

## Checking the effectiveness of the method of conducting physical education classes with 17-19 -year-old female students of special medical group

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### Abstract

The article is aimed at investigating the influence of the method of conducting physical education classes on the development of motor abilities and morphofunctional abilities of 17-19-year-old female students with health disorders who are referred to special medical groups. Participants: 34 female students of the Khmelnytskyi humanitarian-pedagogical academy, who belong by their health status to the special medical group. **Methods:** analysis of normative documents, training programs, scientific and methodical sources; pedagogical experiment; pedagogical observation; methods of mathematical statistics. To determine the initial level of physical abilities of female students, the testing method was used. Evaluation of the morphofunctional condition of female students used the technique that provided results in the following indices: vital; Robinson index; Ruffier-Dickson test; Stange test; BMI body mass index. **Results.** It has been proved that the proposed method of conducting classes promotes gradual development of the female students' respiratory system. The analysis of the dynamics of the Stange test shows improvement of indicators from  $23.4 \pm 2.6$  to  $36.5 \pm 2.9$ , which corresponds to the development of the respiratory system from poor to normal levels of an adult. The dynamics of indicators of Ruffier-Dickson test from  $13.8 \pm 1.5$  to  $9.2 \pm 1.5$  indicated improvement in the physical performance of heart from poor to satisfactory levels. The recovery time after physical exercises increased significantly from  $127.0 \pm 4.2$  to  $112.0 \pm 3.6$ , confirming the positive changes in the functioning of the cardiovascular and respiratory systems of female students with disabilities. Body mass index and indicators of life index showed the presence of excess weight of the subjects. During the experiment, these indicators gradually improved, but it was possible to reach the norm only in the first subgroup. The developed method of carrying out of physical-fitness classes has helped to improve the quantitative assessment of female students' energy potential. The change in the Robinson index from  $97.7 \pm 2.04$  to  $90.4 \pm 1.93$  in the first subgroup and from  $101.3 \pm 2.12$  to  $94.6 \pm 2.1$  in the second subgroup indicates the transition from poor functioning of the cardiovascular system to satisfactory level of its functioning. **Conclusions:** The analysis of indicators of physical condition of 17-19-year-old female students of special medical group at the beginning and at the end of the experiment shows that the use of the author's method of conducting physical education classes had a positive impact on the development of their physical abilities. The most significant changes occurred in the development of endurance  $+25.8 \pm 0.73$ , coordination ability  $+11.8 \pm 0.43$ , force endurance  $+9.9 \pm 0.32$ . The indicators of speed development and force significantly improved  $+5.7 \pm 0.19$ ,  $+4.5 \pm 0.17$ . The slightest changes were recorded in the development of flexibility  $+1.4 \pm 0.1$ . The analysis of the dynamics of changes in physical state of 17-19-year-old female students in the first and second subgroups shows positive tendency in the development of physical qualities of female students of both groups. **Key words:** special medical group, female students, method, physical education.

### Introduction.

The training of students with disabilities in the state of health and who study, according to medical examination, in special medical groups occupies important place in the system of physical education of modern youth. Classes in special medical groups are conducted separately from the main training groups (Bodnar, I. 2005). The main tasks for students are: health promotion, hardening of the body and increase of working capacity; mastering motor

skills and abilities; restoration of disturbances of functions of the organism, compensation of some lost functions; instilling knowledge and skills in the use of physical education in the mode of training, work and leisure; acquirement by students of skills in organizing and conducting morning hygienic gymnastics, instructor skills while learning new physical exercises; acquiring the skills of independent physical exercises (Petruk, V. 2012).

At physical education classes with students of the special medical group, teachers adhere to the generally accepted structure of conducting classes. All parts of the class are aimed at solving educational, pedagogical and health-improving tasks, should be organically combined and form a whole (Mozolev, O. 2017). The students of special medical groups need to gain additional knowledge of the following issues: the impact of physical exercises on human health and physical development; the negative impact of bad habits (smoking, alcohol, drugs) on the body and control them; rules and methods of quenching and self-massage; the purpose and content of medical control, its importance for improving health and enhancing physical development; self-control in the process of physical education, its meaning and content; objective self-control data: body weight, height, vitality of lungs, dynamometry; subjective data: sleep, appetite mood, performance; rules of self-control - monitoring of body weight, dietary regime, sleep, heart rate, respiratory rate; characterization of different forms of work activity (mental, physical, mixed); specificity of professionally applied physical training; preparation of students for work activity, teaching them necessary skills and physical qualities: strength, endurance, speed, flexibility, agility (Koryagin, V. 2013).

