



DOI:10.28925/2664-2069.2021.17

UDK: 796.012.3

PHYSICAL EDUCATION AND RECREATIONAL MODEL OF HEALTH-PRESERVING TECHNOLOGIES IN COMPREHENSIVE SECONDARY EDUCATION INSTITUTIONS

Rybalko Lina ^(ABCDEF)

National University “Yuri Kondratyuk Poltava Polytechnic”, Poltava, Ukraine

Author contribution:

A – study concept and design; B – data collection; C – data analysis and interpretation; D – paper writing; E – paper editing; F – paper final adoption

Abstract

Relevance. In the work, there is an issue of using health-preserving technologies in comprehensive secondary education institutions brought up. The focus is emphasized on physical education and health-promoting model of health-preserving technologies, which makes it possible to intensify motion activity as the main condition for providing healthy lifestyle of a human.

The *aim of the research* consists in reporting on the peculiarities of physical education and health-promoting model of health-preserving technologies and results of an experimental test of using such model in comprehensive secondary education institutions.

In this scientific work, the following *methods of the research* were used: theoretical (analysis and generalization of scientific literature in the issue of the research), and empirical (observation, questionnaire, and pedagogical research).

The results of the research prove that the degree of motion activity among schoolchildren is mostly caused by the organization of physical education at school and involving them to various forms of motion physical education and health-promoting activities in extra-curricular time taking into account that PE lessons taking place 2-3 times a week does not provide necessary motion regimen. The deficiency of motion activities is satisfied only by 20-30%. The norm motion activity indicators for schoolchildren should account for 10-15 hours a week recommended by the WHO. This is exactly what has to be taken into account when planning and conducting PE lessons and organizing physical education and health-promoting activities in comprehensive secondary education institutions.

Conclusions. The conducted monitoring of physical development among schoolchildren of the 4-10 years of studying, notably the girls' physical fitness in the experimental educational institutions where a physical education and health-promoting model of health-preserving technologies is implemented approved a considerable advantage (compared to the other educational institutions) by most indicators, especially of functional level where extra-curricular mass sporting events were fully used and there were four PE lessons a week. Among boys, there are less distinct indicators of significant changes except the ones of the 4th and 8th years of studies. Such indicator, obviously, can be defined with neglecting additional extra-



curricular classes among boys since they manifest motion activity more intensively beyond school (sports classes, football outside, etc.).

Key words: physical education and health-promoting model, health-preserving technologies, motion activity, physical fitness.

Introduction. European integration processes taking place in Ukraine are related to affirmation of healthy lifestyle among youth in a way. That is why at the level of global («Declaration on Primary Health Care»), European («Health-21: The health for all policy framework for the WHO European Region» [2]), and national («National strategy of education development in Ukraine for the period up to the year 2021» [5], etc.) normative documents the idea of organizing and conducting physical education and health-promoting activities in the educational institutions of different types was announced. For that reason, the role of physical education and physical fitness considerably grows which solves the problems of forming, preserving and strengthening the youth's health to some extent.

The generalized analysis of the curriculums and instructional programs in the given subjects and observing the educational process in comprehensive secondary education institutions approves that year after year the classroom-based workloads on schoolchildren grows; the number of the subjects requiring extra-curricular classes restricting moves and elective classes grows; emergence of distance learning deprives schoolchildren of physical activities more and more and leads to sedentary lifestyle. All these things inevitably end in hypodynamia and development of chronic diseases of

musculoskeletal system, cardiovascular system, and digestive organs.

Motion activities for schoolchildren are obligatory in the system of educational process. It includes three hours of physical education classes a week. But this is not enough for schoolchildren, as school practice shows, since a young organism is recommended at least 10-14 hours of motion activities a week for normal development which is approved by the results of scientific researches by the teachers (O. Bychuk [1], V. Marynych [3]) and physicians (T. Miier [14]).

Organization and regular conducting of physical education and health-promoting activities in educational institutions promotes formation of healthy lifestyles among nowadays' youth, development of adaptive functional capabilities, physical qualities and intensification of motion activities among young generation.

Quite a lot of scientists study the problem of organizing physical education and health-promoting activities in theory of physical education. Thus, the pedagogical aspects of physical education and health-promoting work were analyzed in the works of the following scientists: O. Bychuk [1], V. Marynych [3], O. Maslova [6], L. Rybalko [6-9] and others. In the scientists' works there were proved the importance of physical education and health-promoting



activities in the system of physical education within the aspect of preserving and supporting the optimal level of motion activities among schoolchildren and student youth as well as popularizing healthy lifestyle.

At the same time, in the scientific works of nowadays' researchers on the problems in organization of the physical education process in comprehensive secondary education institutions there is lack of focus on the issue of using physical education and health-promoting and health-preserving technologies in comprehensive secondary education institutions.

The **aim of the work** consists in reporting on the peculiarities of physical education and health-promoting model of health-preserving technologies and results of an experimental test of using such model in comprehensive secondary education institutions.

Material and methods of the research. In this scientific work, the following methods of the research were used: theoretical (analysis and generalization of scientific literature in the issue of the research), and empirical (observation, questionnaire, and pedagogical research). The students of the 4th and 8th-10th years of studies of the comprehensive secondary education institutions took part in the research in total of 240 people, among which 126 students of experimental forms and 114 students of control forms.

The pedagogical experiment on finding out the efficiency of the developed physical education and health-promoting model of health-preserving technologies was conducted in the comprehensive secondary

education institutions. For this purpose the experimental schools were defined (Kremenchuk specialized comprehensive school of the I-III degrees № 7 with profound studying of physical education and health-related basics) and the control schools (Kremenchuk comprehensive school of the I-III degrees № 9 and Kremenchuk comprehensive school of the I-III degrees № 23).

Results of the research and discussion. We interpret *health-preserving technologies* as a set of forms, means and methods aimed at gaining positive results in forming strengthening and preserving human health and in forming healthy lifestyle [6, p. 40]. The classification by O. Vashchenko is the easiest and most understandable classification providing an opportunity to differentiate technologies by specific type, preserving and strengthening of health [2]:

- health-preserving technologies create safe conditions for staying and studying at school, rational organization of raising process and compliance of learning and physical workloads with a child's capabilities;
- health-promoting technologies are aimed at solving the tasks of strengthening physical health among schoolchildren by virtue of physical training, fitness, boosting the potential of the organism's resistibility to unfavorable environmental conditions as well as via individual gymnastics, massage, etc.;
- the technologies of health-related studies being created via forming essential skills, preventive care from traumatism, teaching hygienic skills,



building awareness of the harmful effect of tobacco and alcoholic drinks and of overcoming conflicts, etc.;

- raising health culture occurring via forming the ideas on health as the greatest value in human life, conducting healthy lifestyle, growing responsibility for personal health and health of the close people.

