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BASIC PHYSICAL QUALITIES OF CHILDREN IN PRE-SCHOOL EDUCATIONAL ORGANIZATIONS CONSTRUCTED FROM VARIOUS TYPES OF BUILDING MATERIALS

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ABSTRACT

Studies have shown that the physical fitness of children depends on the conditions in which they are raised. Preschoolers raised in preschools built from metal structures demonstrate worse physical fitness results compared to their peers raised in brick buildings. A study of 326 children found that children's running speed and jumping ability varied depending on the type of buildings they were raised in, with children raised in institutions built with steel and reinforced concrete showing the worst results. This indicates that the development of physical qualities in preschool children depends not only on regular physical activity, but also on the learning environment, which necessitates the creation of healthy conditions for the formation of an active lifestyle in future generations.

Key words: children, preschool educational organizations, physical qualities.

INTRODUCTION

Early childhood development is receiving increasing international attention as multiple aspects related to their well-being need to be taken into account. According to the UN Convention on the Rights of the Child, issues related to childhood development span health, nutrition, education and social sciences, highlighting the interdisciplinary nature of these processes [5]. Physical activity

plays a key role in children's health, helping to improve their physical fitness and reduce the risks associated with noncommunicable diseases (NCDs). At the same time, lack of exercise and a sedentary lifestyle can lead to increased incidence of NCDs and negatively impact health systems [4].

Scientific research shows that in preschool educational institutions, the daily volume of movement of children aged 5-6 years, including traditional forms of activity, sports and outdoor games, is approximately 70 to 85 minutes. This highlights the importance of physical activity in children's daily lives for their overall development and health [9].

Fitball aerobics are exercises on special inflatable balls, performed to the accompaniment of music. This type of physical activity, unlike traditional methods, helps develop dexterity in children. Aerobics classes help improve endurance, flexibility and coordination, strength, speed-strength qualities, flexibility and the ability to maintain balance, which is especially important for 5-6-year-old preschoolers [1, 7].

Low physical activity negatively affects the physical fitness of both boys and girls [11].

It is important to note that flexibility, which is one of the main physical qualities, depends on various factors, such as the condition of the muscles and ligaments [3].

About 52.7% of schoolchildren have insufficient physical activity, and the majority limit themselves only to physical education lessons. Only 43.3% of primary schoolchildren are actively involved in physical activity at least 2–2.5 hours a day [2].

The behavioral activity of parents in matters of physical education and health is at a low level. Most of them do not pay due attention to their health, and their lifestyle does not correspond to the principles of a healthy lifestyle. As a result, children do not see a positive example and often adopt their parents' negative attitudes towards health and physical activity. This can lead to the development of similar behavior in the child, which in the future will have a negative impact on his physical development and health [8].

Purpose of the study: comparative assessment of the main indicators of the physical qualities of children brought up in preschool educational organizations built from different building materials.

Materials and methods. The study involved 326 preschool children (156 girls and 170 boys) aged 5 and 6 years. All examined children were divided into 3 groups: 1st and 2nd group – pupils of preschool educational institutions, whose buildings were built, respectively, from metal structures (MS) and reinforced

concrete (RC); Group 3 (control) - included children raised in preschools built from burnt bricks (BBC). The level of physical fitness of children was studied, which is characterized by a set of developed motor skills and basic physical qualities, assessed based on the results of 9 control tests, widely used in practice. The technique or characteristics of tests used to determine the level of physical fitness of preschool children are implemented as follows: speed qualities (speed of movement) - running time from the start of a 30-meter distance, speed-strength qualities (endurance, reaction speed, agility, coordination of movements) - time to run a distance of 3x10 m, strength endurance of the muscles of the shoulder girdle - time to hold weights in the hands in a horizontal position, strength endurance of the back muscles - time to hold the torso in a horizontal position position with hands behind head, coordination of movements, eye and accuracy - the number of times a tennis ball hits a target (5 attempts) located at a distance of 6 meters from the child, coordination and speed of movements - the number of jumping ropes in 60 seconds, speed-strength qualities (strength and speed of movements) - standing long jump distance, speed-strength qualities of the muscles of the shoulder girdle - the number of flexions and extensions of the arms while lying on the floor (push-ups), agility and coordination of movements - the number of rotations of the hoop around the waist in one minute). These tests allow us to determine the physical fitness of children aged 5-6 years and their ability to perform physical exercise in a school environment. Individual assessment of the physical indicators of preschoolers was carried out taking into account the results we obtained in comparison with the control standards established for students in the first grades of general education institutions, as provided for in the current physical education program [6, 10]. Permits were obtained to conduct research work. Statistical processing of research materials was carried out using the application package “Statistika” 6.0 and Microsoft Excel-2016. The work calculated the average value (M) and standard errors (±m). Differences at $p \leq 0.05$ were accepted as statistically significant.

