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GROWTH RATES OF LATITUDE AND CIRCULARITY INDICATORS OF THE BODY IN PRESCHOOL CHILDREN AGED FROM 4 TO 6 YEARS

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ABSTRACT

Research was carried out on state preschool educational organizations (SPEOs) in Tashkent and Surkhandarya region, built from different building materials: light metal structures, reinforced concrete and baked brick. 474 children aged 4 to 6 years were examined, of which 231 were boys and 243 were girls. The children were divided into three groups: the 1st and 2nd groups attended the SPEOs made of light metal structures and reinforced concrete, and the control group - made of baked brick. The results showed that children from preschool educational institutions built from baked bricks had higher rates of growth in physical development compared to children from other groups, emphasizing the importance of the choice of building material for education.

Key words: physical development, preschool children, preschool educational organization.

INTRODUCTION

The rate of physical development of a child is one of the main factors determining his health [8, 10]. Height reflects the general health of the child and may indicate the presence of any developmental abnormalities [1]. An increase in body weight is necessary to meet the energy needs and growth of the body [2]. It is also important to take into account the ratio of weight to height, which helps to identify possible developmental deviations [7].

However, it should be noted that there are other indicators (longitude, latitude and circumference) that are of particular importance to ensure the harmonious development of the child [3]. Measuring head circumference in children allows us to monitor brain development, which is closely monitored from the moment of birth [9].

Comprehensive assessment allows for a more accurate identification of a child's physical condition and possible threats to his or her health [4]. Most studies indicate that the dynamics of children's physical development indicators in comparison with the norms may vary depending on climatic conditions, ethnic factors, environmental situation and the degree of anthropogenic influence [6]. Nevertheless, the relationship between upbringing in preschool educational organizations and children's physical development is still insufficiently studied. Thus, the focus has been on what type of building material affects children's physical development.

Objective of the study. The purpose of the study is to compare the growth rates of latitudinal and girth body indices in preschool children raised in preschool educational organizations built of different building materials.

Material and method of the study. The objects of the study were public preschool educational organizations (SPEOs) built of different construction materials (quick-erected structures, reinforced concrete and burnt bricks), which are located in different districts of Tashkent city and Surkhandarya province. During the study, 474 children aged 4-6 years, including 231 boys and 243 girls, were examined. All surveyed children were divided into 3 groups: The 1st and 2nd groups included children attending PEOs centers built of light metal structures and reinforced concrete, respectively, and the 3rd group was the control group and included children who were brought up in PEOs centers built of burnt bricks. Hygienic, somatometric, medical-statistical and analytical methods were performed.

Necessary devices for measuring somatometric indices: a centimeter tape and a large thick circlet. Latitudinal and girth indices were measured in preschool children based on the methodology of R.T. Kamilova “Unified methodology of research and assessment of physical development of children and adolescents” (Tashkent, 1996). Statistical processing of the obtained materials was processed in Microsoft Excel 2016 program. These programs provide a set of tools and functions to perform various statistical calculations, such as arithmetic mean, standard deviation (σ), minimum and maximum values, the reliability of differences (p) between groups of data was assessed.

Results of the study. As a result of the studies, it was found that the head circumferences of boys from the 3rd group increased by 1.3 cm (from 50.4±0.34 to 51.8±0.20 cm) from 4 to 6 years of age, in the 1st group - by 0.5 cm (from 50.4±0.32 to 50.9±0.26 cm), in the 2nd group - by 0.4 cm (from 50.8±0.29 to 51.3±0.22 cm). The total increase in head circumference in boys from the 3rd group was higher than in boys from groups 1 and 2. In girls, total head circumference gain increased between 4 and 6 years of age by 1.7 cm from the 3rd group (from 49.2±0.38 to 50.9±0.23 cm), by 1.5 cm from the 1st group (48.8±0.49 to 50.4±0.34 cm), and by 0.9 cm from the 2nd group (from 49.6±0.24 to 50.5±0.26 cm).

