

## ФІЗИЧНЕ ВИХОВАННЯ РІЗНИХ ГРУП НАСЕЛЕННЯ

### PHYSICAL CONDITIONS MONITORING SYSTEM FOR MATURE WOMEN IN THE PROCESS OF HEALTH-IMPROVING SHAPING ACTIVITIES



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#### Анотація

У статті розглядаються основні етапи системи моніторингу фізичних кондицій жінок різного періоду зрілого віку в процесі оздоровчих занять шейпінгом. Проведений педагогічний експеримент включав в себе виявлення вихідного рівня фізичних кондицій жінок, критеріїв індивідуального підходу і диференційоване застосування індивідуальних шейпінг програм. Ефективність запропонованої системи моніторингу шейпінг процесу підтверджується оптимізацією загального рівня фізичних кондицій жінок різного періоду зрілого віку згідно нормам розвитку.

**Ключові слова:** шейпінг, жінки, зрілий вік, фізичні кондиції, морфофункціональний стан, фізична підготовленість, моніторинг, процес, оздоровлення.

#### Аннотация

В статье рассматриваются основные этапы системы мониторинга физических кондиций женщин разного периода зрелого возраста в процессе оздоровительных занятий шейпингом. Проведенный педагогический эксперимент включал в себя выявление исходного уровня физических кондиций женщины, критериев индивидуального подхода и дифференцированное применение индивидуальных шейпинг программ. Эффективность предложенной системы мониторинга шейпинг процесса подтверждается оптимизацией общего уровня физических кондиций женщин разного периода зрелого возраста согласно нормам развития.

**Ключевые слова:** шейпинг, женщины, зрелый возраст, физические кондиции, морфофункциональное состояние, физическая подготовленность, мониторинг, процесс, оздоровление.

**Statement of the problem.** Human health is a basic characteristic of human life. Few people think of health having limits as well as means of increasing its level. Knowing the limits of human health, one can forecast it reliably for the near and distant future. Modern understanding of health can be interpreted as a dynamic state of the organism [1, 7].

Human development may consist of destructive processes (old age) and those which stabilize the viability and increase life expectancy (vitaukt) [7].

Therefore, aging necessitates involvement of mature citizens into physical culture, mainly to maintain the optimum level of their physical condition.

It is generally understood that physical condition is a set of indicators of physical development, physical and functional level of preparedness, physical health and body build, which are relevant to norms, requirements and standards for specific age and gender [13].

In modern conditions of life It is impossible to provide high-performance, sustainable health, creative and physical longevity without the involvement of physical culture. Physical exercises are known to be



the primary means of providing disease prevention and active and creative longevity [13]. A prerequisite for optimizing the level of women's health is the high level of their motor activity. It is possible to involve women in doing systematic physical exercises only if they are offered innovative methods, popular tools in combinations which are interesting for them [7, 9].

There is a diversity of health-improving methods with the reserved rights for older persons in the sphere of physical culture [1, 4, 8, 9], which are based on both traditional and non-traditional means, but their practical implementation is difficult due to insufficient in-depth screening of the population, lack of scientifically-practical recommendations for the determination of individual effects of exercising on the body of this age segment. The unresolved issue of the rationalization of motor modes for persons of different periods of mature age fails to help in achieving proper health-improving effect, and in some cases, there are negative consequences. In view of this, we can talk about the existing shortage of optimal fitness programs that can give visible long-term complex health benefits, vividly observed in increasing work efficiency, health, multifaceted development of motor skills and in slowing age-related changes of vital body systems [1, 9, 10].

Shaping technique in the modern sense represents a knowledge-based system that uses advanced technologies for a high-performance application and a guaranteed result. In this regard, let us consider shaping trainings as a complex and balanced way of sports activities, including organizational, diagnostic, educational and remedial-preventive directions [3, 5].

The improvement of the system of shaping trainings become topical on the one hand due to the involuntional changes in the functional, physical and adaptation indicators which are generally disclosed in

women of mature age and on the other hand, due to the lack of methods, fully improving the physical conditions, while most practical programs have a narrow range of effects [3].

One of the options for development of the system of health-improving shaping lessons in the sphere of creating and maintaining women's health is monitoring analysis of their physical development, physical fitness and functional somatic health.

