



ISSUES OF REGULATING CHILDREN'S MOTOR ACTIVITY IN MODERN PRESCHOOL EDUCATION

Lyudmila N. Voloshina^{1*}, Victor L. Kondakov², Evgenia N. Kopeikina³, Olga G. Galimskaia⁴

^{1,2,3}Federal State Autonomous Educational Institution of Higher Education "Belgorod State National Research University" (NRI BelSU), Belgorod, Russia, ⁴Regional State Autonomous Educational Institution of Advanced Professional Education "Belgorod Institute of Educational Development" (RSAEI APE "BelIED"), Russia.

Email: ^{1*}voloshina_l@bsu.edu.ru, ²kondakov@bsu.edu.ru, ³kopeikina@bsu.edu.ru, ⁴galimskaya_og@beliro.ru

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Abstract

Purpose: The objective of the research is to determine the volume and intensity of motor activity of children aged 5-6 years, identify existing problems of motor activity at this age and compare the results with age norms.

Methodology: study and comparative analysis of psychological and pedagogical literature on the topic; pedometry, pulsometry, timing, statistical processing of the results.

Result: The calculation of average daily indicators of pedometry revealed that boys, on average, perform 10789.26 ± 426.15 steps, and girls - respectively 13094.64 ± 511.83 steps. At the same time, boys had significantly lower indicators of pedometry than girls ($p \geq 0.05$). Analysis of the ranking results and comparison of the data obtained with the age norm, which is 11-15 thousand steps per day, suggests that 52.6% of boys perform the norm, and 47.4% of the average daily physical activity is below the norm. Motor activity in 80% of girls is within the age norm, in 10% - above the norm, and in 10% - below the norm. The intensity of daily loads in terms of pulsometry both in boys and girls corresponds to low and medium intensity.

Applications: This research can be used for universities, teachers, and students.

Novelty/Originality: In this research, the model of issues of regulating children's motor activity in modern preschool education is presented in a comprehensive and complete manner.

Keywords: physical education, preschool education, motor activity, volume, intensity, assessment of motor activity, regulation of motor activity, motor experience.

INTRODUCTION

The problem of regulating the motor activity of a growing person becomes social in modern educational space. Numerous studies show that the development of children in modern conditions is closely related to the phenomena of physical inactivity, hyperactivity, and increased psycho-emotional stress on the human body (Voloshina et al. 2018; Ericsson 2011).

Hyperactivity, hypodynamia, overweight, stress, bad habits, etc., slowly and imperceptibly affecting a growing person's body, cause imbalances between the body and the natural social environment, lead to serious diseases of the cardiovascular system, metabolic disorders and especially impairments of the musculoskeletal system (MSS). It is known that 30-40% of preschool children constitute a risk group for the development of mental disorders. During the beginning of schooling, these indicators worsen. The prevalence of chronic diseases increases, the number of children assigned to health groups I and II decreases, the occupancy rates of health groups III and IV increase. Boys have more severe adverse health than girls (Yakovlev, 2014, 275-278).

Such changes entailed such phenomena observed by modern psychologists and educators as a later compared to previous generations, readiness for learning, androgenization and juvenilization of the younger generation, an increasing number of children with dominant right hemisphere activity, increased anxiety and decreased stamina, a shift in daily rhythm to the "night owl" lifestyle, etc.

Children need optimal motor activity. It must both satisfy the biological need of a growing organism for movements and correspond to the abilities and interests of the child, ensures harmonious physical development, the formation of various motor properties (strength, endurance, speed, agility). In modern conditions of the individualization of preschool and primary general education, the scientific substantiation of the motor regimes of hyper and hypo-active children, children with disabilities, and motor-gifted children become popular. All of the above determines the relevance of the research at the scientific-theoretical level. The search for group and individual strategies for building a variable system of physical education and the development of a growing person, subject to the age and individual characteristics, the level of physical activity puts a premium on the need for a comprehensive study of the physical activity of a growing person in the modern educational space in terms of an interdisciplinary approach. Successful solutions to the problems of motor activity regulation can be achieved only by the combined efforts of the state, science, public organizations, educators, teachers, and the children themselves.