**Purpose and objectives.** The purpose of the article is to investigate the influence of the method of conducting physical education classes on the development of motor abilities and morphofunctional abilities of 17-19-year-old female students with health disorders referred to special medical groups.

**Objectives:** to evaluate the level of physical condition of female students at each stage of the pedagogical experiment; to verify the level of development of female students' motor abilities with the help of the test system; to analyse the influence of the author's method on the development of morphofunctional capabilities of the female student body and the progress of their motor abilities.

#### **Materials and methods.**

Participants: 34 female students of the Khmelnytskyi humanitarian-pedagogical academy, who belong by their health status to the special medical group. It is completed with people who have abnormalities in the cardiovascular, respiratory and central nervous systems. The experiment participants were divided into two subgroups. The first subgroup included female students with minor health disabilities. The second subgroup included female students who had more complex forms of the diseases or were in the special medical group for a long period of time.

**Organization of the research:** The research work was conducted at the Khmelnytskyi humanitarian-pedagogical academy from September 2018 to October 2019. The research included the following steps:

1. *Theoretical analysis of the problem of the research, establishment of baseline data (September-October 2018).* The objectives of this stage is to analyze the normative and scientific-pedagogical literature, to develop the author's methods for conducting classes with female students of the special medical group, to determine the level of development of physical abilities and morphofunctional potential of female students using the system of tests and the division of students into two subgroups of the group depending on the degree of the disease.

2. *Classes under the guidance of the teacher (October 2018 - June 2019), current pedagogical control (January, June 2019).* The objective of this stage is to establish the dynamics of development of female students' physical abilities and morphofunctional potential, to adjust the curriculum.

3. *Female students' independent classes (July-August 2019), carrying out the final pedagogical control (September 2019).* The objective of this stage is to determine the level of development of physical abilities and morphofunctional potential of female students using the test system, to study the dynamics of their development.

4. *Theoretical analysis of the conducted research (October 2019).* The objectives of this stage is to investigate the influence of the author's method of conducting classes with female students of the special medical group on the dynamics of development of their physical abilities and morphofunctional potential.

**Methods.** To obtain the necessary information, we used general scientific methods of theoretical level of research, namely: analysis of normative documents, training programs, scientific and methodical sources; pedagogical experiment; pedagogical observation; methods of mathematical statistics.

The analysis of normative documents gave the opportunity to get acquainted with educational, organizational and medical requirements of conducting physical education classes with female students of the special medical group. We used the analysis of scientific and methodological sources to study the modern views of teachers, scientists and doctors on the problems of choosing the methods of conducting physical education classes of students with different levels of deviation in the state of health on the basis of health saving (Pryimakov, O., Eyder, E., Tymoszenko, O., Mazurok, N., & Omelchuk O. 2019; Rudenko, R., Mahliovanyy, A., Shyyan, O., & Prystupa, T. 2015). Pedagogical observation was used in the process of conducting classes, obtaining information about the development of motor abilities, developing the content of conducting physical education classes, which takes into account the information about the functional and physical condition of the subjects (Yazlovetsky V. 2004). The methods of mathematical statistics were used to reliably

determine the level of development of motor abilities and morphofunctional potential of female students (Barde, M. 2012; Gurland, J.; Tripathi, RC. 1971).

**Methodology of research.** To determine the initial level of physical abilities of female students, we used the testing method (Mozolev, O., Bloshchynskyi, I., Aliksieiev, O., Romanyshyna, L., Zdanevych, L., Melnychuk, I., Prontenko, K., & Prontenko, V. 2019).

The system of tests that allowed evaluating the level of physical abilities of female students included the study of the following motor abilities:

- 1) speed - running in place for 10 seconds (the number of steps is counted);
- 2) force - bending and extent of the arms based on the bench (30 cm) in the horizontal position (the number of correctly performed push-ups is counted);
- 3) strength endurance - holding the position of the body lying on the forearm "plank" (number of seconds);
- 4) flexibility - leaning the torso forward from the sitting position (number of cm);
- 5) coordination abilities - keeping balance standing on one leg with arms outstretched to the sides (number of seconds);
- 6) total endurance - swimming without time (number of meters) (Dovbysh, V., Klimakova, S. & Delova, E. 2006).

