

Effect of motor activity on physical readiness indicators of preschoolers with visual impairment

LYUDMILA VOLOSHINA¹, VICTOR KONDAKOV², EVGENIYA KOPEIKINA³, VLADIMIR POTOP⁴,
VICTOR MANOLACHI⁵

^{1,2,3} Belgorod State National Research University, Belgorod, RUSSIA

⁴ Department of Physical Education and Sport, University of Pitesti, ROMANIA

⁵ State University of Physical Education and Sport, REPUBLIC OF MOLDOVA

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Abstract.

The purpose of the study. To evaluate the effectiveness of game programs and technologies that ensure the variability of physical education system of preschoolers with amblyopia and strabismus, according to the criteria of their influence on the optimization of motor activity and the level of physical readiness of children. **Research methods:** pedometry, timing, heart rate monitoring, physical readiness testing. **Organization of the research.** The study was conducted from February to June 2021. It involved 42 preschoolers aged 5-7 years attending corrective groups of Belgorod preschool institutions. **Results of the research and discussion.** A comparative analysis of the indicators of physical development of the preschoolers with limited health opportunities who participated in the experiment revealed positive dynamics. All children recorded an increase in all indicators, however, significant changes were not noted in the indicators of flexibility. For all other parameters, there is a significant increase ($p \leq 0.05$ according to the Student's t-criterion). The only indicator, the growth of which has occurred only due to the natural growth of the child, was observed for girls in 30 m sprint. (7.39%). Among the boys this indicator is at the lower limit of the "good" rating (10.22%) and these improvements occurred due to natural growth and motor activity, i.e. not under the influence of physical exercises. It should be noted that for all other indicators there was an increase due to the effective use of physical exercises. A high increase was obtained in tests related to the manifestation of coordination and, to a lesser extent, with speed and strength qualities. Significant gender differences can be noted only in terms of flexibility. Thus, boys lag significantly behind girls in this test (an increase of 15.61% and 52.74%, respectively). **Conclusion.** Thus, game programs and technologies were a system-forming factor in the construction of a variable system of physical education for preschoolers with limited health opportunities. Our emphasis on the unity of group and individual strategies for the implementation of game programs, a personality-oriented approach ensured the improvement of the practice of physical education of preschoolers with amblyopia and strabismus; contributed to the enrichment of motor-gaming experience, increased physical readiness; contributed to the transformation of the nature and content of organized forms of physical education and independent motor activity of preschoolers and optimization of motor modes.

Key Words: motor activity, physical readiness, preschoolers with limited health opportunities, variable system of physical education, game programs

Introduction.

A relevant and not completely solved problem in the creation of a variable system of physical education for preschoolers is its orientation on regulation of the child's motor activity. The problem of children's motor activity regulation becomes more acute in the context of the implementation of personality-oriented and system-active approaches, of the growth of hyper- and hypo-activity and of the decrease in health indicators (Yumashev et al. 2021; Osipov et al. 2021; Jun & Yanling 2021). In modern national and foreign studies, it is noted that the optimal motor conditions have a positive effect on strengthening the health, the physical development and physical improvement of a growing person. The same positive effect is visible on the achievement of the makings of motor-gifted children, the correction of problems related to the motor and social development of children with limited health opportunities and on the organization of meaningful recreation. (Cavadini, Richard, Dalla-Libera & Gentaz 2021; Abramova et al. 2021; Lundy & Trawick-Smith 2021; Vazou, Long, Lakes & Whalen 2021).

According to I.A. Arshavsky (1982), the theory of personal growth of a child is based on the energy rule. Therefore, during the process of designing the basic program of physical education and personal growth of a preschool child, involving the sequence and continuity of the goals, content, implementation technologies and expected results of this program, we must clearly distinguish such criteria for its evaluation as optimality and rationality of child's motor activity (both organized and independent ones) in the day time.

Unfortunately, the orientation of modern preschool education towards the descriptive methods of evaluation of the results of basic educational program mastering, affects in a negative way the objectivity of assessing the motor activity of children. Such indicators as the total time of motor activity in the preschool child's day time give very generalized ideas about the organization of the optimal motor mode and ways to regulate it (Díaz et al. 2020; Sánchez-Lastra, Martínez-Lemos, Díaz, Villanueva & Ayán 2020).

