



DYNAMICS OF BODY MASS INDEX CHANGES IN SCHOOL-AGE CHILDREN OF TASHKENT

T.A.Ashurov

Alfraganus University, Uzbekistan

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Abstract: The paper presents data from anthropometric studies of school-age children in the city of Tashkent. The age-related dynamics of body mass index changes were studied, and the periods of the most significant increases in this parameter were identified. An analysis of the dynamics of anthropometric indicators was carried out among more than 1000 school-age children in Tashkent aged 7 to 16 years. Each age group included more than 100 boys and girls.

Keywords: anthropometric parameters, morphometry, weight, height, chest circumference.

Relevance: Scientifically grounded data on the growth and development of the child's body make it possible to correctly interpret individual characteristics of these processes and to timely organize the conditions for the harmonious development of children and adolescents. The results of the assessment of growth and development reflect the entire set of factors—including the deteriorating environmental conditions—that affect the human body and serve as informative criteria for children's health. Therefore, monitoring the growth processes of children and adolescents is an important section and the basis of practical work on the prevention and protection of children's health and the health of the population as a whole.

Purpose of the Study: To study the age-related, individual, and gender characteristics of body mass in school-age children of Tashkent.

Materials and Methods: An analysis of the dynamics of body mass increase was conducted among more than 2000 school-age children in Tashkent aged 7 to 16 years. Each age group included more than 100 boys and girls. A method of parametric statistics was used, calculating such indicators as arithmetic mean (M), its error (m), and standard deviation (δ).

When classifying children by level of development, the $M \pm 1\delta$ indicator was used as the range of average values corresponding to normal parameters (in our case, this is Group II of children), where $M + 1\delta$ represents the upper limit of normal and $M - 1\delta$ corresponds to the lower limit of normal. Deviations within the range of $M - 1.1\delta$ to $M - 2\delta$ and from $M - 2.1\delta$ to $M - 3\delta$ and below represent the range of below-average and low values (Group I of children). Deviations within the range of $M + 1.1\delta$ to $M + 2\delta$ and from $M + 2.1\delta$ to $M + 3\delta$ and above represent the range of above-average and high values (Group III of children).

Results and Discussion: The analysis of the obtained materials showed that the age-related changes in anthropometric characteristics of schoolchildren in Tashkent exhibit biological patterns typical for children of school age. Thus, the average body mass indicators for 7-year-old boys and girls were 24.2 ± 0.43 kg and 24 ± 0.41 kg, respectively, while at 16 years they were 60.4 ± 0.87 kg and 57.5 ± 0.78 kg. This means that during the school years, boys experienced an increase in body mass of 36.2 kg or 149.6%, and girls—33.5 kg or 139.6% (Fig. 1).