Monitoring means actions aimed at implementing such functions as surveillance, prevention, control, management, forecasting, and it is a system that allows to carry out continuous monitoring of the initial and current states of a particular object, record its essential characteristics, evaluate them, develop long-term directions of health-improving programs, make management decisions and identify the impact of various processes and factors on the object [10, 11].

The effectiveness of monitoring and evaluation of physical conditions of training women based on that are provided with the corresponding age standards. A standard is one of the necessary conditions for monitoring, as only when it is available it becomes possible to compare the obtained results which determine the level of influence on the female body [11, 12].

This raises the need for a monitoring system of the proposed health-improving method of shaping classes for women of mature age with the view of improving their level of physical condition.

**The analysis of researches and publications.** It has been proved recently that the interest for non-traditional types of motor activity, based on the principles of rehabilitation, maintenance of the level of physical condition is arousing. Shaping is one of such types of motor activity [5, 11].

Nowadays innovations in the sphere of physical culture as well as

in many other spheres of human activities, become a natural phenomenon. As you gain knowledge and experience in this field, new ideas to transform a health and fitness process and guarantee the health of the population have been formulated [3].

Innovative health-preserving technologies are the basic component of a modern progress in the sphere of physical culture and they are always becoming the subject of scientific research [3, 7, 10, 11]. Currently, an extensive use of innovative motor activity is caused by a certain sociocultural request. The new value orientations of a modern man to a healthy and active lifestyle determine a health-improving direction in the development of fitness industry. A modern society has a wide range of personal needs for physical, functional and mental improvement.

Innovative methods in the sphere of sports and recreational activities aim at satisfying the range of individual needs. Nowadays there is a necessity of the implementation of integrated innovative technologies based on modern educational and informational methods, advanced technical equipment, as well as scientific and technological developments, where the main objective is to improve the quality of life, the level of health and to increase life expectancy [3, 10].

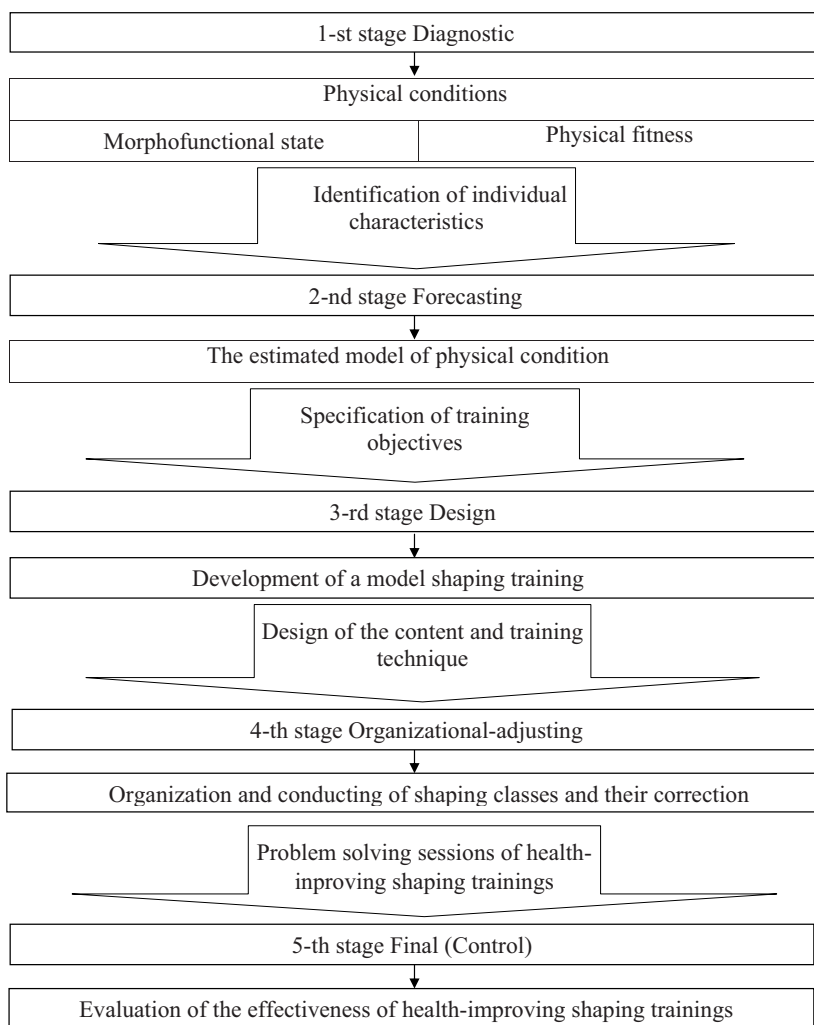
A very topical issue of modern theory and practice is the search for new high-performance health-improving technologies aimed at maximizing the involvement of all strata of the population in active physical education classes.

