Anthropometric Features of Children from Three to Six Years Old Residing in the City of Tashkent

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Abstract. Each age period of childhood is characterized by its own biological characteristics. This process is manifested by a change in morphofunctional development under the influence of external factors. Young children are characterized by rapid rates of physical development, neuropsychic and physical development; low resistance to meteorological conditions and the environment compared to older children. In 2019-2022, an anthropometric study was carried out on 210 children of both sexes under the age of 6 years from state kindergartens in Tashkent. The height, weight, chest and head circumference of each child were measured.

Key words: height, weight, chest circumference, head circumference.

The outward signs of growth are the height and weight of children. However, the child’s height and weight is a good indicator for determining nutritional status. A comparison between the height and weight of children with standard tables can be used for screening by finding malnutrition cases (1). The most common approach to monitoring growth in children is a measurement of anthropometric indices (2).

Physical development is a unique indicator of health, which makes it possible to trace both epoch-making changes in biological nature and relatively short-term effects in relation to the population, and reflects the actual nutritional status of children.

The purpose of this study is to determine the main anthropometric characteristics of assessing the physical development of preschool children in Tashkent in terms of age and gender.

Materials and methods of research. In 2019-2022, an anthropometric study was carried out on 210 children (112 boys and 98 girls) in a state kindergarten in Tashkent. The average age of the children was 4.5±1.5 years.

The assessment of the physical development of patients was carried out by comparing the assessed indicator with its arithmetic mean value according to the tables in the group to which the patient belongs. Physical development was considered average (typical) if its indicators coincide with the arithmetic mean or differ from it by ±1.0 with the results of assessing physical development from M ± 1 to M ± 2; physical development is respectively above or below average; from M ± 2 to M ± 3 - high or low (depending on the + or - sign).

Research results. According to the results obtained, the growth of preschool children increases rapidly in both sexes (Figure 1,2). In boys at the age of 3 years, the average height is 96.7 ± 7.7 cm, where it...
Increases rapidly and reaches $114.21 \pm 5.8$ cm at the age of 6 years. The average annual increase in height is intense throughout the entire period, and the highest values are observed between the ages of 4 and 5 years, when height increases by an average of 10.8 cm. The growth rate in boys varies from 2.1% to 4%, and it is highest between the ages of 4 and 5 years. The average height of girls at the age of 3 years is $95.9 \pm 6.7$ cm. Before they reach the age of 6 years, the height increases by only 18.1 cm and reaches a value of $113.5 \pm 5.8$ cm. The absolute annual growth ranges from 6.1 to 6.8 cm per year. The growth rate varies from 2.6% to 3.3%, and in girls it is highest between 3-4 years. The high rate of growth declines in both sexes between the ages of 5 and 6 years.

Throughout the entire growth period studied, boys are taller than girls, with the difference in height being the smallest in the 4th year of life (1.2 cm) and the largest and statistically significant among children aged 5 years, where the difference reaches 3.2 cm in favor of boys ($p \leq 0.05$).
Regarding body weight (Figure 3.4), the results show that at the age of 3 years, the weight of girls is 15.0 ± 1.7 kg, and that of boys is 15.3 ± 1.9 kg. Weight grows rapidly during the study period, where in boys at the age of 6 years it reaches an average of 19.9 ± 2.5 kg, and in girls - 19.3 ± 3.4 kg. The absolute weight gain per year for boys varies on average from 2.0 to 4.2 kg, while for girls it ranges from 1.8 kg to 4.2 kg. As a rule, during the observed preschool period, girls gain weight by an average of 5.5 kg, and boys by 5.2 kg. The rate of weight gain in boys is highest at the age of 4-5 years, when it reaches 7.9%. In girls, the rate of body weight growth is close to that of boys under the age of 5 years, then it increases sharply and reaches 11.4% at the age of 5-6 years. In terms of gender differences, boys are heavier compared to girls of the same age between 3 and 5 years of age, where gender differences are only statistically significant among children aged 5 years (p≤0.05).

Figure 3. Body weight (boys).

Figure 4. Body weight (girls).
Chest circumference (Figure 5.6) is the third main anthropometric indicator that is used to assess the healthy physical development of children in epidemiological studies. Our results show that at the age of 3 years, the average chest circumference in boys is 52.7 ± 2.9 cm, and in girls - 52.0 ± 3.1 cm, where at the age of 6 years it reaches values of 55.4 ± 2.6 cm for boys and, accordingly, 54.9 ± 3.0 cm for girls. Typically, chest circumference increases by 2.55 cm in boys and 3.56 cm in girls between 3 and 6 years of age. In boys, the average annual increase in chest circumference increases from 1.1 cm to 2.5 cm, while the growth rate is highest at the age of 4-5 years (2.3%) and lowest, respectively, at the age of 5-6 years (0.9%). In girls, the average annual increase in chest circumference is quite uneven - from 0.5 to 4.8 cm, while the growth rate ranges from 0.4% at the age of 3-4 years to 4.3% at the age of 5-6 years. In terms of gender, boys have a larger chest circumference compared to girls aged 3 to 5 years, where the differences are statistically significant among children aged 4 to 5 years (p < 0.05). But during the 6th year, girls are slightly ahead of boys in this indicator, which is associated with a higher average annual increase and a higher growth rate for girls during this period.

Figure 5. Chest circumference during pause (boys)

Figure 6. Chest circumference during pause (girls)

Head circumference (Figure 7.8) is another very important anthropometric indicator for assessing the physical development of children. The head circumference of the studied boys at the age of 3 years is on average 49.5 ± 1.4 cm, and for girls at the age of 3 years, respectively, 49.1 ± 1.3 cm. For both sexes, this figure increases with age, where at the age of 6 years, in boys it reaches an average value of 50.8 ± 3.8 cm, and in girls – 50.5 ± 1.3 cm. In relation to the average annual growth, the most intense
Increase in head circumference in boys is observed at the age of 3-4 years (0.8 cm), and also the highest growth rate for the same period is observed - 0.7%, respectively. In girls, the greatest average annual increase in head circumference is observed at the age of 5-6 years, which corresponds to the highest growth rate (0.8%). During the remaining age periods, head circumference grows at a slower pace for both sexes, which is typical for the characteristics of the head, and as a result, the growth of head circumference over the entire period in boys averages 0.96 cm, and in girls 0.72 cm. In the intergender aspect, boys have a larger head circumference compared to girls over the entire study period, where the differences are largest and statistically significant among children aged 5 to 6 years (p≤0.05).

Figure 6. Head circumference (boys)

Figure 7. Head circumference (girls)

Thus, our results on age and gender differences in the growth dynamics of the main anthropometric indicators (height, weight, chest and head circumference) show unevenness, heterochrony and gender dimorphism both in relation to the absolute values of the indicators and in relation to growth rates and achieved growth rate. While in boys the peaks of increase in height, body weight and chest circumference during the study period (age 3-6 years) coincide in time and are observed at the age of 4 to 5 years, and for head circumference - at the age of 3 to 4 years, in girls, the increase in children's
height is most significant in the period from 3 to 5 years, while their weight, chest and head circumference increase from 5 to 6 years of development.

References