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REGIONAL FEATURES OF THE FUNCTIONAL STATE OF THE EXTERNAL RESPIRATORY SYSTEM AMONG ADOLESCENTS FROM DIFFERENT REGIONS OF UZBEKISTAN

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Abstract

This study examines the functional state of the external respiratory system in adolescents living in the Republic of Karakalpakstan, Bukhara region, and Tashkent region. The study involved 126 adolescents aged 15–17 years. Lung vital capacity, respiratory rate, breath-holding indices, and selected cardiovascular functional parameters were assessed. A comparative analysis was conducted among participants living under different climatic and environmental conditions.

The obtained data demonstrated that environmental conditions, air quality, and ecological characteristics of the region significantly influence respiratory system parameters. Adolescents living in relatively favorable ecological areas showed higher lung vital capacity, better breath-holding performance, and improved functional reserves.

Keywords: adolescents, respiratory system, lung vital capacity, functional state, ecology, Karakalpakstan, Bukhara, Tashkent.

Introduction

Adolescence is an important stage of ontogenesis characterized by intensive growth and maturation of functional systems. During this period, the respiratory system actively develops and plays a key role in oxygen supply and metabolic processes. The functional capacity of the respiratory system is closely associated with overall health status, physical performance, and adaptive reserves of the organism.

In recent years, increasing attention has been paid to the influence of air pollution, climate change, industrial emissions, and urbanization on respiratory health. Since different regions of Uzbekistan vary in natural, climatic, and ecological conditions, a comparative assessment of respiratory function in adolescents is of considerable scientific and practical importance.

Aim of the Study

To determine regional characteristics of the functional state of the external respiratory system in adolescents aged 15–17 years living in the Republic of Karakalpakstan, Bukhara region, and Tashkent region, and to assess the influence of environmental factors.

Materials and Methods

The study included 126 adolescents aged 15–17 years residing in the Republic of Karakalpakstan, Bukhara region, and Tashkent region. Participants were divided into groups according to their place of residence.

Lung vital capacity, respiratory rate, Stange and Genchi breath-holding tests, heart rate, and arterial blood pressure were measured using standard physiological methods. Statistical analysis was performed using Student's t-test. Differences were considered statistically significant at $\mathbf{p < 0.05}$.

Results and Discussion

The results demonstrated that adolescents from the Tashkent region had relatively higher lung vital capacity and better breath-holding indices. This may be associated with better infrastructure, improved healthcare access, and more favorable environmental conditions.

Participants from the Republic of Karakalpakstan showed lower values of several respiratory functional parameters, which may be related to regional ecological problems and adverse atmospheric conditions. Adolescents from the Bukhara region demonstrated intermediate values of respiratory function indicators.

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The observed differences between regions may be associated with climatic factors, environmental quality, living conditions, and adaptive capacity of the organism.

Conclusion

Regional differences in the functional state of the external respiratory system were identified among adolescents living in different regions of Uzbekistan. Adolescents from relatively favorable ecological areas demonstrated better respiratory functional capacity and higher adaptive reserves.

The obtained results may be useful for preventive health programs, medical monitoring of adolescents, and the development of regional healthcare strategies.

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