The mean neck circumference in boys for 2 years (4 to 6 years) increased by 1 cm from the 3rd group (from 25.2±0.21 to 26.2±0.17 cm), in the 1st group increased by 0.6 cm (from 24.8±0.19 to 25.4±0.27 cm), and no increase was found in boys from the 2nd group (from 25.2±0.21 to 25.2±0.27 cm). Similar results showed that girls from the 3rd group had a 1 cm increase in neck circumference (from 24.5±0.25 to 25.5±0.21 cm), in the 1st group had a 0.8 cm increase (from 24.4±0.38 to 25.2±0.26 cm), and the 2nd group had a 0.4 cm increase (from 24.6±0.13 to 25.0±0.18 cm) (fig. 1).

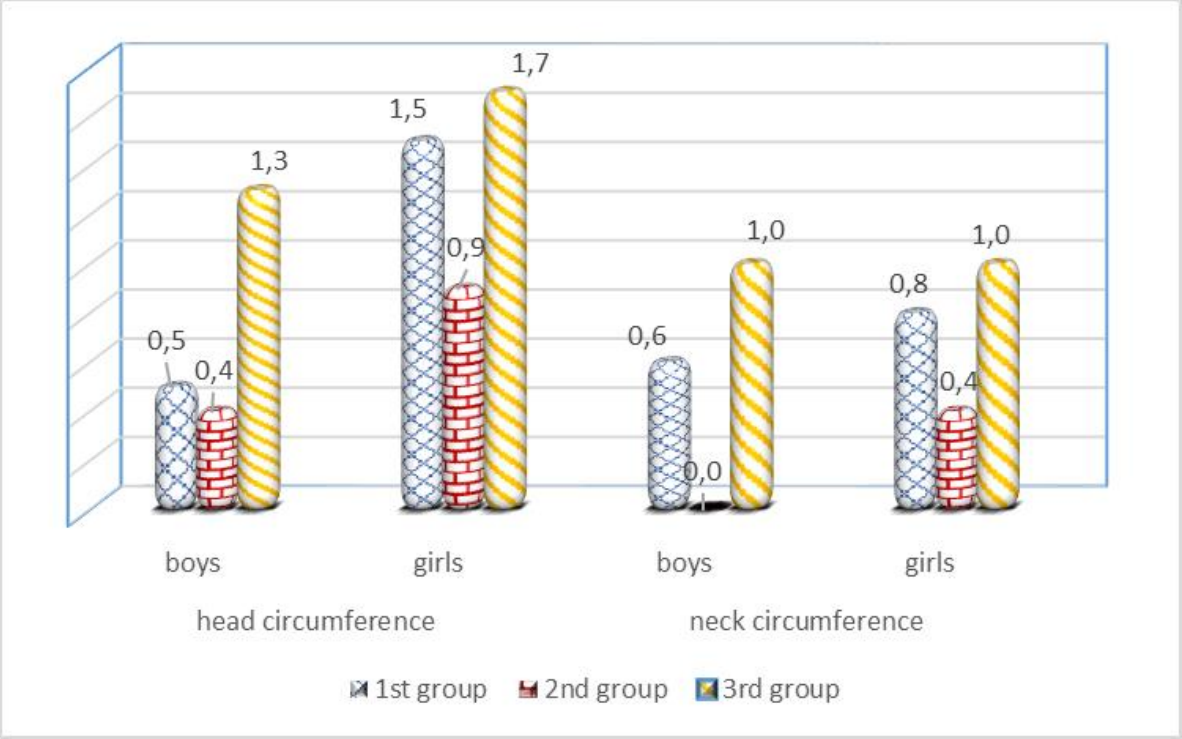

Figure 1. Increases in head and neck circumference in preschoolers for 2 years (from 4 to 6 years)

It was found that the average chest circumference at rest in 6-year-old boys from the 3rd group was 57.7±0.39 cm, in the 2nd group - 56.6±0.78 cm, in the 1st

group - 56.8±0.61 cm. The increase in chest circumference from 4 to 6 years in boys from the 3rd group increased by 3.6 cm, in the 1st group - 3.2 cm, and in the 2nd group - by 2.0 cm. Among 6-year-old girls from group 3, the average chest circumference at rest was 56.1±0.43 cm, in group 2 - 55.9±0.69 cm, in group 1 - 55.0±0 .71 cm. In girls from the 3rd group over 2 years (from 4 to 6 years), the increase in chest circumference at rest was 5.2 cm, in the 2nd group - 3.9 cm, and in the 1st group - 3.2 cm. The overall increase in chest circumference at rest in preschoolers from group 3 was greater than in preschoolers in other groups (fig. 2).