We agree with O. Bychuck [1] classifying health-preserving technologies by the following groups: health-preserving educational, medical and hygienic, physical education and health-promoting, ecological, health and safety technologies distinguishing physical education and health-promoting technologies as a specific group.

As the same time we consider physical education and health-promoting and health-preserving technologies as the ones of the main in the system of education making it possible to intensify motion activities and promote forming healthy lifestyle.

Physical education and health-promoting and health-preserving technologies are first of all aimed at forming, preserving and strengthening a schoolchild's health. They are realized at school during subject lessons, PE lessons and various physical education and health-promoting extra-curricular events. Except this, health-preserving technologies intensify the schoolchildren's motion activities, relieve their nervous system, and promote avoiding stress by virtue of physical education and health-promoting activities [4].

Under the conditions of comprehensive secondary education institutions the following should be

attributed to motion activities: physical exercises on PE lessons; active games on the brakes for younger schoolchildren; easy and simple exercises for senior schoolchildren possible to be done before the lessons or during independent exercising; specially organized competitions among schoolchildren in after-school time; training schoolchildren in specialized children's and youth's sports schools.

Generalizing the analysis of scientific literature [1–16] on defining the term «motion activity» we came to a conclusion that in this term there is there is the main means of physical education among schoolchildren with variability inherent for it, specific focus and sporting (competitive) activity embedded.

School practice approves that nowadays' schoolchildren experience motion deficiency which means that the number of moves completed by them a day are lower than age norm. It has a negative impact on their organisms [3]. Besides, the deficiency of motion activities causes visible functional disorders in the schoolchildren's organisms: the strength and functionality of skeletal muscles decrease leading to posture disorders, spinal curvature, and flatfoot; age growth retardation of speed, agility, move coordination, flexibility, endurance and strength.

Continuous staying in static position (for example, at the desk at school or at home at the computer) provokes static load on specific muscle groups leading to their fatigue and boosting negative impact of hypokinesia.

Hypokinesia leads to development



of metabolic disorders in the organism, excessive fat deposits and also causes emergence of digestive, cardiovascular and musculoskeletal systems' diseases. Among such schoolchildren, the traumas of limbs happen more often and disease incidence of respiratory-related infections 3-5 times higher [1].

Chronic deficiency of motion activities is now a real threat for health and normal development of schoolchildren. To eliminate the negative impact of hypokinesia on the schoolchildren's organisms there is a need in motion activities with a specific amount of physical workloads. Taking into account the fact that at the PE lessons a schoolchildren's weekly need is met only by 20%, its replenishment is possible by virtue of other motion activities including those during independent exercising.

A conscious attitude to such process of each schoolchild will mean transition to healthy lifestyle whose basis is not only healthy eating as doctors explain us, not only refusing from harmful habits, but actually motion activities. Undoubtedly, physical workloads should comply with the schoolchildren's physical training, their age and gender peculiarities.

Physical education and health-promoting activities in comprehensive secondary education institutions can be conducted not only compulsorily which is regulated by instructional programs in physical education, but also voluntarily out of school as independent exercising [6].

Quite a lot of scientists [1–6] and practitioners [12; 16] lean towards the view that in specially-organized types of physical education and health-promoting activities among

schoolchildren school PE lessons are the most efficient.

Extra-curricular mass sporting events within physical education and health-promoting activities of an educational institution are not organized in each and every school (games at the breaks after the second or third lesson, sports competitions, spartakiads, day of a runner, bike rides, tourist gatherings, etc.), and after-school classes (children's and youth's sports schools with various sports) are attended by not more than 10% of schoolchildren. It becomes obvious why only 10-11% of the schoolchildren are virtually healthy after leaving school.

The following question arises: how exactly is it possible to achieve 10-14 hours' motion activity a week in accordance with the recommendations of International Council of Sport Science and Physical Education. In such case, it is possible to rely only on conscious attitude among schoolchildren, their independent exercising, going to school and home from school on foot, domestic physical activities, etc. or on successfully organized physical education and health-promoting activities.

Motion activities of a human are evaluated in specific units of measurement via the main methods of measuring motion activities:

- stepometrics (number of locomotor moves a day);
- by time expenditures a day or a week;
- by energy expenditures in calories or joules per unit of time.

The most available method of measuring motion activities is the number of locomotor moves a day.



Thus, Japanese scientists recommend the minimal daily norm of 10 000 steps and more. If we consider that the average stride length accounts for 70 cm, the minimal number of kilometers a day should account for 7 km for an adult. The methodology of measuring occurs via stepometer but the number of steps is not an indicator of intensity, motion activities can be manifested not only in the course of moving but also in place (in a sitting or lying position).

The classification of activity types depending on multiplicity of boosting metabolism relative to the level of basic metabolism is a more accurate method of measurement. N. Tugut and M. Bekar [14] offer to determine motion activities by the time spent on doing moves (physical exercises) if different intensity. For example, slow walking, art and crafts lessons, etc. – the multiplicity of boosting metabolism is 3 compared to motionless state of a person in the lying position. Active games, physical exercises' complex during morning exercising (light physical workloads) – the multiplicity of boosting metabolism is 4-6. Average physical workloads (sports games, running with 75% intensity) – the multiplicity reaches 7-9, and provided that physical workloads are high, the multiplicity of boosting metabolism reaches 10 and more.

If we compare exercising in different zones of multiplicity by time, provided that work is the lightest the duration can reach 180-200 min.; provided that work is light – 30-45 min.; and provided that work is of a medium workload – up to 30 min. for girls and up to 45 min. for boys. In the course of intensive exercising (up to 100%) the recommended duration of

work for girls is up to 5 min. and for boys – up to 10 min.