We developed the author's idea of building a variable system of physical education based on game programs and technologies, along with the criteria of completeness and consistency of the motor activity content and the integrity of the process of socialization-individualization of children in motor and gaming activities. We focused on the criterion of optimality (in accordance with the possibilities of age and health) of the volume, time and intensity of motor activity of preschoolers during the day. The analysis and assessment of implementation degree of this criterion allows to establish the relationship of the results of the physical readiness of the child obtained during the introduction of game programs and technologies with the factors affecting them.

The purpose of the study. To evaluate the effectiveness of game programs and technologies that ensure the variability of physical education system of preschoolers with amblyopia and strabismus, according to the criteria of their influence on the optimization of motor activity and the level of physical readiness of children.

Material and methods

The study was conducted from February to June 2021. It involved 42 preschoolers aged 5-7 years attending corrective groups of Belgorod preschool institutions. Research methods: pedometry, timing, heart rate monitoring, physical readiness testing.

Statistical analysis. The statistical analysis of the obtained data was carried out using licensed Microsoft Excel (2016). The indicators of the descriptive statistics (arithmetic mean, standard deviation, and average error) were determined. The reliability of the differences in values was evaluated by means of Student's t-criterion. The difference was considered reliable at $p < 0.05$.

Results

The processes of destruction of the children play space, the problematic regulation of motor modes, the search for ways to update the stereotypes of physical education of preschoolers in terms of personality-oriented and system-active approaches have become prerequisites for the design and scientific substantiation of game programs and physical education technologies for motor-gifted children and children with limited health opportunities.

The personality-oriented approach, the conventional nature of modern education, the requirements of the Federal State Educational Standard of preschool education suggest the possibility of constructing the content of the variable part of the educational field "Physical development" of the main educational program. Prognostic activity at the ascertaining stage of experimental work, within the framework of the project, assumed, taking into account the identification of existing problems of motor activity regulation, the creation of a variable system of physical education based on game programs and technologies. Creating it, we were guided by the definition of P.K. Anokhin: "... a system can be called only a complex of such selectively involved components, in which interaction and relationship take on the character of mutual interaction to obtain a focused useful result" (Anokhin 1978).

With regard to the developed scientifically based game programs and game technologies of physical education for motor-gifted children and preschoolers with limited health opportunities, the system-forming factors are the objective requirements of the state, society and the preschool education system for the physical culture of a growing person, his physical conditions: i.e., physical readiness, motor activity, as an energy base, optimal level of physical development and health of a preschooler (Voloshina, Kurilova, Usacheva, Bovinova 2020).

The effectiveness of game programs and technologies is due to the age capabilities and needs of the child, the presence of targets and objectives that concentrate the orientation towards the humanistic personality in the modern preschool education:

- support of individual expressions of the child's personality in motor and play activities;
- self-realization of his spiritual and physical abilities;
- the integrity of the spiritual, moral, intellectual, social and physical health of the preschooler.

The psychological and pedagogical mechanisms for achieving the stated goals are ensured by the presence of a clear structure in the variable game programs and the selection of available content and algorithms for implementation. They take into account the particularities and patterns of the process of creating the children's motor experience and improving their motor abilities, with focus on integrating the processes of learning, upbringing, development, correction, recovery and socialization of children's personality.

The interaction of "teachers-parents-children", "younger children - elder children", implemented in the process of mastering the motor-game experience by children, is one of the most effective means of broadcasting the value of sports games, social norms and attitudes, the transfer of skills, and in the future, stimulating independent motor activity.

In the presence of a rationally organized spatial-subject environment that provides motor activity, pedagogical support from adults, the kindergarten territory becomes a space of activity and personal growth of children. Group and individual strategies embedded in the technology of implementation of physical education game programs have determined the need to find conditions for the disclosure of individual abilities and motor endowment, positive moral qualities of children's personality, improvement of their psycho-emotional, physical and personal health potentials, also the satisfaction of their biological need for movement. In our previous studies we have proved the positive impact of gaming programs and technologies on the enrichment of children's motor-gaming and social experience (Voloshina, Musanova 2012; Voloshina, Kondakov, Kopeikina & Voloshina 2020; Kondakov, Voloshina, Kopeikina & Kadutskaia 2020). At this stage, let it focus on the analysis of the results and its impact on the optimization of motor activity of preschoolers in relation to indicators of physical development (Table 1).

