

Age-Specific Characteristics of Anthropometric Indicators of Preschool Children Living in Tashkent

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Abstract The physical development of children is one of the important indicators of the state of health of the child, which reflects the general standard of living of different population groups and, as an indicator, is sensitive to any environmental changes. Determining the patterns in the processes of growth and development of the child's body is of great importance in solving the problem of prevention and reduction of the disease, as well as in organizing their dispensary control.

Keywords Physical development, Environmental factors, Genetic program, Human body living

1. Introduction

The processes of growth and development of the child's body are determined by hereditary and environmental factors. Under the influence of environmental factors, the genotype becomes phenotypic manifestations (T.V. Chiryateva, 2001; A.G. Tshedrina, 2007), which changes throughout life to reflect physical age dynamics. At different age periods, the influence of genetic program and environmental factors on physical development varies (A. G. Sokolov, 2002).

The anthropological approach, widely used by scientists in the study of the human body living in various climatogeographic zones, allows not only to determine the growth and development characteristics of children and adolescents, but also to determine their laws in the populations under study (V.L. Grisinskaya, 2003).

The quality of the health and physical development of children is the future, gene pool of the nation, its intellectual and economic potential.

The health of children depends on the level of physical and mental development, the functionality of the organism of different ages, the state of adaptive reactions during the growing season, morbidity, the level of specific and non-specific resistance and other factors.

Children and adolescents are considered one of the most sensitive subjects of environmental factors and population groups to the influence of living conditions, therefore, their different age and gender groups become the object of study, observation and analysis of the state of Health in relation to the environment (Belyakov, B. A. 2003).

2. Materials and Methods

As you know, the physical development of children is one of the informative indicators of assessing the health of the population. The simplicity and convenience of anthropometric measurements among child contingents, the informativeness of the information obtained gives an indicator of physical development, the importance of an objective criterion of sanitary and hygienic well-being of the population along with morbidity and medical and demographic data (Voronsovi. M., 1999; Leonova. V., Matveevan. A., Kuzmichev Yu.G., 2004).

The purpose of the study is to develop proposals and recommendations for determining scientifically based criteria for assessing anthropometric indicators and biological maturity of preschool children in Tashkent, based on determining the somatometric indicators, age-sex characteristics of their development.

To implement the goal solution set before us, 1329 healthy preschool children were involved in our research and organized by children raised in preschool educational institutions of the city of Tashkent. Of all the children examined, 653 (49.1%) were girls and 676 (50.9%) were boys. Research observations took an average of 1 year.

At the first stage of the study's work, the following anthropometric indicators were obtained: height length, body weight, head and chest circumference.

In the second stage of the study, we used the sentil method and evaluated the physical development of children based on the anthropometric data obtained. Using the data tables of the senthyl corridors, we identified the following: level of physical development (by height length), somatotype and morphotype, developmental Harmony, Health Corridor.

According to the results obtained, the growth of preschool children increased intensively in both sexes. Boys from 3 years of age are intensively growing in average height length and were 96.7 ± 7.7 . The average annual rate of height increase was rapid throughout the year, with the highest rates

found to be 107.63 ± 0.14 between the ages of 5 and 6, with an increase of 6.55 CM on average. The rate of growth in boys has been observed to vary from 2.1% to 4%, and this has been demonstrated in the 5-to 6-year-old range. The average height of girls aged 3 years was 95.9 ± 6.7 cm. They were found to have increased their height to only 18.1 cm by the age of 6 and to be 113.5 ± 5.8 cm overall. Peak height increases were observed between the ages of 5 and 6 years, which was found to be between 6.1 cm and 8.5 cm. The growth rate has accelerated in children of both sexes between the ages of 5 and 6 years.

In the studied period, the height is higher in boys than in girls, and the signal deviation of indicators was 0.53 CM in the 3rd year of life, 0.24 CM in the 4th year, 0.48 CM in the 5th year, 0.31 CM in the 6th year and has statistical significance ($R < 0.05$). The signal deviation of the length of the height between 7-year-olds was 0.56 CM. In girls, the signal deviation of these indicators was 0.1 cm in the 3rd year of life, 0.2 cm in the 4th year, 0.44 CM in the 5th year, 0.16 CM in the 6th year, and at 7 years of age, the signal deviation was 0.43 CM.