**Objective:** to develop and experimentally substantiate the system of physical condition monitoring for women coming of age in the process of health-improving shaping activities.

#### **Tasks of research:**

1. To develop the basic stages of organizing the system of health improving shaping process moni-





**Figure 1. The main stages of the shaping activities monitoring system for women coming of age.**

toring for practicing with women of mature age.

2. To evaluate the initial level of physical condition of mature women at different periods.

3. To assess the effectiveness of the developed system of physical condition monitoring for mature women at different periods in the process of health-improving shaping activities.

**Research results and their discussion.** The introduction to the health-improving process of the monitoring system of study and adjustment of physical conditions of women coming of age was carried out on the basis of the Gomel health and fitness center. The pedagogical

experiment has identified the main stages of the health-improving shaping process monitoring system for women coming of age (fig. 1). The present study involved 87 women aged from 21 to 55 years.

The first (diagnostic) stage of the monitoring system suggested the analysis of physical condition level and state of somatic health of mature women at different periods.

The evaluation of the physical conditions of the given community was based on the testing of functional status, physical development as well as an analysis of the level of their physical fitness.

The testing of the initial morphofunctional state of women of

varying maturity has identified deviations from the norm of most indicators (table 1). All women surveyed have an excess of body weight compared with the standard indicators. Moreover, the older the women are, the more the excess is: in the Group aged 21-35 years it accounted for 14% (upon average 8 kg), in the group aged 36-55 years – 23,4% (14 kg). The following indicators go beyond the normal range of development: weight-height index has risen by 7,7% in the first age group and by 19,2% in the second group; vital capacity of lungs (VCL) has increased by 12,8% and 17,6%, life index has gone up by 19,2% and 35,5%, heart rate at rest index – by 10,8% and 12,9%, the sample results of breath-holding index – by 3,7% and 23,8%, indicators of overall efficiency as measured by test PWC170 – by 11,1% and 9,3%, systolic blood pressure of women aged 21-35 years – by 4%, women aged 36-55 years the indicators are above the normal rates by 9,5%. All these indicators speak about mild hypertension.

The sample results with sit-ups of all age groups are at the bottom border which reflects the cardiovascular response to exercise.

Besides the body composition of mature age women is characterized by a significantly exceeding fat body mass component and, on the contrary, a decreasing muscular body mass component. The analysis of the secondary indicators has revealed that there are differences between different groups of mature age women – the older the women are, the higher a body fat percentage is. All women have the greatest concentration of fatty tissue located in large areas of the body: the stomach, the thighs, the shoulders and the back, which indicates a clear violation of physique proportionality.

The level of physical fitness of women aged 21-35 years (according to Y.N. Vavilov) [2] is marked as below average (-0,18). The results of test exercises show that the subjects



Table 1

**Change dynamics of physical conditions of mature women of I and II age groups during the pedagogical experiment ( $X \pm m$ )**