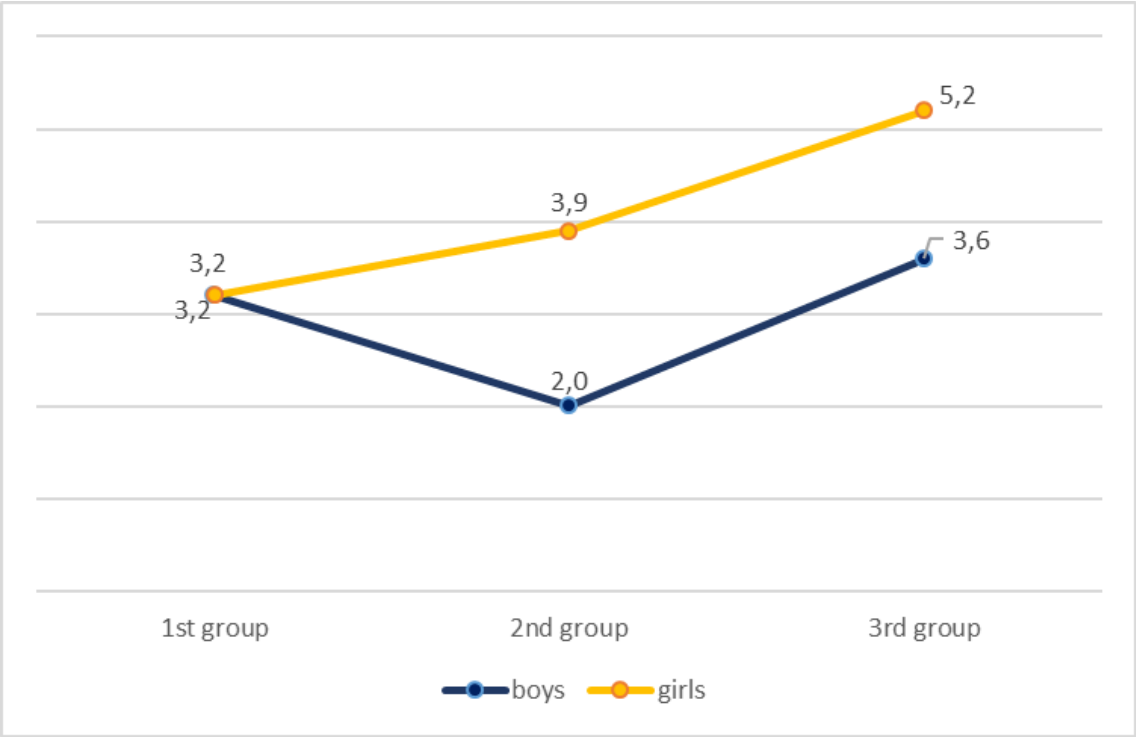

Figure 2. Increase in OGK at rest in preschoolers for 2 years (from 4 to 6 years)

Shoulder circumference at rest in boys from the 3rd group aged 4 to 6 years increased by 0.9 cm from 15.9±0.20 to 16.8±0.17 cm, in the 1st group - by 0.8 cm (from 15.5±0.26 to 16.2±0.23 cm), however, in boys from the 2nd group no increase was detected and the average value in 4-year-old boys was 16.0±0.19 cm, and in 6-year-olds this figure was 15.8±0.24 cm. Among girls, the increase in shoulder circumference at rest over 2 years increased by 1.2 cm from the 1st group from 15.2±0.30 to 16.5±0.30 cm, in the 3rd group – by 1.0 cm (from 15.6±0.25 cm to 16.6±0.20 cm), in the 2nd group – by 0.7 cm (from 15.8±0.15 to 16.5±0.22 cm) (fig. 3).