Table 1. Dynamics of physical readiness indicators of 5-6-year-old children with amblyopia and strabismus.

| indicators | girls | | | boys | | |
|--------------------------------------------------|-----------------|-----------------|---|-----------------|-----------------|---|
| | before m ± m | after m ± m | p | before m ± m | after m ± m | p |
| running 30m (sec) | 2.72±0.08 | 2.53±0.08 | * | 2.71±0.06 | 2.44±0.05 | * |
| standing long jump (cm) | 88.82±6.33 | 104.0±6.07 | * | 84.29±3.51 | 102.29±4.81 | * |
| long distance throwing of the ball (m) | 5.03±0.40 | 6.67±0.49 | * | 6.36±0.58 | 7.81±0.57 | * |
| target throwing of the ball (number of hits) | 0.27±0.14 | 0.73±0.19 | * | 0.64±0.23 | 1.50±0.20 | * |
| throwing and catching the ball (number of times) | 18.45±3.57 | 38.36±4.85 | * | 21.86±3.92 | 33.29±6.77 | * |
| flexibility (cm) | 5.36±1.74 | 7.36±1.87 | | 2.43±0.72 | 3.29±0.98 | |
| balance (sec) | 16.0±1.42 | 23.18±2.16 | * | 11.86±2.27 | 18.64±2.54 | * |
| Pedometry (number of steps) | 12959.99±286.66 | 16914.21±266.16 | * | 11720.17±360.70 | 15854.60±315.66 | * |

* - reliability of differences according to the Student's t-criterion

A comparative analysis of the indicators of physical development of the preschoolers with limited health opportunities who participated in the experiment revealed positive dynamics. All children recorded an increase in all indicators, however, significant changes were not noted in the indicators of flexibility. For all other parameters, there is a significant increase ($p \leq 0.05$ according to the Student's t-criterion).

Assessing the increase in physical readiness indicators of the children of this age and the degree of influence on this increase of the purposeful work on mastering the content of the adaptive partial program "Play for health" in the conditions of a variable system of physical education of preschoolers, it is necessary to take into account the sensitive periods of development of physical qualities and also the likelihood of improvement of these indicators due to natural growth. The simplest way to determine the growth rate of indicators of physical qualities is calculated according to V.I. Usakov's formula of the growth of physical qualities:

$$W = \frac{100 * (V2 - V1)}{(V1 + V2)/2}$$

Where W is the growth rate of indicators of physical qualities (%);

V1 – the initial level;

V2 is the final level.

Interpretation:

up to 8 - Unsatisfactory - Due to natural growth

8-10 - Satisfactory - Due to natural growth and growth of natural motor activity

10-15 - Good - Due to natural growth and a purposeful system of physical education

Over 15 - Excellent - Due to the effective use of natural forces of nature and physical exercises

The result allowed to determine the effectiveness of the experimental work in preschool physical education and give it a rating (Fig. 1).