Indicators	21-35 years (n=46)		36-55 years (n=41)	
	Before experiment	After experiment	Before experiment	After experiment
Morphofunctional state indicators				
Height (cm)	165,4±1,3	165,5±1,4	166,3±1,0	166,4±1,1
Body weight (kg)	66,7±2,1	57,4±1,1*	74,4±4,3	65,0±1,3*
The Quetelet index (gm/cm)	404,2±12,7	347,8±6,7*	447,3±25,9	390,6±7,8*
VCL (ml)	2962,3±34,2	3359,3±76,0*	2883,0±26,5	3186,0±86,0*
The plan. index (ml/kg)	44,4±0,9	58,5±0,7*	38,7±1,8	49,0±0,3*
Heart rate at rest (beats/min)	78,5±1,2	69,6±2,8*	86,2±1,4	75,1±0,4*
Systolic pressure (mm Hg)	124,8±3,5	116,5±2,4*	143,7±4,0	129,2±1,4*
Diastolic pressure (mm Hg)	76,8±2,2	70,2±1,6*	87,8 ±3,5	77,5±1,5*
Stange's test (sec)	38,6±4,0	51,2±0,9*	32,3±5,3	40,2±4,9*
PWC170 (kg m/min kg)	11,2±0,4	12,7±0,4*	10,7±0,2	11,7±0,2*
Recovery time after 20 sit-ups (sec)	120,2±9,7	100,4±2,6*	132,1±15,3	105,4±13,1*
Neck hold (cm)	32,8±1,2	30,7±0,7	32,3±0,4	31,1±0,4
Waist hold (cm)	83,1±1,4	70,1±1,2*	89,5±1,1	75,1±1,2*
Buttocks hold (cm)	100,1±1,4	93,1±0,6*	108,0±2,0	100,0±1,9*
Hip circumference hold (cm)	60,0±0,8	54,2±0,7*	67,1±1,4	61,7±1,4*
Shin circumference hold (cm)	35,0±0,4	34,0±0,2*	36,9±0,4	35,0±0,3*
Leverage BHC rear (mm)	17,6±0,4	10,3±0,2*	21,3±0,4	17,7±0,3*
Back light rear (mm)	15,6±0,9	9,6±0,5*	21,5±0,2	18,8±0,3*
CHD belly top (mm)	13,3±0,8	8,6±0,8*	22,6±1,7	16,2±0,4*
CHD belly bottom (mm)	25,7±0,8	16,8±0,8*	33,8±0,6	20,4±0,6*
CHD thighs front (mm)	22,8±1,1	17,0±1,0*	27,1±0,1	20,6±0,1*
CHD thighs rear (mm)	26,4±0,2	20,8±0,3*	33,4±0,7	24,4±0,6*
Fat component (%)	28,3±1,2	23,8±0,7*	39,4±7,3	26,6±0,9*
Muscle component (%)	30,4±0,4	38,6±0,9*	22,8±0,6	28,6±1,6*
Indicators of physical fitness				
Running 1000 m (sec)	325,5±1,2	319,2±1,3*	371,2±1,3	363,1±1,0*
Lean forward (cm)	5,5±0,3	10,1±1,8*	2,4±1,2	4,4±1,0*
Fold. and unfold. (number of times)	6,5±0,9	14,2±0,8*	2,6±0,7	6,1±1,0*
Ipos on the bar (sec)	9,6±0,3	15,6±0,3*	5,4±0,2	11,3±0,3*
Long jump from their seats (cm)	130,7±0,9	133,9±0,8*	110,4±0,7	124,3±1,1*
The FSA by Y.N. Vavilov (c.u.)	-0,18±0,1	0,21±0,2*	-0,27±0,2	0,18±0,2*
Motor age by Y.N. Vavilov (years)	35,7±1,6	26,1±0,5*	53,3±0,5	38,0±1,0*
Level of health by G.L. Apanasenko, points	-1	12*	-4	7*

Note: \*-the reliability of differences in Student's t-test  $p < 0,05$ .

have total endurance indexes on average 5% below the guideline values and force endurance index is lower by 40% , strength indexes

– by 40,9%, strength-speed-power abilities indexes – by 15%, explosive force index – by 4,5% and flexibility index – by 21,4%. The mo-

tor age of this group is 35,7 years, which is almost 7 years above real (passport) markings.

The analysis of test results of



Model shaping training for women coming of age

Blocks classes focus	Motor mode
1-th warming-up block: adaptation of body to physical activity	General
2-nd stretching block: increasing of the flexibility of the body, improving the mobility of the spine and joints, ligaments, muscles	
3-rd power unit: development of strength abilities, endurance, formation of physique, normalization of body composition	Individual: 1 video instructor (60% HRR max) 2 video instructor (70% HRR max) 3 video instructor (80% HRR max)
4-th aerobic block: development of general endurance, decrease of body mass index	
5-th correction block: individual correction of problem areas of the body	
6-th preventive block: preventive maintenance of diseases	
7-th static block: force development, regulation of muscle tone, strengthening of ligaments	
8-th recovery block: recovery of functional systems, acquisition of neuromuscular balance	General

women of the second group shows that the overall level of their physical condition is close to evaluating low (-0,27) «satisfactory». The subjects have got retreating for the worse from the norm total endurance indicators (by 9,6%) and force endurance indexes by 40%, force indexes – by 48%, speed-strength abilities indexes – by 18%, explosive force index – by 8% and flexibility index – by 40%. The average motor age of this group is 53,3 years, which exceeds the average passport one by 11 years.