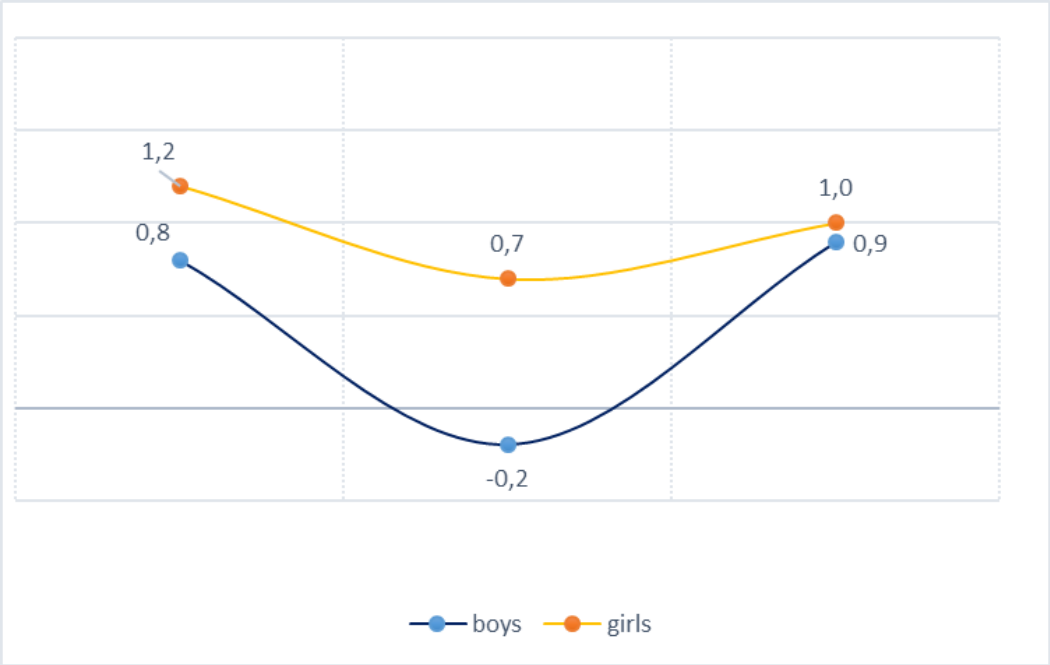

Figure 3. Increase in resting shoulder circumference in preschoolers over 2 years (from 4 to 6 years)

Boys from the 3rd group increased their wrist circumference by 0.8 cm for 2 years (from 11.7±0.14 to 12.5±0.09 cm), from the 1st group – by 0.3 cm (from 11.6±0.14 to 11.9±0.11 cm), while no changes were found in the 2nd group. Among girls from the 1st and 3rd groups, the increase in wrist circumference for 2 years amounted to a single 0.5 cm, respectively, and in the 2nd group the increase was 0.4 cm, while the average values of this parameter in children from the 1st groups aged 4 to 6 years were 11.3±0.17 and 11.8±0.20 cm; in the 2nd group – 11.5±0.10 and 11.9±0.15 cm; in the 3rd group – 11.4±0.15 and 11.9±0.12 cm (fig. 4).