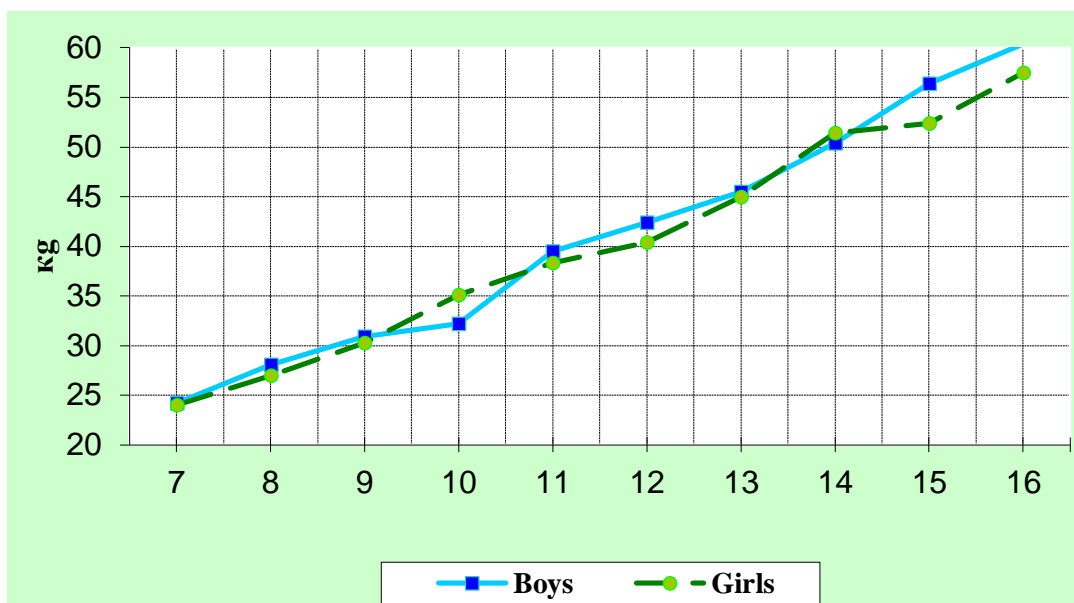


Fig. 1. Age dynamics of body mass indicators of children and adolescents in Tashkent, kg.

The analysis of the data indicates that body mass increased most intensively in boys aged 7–8 years (by 3.9 kg or 16.1%), 10–11 years (by 7.3 kg or 22.7%), 13–14 years (by 4.9 kg or 10.8%), and 14–15 years (by 6 kg or 11.9%). Among girls, the greatest increases were observed at ages 9–10 years (by 4.8 kg or 15.8%), 12–13 years (by 4.6 kg or 11.4%), 13–14 years (by 6.4 kg or 14.2%), and 15–16 years (by 5.1 kg or 9.7%). The average annual increase during the studied age period was 4 kg for boys and 3.7 kg for girls.

A detailed analysis of the variation series of body mass indicators by developmental level was performed separately for each age and sex group of students. For this purpose, the body mass values of children were divided into the following groups:

- Group I – children with values below the normal range (below $M-1\delta$);
- Group II – children with values within the normal corridor ($M \pm 1\delta$);
- Group III – children with values exceeding the normal range (above $M+1\delta$).

The obtained data indicate a general trend of increasing body mass indicators across all three groups of examined children. In boys belonging to Group I, body mass increased 2.5 times or by 154.1% up to the age of 16; in Group II – 2.6 times or by 159.7%; and in Group III – 2.2 times or by 119.6%. The analysis of body mass dynamics among girls across the three developmental groups also showed that girls in Groups I and II had a greater increase in body mass by the age of 16. Thus, the body mass of girls in Group I increased by 147.2% compared to their 7-year-old level, Group II – by 138.7%, and Group III – by 120.8%. The greatest annual gain in all three groups occurred at ages 10–11 for boys and 13–14 for girls.

The proportion of girls within the normal range varied from 65.4 to 76%, while for boys it ranged from 62.3 to 80%. Across all age groups, 10 to 18.3% of girls and 9 to 20.2% of boys were found to have body mass deficiency (Group I). The proportion of girls with excessive body mass ranged from 11 to 19.5%, while the proportion of boys whose body mass exceeded normative values ranged from 11 to 19.3% (Group III). Depending on age and sex group, a certain pattern was identified regarding the number of children with body mass deficiency, excess, and normal body mass; that is, the percentage distribution of children aged 7 to 16 years among Groups I, II, and III differed. Comparing the body mass indicators of children in Group I,

it was noted that the highest number of boys with body mass values outside the normal range was observed at age 16 (20.2% – body mass deficiency) and at ages 12, 13, and 16 (17.5%, 19.3%, and 17.5%, respectively – body mass excess). Among girls, body mass deficiency was most common at ages 9 (18.3%) and 11 (17%), while excess body mass was observed at ages 10, 15, and 16 (19.5%, 17%, and 19%). On average across all age groups, 14% of boys and 13.6% of girls had body mass deficiency, while 14.9% of boys and 15.3% of girls had excess body mass. A total of 71.1% of children of both sexes had body mass within $M \pm 1\delta$.

Conclusion and Summary: Thus, the analysis of body mass dynamics showed that during the school years, boys and girls demonstrated the greatest body mass increase (by 149.6% and 139.6%, respectively). The maximum gains did not coincide between sexes and occurred 1–2 years later in girls than in boys. The proportion of children with average body mass values was 71.1%, while 13.8% had below-average or low values, and 15.1% had above-average or high values.

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