The total one day's motion activity for schoolchildren by the energy expenditures in calories (by L. Rybalko [7]) is evaluated by specific age groups and assessment of motion activity, notably hypokinesia, hygienic norm and hyperkinesia. For example, energy expenditures for the children aged 7-10 years old in response to hygienic norm account for 10.6-12.5 MJ. If it is less than 8 MJ, it is evaluated as hypokinesia, and if it is more than 15 MJ – as hyperkinesia. Consequently, in general an increase of motion activities among schoolchildren is observed with aging, with a slight prevailing among boys beginning from 11-14 years old. The hygienic norm for 11-14-year-old children already accounts for 12.6-14.5 (12.6-13.5 – girls), and for 15-17-year-olds – 14.6-16.5 (13.6-14.5 – girls) MJ.

The number of locomotor moves a day is characterized with a similar dynamics: with aging it increases, and beginning from the age of 11-14 among boys and male-adolescents the prevailing grows above the girls' and female-adolescents' indicators. If locomotor moves a day account for 20-25 thousand steps among 11-14-year-old boys [10; 14] (hygienic norm), among girls this indicator is lower by 3 thousand steps, and among 15-17-year-old schoolchildren this indicator equals 5 thousand steps.

The mentioned indicators of the hygienic norm of motion activities are worth taking into consideration when planning and conducting the PE lessons at schools and organizing physical education and health-promoting activities.



In the course of the research (using the method of interviewing and questionnaire) conducted in the schools of Poltava and Kremenchuk, a striking number was defined – 98% of the schoolchildren have never heard any information on benefit of exercising, their significance for human health, healthy lifestyle or motion regimen of a schoolchild, etc. from their PE teachers for the whole period of school studies. We are not inclined to considering that such state of «awareness-raising» work of the PE teachers is inherent for our region.

The development of mass physical education and sport in comprehensive secondary education institutions is aimed principally at strengthening the schoolchildren's health, their physical development and motion activities. Today the school's challenge is to maximally use various forms and methods of physical education and health-promoting work with schoolchildren and to cover as big number of schoolchildren of all age categories with systematic physical exercising and sport.

One of the efficient means for strengthening the schoolchildren's health and improving their physical development is conducting physical education and health-promoting events in the school's schedule as well as organization and holding of mass physical education and sporting events [12; 16; 17].

The efficient implementation of health-preserving technologies can take place only provided that the implementation process itself, the components of the technology, and the ways of realization would be understood, logically substantiated and

information-open for teachers and schoolchildren. The system of teaching the subjects this process is very important. This means that all the school's pedagogical staff takes active part in organization of extra-curricular mass sporting events among the schoolchildren of all age groups [8, 12].

The systemic work focused on using physical education and health-promoting model of health-preserving technologies requires combining the efforts of all the subjects of educational process of a comprehensive secondary education institution, agreement of the actions of the authorities, school, form-teachers, subject-teachers, after-school teachers, class section and club leaders, medical staff, librarians as well as with parents' support.

A physical education and health-promoting model of health-preserving technologies (pic. 1) of today's school was developed making it possible to make schoolchildren's motion activities closer to the recommendation parameters – 10-15 hours a week.

The peculiarities of the organization of the given model are [12]:

- educational process starts with a morning gymnastics with musical support conducted by PE teachers or students of senior school under form-teachers' and school authorities' control;
- at every lesson there are exercise minutes making it possible to adapt to learning process at the first lesson, to support the process of active work at the lessons 2-4, and take away fatigue at the lessons 5-6;
- after the third lesson there is a dynamic brake of 30 min.



(schoolchildren of the forms 1-4 change their clothes into sporting ones and conduct active games together with their form-teachers; schoolchildren of the forms 5-11 exercise by the plan of sporting and entertainment events at sports grounds;

- the curriculum includes four PE lessons a week, and in parallel forms boys and girls exercise separately;
- on Saturday from 10 a.m. to 1 p.m. the weekend club is conducted under monitor-teachers' control and every student can come together with their parents and do the sport to their taste;
- a sporting holiday is conducted monthly (for example, opening and closing of a school spartakiad, Olympic lesson, the day of a tourist, a runner, a bike ride, a holiday of a sports family – «Daddy, mummy and I are a sports family», «Let's go, girls!», «Knight tournament», Cossack group, etc.

To implement the physical education and health-promoting model of health-preserving technologies an experimental individual school curriculum on introducing 5 hours of

physical education weekly in all forms and organization of weekly physical education and health-promoting activities were developed.

By virtue of additional hours of physical education, the amount of theoretical and practical paragraphs of the program realized to the fullest extent and focused on raising a conscious attitude to their health and physical development among schoolchildren as well as forming healthy lifestyle increased.

Physical activity among students at school should be organized under the condition of combining two mutually supportive directions: classes in the main forms of physical education including PE lessons and work in sports classes in after-school time and additional forms implemented in the structure of a studying day to support a high level of functionality among schoolchildren during all period of studying. Such forms include: morning gymnastics before the lessons; exercise minutes and exercise pauses, exercising on the long brake, etc.