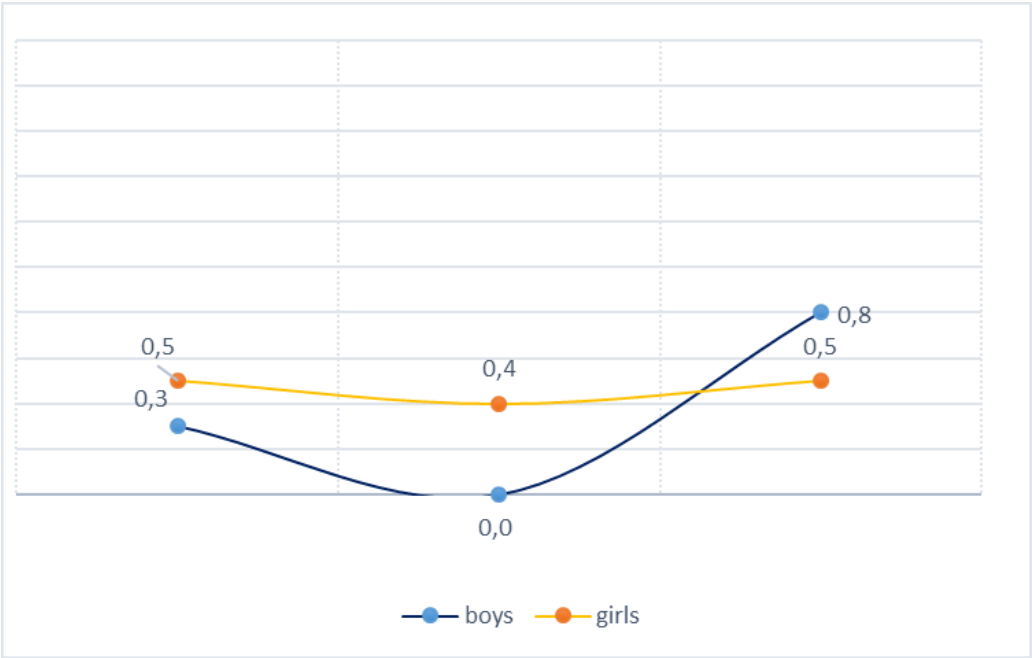

Figure 4. Increase in wrist circumference in preschoolers for 2 years (from 4 to 6 years)

The average abdominal circumference in boys aged 4 to 6 years from the 3rd group increased from 51.9±0.62 to 54.0±0.52 cm and the increase was 2.1 cm, in the 2nd group - 1.4 cm (from 52.0±0.64 to 53.4±0.90 cm), in the 1st group - 1.5 cm (from 51.3±0.80 to 52.8±0.69 cm). In girls, the increase in this indicator was 3.4 cm in the 3rd group (from 49.5±0.50 to 52.9±0.49 cm), in the 2nd group 3.3 cm (from 50.1± 0.50 to 53.4±0.73 cm), in group 1 1.4 cm (from 50.7±0.68 to 52.1±0.68 cm).

The hip circumference in boys aged 4 to 6 years increased from 53.3±0.42 to 58.3±0.48 cm in the 3rd group and the increase during this time was 5.0 cm, in the 1st group - 3.4 cm (from 52.9±0.53 to 56.3±0.73 cm), group 2 – 2.7 cm (from 54.3±0.60 to 57.0±0.98 cm). In girls, hip circumference increased over 2 years from 52.2±0.66 to 57.6±0.53 cm by 5.4 cm from the 3rd group, by 5.5 cm from the 1st group (from 51 .7±0.71 to 57.2±0.96 cm), group 2 – by 4.8 cm (from 53.4±0.42 to 58.2±0.71 cm) (fig. 5).

