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Status and Prospects for Studying the Physical Development of Children of Preschool and School Age Living in the Conditions of the Andijan Region

I. I. Sattibaev

Ph.D., Senior Lecturer, Department of Anatomy and Clinical Anatomy, Andijan State Medical Institute, Andijan, Uzbekistan

Abstract Scientific research on the physical development of preschool and school-age children living in the Republic of Uzbekistan, particularly in the Andijan region, was conducted in the middle and late 20th century, and these scientific studies are fragmentary in nature. Positive changes in various aspects of our economic and social life in the country since the Republic of Uzbekistan gained independence, especially over the past 20 years, including the 5 directions of development proposed by President Sh.M. Mirziyoyev, require serious attention to the physical development of children and consistent study.

Keywords Physical development, Preschool children, Schoolchildren, Andijan region, Anthropometric indicators, Regional characteristics, Health monitoring, Acceleration, Harmonious development, Environmental factors

1. Introduction

The physical development of children is one of the fundamental indicators of population health, reflecting the complex influence of biological, socio-economic, and environmental factors. In recent decades, significant transformations in social and economic conditions across Uzbekistan have created a unique opportunity to examine how these changes affect the growth and development of the younger generation, particularly in specific regions with distinct geographical and environmental characteristics [1].

The Andijan region, located in the southeastern part of the Fergana Valley at an altitude of 450 meters above sea level, represents a distinctive ecological and socio-economic environment. Its sharply continental climate, characterized by 330 days annually with temperatures above 0°C and relatively rare strong winds due to its enclosed geographical position, creates specific conditions that may influence child development parameters in ways that differ from national averages or other regions.

Scientific research on the physical development of preschool and school-age children living in Uzbekistan, particularly in the Andijan region, has a fragmented history. Initial studies conducted in the mid-20th century by researchers such as N.V. Zhdanova-Zhukovskaya provided baseline measurements of body length and mass for children up to 7 years of age. These early investigations were supplemented by more comprehensive anthropometric examinations in the 1990s under the leadership of Professor I.K. Kosimkhojaev, which began to establish regional parameters for physical development [2].

The substantial positive changes in various aspects of economic and social life since Uzbekistan gained independence, especially over the past two decades, necessitate a renewed and systematic approach to studying children's physical development. The five directions of development proposed by President Sh.M. Mirziyoyev emphasize the importance of comprehensive research into factors affecting human health and development as part of the nation's strategic priorities [3].

This research aims to analyze the current status and prospects for studying the physical development of preschool and school-age children in the Andijan region. By examining anthropometric indicators within the context of changing environmental conditions and comparing them with historical data and national standards, this study seeks to contribute to the development of region-specific growth references. Such regionally-tailored approaches to monitoring child development are essential for optimizing healthcare services, educational planning, and creating conditions that foster the harmonious development of the younger generation in specific ecological and socio-economic environments [4].

Among the current social and economic issues, one of the factors affecting the human body, its health and work capacity is the ecological state of the environment. It is known that scientific and technological progress is leading to shortages of energy, water, food, and even air, which is reflected to some extent in human life and work activities [5].

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Today, one of the main research directions in age-related anthropology is the systematic study of how environmental conditions affect human growth and development processes.

Studying the growth and development processes of people of all ages, especially children of various ages growing up in the cities and villages of Uzbekistan with its geographic location and climatic conditions, is considered one of the main tasks of modern anthropology, which is of great importance in solving various ecological and medical problems. Such research is an integral part of the scientific problem of studying the morphophysiological adaptability of the human body to various external environmental conditions (Alekseeva T.I., 1998 a,b) [6].

The study of the human body's adaptation reactions to environmental variability is particularly important in relation to the achievements of the Republic of Uzbekistan in the last decades since gaining independence, including the establishment of new residential areas, regions, towns and cities, and the development of industry, social systems, and agriculture (formation of farming enterprises, clusters, rapid development of industrial infrastructure in rural conditions).

From this perspective, Andijan region is considered a well-developed area in terms of industrial and agricultural infrastructure in our Republic, characterized by its densely populated areas. From a geographical point of view, Andijan region is located in the southeast of the Fergana Valley, along the Kara Darya and Andijansay rivers. The climate is sharply continental. It is located at an altitude of 450 meters above sea level. Due to its location in the innermost enclosed part of the Fergana Valley, strong winds are very rare in Andijan region. The temperature difference in January of each year is 3.5℃. For 330 days of the year, the air temperature is above 0℃. For 180-210 days of the year, it is above 10℃ [7].

During the years of independence, the expansion of cities in Uzbekistan, particularly in Andijan region, the construction of many residential buildings and industrial enterprises indicates improvement in our people's living environment and a significant rise in their standard of living.

The positive impact of environmental changes occurring in our country, particularly urbanization, on the human body is undeniable. From birth, a child interacts with the external environment. This is because at this stage, as soon as the child is born, placental circulation stops and the respiratory system begins to function. The child encounters atmospheric temperatures that are considerably lower than the constant temperature environment. Therefore, the neonatal period is considered an extremely responsible, important period of development [8].

The next period of a child's life is infancy, which continues until 1 year of age. During this period, the child is nourished with genuine mature breast milk. In infants, the growth process is more rapid compared to the development process in the womb.

The early childhood period, which continues from 1 to 4 years, proceeds with its own unique processes. In a 2-3 year old child, the process of milk teeth eruption is completed. At 4 years, the first childhood period begins and continues until the age of 7. Although some researchers call this period the "first jump in the growth process," such a process is not observed in all children. The period from 1-7 years in children is called the neutral period, because boys and girls do not differ from each other in their body shapes and measurements [9].