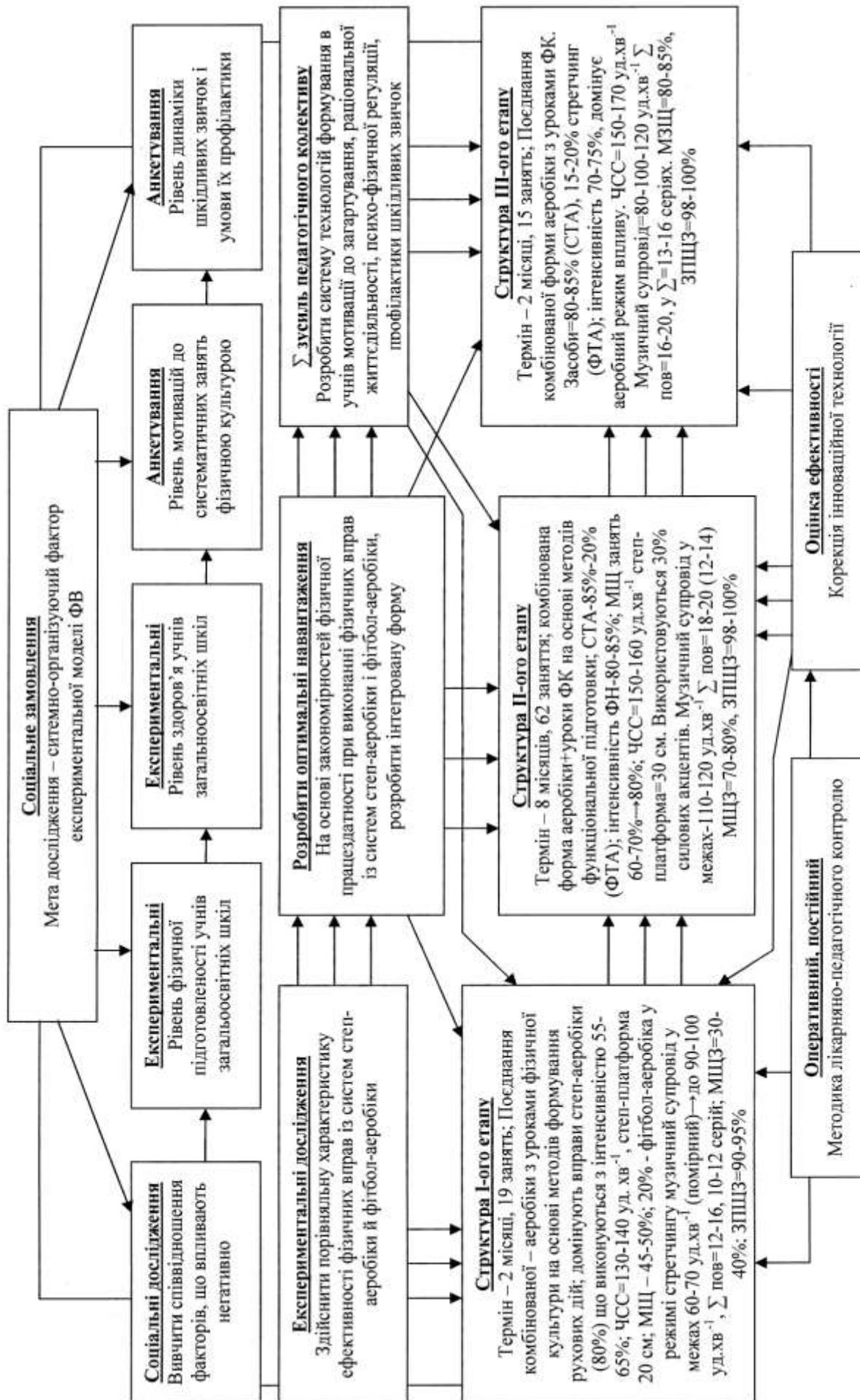


Рис. 1. Структура інноваційної системи фізкультурно-оздоровчої роботи з використанням аеробних технологій



Based on each school, the sports section classes with 3-5 kinds of sports should run by the developed physical education and health-promoting model of health-preserving technologies. Under the condition of such organization of physical education and health-promoting activities, a weekly motion activity among schoolchildren will account for 10-15 hours.

At the beginning of the experiment, the questionnaire was conducted to define the schoolchildren's motivation to independent exercising whose results are covered in the table 1.

The questionnaire defined negative dynamics (-17.4%) of the number of healthy schoolchildren and those with various health disorders.

Table 1

Priority motives among schoolchildren of 8-10 forms to independent exercising, %

Answer options		Boys		Girls	
		%	rating	%	rating
1.	Improving body shapes	27.8	1	40.0	1
2.	Active rest	26.4	2	15.5	3
3.	Communicating with friends	20.8	3	11.2	4
4.	Improving health	13.9	4	27.5	2
5.	Reaching the results	11.1	5	6.3	5

The dynamics of age peculiarities of development of physical qualities among schoolchildren made it possible to define the correlation between the indicators of their health state and the main components of quality state of motion sphere among teenagers (almost 57.0-59.9% of them belonged to the group of risk of various diseases' emergence).

The research proves the urgent need in optimizing motion activities, and therefore, organization of physical education among schoolchildren accomplished by us based on including special exercises in combined aerobics as part of after-school work and was a building factor of experimental pedagogical program.

The analysis of the structure of physical functionality among teenagers under conditions of physical workloads

of various morphofunctional and energy focus combined with the factor analysis made it possible for us to specify optimal pedagogical parameters of innovative program of physical education and health-promoting exercises for the students of the forms 8-10 structured by the levels of: intensity; amount; duration of a onetime impact of physical workloads on a human organism; intervals of recovery in phases of super-compensation of compensated fatigue; forms of recovering functional capabilities of an organism; and morphofunctional structure of physical workloads.

In the course of integrating combined aerobics in the general system of physical education among schoolchildren, except determining the efficient types of motion activities in the program of aerobic technologies it



is important to determine their overall impact on the schoolchildren's organisms at the level of full session.

We implemented the complex step-aerobics + fitball-aerobics having calculated qualitative parameters of dosing physical workloads for the sessions using combined aerobics (tables 2, 3).

The preparatory part of the session consisted of 5-6 repetitions (48-85 elements), the amount of physical workload reached 7-9 series, the number of heart beats reached 110-145 bpm⁻¹. At the same time, the intensity of physical workloads fluctuated between 30-50%, the rate of music

support was in an optimal range of 105-115 bpm⁻¹, and the duration of this part of the session varied within 5-8 min.

Optimal parameters of the main part of the sessions were characterized by the following indicators: the indicators of physical workloads' intensity stayed within 80-85%, the amount reached the level of 350 elements with 15-16 series with 12-18 repetitions, the HR stayed within 140-170 bpm⁻¹ at the same time, and the rate of music support was within 130-150 bpm⁻¹. The session duration in all groups fluctuated within 30-35 min.

Table 2

Model characteristics of dosing physical workloads in the system of aerobic technologies under conditions of building an innovative system of physical education among schoolchildren

Form of the session	Exercising with the complex step-aerobics + fitball-aerobics (2 in a weekly cycle)		
Structure components of physical workloads	Preparatory part (5-8 min)	Intensity of physical workloads, %	30-50
		Amount of physical workloads (number of reps/ number of series)	5-6/7-9
		Total amount (number of elements)	48-56, 70-85
		HR, bpm ⁻¹	110-145
		Rate of music support, bpm ⁻¹	105-115
	Main part (30-35 min)	Intensity of physical workloads, %	80-85
		Amount of physical workloads (number of reps/ number of series)	12-18/15-16
		Total amount (number of elements)	320-350
		HR, bpm ⁻¹	140-170
		Rate of music support, bpm ⁻¹	130-150
	Final part (5-8 min)	Intensity of physical workloads, %	25-30
		Amount of physical workloads (number of reps/ number of series)	3-5/6-9
		Total amount (number of elements)	51-62, 60-70
		HR, bpm ⁻¹	105-110
		Rate of music support, bpm ⁻¹	60-65

The final part of the sessions had optimal parameters of physical workloads, such as: intensity within the range 25-

30%, optimal amount within 51-70 elements with 5-9 series with 3-5 repetitions, HR at the same time within



105-110 bpm⁻¹. The rate of music support reached a bit higher than reasonable 60-65 bpm⁻¹.