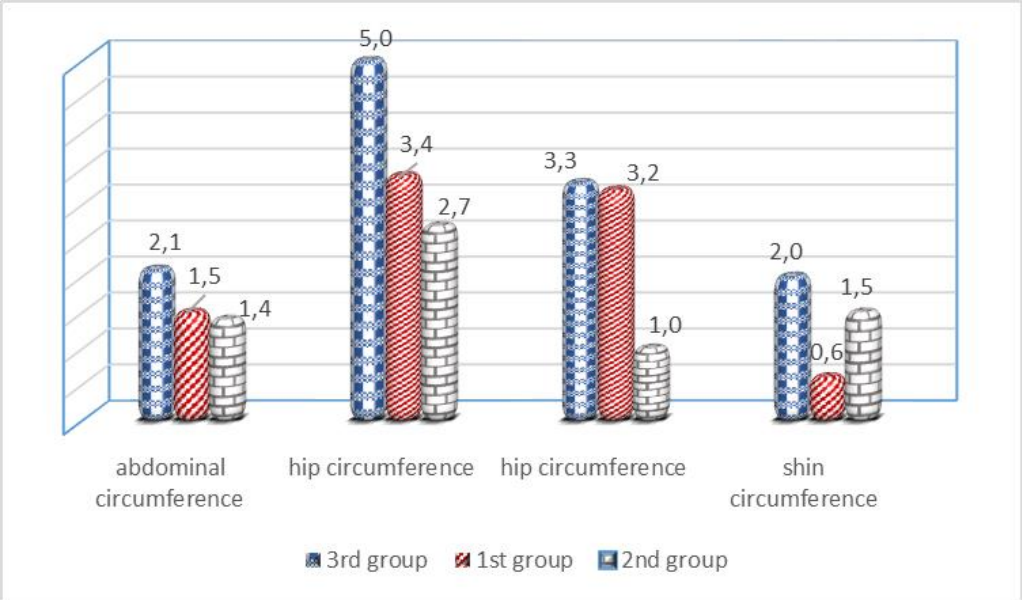

Figure 5. Gains in abdominal, hip, thigh and lower leg circumference in boys for 2 years (from 4 to 6 years)

The overall increase in hip circumference in boys for 2 years (from 4 to 6 years old) increased by 3.3 cm from group 3 (from 31.3±0.36 to 34.7±0.38 cm), group 1 group - by 3.2 cm (from 30.1±0.42 to 33.3±0.63 cm), group 2 - by 1.0 cm (from 31.7±0.52 to 32.7 ±0.60 cm). Among girls from group 3, shin circumference increased by 3.7 cm over 2 years (from 31.0±0.72 to 34.7±0.40 cm), in group 1 – by 3.2 cm (from 30.6±0.90 to 33.8±0.67 cm), group 2 – by 3.3 cm (from 31.6±0.32 to 34.9±0.52 cm).

The shin circumference in boys from 4 to 6 years old increased by 2.0 cm from the 3rd group (from 21.2±0.25 to 23.3±0.20), from the 1st group - by 1.5 cm (from 20.9±0.27 to 22.4±0.35 cm), group 2 – by 0.6 cm (from 21.6±0.27 to

22.1±0.31 cm). Among girls from group 3, hip circumference increased by 2.1 cm over 2 years (from 20.7 ± 0.31 to 22.8 ± 0.27 cm), in group 1 – by 1.9 cm (from 20.9±0.31 to 22.8±0.34 cm), group 2 – by 1.6 cm (from 21.3±0.20 to 22.8±0.30 cm) (fig. 6).

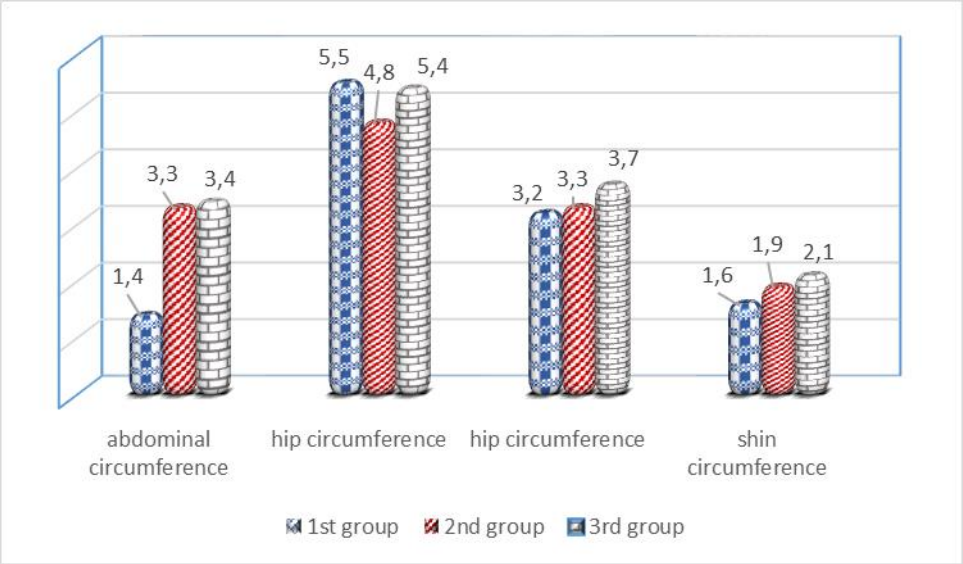

Figure 6. Increases in abdominal, hip, thigh and lower leg circumference in girls for 2 years (from 4 to 6 years)