The initial level of health of the subjects of all age groups, measured by G.L. Apanasenko's methodology [6] in sub-zero values, is assessed as low.

The results of the second (predictive or forecasting) stage on the bases of obtained data of the initial level of physical conditions of mature women let us define a task model of health-improving shaping training to increase the level of physical conditions of women aged 21-35 years and 36-55 years: - improvement of the physique proportions (weight reduction, normalization of body composition, body parts reduction and skin-fat folds size reduction), - restoration of the level of functioning of vital body systems, - preven-

tion of diseases caused by age-related changes in body, - achievement of normative indicators of the basic physical qualities, - record and satisfaction of needs, individual differences of the subjects in the process of trainings.

The third (designing) stage allowed to develop a model for shaping sessions for mature women (table 2).

At the fourth (organizational-adjusting) stage the formed subgroups of mature women practiced simultaneously, but each did this in its individual motor sector with a video-instructor according to the developed model of shaping exercises. During trainings, if necessary, the content of the exercises was being adjusted as an individual approach to each subject. Classes were held three times a week during 60 minutes. The pedagogical experiment had been conducted during eleven months.

The estimation of efficiency of the developed content and technique of health-improving shaping trainings for women has been carried out at the fifth (control) stage. The effectiveness of the used approaches has been defined by dynamics and reliability changes in the indicators characterizing the overall level of

physical condition of women.

The result of the differential application of individual shaping programs for mature women of different age has led to an increased level of morphofunctional state (table 1).

The analysis of data obtained from studies of morphofunctional state of women in both age groups (21-35 and 36-55 years) has identified reliable changes in all indicators in comparison with the original ones.

After eleven months of classes in all age groups, the body weight of the test subjects significantly (to 5% of the level of significance) has dropped: in the group of women aged 21-35 years the body weight has dropped by 13,9%, or 9,3 kg, making due weight, and in the group of women aged 36-55 years the body weight has dropped by 12,6%, or 9,4 kg. The Quetelet index is also marked by credible reduction in the first group by 13,9% and in the second group by 12,7%. The indicators of lung capacity in the group of women aged 21-35 years have grown by 13,3% (397 ml) and in the group of women aged 36-55 years - by 10,5% (303 ml). The life index indicators in the first age group have increased by 31,7% - (14,1 ml/kg) and conform to the norm, as far as



the women of the second age group are concerned their life index indicators have increased by 26,6% (10,3 ml/kg) and may be noted as a norm-approaching.

In the process of health-improving shaping trainings women of all age groups have greatly improved the results of functional tests and reached the standards. The greatest increase in the Stange's test occurs in the first age group by 32,6% (12,6 sec), in the test PWC170 – by 13,4% (1,5 kg m/min kg), the representatives of the second age group have increased their results by – 24,4% (7,9 sec) and 9,3% (1 kg m/min kg) accordingly, what indicates a good physical condition.

The heart rate at rest among women aged 21-35 years has decreased by 11,3% (8,9 beats/min), systolic pressure by 6,6% (8,3 mm Hg), diastolic pressure by 8,5% (6,6 mm Hg). There has also been a significant reduction in indicators of the second age group: the heart rate has decreased by 12,8% (11,1 beats/min), systolic pressure by 10,1% (14,5 mm Hg), diastolic pressure by 11,7% (10,3 mm Hg). It should be noted that all these indicators correspond to their normative meanings.

The body composition assessment has showed that the body fat percentage in all the groups studied has lowered. There has been noted a dynamical reduction of a fatty component in all the studied groups of women: in the first age group by 15,9%, in the second age group - by 32,4%. On the contrary a muscle component has increased by 26,9% and 25,4%. The body composition indicators have reached the standards.

The level of somatic health of the subjects assessed by G.L. Apanasenko's methods has certainly increased: the increase in the first age group has amounted to 13,0 points, score «above average», in the second group it has amounted to 11,0 points, which corresponds to the «average» valuation of the functional health level.

The subjects have reliably increased their results in test exercises, which allow to estimate various aspects of their physical fitness: flexibility, endurance, strength and speed. The level of physical condition of women aged 21-35 years has increased (0,21) and become close to the assessment of «excellent» and the level of physical condition of women aged 36-55 years has become a bit smaller (0,18) and scores «above average». The amount of motor age of the first age group, estimated by Y.N. Vavilov has dropped by 26,8% (by 9,6 years) and composes 26,1 years which is below average passport age of the subjects. The motor age of the women of the second age group has decreased by 28,7% (by 15,3 years) and amounts to 38 years of age, which is also lower than the actual age.