Further studying of the structure of physical functionality among teenagers under conditions of physical workloads of different intensity and amount made it possible for us to specify optimal pedagogical parameters of the innovative program for physical education and health-promoting sessions for the schoolchildren of the forms 9-10. Depending on the level of physical fitness among schoolchildren, general pedagogical characteristics of this technology were the following:

1) *low level*: duration of the session 35-45 min; motor-pedagogical density equals 35-40%; HR – 120-130 bpm⁻¹; rate of music support 100-110 bpm⁻¹; intervals of recovery – full up to 65-90 bpm⁻¹; 70-75% of learning time is physical exercising of aerobic focus combined with respiratory exercises and stretching; means in the form of different step-actions (platform height 15-20 cm) and exercises on the ball (intensity 50-55%, 5-6 series with 10-15 repetitions);

2) *medium level*: duration of the session 48-55 min, motor density and total pedagogical density of the session equaled 45-60% and 90-100%, respectively, intensity of physical workloads stayed within 55-65%, amount – 60-65%, 6-8 series with 15-18 repetitions; rate of music support 120-130 bpm⁻¹; HR stayed within 130-140 bpm⁻¹; 70-75% of learning time physical exercises of aerobic and anaerobic focus with a combined option with hypersensitivity on the ball and stretching were used; intervals of recovery within HR – 95-100 bpm⁻¹.

3) *higher than medium level*: duration of the session reaches 60-70

min., indicators of motor and total pedagogical density of the session stay within 70-75% and 98-100% (6-7 series with 10-12 repetitions); rate of music support reached 140-150 bpm⁻¹; HR equaled at the same time 150-170 bpm⁻¹; intervals of recovery were concise to HR within 100-105 bpm⁻¹; physical workloads within 85-95% were used fragmentarily, HR equaled 165-185 bpm⁻¹; 80-85% of learning time physical exercises of aerobic manner were used (30%) combined with stretching and respiratory exercises (the combinations with additional weight, increasing the platform height up to 30-40 cm, with dancing exercises, and with various elements of competitive exercises were used).

This informational base is enough for introducing the innovative system of physical education among schoolchildren of comprehensive secondary education institutions using modern aerobic technologies of physical education and health-promoting model (fig. 1).

The system of physical education among schoolchildren using physical education and health-promoting technologies (health-promoting aerobic technologies) was used as a physical education and health-promoting model of health-preserving technologies. It included three interrelated stages of its realization under practical conditions of the school's functioning during the academic year.

The difference of the developed model compared to health-preserving technologies being used consists in the fact that physical workloads of aerobic structure are done until the phase of compensated fatigue. Then



schoolchildren's continuous activity is realized in the stretching regimen (intensification of myotonic responses), relaxation, static and dynamic unloading of musculoskeletal system, and completing respiratory exercises. The recovery and developing effect gained in such form is used for further impact of various physical exercises of aerobic focus, combined physical exercises with functional emphases of strength, speed, speed and strength

focus.

The results of the pedagogical experiment approved that among the schoolchildren of the experimental groups there are better physical indicators than among the schoolchildren of the control schools. The research of physical development among schoolchildren was conducted by 14 parameters in the 10th class separately for girls and boys.

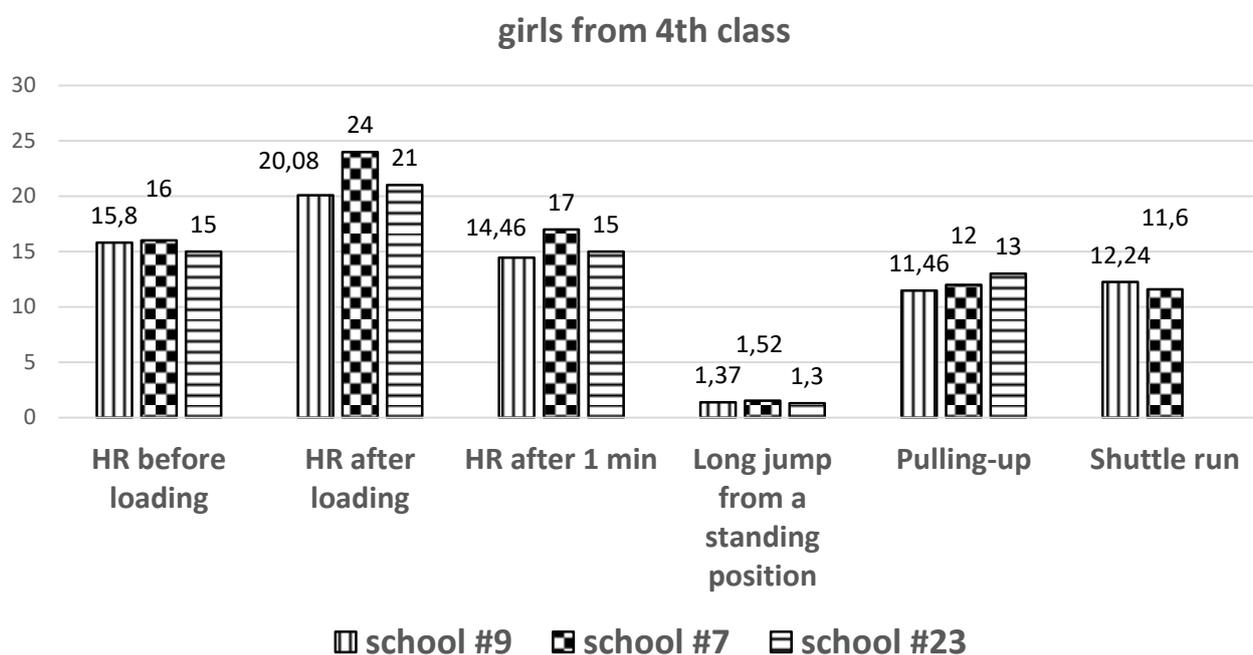


Figure 2. Indicators of physical fitness among schoolchildren of the 4th class (girls)

The analysis of the diagram of physical fitness among schoolchildren of the 4th class among girls (fig. 2) shows the privileges of the female-students of the comprehensive secondary school № 7 by almost all parameters except pull-ups and shuttle run.