Analysis of diametrical indicators shows that the increase in latitudinal indicators is significantly higher among preschoolers of the 3rd group compared to other groups (Table 1).

Table 1

Increase in latitudinal indicators of preschoolers for 2 years (from 4 to 6 years old)

Indicators	Group	1st group		2nd group		3rd group	
	sex	b	g	b	g	b	g
Head diameter anteroposterior		-0,1	0,1	-0,1	0,0	0,4	0,5
Transverse head diameter		0,3	0,7	0,1	0,0	0,2	-0,1
Chest diameter anteroposterior		0,9	1,3	0,6	0,6	1,1	1,0
Transverse chest diameter		0,7	0,9	0,1	1,0	0,7	1,1
Shoulder diameter		2,0	1,8	2,1	2,2	3,2	2,8
Pelvic diameter		1,5	1,6	1,4	1,1	1,8	1,8
Hips diameter		1,4	1,6	1,3	1,7	1,9	2,0

Conclusions.

The results of the study showed that the conditions of education in SPEOs vary significantly depending on the material used. Children raised in a preschool educational institution made of baked bricks demonstrated higher rates of growth in body width and girth indicators, compared to a preschool educational institution made of prefabricated structures and reinforced concrete.

Thus, the results of the study emphasize the importance of choosing building materials to create a comfortable and healthy learning environment for preschool children.

REFERENCES

1. Baranov A.A., Kuchma V.R. Physical development of children and adolescents of the Russian Federation: Collection of materials. Issue VI. - Moscow: Pediatr. - 2013. - C. 7.

2. Chernenkov Yu.V., Gumeniuk O.I. DEFICIT OF BODY MASS IN CHILDREN //Medical nurse. - 2015. - №3. - C. 4-8.

3. Filatova O.V., Kutseva E.V. Complex assessment of physical development of children of the first childhood period in Barnaul //Acta Biologica Sibirica. - 2015. - Vol. 1. - №1-2. - C. 7-21.

4. Gritsinskaya V.L., Salchak N.Y., Sanchat N.O., Omzar O.S. Comprehensive assessment of physical development of children of the Republic of Tyva //Acta Biomedica Scientifica. - 2013. - №3-2(91). - C. 60-63.

5. Kamilova R.T. Unified methodology of research and assessment of physical development of children and adolescents. - Monograph. Tashkent - 1996. 103 c.

6. Kapranov S.V., Agarkov V.I., Koktyshev I.V. Physical development of children who attended children's educational institutions in the city districts with different environmental situation //Medical Bulletin of the South of Russia. - 2013. - №2. - C. 70-75.

7. Kirilova I.A. Assessment of the level of physical development of preschool children of Irkutsk using indices //Modern medicine: current issues. - 2014. - №34. - C. 29-35.

8. Kuselman A.I., Antokhina Y.A., Gorshkova L. Features of physical development of children in the Ulyanovsk region //Ulyanovsk Medical and Biological Journal. - №4. - 2015. - C. 84-93.

9. Orlova N.I., Vasilieva R.M., Pronina T.S., Son'kin V.D. Peculiarities of the physical development of children 6-7 years old in the city of Reutov, Moscow region //New Research. - 2019. - №3(59). - C. 12-22.

10. Zubaidullina O.R., Povargo E.A., Zulkarnaeva A.T., Akhmetshina R.A., Zulkarnaev T.R. Physical development of preschool children of the city of Ufa //Health of the population and habitat. - 2014. - №6(255). - C. 19-21.