The following control stages were conducted at the end of the fourth, ninth and twelfth months of classes. At each stage of the pedagogical experiment, we evaluated the morphofunctional condition of female students using the technique that provided results in the following indices:

- vital (characterizes the functionality of the respiratory system);
- Robinson index (quantitative assessment of human energy potential);
- Ruffier-Dickson test (determination of physical cardiac performance);
- Stange test (assessment of the respiratory system);
- BMI body mass index (assessment of conformity of body weight of human height).

The method of organizing and conducting classes with female students of the special medical group was based on the individual approach and adherence to the principles of physical education. The main principle of physical education of female students of medical groups is health-improving, curative-preventive orientation of the classes. When choosing the means of physical education, we took into account the level of individual physical development of female students, their morphofunctional potential, their state after the disease.

In the preparatory part of the lesson, the teacher conducts surveys about the state of health of female students, establishes the level of readiness for further classes, informs theoretical data and explains the tasks of the lesson. During the warm-up, line-up and mixed line-up, walking, breathing exercises, general developing exercises, walking with different arms position, dance and preparatory exercises are performed. It is advisable to alternate special breathing exercises with regular ones. General developing exercises are performed first in slow motion and then at the average pace. Each exercise is repeated 4-8 times depending on the complexity of its implementation. General developing exercises are used to warm up the main groups of muscles of the arms, legs and torso. When doing them, special attention should be paid to deep and even breathing, it is not recommended to perform exercises that require great muscular effort. At the end of the preparatory part, the teacher organizes the pulse and respiratory check (Blavt, O. 2012). The duration of the preparatory part of the lesson is 20-25 minutes.

In the main part of the lesson, the teacher organizes the study of new movements that contribute to the recovery of the female student body, explains the technique and feasibility of their performing, conducts training of the previously learned movements. For each subgroup of female students, the teacher selects special physical exercises, limits the intensity, duration and number of repetitions of each exercise. The main part of the lesson includes 2-3 training questions. The first training question, as a rule, is aimed at developing the coordination of movements, the technique of performing exercises and individual elements, the accuracy and the precision of work with a ball. Female students acquire new physical exercises and motor skills, develop their motor abilities. The second and the third training questions, as a rule, are aimed at improving the previously studied motor actions and have a higher intensity in content. Muscle loading increases gradually so that its highest level was during the second half of the main part of the class. While performing high-intensity exercises, it is advisable to make small pauses of 1-2 minutes, to check the state of well-being of female students. During the classes, one must try to avoid the highly specialized development of motor abilities, which is achieved due to the diversity of selection of physical exercises and the use of exercises of different intensity (small - for the development of endurance, large - for the development of strength and speed). At the end of the main part of the class the teacher organizes games of small and medium intensity with the participation of the maximum number of female students (Yazlovetsky, V. 2004). The duration of the main part of the class is 40-50 minutes.

The main task of the final part is to promote the restoration of the functional state of the body of female students caused by physical activity of the main part. In the final part of the class, female students perform breathing exercises and relaxation exercises that help bring the body to rest. At the end of the final part of the class the teacher organizes the heart rate calculation and conducts the survey on the state of health of the female

students (Blavt, O.2012). The teacher summarizes the results of the lesson and gives the task for independent work. The duration of the final part of the class is 10-15 minutes.