Results and discussion. Analysis of the study results showed that over the course of a year (from 5 to 6 years) there was a decrease in the speed of running a distance of 30 m: in boys of the 1st group - by 0.2 s (2.2%), in girls - by 0.5 s (5.3%); in children of both sexes of group 2 by 0.3 s (4%); in boys and girls of the 3rd group - by 1.9 s (21.8%) and by 1.2 s (13.2%) - respectively ($p<0.01$-0.001). Consequently, the maximum decrease in 30 m running time was observed in children of the control group, i.e. among pupils of preschool educational institutions whose buildings were built of burnt brick (Table 1).

Table 1

Average results of the 30 m run test in children raised in preschools made of different building materials

Run 30 m, s									
Age, years	1st group (MS)		2 nd group (RC)		P_{1-2}	3-group (BBC)		P_{1-C}	P_{2-C}
	M	±m	M	±m		M	±m		
boys									
5	9,1	0,27	7,7	0,37	^^	8,7	0,35	-	^
6	8,9	0,38	7,4	0,21	^^^	6,8***	0,33	^^^	-
girls									
5	9,4	0,26	8,6	0,68	-	9,1	0,30	-	-
6	8,9	0,29	8,3	0,41	-	7,9**	0,21	^^	-

*Note: * - difference in indicators between children 5 and 6 years old; ^ - difference in indicators between children of groups 1, 2 and 3; ^ * - p<0.05, ^^ ** - p<0.01, ^^^ *** - p<0.001*

A comparative analysis of running speed over a distance of 30 m showed that the worst results were observed among children raised in preschool educational institutions, whose buildings were built from metal structures. Reliably significant differences were revealed between the indicators of children in the control group and the indicators of preschool children of groups 1 and 2 (p<0.05-0.001).

Gender differences were observed in running speed over a distance of 30 m. Boys had better results compared to their peers, but the maximum gender differences were found in groups 2 and 3 (11-14%).

Considering the parameters of the shuttle running test at a distance of 3*10 m, it was possible to identify differences depending on age and gender. Over the course of a year, an improvement in the speed of shuttle running over a distance of 3×10 m was noted: in boys of 3 groups the decrease was 6.6-14.6% (p_{MS5-6}<0.001; p_{RC5-6}<0.01; p_{BBC5-6}< 0.001) and in girls – by 8.6-11.9% (p_{MS5-6}<0.05; p_{BBC5-6}<0.001). The maximum improvement in shuttle running speed over a distance of 3×10 m was found in children of the control group (Table 2)

The endurance test of the 3*10 m shuttle run test showed that the average results of time spent among 6-year-old children between the 2nd and control groups have significant differences (p<0.05-0.001).

Thus, an analysis of the obtained data on the endurance of shuttle running at a distance of 3 * 10 m showed that the worst results were observed among children brought up in preschool educational institutions whose buildings were built of reinforced concrete.

Table 2

Average indicators of shuttle running 3*10 m in children raised in preschool educational institutions built from different building materials.

Shuttle run 3*10 m, s									
Age, years	1st group (MS)		2 nd group (RC)		P_{1-2}	3-group (BBC)		P_{1-C}	P_{2-C}
	M	±m	M	±m		M	±m		
boys									
5	13,4	0,54	13,7	0,59	-	13,0	0,31	-	-
6	11,9***	0,37	12,8**	0,32	-	11,1***	0,32	-	^^^
girls									
5	13,3	0,58	14,0	0,78	-	13,4	0,26	-	-
6	12,0*	0,22	12,8	0,37	-	11,8***	0,30	-	^

*Note: * - difference in indicators between children 5 and 6 years old; ^ - difference in indicators between children of groups 1, 2 and 3; ^ * - p<0.05, ^^ ** - p<0.01, ^^^ *** - p<0.001*

It was revealed that in the studied age groups, boys had better performance compared to their peers, but the maximum differences were found in the 2nd and third groups (by 2-6%).