The researches approved that among boys on the contrary there are no privileges by the mentioned indicators except push-ups and HR to workloads. Almost identical indicators

are observed in most tests.

Among the schoolchildren of the 8th class (fig. 3, 4), the same privilege is repeated among girls by six indicators and only in shuttle run and VC there are no such privileges. Among boys there is no privilege out of the six.

Among the schoolchildren of the 10th class, the dynamics of indicators does not change: among girls, the indicators are better by six parameters, and among boys only in pull-ups and



long jumps from standing position (fig. 5, 6).

Generalizing the data of the given diagrams, it is possible to make a conclusion that motion activity level among the schoolchildren of the comprehensive secondary school № 7 is different for girls and boys. The girls have privileges by most parameters of physical fitness over their age-mates from the other schools. The boys do not have such privileges except pu-ups (a

great privilege) in the 4th class and pull-ups in the 10th class. Such data can probably be defined by neglecting additional sessions among boys after school (sports classes, football outside, etc.).

Among girls, such activities after school are less visible, so the organized after-school sessions in the system of physical training directly at school influence on the results of the female-schoolchildren's physical fitness.

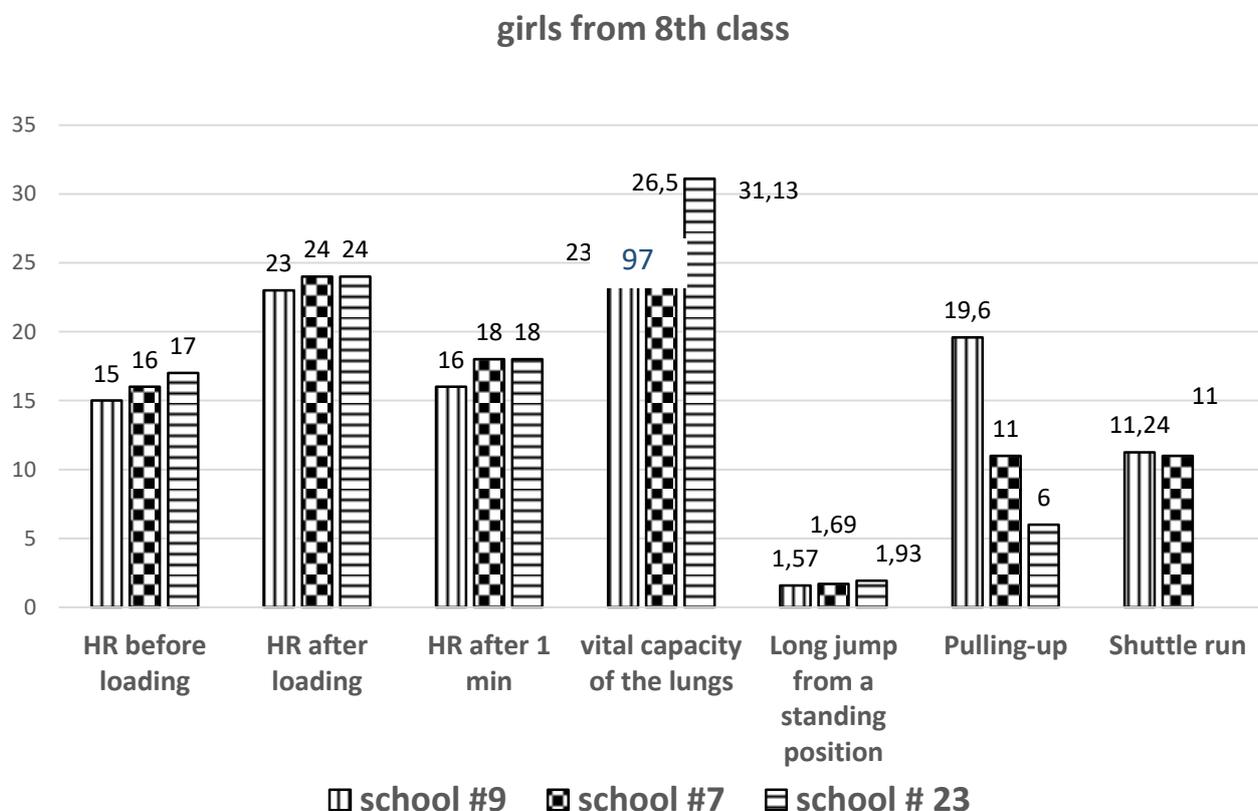


Figure 3. Indicators of physical fitness among the schoolchildren of the 8th class (girls)