As for the body weight of preschool children, the results showed that at the age of 3, girls weighed 15.03 ± 0.01 kg, and boys weighed 15.28 ± 0.02 kg. During the observation period, weight was found to increase intensively, with boys aged 3 years weighing 15.28 ± 0.02 kg, girls 15.03 ± 0.01 kg, boys aged 4 years averaging 16.28 ± 0.04 kg, girls 16.51 ± 0.03 kg, boys aged 5 years 17.97 ± 0.03 kg, girls 17.48 ± 0.03 kg, boys aged 6 years 19.97 ± 0.02 kg, girls 19.26 ± 0.06 kg and 7 years old, boys were 20.78 ± 0.05 kg and girls were 20.86 ± 0.05 kg. Absolute weight gain per year for boys was observed from a maximum of 1.25 to 2.19 kg between the ages of 5 and 6, with absolute weight gain for girls ranging from 1.48 kg to 1.78 kg.

As a result of the study, at the observed age, girls from preschool age received an average weight of 5.9 kg, and boys-5.5 kg. The rate of weight gain in boys was 1.69 kg (9.8%) at age 4-5, 2.0 kg (11.8%) at age 5-6, and 0.81 kg (4.8%) at age 6-7. The growth rate of body weight in girls was close to that of boys, at 4-5 years 0.97 kg (5.8%), at 5-6 years 1.78 kg (10.7%), and at 6-7 years 1.6 kg (9.7%). As for gender differences, boys are heavier than girls of the same age at age 5, where gender differences only indicate statistical significance among 5-year-olds ($R < 0.05$).

3. Discussion and Result

The thoracic circle is one of the third key indicators within anthropometric indicators and is used to assess the healthy physical development of children. Our results show that at 3 years of age the average circumference of the chest in a calm state in boys is 52.99 ± 0.01 CM, in girls 52.00 ± 0.03 CM, in boys at 4 years the average circumference of the chest in a calm state is 54.07 ± 0.13 CM, in girls 53.64 ± 0.03 CM, in boys at 5 years the average circumference of the chest in a calm state is 55.00 ± 0.02 CM, and in girls 54.00 ± 0.02 the SM

was 55.47 ± 0.03 CM for boys at age 6 and 55.02 ± 0.02 CM for girls and 55.64 ± 0.02 CM for boys at age 7 and 54.99 ± 0.01 CM for girls.

In boys, the quiescent circumference of the chest has grown from an average of 0.05 cm to 0.12 cm per year, while in girls it has been found that in children it increases from 0.05 cm to 0.11 CM. The growth rate, on the other hand, is highest at 4-5 years (2.3%) and lowest at 5-6 years (0.9%), respectively. In girls from 3 to 7 years of age, the breast circumference was enlarged to 3.15 CM, the growth rate was 1.4 cm (2.6%) at 3-4 years, and 1.1 cm (2.01%) at 6-7 years. In terms of gender, boys have a large chest compared to girls between the ages of 3 and 5, where the differences are statistically significant among children between 4 and 5 years of age ($R < 0.05$). But girls at the age of 6 are slightly superior to boys in this rate, which is due to the high average annual growth and the high growth rate of girls during this period.

The head circumference is another very important anthropometric indicator for assessing the physical development of children. The head circumference of boys under study at age 3 is 49.45 ± 0.05 cm on average, 48.11 ± 0.13 CM for girls at age 3, the head circumference of boys under study at age 4 is 50.01 ± 0.01 CM, for girls at age 4 is 49.70 ± 0.05 cm, the head circumference of boys under study at age 5 is 50.98 ± 0.02 CM, for girls at age 5 is 50.55 ± 0.15 CM, it increases with age, where at the age of 6 it reaches an average of 50.64 ± 0.02 CM for boys and 50.60 ± 0.02 CM for girls. The rich circumference of boys aged 7 years was 51.05 ± 0.02 CM, in girls this figure was 50.88 ± 0.03 CM.