The study of publications by foreign researchers has shown that high interest is caused by the development of developmental programs, issues of optimizing motor activity, subject to the social factors that characterize the educational

process in specific countries. At present, assessment of the existing physical activity of modern children is of great practical significance in order to improve the principles of its rationing and determine the “minimum-maximum” that is necessary to ensure the harmonious physical development of the child (Hacke et al. 2019; Niemisto et al. 2019; Guo et al. 2018).

Unfortunately, modern standards (FSES PSE, FSES PGE) and exemplary educational programs of pre-school education and primary education, SanPin do not set guidelines for regulating a child’s daily physical activity (its volume and intensity, taking into account age and individual characteristics, health, and needs).

SanPin sets a generalized weekly rate for older preschoolers. Children should move 6-8 hours a week. This clearly contradicts the age possibilities and previous approaches in domestic preschool education to rationing the volume, intensity, time, and motor loads. For comparison, we shall cite the fact that the educational program “Istoki” recommend doing 10-13.6 thousand conventional steps, duration - 240-250 minutes (more than 4 hours), with the intensity of up to 46-52 movements per minute at the age of five years, during the period of stay in a preschool institution. The natural motive need for outdoor games during a walk corresponds to approximately 1500-2000 locomotion per hour.

The absence of age-related norms of motor activity of children of different nosological groups, considering the age and individual psycho-physiological features, does not allow for medical and pedagogical control over its volume and intensity. The system-forming factor of physical education at this age level should be the satisfaction of the natural biological need for movement. For this purpose, scientific recommendations and developments are needed to solve the problem of controlling motor activity.

The objective of the research is to determine the volume and intensity of motor activity of children aged 5-6 years, identify existing problems of motor activity at this age and compare the results with age norms.

METHODS

The study involved 95 boys and 80 girls aged 5-6 years, attending MADOU nursery school No. 69 “Skazka”, MBDOU nursery schools No.57 and 64 of Belgorod. Research methods: study and comparative analysis of psychological and pedagogical literature on the studied problem; pedometry, pulsometry, timing, statistical processing of the results.

RESULTS AND ITS DISCUSSION

The calculation of average daily indicators of pedometry revealed that boys, on average, perform 10789.26 ± 426.15 steps per day, and girls - respectively 13094.64 ± 511.83 steps per day. At the same time, boys had significantly lower indicators of pedometry than girls ($p \geq 0.05$). Analysis of the ranking results and comparison of the data obtained with the age norm, which is 11-15 thousand steps per day, suggests that 52.6% of boys perform the norm, and 47.4% of the average daily physical activity is below the norm. Motor activity in 80% of girls is within the age norm, in 10% - above the norm, and in 10% - below the norm.

The intensity of daily loads in terms of pulsometry both in boys and girls corresponds to low and medium intensity. The intensity of physical activity is assessed by pulsometry and is recorded using a fitness bracelet (Lerbyee Fitness tracker K1) (Figure 1, Figure 2), and by the number of locomotion performed per unit of time (steps per min) (Table 1).

Table 1: Intensity indicators of motor activity

Time interval	STEPS				average heart rate			
	girls		boys		girls		boys	
	M ± m		M ± m		M ± m		M ± m	
a day	13094,64	± 511,83	10789,26	± 426,15	101,1	± 0,41	99,90	± 0,26
physical class in a children educational institution	1246,68	± 145,07	1154,11	± 152,73	124,43	± 1,68	112,79	± 2,30
a minute of physical class in a children educational institution	20,78	± 2,42	19,24	± 2,55				
training session	1305,65	± 338,88	1291,75	± 204,43	108,91	± 3,12	112,64	± 4,83
a minute of training	21,76	± 5,65	21,53	± 3,41				
walk (Mon.-Fri.)	1262,18	± 943,25	958,92	± 78,63	105,03	± 1,76	99,74	± 4,88
a minute of walk	21,04	± 15,72	15,98	± 1,31				

