

ANALYSIS OF PHYSICAL DEVELOPMENT INDICATORS OF CHILDREN AGED 8-14 LIVING IN URGENCH CITY

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Abstract. This article analyzes anthropometric and functional indicators of 300 school-age children aged 8-14 living in Urgench. The study studied parameters such as height, body weight, body mass index (BMI), chest circumference, vital lung volume (VLV), arm muscle strength (dynamometry), arterial pressure and heart rate depending on age and gender. The results showed that age-related progressive changes were observed in the physical development of children, as well as the presence of gender differences in some indicators.

Keywords: children, physical development, anthropometry, body mass index, vital lung volume, muscle strength.

Introduction. The physical development of children and adolescents is an important criterion for their health status. The study of anthropometric and functional changes in adolescence is important for the development of age norms, early detection of pathological deviations and planning preventive measures. The purpose of this study was to assess the main indicators of physical development of children aged 8–14 years living in the city of Urgench and to determine their age and gender-related changes.

Materials and methods. The study collected data on 300 children (boys and girls) aged 8 to 14 years living in the city of Urgench and analyzed the following indicators: Anthropometric: height (cm), body weight (kg), body mass index ($BMI = \text{weight (kg)}/\text{height}^2 \text{ (m}^2\text{)}$), chest circumference (in a resting position, cm). Functional: vital capacity of the lungs (VLC, ml), right and left arm muscle strength (kg), heart rate (pulse, beats/min), systolic and diastolic arterial pressure (mm systolic) and other data: age, gender (boy, girl).

The data were grouped by age groups (8, 9, 10, 11, 12, 13, 14 years) and gender, and the average values (\pm standard deviation) were calculated. Descriptive methods were used for statistical analysis.

Results.

Anthropometric indicators. Height and body weight. The height and body weight of children naturally increase with age. From 8 to 14 years, the average height in boys varied between 120–165 cm, and in girls between 112–163 cm. Body weight ranged from 20–85 kg in boys and 16–74 kg in girls. With the transition to adolescence at 13–14 years of age, the rate of weight and height growth began to differ by gender: girls grew faster at this age.

Body mass index (BMI). Age-related changes in BMI increased from an average of 15–17 kg at 8 years of age to 18–22 kg at 14 years of age. In some cases (for example, in 13-year-old boys), BMI values above 25 kg (overweight) were recorded. BMI in girls was slightly higher than in boys, especially at 11–12 years of age.

Chest circumference. Chest circumference (at rest) increases with age: at 8 years old, it reaches an average of 57–62 cm, and at 14 years old, it reaches 70–85 cm. In girls, the chest circumference is slightly larger than in boys at 11–13 years old.

Functional indicators: Vital capacity of the lungs (VLC). VLC increases sharply with age. At 8 years old, it is on average 1400–1700 ml, and at 14 years old it reaches 2500–3500 ml. VLC in boys is higher than in girls in all age groups, but the difference is especially noticeable at 13–14 years old (on average 2800–3400 ml in boys, 2200–2800 ml in girls).

Muscle strength (dynamometry). The muscle strength of the right and left hands increases with age. At 8 years old, the average is 13–17 kg, while at 14 years old it increases to 25–40 kg in boys and 20–30 kg in girls. The hand strength of boys is significantly higher than that of girls ($p < 0.05$).

Cardiovascular system: Heart rate (pulse) tends to decrease with age: at 8 years old, it is on average 90–130 beats/min, at 14 years old it is 70–100 beats/min. Systolic arterial pressure increases to 90–110 mm Hg at 8 years old, and to 100–130 mm Hg at 14 years old. Diastolic pressure is in the range of 50–80 mm Hg, and no significant age-related changes are observed.

Conclusion. The results of the study showed that the physical development of children follows general laws - a progressive increase in the main anthropometric and functional indicators with age. The differences between boys and girls are especially pronounced in adolescence (13–14 years): boys lag behind girls in height, body weight, hip and muscle strength, while girls have a relatively higher chest circumference and BMI. This is a natural manifestation of sexual dimorphism.

The fact that some children have BMI above the norm (overweight or obesity) indicates the presence of problems with malnutrition and inactivity among school-age children

1. Height, body weight, BMI, chest circumference, hip circumference, and muscle strength in children of Urgench city aged 8–14 years increase steadily with age.
2. Boys have an advantage over girls in terms of hip circumference and muscle strength at 13–14 years.
3. Some children have a BMI above the norm - this indicates the need to strengthen preventive measures to prevent obesity.
4. The results obtained can serve as a basis for developing local age standards and monitoring the health of school-age children.

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