pISSN:2349-5707 Volume:13,Issue 4, April -2026 eISSN:2349-5715

# ANALYSIS OF THE FUNCTIONAL STATE AND ADAPTIVE CAPACITY OF ADOLESCENTS LIVING IN THE REPUBLIC OF KARAKALPAKSTAN

**Gulnara Ilyasova Kenesbaevna**
Associate Professor
Institute for Retraining and Advanced Training of Specialists in

Physical Culture and Sports under the Uzbek State Academy of Sports

**Abstract.** This study examines the functional state and adaptive capacity of adolescents residing in the Republic of Karakalpakstan. The research focuses on key physiological indicators of the cardiovascular and respiratory systems in adolescents aged 15–17 years. The findings indicate that the natural, climatic, and environmental conditions of the region significantly influence the functional state of the body and its adaptive capacity. The results obtained may be useful for assessing adolescent health status and for developing preventive health measures.

**Keywords:** adolescents, functional state, adaptation, cardiovascular system, respiratory system, environmental factors

**Introduction.** Adolescent health is a crucial determinant of the future socio-economic development of society. This developmental stage is characterized by rapid physical growth, maturation of major physiological systems, and the enhancement of adaptive mechanisms to environmental conditions. During adolescence, the human body is particularly sensitive to the effects of natural, climatic, and environmental factors.

The Republic of Karakalpakstan is considered a region with a relatively unfavorable environmental situation. The desiccation of the Aral Sea has led to significant ecological changes, including increased levels of dust and salt aerosols in the atmosphere. These environmental stressors may negatively affect public health, particularly among adolescents whose bodies are undergoing active development.

The functional state of the body is largely determined by the performance of key physiological systems, primarily the cardiovascular and respiratory systems. These systems are responsible for oxygen transport and nutrient delivery to tissues and play a central role in adaptive processes. Therefore, assessing their functional indicators provides valuable insight into the overall health status of adolescents and their ability to adapt to environmental challenges.

**The purpose of the study** is to analyze the functional state and adaptive capacity of adolescents living in the Republic of Karakalpakstan.

**Materials and Methods.** The study involved adolescents aged 15–17 years who reside in the Republic of Karakalpakstan and attend general secondary schools. Standard physiological assessment methods were employed to evaluate the functional state of the body. The parameters measured included heart rate, arterial blood pressure, vital lung capacity, and respiratory rate. These indicators were used to assess the condition of the cardiovascular and respiratory systems, as well as the adaptive capacity of the participants. The collected data were subjected to statistical analysis.

**Results and Discussion.** The analysis revealed that adolescents living in the Republic of Karakalpakstan exhibit specific characteristics in their functional state. Some participants demonstrated variations in cardiovascular indicators, including fluctuations in heart rate and

pISSN:2349-5707 Volume:13,Issue 4, April -2026 eISSN:2349-5715

blood pressure. These changes may reflect adaptive responses of the body to environmental conditions.

Assessment of the respiratory system showed that some adolescents had reduced vital lung capacity. This finding may be attributed to adverse environmental factors, particularly the elevated concentration of dust and salt particles in the ambient air. Such conditions can impair respiratory function and reduce overall physiological capacity.

Despite these findings, the majority of adolescents demonstrated a satisfactory level of adaptive capacity. This suggests the presence of effective compensatory mechanisms that enable the body to adjust to unfavorable environmental conditions. It is important to note that adolescence is characterized by a high adaptive potential, allowing individuals to respond efficiently to environmental changes.

**Conclusion.** The results of this study indicate that the functional state and adaptive capacity of adolescents living in the Republic of Karakalpakstan are influenced by regional natural and environmental conditions. Although certain deviations in cardiovascular and respiratory indicators were observed, most adolescents maintain a satisfactory level of adaptation.

These findings have important practical implications and can be used in the development of preventive strategies aimed at improving adolescent health. Furthermore, the results may be applied in designing physical education and health promotion programs that take into account the specific environmental conditions of the region.

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