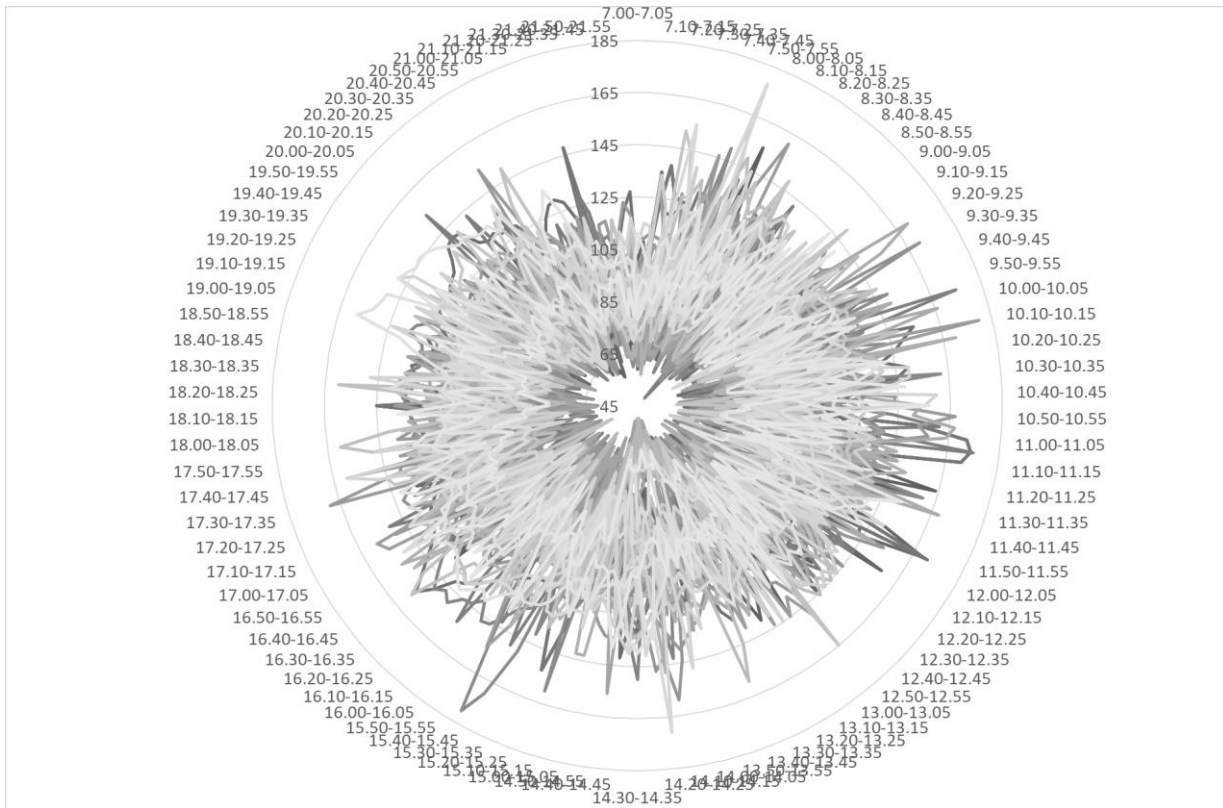


Figure 1: 24-hour heart rate in girls.