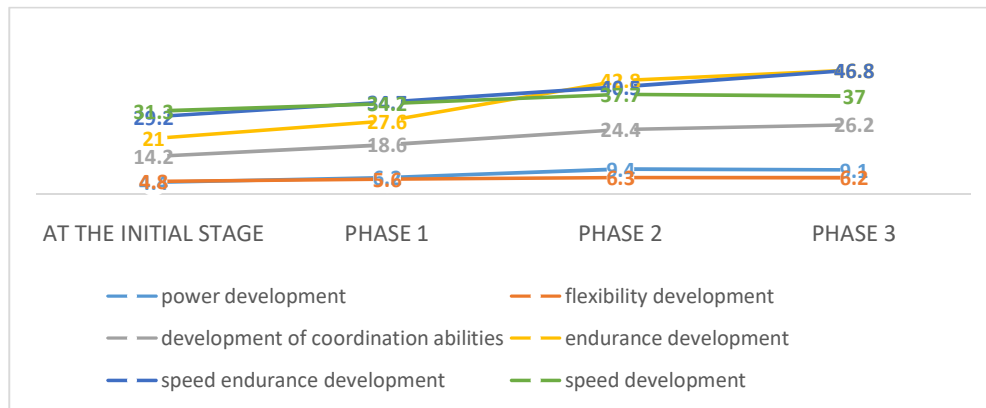
All parts of the lesson, aimed at solving educational, pedagogical and health-improving tasks, are organically interconnected and form a whole. Female students are shown the need for systematic monitoring of their state of health, noting all the changes that occur in the body before and after physical exercises. For this purpose, the diagnosis or self-diagnosis of objective indicators of the functional state are carried out, where should be recorded: heart rate, blood pressure, respiration, weight, anthropometric data. Diagnosis is also used to determine the level of training.

**Results of the research.**

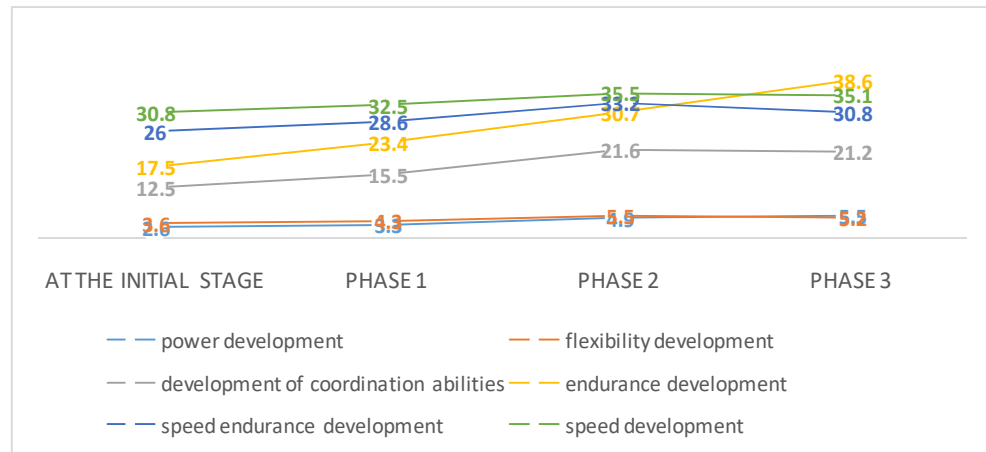
Table 1. Indicators of physical state of 17-19-year-old female students of special medical group at different stages of the experiment (n = 34).

Test	Stages of the research							
	At the beginning of the experiment		At the 2 <sup>nd</sup> stage of the research				At the 3 <sup>rd</sup> stage of the research	
			January 2019		June 2019			
	X±σ		X±σ		X±σ		X±σ	
	1 rp.	2 rp.	1 rp.	2 rp.	1 rp.	2 rp.	1 rp.	2 rp.
№ 1	31,3±2,93	30,8±3,07	34,2±2,88	32,5±2,95	37,7±2,72	35,5±2,9	37,0±2,84	35,1±2,92
№ 2	4,4±1,76	2,6±1,61	6,2 ±1,82	3,3±1,67	9,4±1,86	5,5±1,61	9,1±1,72	5,2±1,76
№ 3	29,2±2,72	26,0±3,12	34,7±3,07	28,6±3,03	40,5±2,92	33,2±3,03	39,1±3,04	30,8±3,13
№ 4	4,8±1,67	3,5±1,85	5,6±1,62	4,3±1,81	6,3±1,74	4,9±1,71	6,2±1,68	4,5±1,82
№ 5	14,2±2,23	12,5±2,42	18,6±2,46	15,5±2,33	24,4±2,38	21,6±2,43	26,2±2,28	21,2±2,34
№ 6	21,0±4,14	17,5±4,02	27,6±3,74	23,4±3,93	42,8±3,82	37,7±3,97	46,8±3,71	38,6±3,88

The dynamics of changes in the physical state of 17-19-year-old female students of the special medical group at different stages of the experiment are presented in Fig. 1 and Fig. 2.