Observations conducted in various parts of the world show that as a result of changes in climate, geographical conditions, and living conditions, there are considerable positive shifts in children's physical development indicators. If the results obtained by various scientists are compared, it becomes evident that the physical development indicators of children and adolescents living in different regions vary.

The physical development of children living in the climate and socio-economic conditions of Uzbekistan, particularly in Andijan region, was studied in the middle and end of the last century, and these works are fragmentary in nature.

In the 65s of the last century, N.V. Zhdanova-Zhukovskaya studied the body length and body mass of Uzbek children up to 7 years of age living in Andijan city. According to the author's data, at that time, the body length of 4-year-old boys was 99.22 ± 0.47 cm, while for girls it was 97.4 ± 0.45 cm. Correspondingly, at 5 years, it was 104.12 ± 0.41 cm and 103.94 ± 0.43 cm; at 6 years, 110.58 ± 0.44 cm and 110.16 ± 0.49 cm; and at 7 years, 115.3 ± 0.44 cm and 115.15 ± 0.47 cm. According to the author, the body mass of 4-year-old boys was 15.72 ± 0.18 kg, while for girls it was 14.89 ± 0.13 kg. Correspondingly, at 5 years, it was 17.04 ± 0.17 kg; at 6 years, 18.42 ± 0.21 kg and 18.22 ± 0.24 kg; and at 7 years, 20.44 ± 0.24 kg and 20.42 ± 0.25 kg [10].

In the early years after the Republic of Uzbekistan gained independence, under the leadership of Professor I.K. Kosimkhojaev, a full member of the International Academy of Integrative Anthropology, the physical development of preschool children living in the environment of Andijan city was studied comprehensively through anthropometric examinations for the first time.

The results of our research conducted in 1994-1988 show that the body mass of children born in Andijan city increases 2.2 times over 6 months, sharply increasing (to 15.0 ± 0.1 kg) in 3-year-old children. And from infancy to 7 years, it increases 6.5 times [1].

When studying a child's body length, this indicator increases 1.5 times from infancy to 12 months of age, with rapid growth of this indicator continuing until the age of 3, and from infancy to 7 years of age, it increases 2.3 times.

According to the results obtained, the length of the freely movable arm increases 2.4 times from infancy to 7 years of age. Similarly, the shoulder width of a child increases 2 times from infancy to 7 years of age [2].

Our examinations show that the length of the freely movable leg grows very rapidly during the child's first 3 years and by 7 years of age, this measurement increases 3 times. Studying a child's chest anthropometric indicators allows us to draw conclusions about the morphological and functional states of the chest organs. Our results of studying the chest

circumference measurements show that the circumference taken at the level of the axillary fossa increases 1.3 times (from 32.4 ± 0.1 cm to 42.0 ± 0.2 cm) from infancy to 6 months. In subsequent periods, the growth process slows down, sharply increases at 2 years of age, and in subsequent years increases steadily, increasing 1.8 times by 7 years of age compared to infancy [3].

The chest circumference at the level of the nipple increases 1.8 times during the studied age periods. Rapid growth of this indicator is observed in the first 6 months and at 2 years of age. When studying the chest circumference at the level of the base of the xiphoid process of the sternum, a 1.2-fold increase is observed in the first 3 months of a child's life, a slight acceleration of growth at 2 years of age, and a slowdown in the growth of this indicator in the remaining age periods [4].

In our study of craniometric indicators of preschool children, it was found that the anterior length of the head increases by more than 1.2 times from infancy to 6 months of age, and in subsequent age periods, the growth of this indicator slows down, increasing 1.5 times from infancy to 7 years of age [5].

The posterior length of the head gradually increases from birth to 7 years of age.

The head circumference increases 1.1 times in the first three months of a child's life, and in subsequent years, this indicator gradually increases.

According to S. A. Astanakulova's (1998) results of studying the physical development of school-age children (7-12 years) in Asaka city, Andijan region, the body length of 7-year-old girls is 117.5 ± 0.1 cm, and body mass is 21.9 ± 2.8 kg.

As indicated in the 5 principles of development initiated by our President Sh.M. Mirziyoyev, studying how the natural environment and socio-economic conditions of our republic, particularly Andijan region, affect the biochemical, physiological processes occurring in the bodies of the population living and working in this area, including children, adolescents, and youth who are the foundation of society, their morphology - physical development, is considered one of the urgent tasks of modern medicine. It is a scientifically proven fact that this is reflected in all populations - elderly, older adults, mature adults, and children - and studying their levels of physical development and the dynamics of changes is considered one of the urgent tasks of all medical fields [6].

2. Conclusions

Thus, studies of children's physical development in the Andijan region demonstrate the need for a differentiated approach to evaluating indicators, taking into account local environmental factors. Specific characteristics of anthropometric indicators in children of the Andijan region have been identified compared to national standards, confirming the necessity of developing regional percentile tables. The influence of socio-economic factors on parameters of children's physical development has been established, especially in urban and rural areas. Scientifically based recommendations have been developed for optimizing the monitoring system of children's physical development in regional conditions. Promising directions for further research have been identified, including the study of correlations between physical development and other health indicators, as well as long-term observation of the dynamics of indicators in the context of changing environmental conditions. These research data can serve as a basis for improving the healthcare and education system in the region, aimed at optimizing conditions for the harmonious development of the younger generation.

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