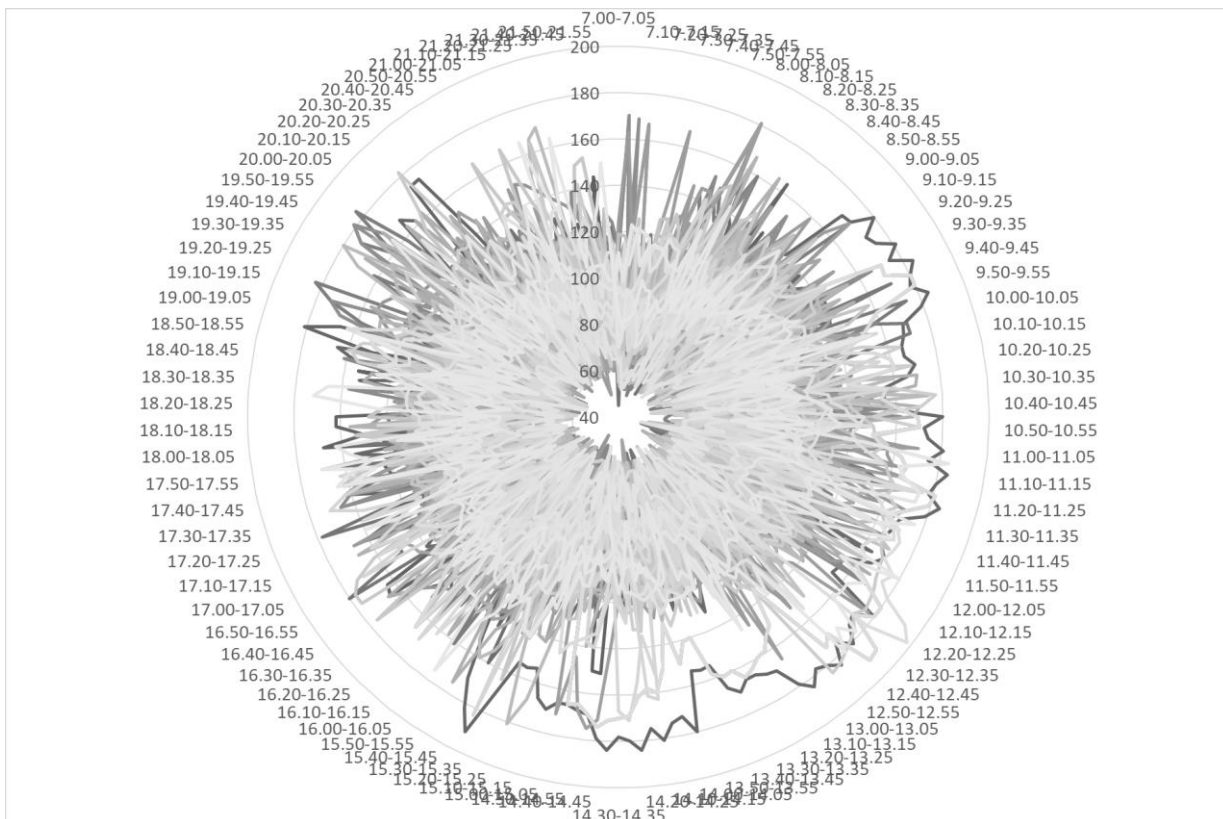


Figure 2: 24-hour heart rate in boys.

Analysis of the results of daily pulsometry suggests that the intensity of daily loads in boys corresponds mainly to the modes of low and medium intensity (pulse increase to 160 beats per minute). Accordingly, in girls, the intensity of daily loads is mainly low (increase in pulse rate up to 140 beats per minute). At the same time, during the day, only a small number of children experienced high-intensity exercise (an increase in heart rate over 160 beats per minute). It is worth noting that boys prevail among such children.

The average motor activity of nursery school students during the walk is 958.92 ± 78.63 steps in boys, 1262.18 ± 943.25 steps in girls, while the heart rate in boys is 99.74 ± 4.88 bpm, and in girls - 105.03 ± 1.76 bpm. Accordingly, the intensity of physical activity during the walk in boys is 15.98 ± 1.31 steps per minute, and in girls - 21.04 ± 15.72 steps per minute, which does not correspond to the age norms.

The intensity of physical activity in sport classes in preschool institutions and in training in various sports sections for boys ranges from 1154.11 ± 15.73 to 1291.75 ± 204.43 steps, and for girls - from 1246.68 ± 145.07 to 1305.65 ± 338.88 steps, while the heart rate in boys is from 112.64 ± 4.83 to 112.79 ± 2.30 bpm, and in girls - from 108.91 ± 3.12 to 124.43 ± 1.68 bpm. Accordingly, the intensity of motor activity in sport classes in preschool institutions and in training in various sports sections for boys ranges from 19.24 ± 2.55 to 21.53 ± 3.41 steps per minute, and for girls - from 20.78 ± 2.42 to 21.76 ± 5.65 steps per minute, which is significantly below the age norms.