**Figure 1:** The dynamics of changes of the indices of physical state of female students in the first subgroup at different stages of the experiment



**Figure 2:** The dynamics of changes of the indices of physical state of female students in the second subgroup at different stages of the experiment

The analysis of the dynamics of indices of the physical condition of the female students at different stages of the experiment shows that the most productive in the development of motor capabilities was the second stage of the research. At the third stage (individual classes) there was a slight decrease in physical development indicators, but in general the process of consolidation of the achieved results was observed.

Indicators of morphofunctional state of 17-19-year-old female students of special medical group are presented in table 2.

Table 2. Dynamics of indicators of morphofunctional state of 17-19-year-old female students at different stages of the experiment (n = 34).

Indicators	Stages of the research							
	At the beginning of the experiment		At the 2 <sup>nd</sup> stage of the research				At the 3 <sup>rd</sup> stage of the research	
			January 2019		June 2019			
	X±σ		X±σ		X±σ		X±σ	
	1 <sup>st</sup> group	2 <sup>nd</sup> group	1 <sup>st</sup> group	2 <sup>nd</sup> group	1 <sup>st</sup> group	2 <sup>nd</sup> group	1 <sup>st</sup> group	2 <sup>nd</sup> group
Height (cm)	158,2±2,8	159,7±3,1	158,2±2,8	159,7±3,1	158,2±2,8	159,7±3,1	158,2±2,8	159,7±3,1
Body mass (kg)	62,8±2,12	66,2±2,55	62,2±2,42	66,0±2,68	61,6±2,47	65,4±2,42	61,9±2,73	65,6±2,82
Lung capacity (ml)	2960±11,6	2950±12,8	3050±12,3	3020±12,2	3120±10,7	3080±11,8	3120±11,1	3070±11,6
Heart rate (beats per minute)	78,5 ±3,0	80,2 ±3,5	76,8 ±3,3	78,6 ±3,2	74,7±2,9	76,2±3,3	75,5±2,8	76,3±3,15
Systolic blood pressure (mm Hg)	124,5±3,1	126,3±3,1	122,8±3,2	125,5±3,1	121,0±3,2	124,2±3,1	121,5±3,2	124,2±3,1
Diastolic blood pressure (mm Hg)	78,5±3,0	79,7±2,85	78,5±2,9	79,4±2,9	77,2±2,9	78,1±2,8	77,8±2,9	78,7±2,7
Robinson index	97,7±2,04	101,3±2,12	94,3±1,87	98,6±2,05	90,4±1,93	94,6±2,1	91,1±2,02	94,8±2,14
Ruffier-Dickson test	13,1±1,6	13,8±1,5	10,7±1,7	11,8±1,6	9,2±1,5	10,1±1,6	9,4±1,6	10,8±1,7
Stange test (s)	24,5±2,8	23,4±2,6	29,5±2,9	27,4±2,8	36,5±2,9	33,4±2,8	35,2±2,8	31,8±2,9
Body mass index (kg/m <sup>2</sup> )	25,12±1,51	25,96±1,62	24,88±1,47	25,88±1,58	24,64±1,52	25,64±1,6	24,76±1,56	25,76±1,67
Vital index (ml/kg)	47,13±1,87	44,56±2,1	49,04±1,82	45,76±2,14	50,65±1,8	47,09±1,93	50,40±1,84	46,8±2,04
Recovery time after 20 squats(s)	124,2±3,8	127,0±4,2	120,7±3,9	123,4±4,1	112,0±3,6	117,4±3,9	114,6±3,8	118,0±3,9

The author's method of conducting classes promotes gradual development of the female students' respiratory system. The analysis of the dynamics of the Stange test shows improvement of indicators from 23.4±2.6 to 36.5±2.9, which corresponds to the development of the respiratory system from poor to normal levels of an adult.

The dynamics of indicators of Ruffier-Dickson test from 13.8±1.5 to 9.2 ±1.5 indicated improvement in the physical performance of heart from poor to satisfactory levels. The recovery time after physical exercises increased significantly from 127.0±4.2 to 112.0±3.6, confirming the positive changes in the functioning of the cardiovascular and respiratory systems of female students with disabilities.

Body mass index and indicators of life index showed the presence of excess weight of the subjects. During the experiment, these indicators gradually improved, but it was possible to reach the norm only in the first subgroup.

