82 mm Hg. Art. Apparently,

this is due to the high voltage of adaptive reactions in the body of the examined during the educational process. The lowest values are observed in persons of the younger age group of young men from the northern regions of Karakalpakstan. It was also established that among young men of the first age group, the level of functioning of the main systems is within the standard.

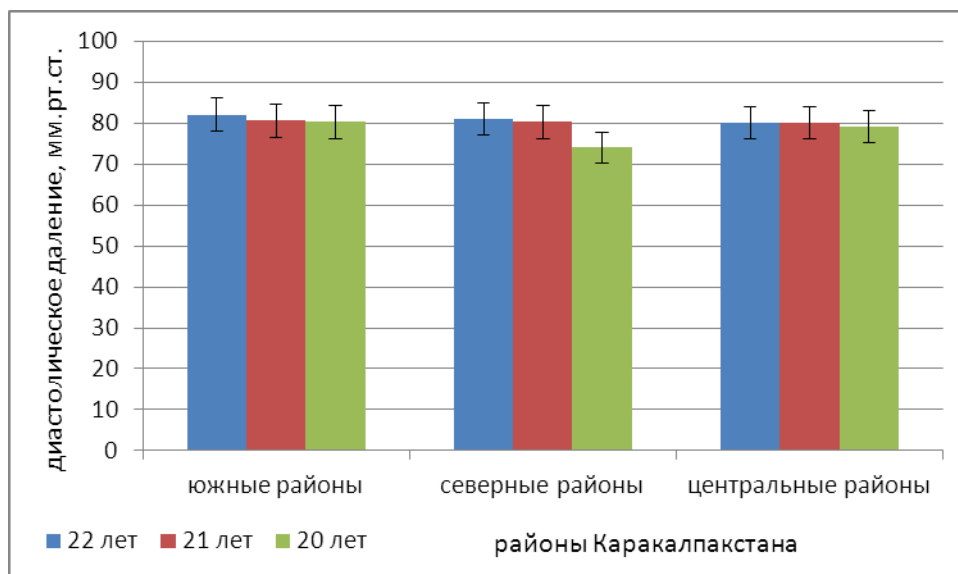


Figure 2: Dynamics of DBP indicators (mm Hg) in young men living in Karakalpakstan depending on age

When determining the type of autonomic regulation, the prevalence of vagotonics (66%) was noted in older youths (second group), and the number of normotonics in young men (first group) (62%).

The study of heart rate (HR) is of great clinical importance, as it allows you to get very valuable and objective information about changes in the vascular system associated with cardiac activity (Fig. 3).

Pulse - jerky oscillations of the walls of arteries associated with cardiac cycles. The rhythm of cardiac activity can be determined by heart rate. To characterize muscle work, both

the pulse rate during work and the rate of recovery after work are taken into account. The analysis of indicators of HR among young men living in the southern regions of Karakalpakstan, the highest rate was revealed at the age of 21 years, while the highest rate among young men of the older group was 22 years old. As for the dynamics of indicators of HR among young men from the northern regions, the highest level of HR in young men at the age of 21 years was established, the minimum - 22 years. In young men from the central regions, the indicators of HR significantly increase with age ($p > 0.05$).

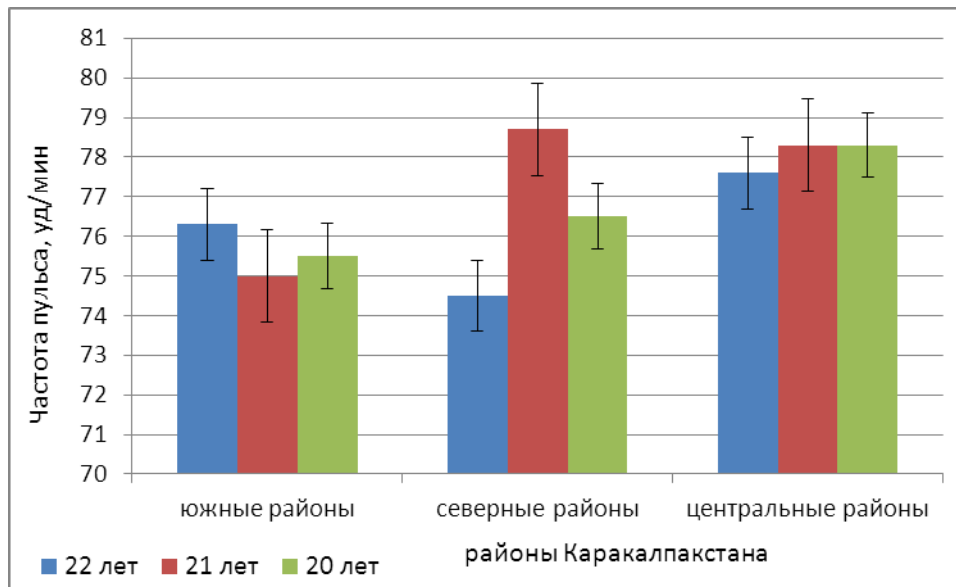


Figure 3: The dynamics of indicators of emergency (mm Hg) in young men living in Karakalpakstan depending on age (alone)

The most important physiological feature of the development of vegetative processes is a sharp expansion of the reserve capabilities of all organs and systems. This expansion takes place in the body in two ways: due to the development of the functional capabilities of peripheral organs (by the age of 17, the vegetative support system has reached a mature level of functioning) and due to the improvement of central control mechanisms [2, 3]. The stability of the heart rhythm and the maintenance of hemodynamic parameters at the appropriate level are largely determined by extracardial influences from the higher nervous system.

Thus, the studies also made it possible to establish that, depending on the place of residence in young men of age groups (21-22 years old), the maximum values for blood pressure (systolic and diastolic) were found for people living in the southern and central regions of Karakalpakstan. An analysis of hemodynamic parameters and heart rate stability indicates the presence of certain gender and age differences in individuals with various types of autonomic load reactivity.

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