DISCUSSION

A decrease in motor activity and muscular effort depends on many factors. A number of studies connect this problem with social factors ([Aivazidis et al. 2019](#); [Duncan et al. 2019](#); [Engel et al. 2018](#)). Most often are a sedentary lifestyle, comfort that accompanies modern civilization, the development of public and personal transport, the media, changing interests, the emergence of various forms of leisure, excluding physical activity ([Krivolapchuk, 2012](#); [Istoki 2011](#); [Laukkanen et al. 2018](#); [Johnstone et al. 2018](#)).

Innovations developed in the education system and introduced in preschool institutions take into account primarily the various changes that occur in society, in science and technology. At the same time, these innovations in pedagogy neglect the features of epochal transformations affecting the physiological and psychological nature of students. Psychologists and physiologists note a weakening of physical endurance, as well as a decrease in the strength of the nervous system of a modern child.

Attention should be paid to the fact that as a result of scientific and technological progress significant changes occurred in the structure of leisure and in the interests of children. In the context of the variability of education in general and the physical education and development of children, in particular, there is an acute question of the level of demand in movement experience in the life of children acquired during sports classes during childhood. Scientists and practicing teachers have noted the facts of the destruction of the playing space of childhood, the disappearance of fascinating outdoor and sports games from the lives of modern children, which negatively affects their physical activity. This also adversely affects the health, development, socialization of a growing person and actualizes the scientific search for pedagogical approaches, means, technologies, forms of enrichment of motor and gaming experience, which is crucial at this age. For preschoolers, the state of physical inactivity is characterized by a decrease in the functions of all organs and systems, their disordered interconnections in the body. The biological reliability and stability of a child's body with significant functional loads and the effects of adverse environmental factors are reduced, and the body's working abilities are limited. With regard to children, the case is only relative hypodynamia, because a certain amount of motor activity of a child is implemented in daily life in self-motor activity, which is proved by the results of our research. At the same time, insufficient motor activity adversely affects many functions of a growing organism and can serve as a pathogenetic factor in the occurrence and course of a number of diseases. Insufficient physical activity of children adversely affects the development and functional state of the cardiovascular system. Many children, distinguished by normal physical development, show the imperfect activity of some functions, a decrease in physical performance, which is caused by pronounced physical inactivity.

All the above indicates the demand for a new concept and strategy for regulating the motor activity of a growing person as an urgent scientific and national challenge. The motor activity should contribute to the extensive harmonious development of the child. First of all, it is optimal to influence physical and mental development, to strengthen health, to ensure working capacity in subsequent periods of a person's life.

The author's project "A comprehensive study of the motor activity of a growing person under a variable system of physical education", supported by the Russian Foundation for Basic Research, involves solving this fundamental scientific task.

CONCLUSION

1. Analysis of modern studies has shown that the lack of implementation of the need for physical activity leads to a decrease in mental performance, and significantly affects both the physical and the mental state of the child. It is extremely important to eliminate the problems identified in the studies, namely the existing deficit in 47.4% of boys' and 10% of girls' physical activity and its regulation in hyperactive children. This, in turn, brings to the fore the problems of determining the "minimum - maximum" volume, the intensity of motor activity, subject to the age, health, and individual typological characteristics of motor status.
2. One should consider the fact that the average indicator of the volume of physical activity of children during extended activities in the sports sections is higher than in sport classes in the preschool institution.

3. We think that low and medium daily intensity of physical activities has virtually no developing and training effect during sports classes, in sports sections and in independent motor activity.
4. We believe that the problem of optimizing physical activity at this age level requires additional in-depth study.

Analysis of the results of the research confirms the need for correlation analysis between the indicators of the psychophysiological development of children and their motor activity. It requires further study using the observation method of independent motor activity in order to determine the prospects for modeling the adaptation concept of controlling the motor activity of a growing person.

Age norms of motor activity of preschool students, starting with early childhood, require clarification and scientific justification.

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