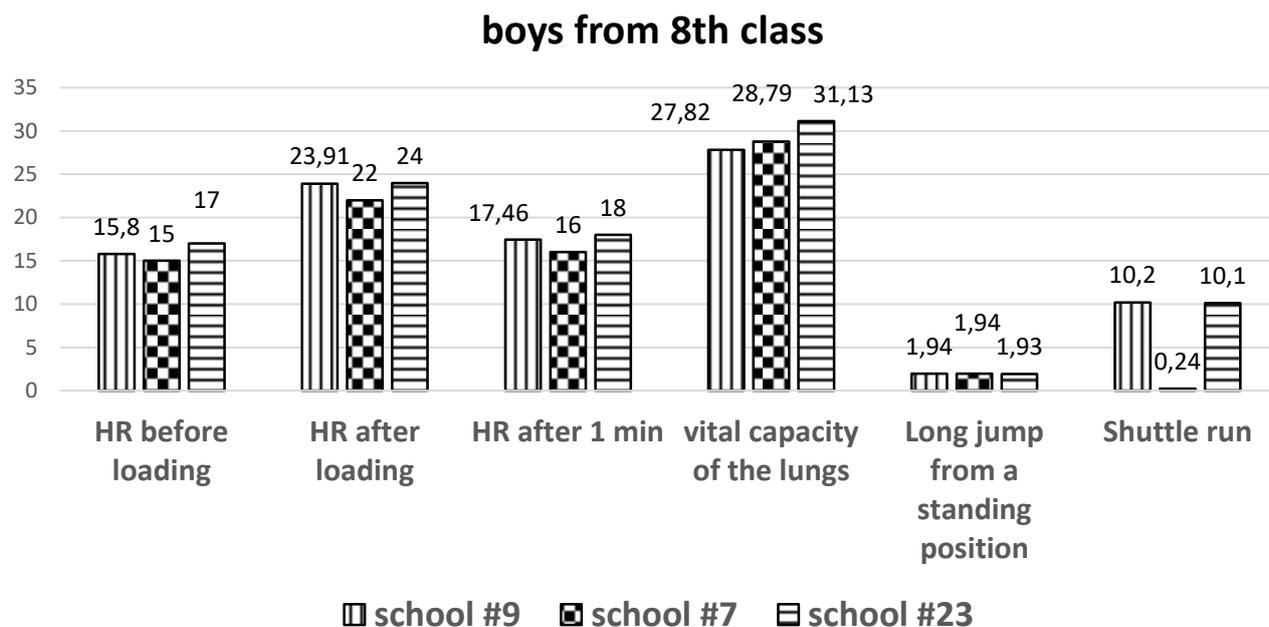


Figure 4. Indicators of physical fitness among the schoolchildren of the 8th class (boys)

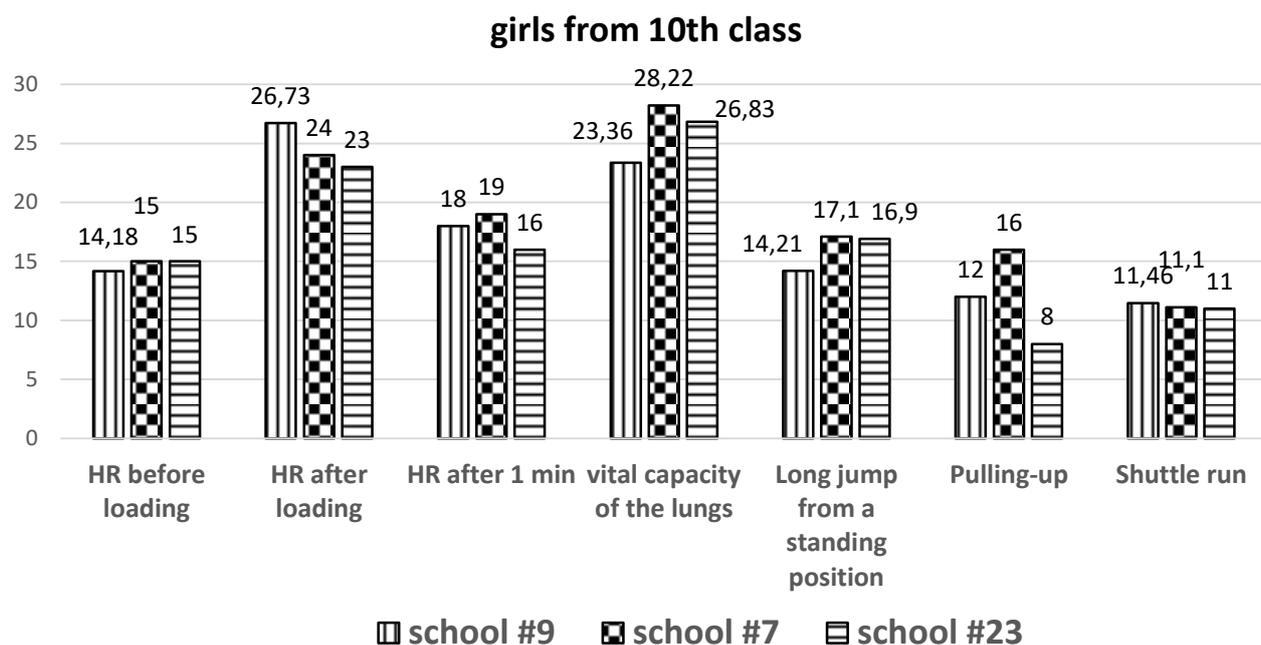


Figure 5. Indicators of physical fitness among the schoolchildren of the 10th class (girls)

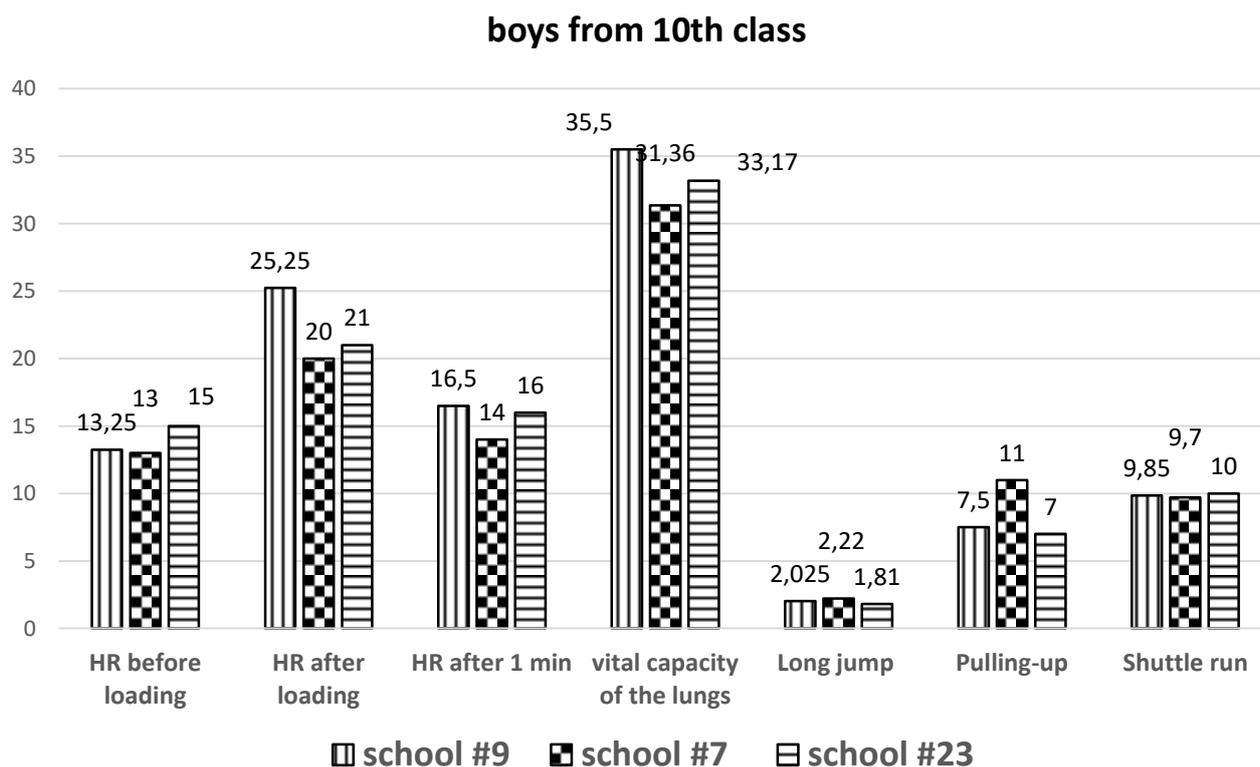


Figure 6. Indicators of physical fitness among the schoolchildren of the 10th class (boys)