The noted increase over the year (from 5 to 6 years) in indicators of strength endurance of the shoulder girdle and back in children of both sexes, regardless of preschool education, ranged from 5.5 to 15.7 s, p5-6<0.05-0.001 and from 4.6 to 23.9 s, p5-6<0.001, respectively. The maximum increase over the year in indicators of strength endurance of the shoulder girdle and back was noted among pupils of preschool educational institutions, whose buildings were built from metal structures and baked bricks (Fig. 1, 2).

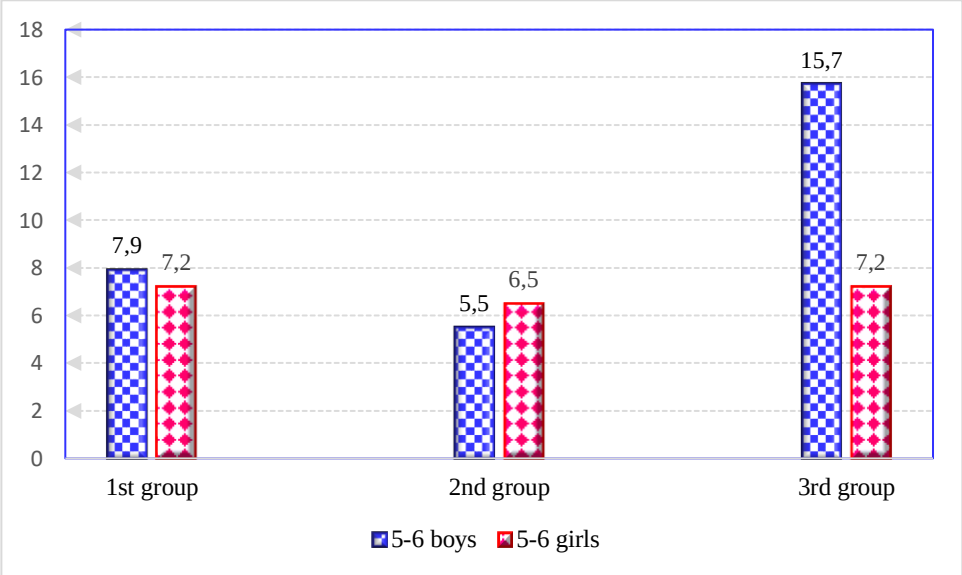

Figure 1. Improvement in the indicator of strength endurance of the muscles of the shoulder girdle in 5-6-year-old preschool children, built from various building materials, during the year, p.

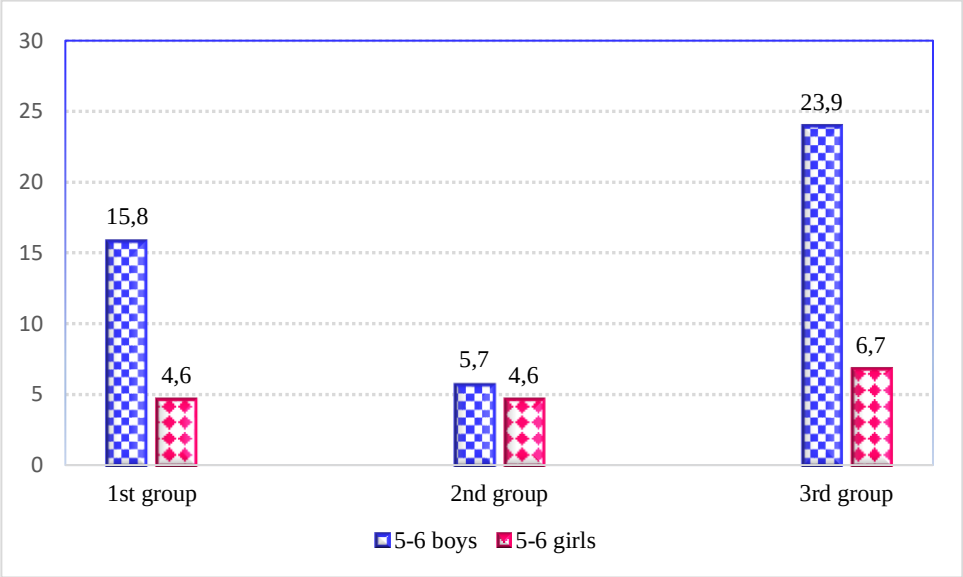

Figure 2. Improvement in the indicator of strength endurance of the back muscles in 5-6-year-old preschool children, built from various building materials, over the course of a year, with

Tests to measure agility, accuracy, coordination and speed of movement included exercises such as throwing a tennis ball at a target, jumping rope, standing long jump, push-ups and twirling a hula hoop. These tests were performed by children with great difficulty or were not possible at all. Thus, out of 6 proposed attempts, only 9.76% of children had the number of successfully executed tennis ball throws equal to 3 (Fig. 3).