The strongest increase in the head circumference in boys compared to the average annual growth was observed at the age of 4-5 years (0.12 CM), and the highest growth rate during the same period was 0.7%, respectively. The average annual growth of the cranium in females was observed at the age of 5-6 years, with a peak growth rate of 0.8%. In the remaining Age periods, the head circumference is slower for both sexes, typical of the general characteristics of the head, and as a result, boys aged 3 to 7 years have an average of 2.05 CM of head circumference growth over the entire period, while girls have 2.72 CM. In terms of gender, boys have a larger head circumference compared to girls, where the differences are greatest and statistically significant among children between the ages of 5 and 6 ($R < 0.05$).

Thus, our results on age and gender differences in the growth dynamics of the main anthropometric indicators (height self, weight, chest and head circumference) show unevenness, heterochrony and sexual dimorphism both in relation to the absolute values of the indicators and in relation to the growth rates and the growth rates achieved. Height increases were highest in children of both sexes between the ages of 5 and 6. Boys are heavier than girls of the same age at age 5, where gender differences only showed statistical significance among 5-year-olds. In terms of gender, boys have a large chest compared to girls between the ages of 3 and 5, but girls between the ages of 6 are slightly superior to boys in this rate, which is due to the high average annual

growth and the high growth rate of girls during this period. The strongest increase in the cranial circumference in boys compared to the average annual increase was observed at 4-5 years of age, while the average annual increase in the cranial circumference in girls was observed at 5-6 years of age.

In boys and girls, the maximum increase in arm length corresponds to age groups of 3-4 (1.06%) and 5-6 (1.04). The average annual growth of children of both sexes was nearly the same and averaged 2.5 cm or 5.4% in boys and 2.7 cm or 5% in girls, with the average of the largest annual increase in arm length being observed in Group I Children and the smallest in Group II Children. The largest increase in EU in boys was observed at 6-7 (2.6 cm) years, and in girls at 6-7 (2.14 CM) years, respectively, and the average of the largest annual increase in shoulder length over 5 years was observed in children of Group III, and the smallest in children of Group I.

The average annual growth for this in children of both sexes was almost the same between the ages of 3 and 7-0.9 cm (4.2%). The largest increase was observed in representatives of both sexes at the age of 3-4 (2.6 cm). The average value of the largest annual increase in wrist length over 5 years has been observed in Group III children, and the smallest in Group I Children. The maximum increase in shoulder width was observed in boys aged 5-6 (1.6 cm) and girls aged (1.7 cm); the average increase over 5 years was 2.8 cm or 11.3% for boys and 2 cm or 8.2% for girls. All this information indicates that the width of the shoulders in boys increases significantly more than in their peers. The size of the shoulder girdle when relaxed increased EA 1.06 times in children of both sexes between the ages of 3 and 7, with a total increase of 1 cm or 5.7%, while the average value of the largest annual growth of the shoulder girdle was observed in boys in Group III children, girls in groups I and II, and the youngest in boys in When the dimensions of leg length were analyzed, children of both sexes between the ages of 3 and 7 had an OU increase of 2.6 times, with a total increase of 14.8 cm or 24.95%. The largest increase was also seen in boys (6.7 cm) and girls (5.11 CM). The average value of the largest annual increase in leg length has been observed in Group II Children, and the smallest in Group III children.

When the size of the thigh length was analyzed, the largest increase in children of both sexes was observed in boys (3.2 cm), girls (1.8 cm) at the age of 3-4 years, and the average value of the largest annual increase in the thigh length was manifested in children of Group III, and the smallest in children of Group I. The greatest increase in the length of the calf was observed in boys (1.6 cm) at the age of 3-4 years, boys (1.8 cm) at 4-5 years, girls at these ages (1.3 cm), respectively. As a result of the study, the average value of the largest annual increase in the length of the calf was observed in children of Group I, and the smallest in children of Group III.

When the size of the number circle was analyzed, SA increased 1.1 times in boys aged 3 to 7 years, i.e. 1.4 cm or 4.8% overall growth, sa increased 1.2 times in girls, i.e. 2 cm or 7% overall growth, the average value of the largest annual

increase in the number circle was observed in Group I Children, and the smallest in.

All values obtained as a result of the study depend on the individual characteristics of the body and may indicate pathologies in physical development. The value of all indicators is influenced by biological, socio-economic, domestic and other factors.