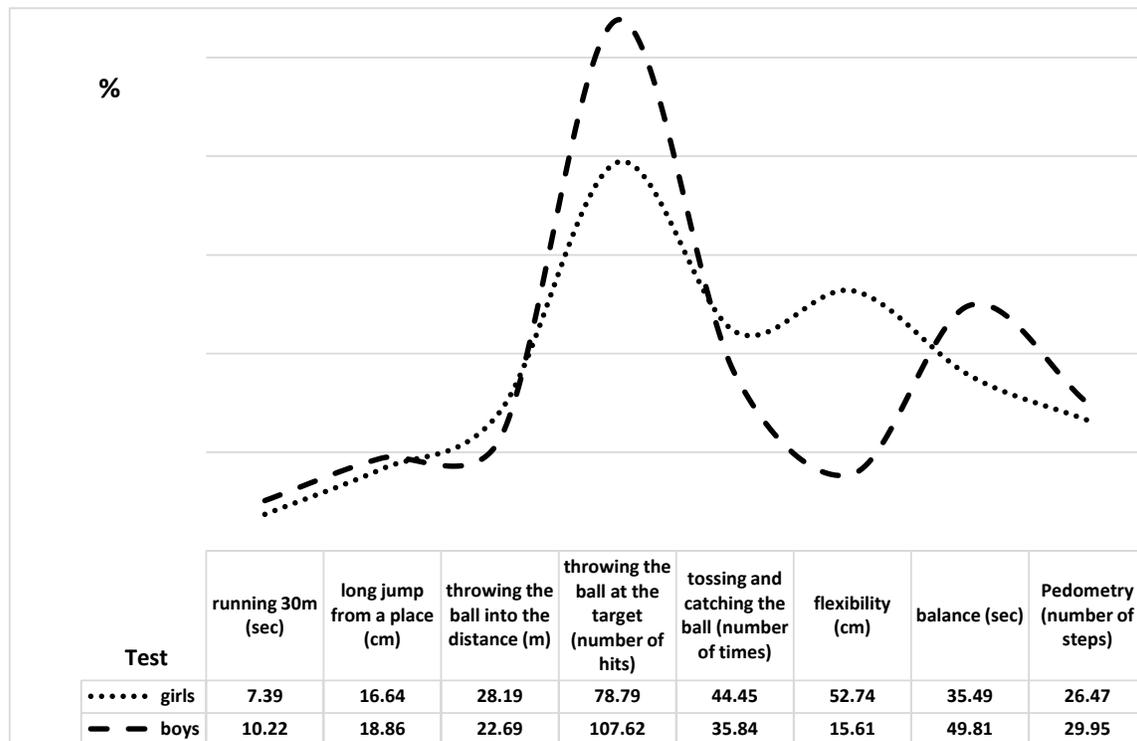


Figure 1. The growth indicators of physical readiness of preschoolers with limited health opportunities (%).

The only indicator, the growth of which has occurred only due to the natural growth of the child, was observed for girls in 30 m sprint. (7,39%). Among the boys this indicator is at the lower limit of the "good" rating (10.22%) and these improvements occurred due to natural growth and motor activity, i.e. not under the influence of physical exercises.

It should be noted that for all other indicators there was an increase due to the effective use of physical exercises. A high increase was obtained in tests related to the manifestation of coordination and, to a lesser extent, with speed and strength skills. Significant gender differences can be noted only in terms of flexibility. Thus, boys lag significantly behind girls in this test (an increase of 15.61% and 52.74%, respectively).

Discussion

Regulation of motor activity of preschoolers is quite an urgent problem for scientists in many countries of the world (Sosunovsky & Zagrevskaya 2020; Zakaria, Hasan & Md Radzi 2020; Schwarzfischer et al. 2020; Koipysheva & Lebedinskiy2020). Thus, in their articles Lemos, L. et al. (2021) studied the relationship between physical readiness and the nature of the daily motor activity of preschoolers.

Bezerra, T.A. et al. (2020) confirmed the effect of daily activity on the health and commitment of preschoolers to a healthy lifestyle.

The results of our study confirm the conclusions of Tortella, P. et al. (2019) that specially organized outdoor games have a significant impact on the motor activity of the children of 4-5 years old, compared with independent ones.

We believe that game programs and technologies have contributed to stimulating and optimizing the volume of motor activity of preschoolers with amblyopia and strabismus. These conclusions coincide with the opinion of Kyhälä, A.-L., Reunamo, J. & Valtonen, JO. (2021), who justified recommendations for teachers of preschool education in Finland on the need to include physical exercises in various activities of children in order to increase their motor activity.

Connelly, J.-A., Manningham, S. & Champagne, M. (2021) studied the factors determining the nature and level of motor activity of Canadian preschoolers during outdoor games in children's institutions. They proved that the most important moment affecting the nature and level of motor activity of Canadian preschoolers is their encouragement and participation in the daily program of outdoor games.

Our studies prove the relationship between the indicators of motor activity and the physical readiness of preschoolers with visual impairments.

Conclusion

Thus, game programs and technologies were a system-forming factor in the construction of a variable system of physical education for preschoolers with limited health opportunities. They provide:

- updating of the process of physical education of children with limited health opportunities;
- positive influence on the regulation of motor activity and indicators of physical fitness;
- activation of independent motor activity of the child and interaction of different ages.

As a result, the methodological principle of unity of goals, tasks, substantive and procedural components, expected results of physical education of preschoolers in a variable system of physical education is implemented. Our emphasis on the unity of group and individual strategies for the implementation of game programs, a personality-oriented approach, ensured the improvement of the practice of physical education of preschoolers with amblyopia and strabismus; contributed to the enrichment of motor-gaming experience, increased physical readiness; contributed to the transformation of the nature and content of organized forms of physical education and independent motor activity of preschoolers and optimization of motor modes.

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