**Conclusions.** The results of the study allow to make the following conclusions:

1. A structured approach to the development of the content and health-improving shaping trainings technology for mature women allows to optimize the improvement process, excluding negative sides through rationally qualitative organization of each stage.

2. The monitoring of the initial level of the physical condition of women of the first and second mature ages according to the most indicators of physical development, functional status and physical fitness have identified deviations from the norm. A developed block model of health-improving shaping trainings promotes an integrated solution of scheduled tasks in the process of shaping trainings to improve the overall physical condition of women of different mature age.

3. The results of the pedagogical experiment on the basis of individual orientation programs and application of multiple-purpose exercises have shown that the selection tools used and the shaping training method have allowed significantly ( $p < 0.05$ ) to improve the indicators

of physical development, health, functional status and physical fitness of the women of the tested age groups. The proposed technique of shaping classes has optimized the overall level of physical condition of the women of the first and second stages of adulthood according to the normative indicators.

**Prospects of the further researches** are focused on the task-oriented study of the influence of differentiated shaping trainings on the psycho-emotional condition of mature women of different age.

#### List of references

1. Batischeva, L.D. (2007), "Prevention of premature aging of women coming of age on the basis of health-improving physical education tools", Thesis abstract for Cand. Sc. (Education), 13.00.04, Adyge State University, Maykop, Russia.
2. Vavilov, Y.N. (1997), Check yourself [Prover sebya], Theory and practice of physical education, Russia.
3. Grigorev, V.I. (2008), "Methodical aspects of technological development of the fitness industry", *Fitnes v innovatsionnyih protsessah sovremennoy fizicheskoy kulturyi. Materialyi Vserossiyskoy nauchno-prakticheskoy konferentsii* [Fitness in innovative processes of modern physical culture. Collection of materials of the All-Russian Academic conference], Saint Petersburg, RGPU im. A.I. Gertsena, September 4-6, 2008, pp. 17-32.
4. Zhigalova, Ya.V. (2003), "The design of integrated health-improving fitness programs for women aged 30-50", Thesis for Cand. Sc. (Education), 13.00.04, Moscow City Pedagogical University, Moscow, Russia.
5. Ivliev, B.K. (2006), "Organizational and pedagogical foundations of shaping technology development in Russia", The-



- sis for Cand. Sc. (Education), 13.00.04, Russian State University of Physical Culture, Sports and Tourism, Moscow, Russia.
6. Landa, B.H. (2006), Metodika kompleksnoy otsenki fizicheskogo razvitiya i fizicheskoy podgotovlennosti [The technique of integrated assessment of physical development and physical fitness], Sovetskiy sport, Moscow, Russia.
  7. Mityaeva, A.M. (2008), Zdorovesberegayushchie pedagogicheskie tehnologii [Health-saving pedagogical technologies], Akademiya, Moscow, Russia.
  8. Plaxina, O.I. (2008), "Fitness clubs individual health and strength training for women", Thesis for Cand. Sc. (Education), 13.00.04, Russian State Social University, Moscow, Russia.
  9. Repnikova, E.A. (2003), "The technique of improving the effectiveness of shaping trainings on the basis of stato-dynamic regime of exercises application", Thesis for Cand. Sc. (Education), 13.00.04, Volgograd State Academy of Physical Education Culture, Volgograd, Russia.
  10. Seluyanov, V.N. (2009), Tehnologiya ozdorovitelnoy fizicheskoy kulturyi [The technology of health-improving physical culture], TVT Division, Moscow, Russia.
  11. Smirnov, S.I. (2013), "Organizational and pedagogical factors of fitness services management", Thesis for Cand. Sc. (Education), 13.00.04, National State University of Physical Culture, Sport and Health named after P.F. Lesgafta, Saint Petersburg, Russia.
  12. Utenko, V.N., Balandin, V.I., and Shchegolev, V.A. (2000), "The use of non-traditional means of health-improving physical training: State of the problem and possible solutions", Vestnik Baltiyskoy akademii nauk, no. 1, pp. 8-14.
  13. Yatsevirskaya, R.S. (1998), Sotsialnaya gerontologiya [Social gerontology], MGSU «Soyuz», Moscow, Russia.