The analysis of the schoolchildren's physical development gives reasons to state that the implementation of physical education and health-promoting model of health-preserving technologies for a week promoted physical development among schoolchildren as well as formation of healthy lifestyle and development of motivation to physical education and sport.

Conclusions. Consequently, the conducted research proves that the level of motion activity among schoolchildren is mostly caused by organization of physical education at school and involving children in different classes of extra-curricular time for doing physical exercises. It goes taking into account that PE lessons two-three times a week do not provide the necessary motion regimen.

The deficiency in motion activities is satisfied only by 20-30%. The indicators of the hygienic norm of weekly motion activity of 10-15 hours a week recommended by the WHO should be considered in the course of planning and conducting PE lessons in comprehensive secondary education institutions.

The monitoring of physical development, notably functional fitness among the girls of the experimental comprehensive secondary school № 7 gives reasons to state a considerable privilege (compared to the other comprehensive secondary education institutions) by most indicators, especially functional training where extra-curricular mass sporting events and four PE lessons a week were fully used.

Among the boys, the indicators of



significant changes were less visible except the 8th class (educational institutions 7-9) and the 4th class (educational institutions 7-23).

Such results can be defined by neglecting additional after-school sessions among boys as they manifest motion activities more intensively after

school (sports classes, football outside, etc.).

Prospects for further research will be focused on adaptation of the developed physical education and health-promoting model of health-preserving technologies to using in higher education institutions.

References:

1. Bychuk OI. Physical training and health work at school. Luts'k: Nadstyr"ya. 2007:28-32. *Ukrainian*
2. Health-21. Health policy framework for all in the WHO / Europe region. WHO Regional Office. Copenhagen, 2009. 243 p. (European series on health for all, № 6). *Russian*
3. Marynych VL, Kohut IO. Content and forms of physical culture and health work in out-of-school educational institutions. *Sportyvnyy visnyk Prydniprov"ya*. 2013;2:44-49. *Russian*
4. Maslova O. The effectiveness of the concept of health-promoting technologies in the process of adaptive physical education of school-age children with hearing impairment. *Sports science and human health*. 2020;1(3):88-100. *Ukrainian*
5. On the National Strategy for the Development of Education in Ukraine until 2021. Access mode: <https://zakon.rada.gov.ua/laws/show/344/2013#Text>. *Ukrainian*
6. Rybalko LM. Health-preserving technologies in the system of physical education of student youth. *Fizychny vykhovannya v ridniy shkoli*. 2019;4(123):39-43. *Ukrainian*
7. Rybalko LM. World experience of physical culture and health-improving activity in higher education institutions. *Scientific journal of Dragomanov NPU*. 2019;3K(110)19:487-491. *Ukrainian*
8. Rybalko LM. The essence and content of health technologies. Health technologies in the educational environment: collective monography. Ternopil. 2019:14-25. *Ukrainian*
9. Rybalko LM. Formation of readiness of future specialists in physical culture and sports to carry out health-preserving technologies. *Bulletin of the National University "Chernihiv Collegium" named after T.G. Shevchenko*. 2019:201-208. *Ukrainian*
10. Synytsya TO. The impact of a comprehensive program of health aerobics and mental fitness on the level of physical health of women of the first mature age. *Sports science of Ukraine*. Lviv: LNUFKS. 2019:87-94. *Ukrainian*
11. Cihangiroglu Z. Healthy Life Style Behaviors and Related Influencing Factors of the Students of Elazig High School of Health Sciences of Firat University. *Firat Medical Journal*. 2011;16(2):78-83.
12. Diachenko-Bohun M, Rybalko L, Grygus I, Zukow V. Health preserving educational environment in the condition for information technologies. *Journal of History Culture and Art Research*. 2019;8(2):93-101.
13. Lavrentieva LO, Rybalko LM, Lakomova OO. Implementation of the dual system of vocational education: history, trends, perspectives. The actual problems of the world today: collective monograph. London: UK. 2019:114-124.
14. Miier TI, Holodiuk LS, Rybalko LM, Tkachenko IA. Chronic fatigue development of modern human in the context of V. Vernadsky's noosphere theory. *Wiadomości Lekarskie, Polskie Towarzystwo Lekarskie*. 2019; LXXII.5.II:1012-1016.



15. Rybalko L, Zukow V. Physical culture and health activities in higher education institutions of Ukraine and Poland: a comparative aspect. *Humanitarian Bulletin of Poltava NTU named after Yuri Kondratyuk. Poltava: PoltNTU named after Yuri Kondratyuk*. 2019;5-6:62-68.
16. Tugut N, Bekar M. University student's health perception state and the correlation of health promotion lifestyle. *Journal of Anatolia Nursing and Health Sciences*. 2008;11(3):17-26.
17. Yopa TV. Formation of healthcare competence future professionals in physical culture and sports. Perspectives of world science and education: 2nd International scientific and practical conference, October 30-31, 2019. CPN Publishing Group, Osaka, Japan. 2019:552-555.

The author claims no conflict of interests.

Author's information:

Lina RYBALKO,

doctor of pedagogical sciences, professor

chief of the department of physical education and sport,

National University «Yuri Kondratyuk Poltava Polytechnic»,

Poltava, Ukraine

ORCID: 0000-0001-6092-9442

E-mail: lina-rybalko@ukr.net

The article received January 23, 2021

Rybalko L. Physical education and recreational model of health-preserving technologies in comprehensive secondary education institutions. *Sports Science and Human Health*. 2021; 1(5):66-83. DOI:10.28925/2664-2069.2021.17