The developed method of carrying out of physical-fitness classes has helped to improve the quantitative assessment of female students' energy potential. The change in the Robinson index from 97.7±2.04 to 90.4±1.93 in the first subgroup and from 101.3±2.12 to 94.6±2.1 in the second subgroup indicates the transition from poor functioning of the cardiovascular system to satisfactory level of its functioning.

### Discussion.

Selection, development and conditions of use of the complexes of physical exercises used at different stages of recovery are of great importance in the process of physical rehabilitation. Physical exercises and conditions of conducting classes should develop the reserve and compensatory capacities of the student body, resulting in overall success in the recovery of the human body (Onyshchuk, V., Bohuslavskva, V., Pityn, M., Kyselytsia, O., & Dotsiuk, L. 2017).

According to some scholars, the issue of physical rehabilitation should be considered much broader than a simple restoration of performance. Social adaptation and occupational conditioning of human health preservation should evolve into a cultural need for systematic physical exercises, a desire for personal physical self-improvement (Mozolev, O. 2013; Grinko, V, Kudelko, V., & Hlotov, Y. 2018).

Teachers and trainers pay attention to the aesthetic and motivational appeal of sports, which encourages people with physical disabilities to actively exercise. The interaction of physical education with the aesthetic is that, on the one hand, physical education expands the scope of aesthetic influence on a person, on the other hand - aesthetic education increases the efficiency of the physical one by introducing positive emotional moment and additional attractive stimuli for physical exercise (Osip, A., Kudryavtsev, M., Fedorova, R., Serzhanova, Z., Panov, E., Zakharova, L., Savchuk, A., Yanova, M., Zhavner, T., & Klimuk, Y. 2017).

A number of researchers point to the need to change priorities in the content and quality training of physical education professionals. They note that modern physical education teachers should be able to apply innovative rehabilitation techniques and have physical education classes with people with disabilities (Mozolev, O., Halus, O., Bloschynskiy, I., & Kovalchuk, R. 2019).

The analysis of the results of our research confirms the researches of scientists about the priority of health and improvement of state of health in the system of physical education of young people, the need to involve all students in active sports, the development of motivation for physical self-improvement (Nosko, M., Garkusha, S., & Voedilova, A. 2014).

Based on the results of our research, the data on the practical application of the method of conducting physical education classes in special medical groups have been expanded. The author's method of conducting classes with female students with deviations in the functioning of the cardiovascular, respiratory and central nervous systems has been disclosed and tested.

The data of the researches (Cherepov, O., Myasoedenkov, K., & Kopylov, O. 2011) on the health impact of physical exercises on female students' somatic health have been extended. The conducted research confirmed the scientific views on the need for a systematic assessment of the level of physical health and functional status of female students at each stage of training (Dolzhenko, L. 2006), which allows to make timely changes and make adjustments in the organization and methods of conducting classes.

### Conclusions.

The analysis of indicators of physical condition of 17-19-year-old female students of special medical group at the beginning and at the end of the experiment shows that the use of the proposed method of conducting physical education classes had a positive impact on the development of their physical abilities. The most significant changes occurred in the development of endurance  $+25.8 \pm 0.73$ , coordination ability  $+11.8 \pm 0.43$ , force endurance  $+9.9 \pm 0.32$ . The indicators of speed development and force significantly improved  $+5.7 \pm 0.19$ ,  $+4.5 \pm 0.17$ . The slightest changes were recorded in the development of flexibility  $+1.4 \pm 0.1$ .

The analysis of the dynamics of changes in physical state of 17-19-year-old female students in the first and second subgroups shows positive tendency in the development of physical qualities of female students of both groups. However, these processes occurred much faster for the students of the first subgroup,

The analysis of the dynamics of changes in the indicators of the morphofunctional state of female students of special medical groups shows the effectiveness of the author's method of conducting classes. At the same time, achieved positive changes do not make it possible to state the achievement of results that correspond to the level of preparation of a healthy person.

Conducting classes with students with health disabilities requires the teacher to have special knowledge and methodological skills, increased pedagogical control over the students' health state, and the necessary communication skills. Having proper information about the peculiarities of physical condition of students of special medical groups allows the teacher to adjust the educational process in a timely manner, to define tasks and to correct individual programs of physical development of students.

**Conflicts of interest:** No conflicts of interest exist.

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