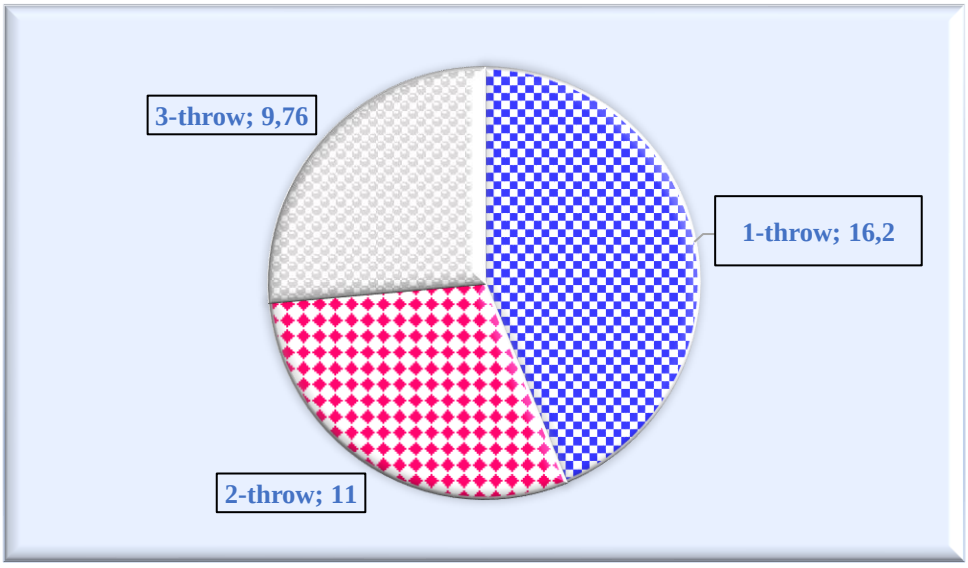

Figure 3. The number of results of children aged 5 and 6 years old, raised in preschools, built from various building materials, on the test for throwing a tennis ball at a target, %.

The results of the study among children aged 5 and 6 years were compared with control standards established for students in the first grades of general education institutions [11]. It was revealed that the improvement in the results of

jumping rope over the examined period in children of the three groups ranged from 61.5 to 95.2%; this, in our opinion, is associated with a significant improvement in test results at 6 years of age (p5-6<0.001) . The maximum improvement in jumping rope results was found among preschool children whose buildings were built from metal structures (Table 3).

Table 3

Average jump rope test results for children raised in preschools made from different building materials.

Jumping rope, number of times									
Age, years	1st group (MS)		2 nd group (RC)		P_{1-2}	3-group (BBC)		P_{C-1}	P_{C-2}
	M	±m	M	±m		M	±m		
boys									
5	1,4	0,6	0,1	0,07	^	0,4	0,23	-	-
6	7,6***	0,37	2,1***	0,51	^^^	4,4***	1,01	^^	^
girls									
5	0,7	0,31	1	0,76	-	1,7	0,74	-	-
6	9,6***	0,64	2,6	0,83	^^^	4,8	1,51	^^	-

*Note: * - difference in indicators between children 5 and 6 years old; ^ - difference in indicators between children of groups 1, 2 and 3; ^ * - p<0.05, ^^ ** - p<0.01, ^^^ *** - p<0.001*

Gender differences were observed in jumping rope; girls had better results compared to their peers, but the maximum gender differences were found in groups 1 and 2 (21-90%).

The conducted studies indicate the need to continue research to identify optimal conditions that promote the development of physical qualities in children, depending on the building materials of institutions.

Conclusions.

1. Analysis of the research results showed that the design features of the buildings in which children are raised have a significant impact on their physical fitness. The most pronounced negative results were recorded among pupils of preschool educational institutions built from metal structures and reinforced concrete.

2. The results of studying running speed showed that over the course of a year from 5 to 6 years, the maximum decrease in the time of running 30 m and shuttle running was noted in children of preschool children in baked brick buildings.

3. Boys in the age group of 5-6 years show better results in running speed, strength endurance of the shoulder girdle and back than girls, which requires additional attention to girls' training methods and indicates the need to take into account gender aspects when organizing children's physical activity.

4. From the above studies, it becomes clear that building material has an impact on the level of physical fitness of children.

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