In the second stage of our study, we created a "health corridor" with the Sentile method based on anthropometric indicators of the physical development of children from 3 to 7 years old in preschool educational institutions living in Tashkent. The value of the observed anthropometric indicators was assessed as a normative indicator if it was in the range of 25-75 cents.

Drawing conclusions from the data obtained, we can say the following. Of the 1,329 children examined, 35 (2.63%) were admitted to very low physical development, 134 (10.1%) to low physical development, 245 (18.4%) to moderately low physical development, 386 (29%) to moderate, 478 (35.9%) to moderately high physical development, 32 (2.4%) to high physical development, and 19 (1.44%) to very high physical development. 280 children were found to deviate from the norms of the accepted anthropometric indicators. The physical development of these children does not meet the average standards for this age.

The results of the study showed that 29% of children examined were included in the 4 corridor of the "health corridor", 35.9% in the 5 corridor, and, on average, in the category of physical development and above. 1-,2-,6-,7-children who are included in the corridor are definitely recommended to be examined by deep specialists. Children are in constant growth and Development, their future largely depends on how the child grows and develops, and therefore this process should be under the constant supervision of parents, doctors and teachers from the moment the child was born to the period of maturity. The normal course of growth and development of a child ensures a comfortable state of his body, indicates the absence of harmful effects, and physical development at this age is one of the leading signs of Health, which depends on his other indicators.

We also identified the somatotype of the children we observed in our study. To do this, the sum of the children's height, body weight and senile indicators of the chest circumference was calculated, and the following results were determined.

The body structure of pre-school boys was 474 in mesosomatotype appearance (35.7%), the microsomatotype 96 (7.2%), the macrosomatotype 106 (7.9%) and the body structure of girls made up 461 in mesosomatotype appearance (34.7%), the microsomatotype 89 (6.7%), and the macrosomatotype 103 children (7.8%) in type.

I.M.Voronsov argues that determining the somatotype of children not only provides information about its body structure, but also describes the degree of growth and development-that is, it is possible to get an idea of the slowdown in microsomatotype growth or the acceleration of macrosomatotype growth. So in our study, children with an average growth rate were 935 (70%).

We also identified morphotypes of preschool children by height and body weight at the next stage of our study.

The study found a normosomy of 18.3% in both sexes in the body structure morphotype of preschoolers, i.e. boys, and 24.7% in girls, respectively ($R < 0.05$).

The coherence of physical development was determined by the difference in senile corridors between height length and body weight. With a difference of 0 or 1, physical development is harmonious, with a difference of 2 – no harmony, with a difference of 3 or more – not sharply harmonious. So in our study, children with harmonious physical development accounted for 978 (74%), children with no harmony accounted for 297 (22.30%), children with sharp incongruity accounted for 54 (4.10%).

We used a graphical table compiled by the Center for Health Statistics/Center for Disease Control and Prevention and recommended by the WHO (2022), which is widely used to assess the indicators of Z-scores of physical development of preschool children at the next stage of the study.

The results of the study show that in 95.96% of children examined, height is normal, in 2.6% height is low, in 1.44% height is high, in 90.5% the child's body weight is normal, in 4.3% the child has a lack of body weight, in 5.2% the child has excess body weight. When the body weight index was assessed, it was found that 94.14% of children had normal body weight, 2.70% of children had a lack of body weight, and 3.16% of children had excess body weight.

At the third stage of the study, the level of biological maturity of children (biological age) was assessed. It was carried out depending on the length of the neck, weight gain, the time of exit of permanent teeth and their number, the degree of change in body proportions. The growth of the height of children under 6 years of age should be at least 4 cm during the year, the number of permanent teeth should be at least one.

In medical and pedagogical practice, relatively easily measured indicators, called somatometric, are often used in order to determine the biological age of the child, which we applied in our study. The leading indicators of biological development in preschool age are: height length, the pace of growth of height length throughout the year, the total number of permanent teeth in the upper and lower jaw. As additional indicators, the biological age of children was determined based on changes in body proportions (the ratio of the circumference of the head to the length of the neck). The results showed that in 94.5% of children between the ages of 3 and 7 who were examined, the physical age matched

the biological age. An imbalance was found between the physical age of 5.5% of children and their biological age.

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