ISSN 2311-6374

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
KHARKIV STATE ACADEMY OF PHYSICAL CULTURE

SLOBOZHANSKYI HERALD OF SCIENCE AND SPORT

Scientific and theoretical journal

Published 6 times in a year
English ed. Online published in October 2013

Vollum 8 No. 5

Kharkiv
Kharkiv State Academy of Physical Culture
2020

P 48
UDC 796.011(055)"540.3"

Slobozhanskyi herald of science and sport: [scientific and theoretical journal]. Kharkiv : KhSAPC, 2020. Vol. 8. No. 5. 129 p.

English version of the journal "SLOBOZANS`KIJ NAUKOVO-SPORTIVNIJ VISNIK"

The journal includes articles which are reflecting the materials of modern scientific researches in the field of physical culture and sports.
The journal is intended for teachers, coaches, athletes, postgraduates, doctoral students research workers and other industry experts.

Contents Themes:
1. Physical education of different population groups.
2. Improving the training of athletes of different qualification.
3. Biomedical Aspects of Physical Education and Sports.
4. Human health, physical rehabilitation and physical recreation.
5. Biomechanical and informational tools and technologies in physical education and sport.
6. Management, psychological-educational, sociological and philosophical aspects of physical education and sport.
7. Historical aspects of the development of physical culture and sports.

Publication of Kharkiv State Academy of Physical Culture
Publication language – English

ISSN (English ed. Online) 2311-6374
ISSN (Ukrainian ed. Print) 1991-0177
ISSN (Ukrainian ed. Online) 1999-818X
Key title: Slobozhanskyi herald of science and sport
Abbreviated key title: Slobozhanskyi her. sci. sport

SLOBOZHANSKYI HERALD OF SCIENCE AND SPORT

scientific and theoretical journal **Vollum 8. No. 5. 2020**

CONTENT

UDC [796.075.6:796.077.5:796.062]

ISSN (English ed. Online) 2311-6374

2020. Vol. 8. No. 5, pp. 5-16

TECHNOLOGY OF MANAGERIAL COMPETENCE FORMATION OF FUTURE MANAGERS OF PHYSICAL CULTURE

Oleksandr Aghyppo
Maryna Korolova

Kharkiv State Academy of Physical Culture,
Kharkiv, Ukraine

Purpose: to develop and theoretically substantiate the technology of forming the managerial competence of future managers of physical culture.

Material and methods: a theoretical analysis of modern literature on the problem under the study was carried out; the regulatory framework for the training future managers of physical culture is analyzed; a survey of applicants for education of the second (master's) level of higher education was conducted (n = 50); using the method of paired comparison, an expert assessment among the teaching staff of the Kharkov State Academy of Physical Culture (n = 10) was carried out.

Results: the concepts of “competence”, “competency”, “managerial competence”, “managerial competency” were clarified; self-assessment was revealed and self-analysis of applicants for education of the second (master's) level of higher education of learning outcomes in terms of the level of formation of their managerial competencies was carried out; the most significant managerial competencies of the future managers of physical culture were determined. Based on the results of our own research, the matrix of managerial competence of a physical culture manager is presented. The technology has been developed and substantiated: methods, forms and

means of forming managerial competence among future managers of physical culture.

Conclusions: management competencies have been identified, which are important for the implementation of the future management activities of physical culture managers, among them the first five positions are occupied by: leadership, idea generation, communication, mastery of the system for solving managerial problems and business qualities.

Keywords: applicant for higher education, manager of physical culture, competence, managerial competence, managerial competencies.

Introduction

As you know, the manager in his professional activity daily solves a number of tasks that require special knowledge, skills, abilities, including those acquired in the process of special training - education. The Law of Ukraine "On Higher Education" (2014) [4] states that the learning outcomes are the competencies that a person has acquired in a higher education institution in the relevant field of knowledge according to a certain qualification.

The analysis of the literature shows that mostly scientists consider competence as an evaluation category that characterizes a person as a subject of activity, his ability to successfully perform their duties [2]. In the scientific works of modern scientists you can find theoretical approaches to determining the professional competence of future managers in various fields, including physical culture and sports (Dubrevsky Yu., 2008; Svertnev O., 2017; Kryshtanovich S., 2018; Kovalenko Y., 2019), education (Bereka V., 2008; Zgalat-Lozynska L., Golovach N., 2018), health care, economics. Authors [1; 3; 5; 6; 7; 9] agree that professional competence is the practical realization of professional abilities and business qualities of an employee in their synergetic relationship and interdependence.

The purpose of the study is to develop and theoretically substantiate the technology of formation of managerial competence of future managers of physical culture.

Material and Methods of the research

The study was conducted on the basis of the Kharkiv State Academy of Physical Culture. The study involved 50 applicants for the second (Master's) level of higher education, who study in various educational and professional programs, including the specialization "management and marketing in the field of physical culture and sports." Theoretical analysis of modern research on the researched problem is carried out, the normative-legal base of preparation of future managers of physical culture is analyzed; the concepts of "competence", "competency", "managerial competence", "managerial competencies" are specified. A survey of students was conducted in order to self-assess to determine the level of formation of their managerial competencies. The most significant managerial competencies of future physical culture managers have been identified using the method of "pairwise comparisons" with the involvement of experts. 10 experts in the field of management and marketing from among the teaching staff of the Kharkiv State Academy of Physical Culture acted as experts.

Results of the research

Scientists consider managerial competence in the form of a dynamic system, the formation and functioning of which takes place within the management activities and depends on the nature of the interaction of objective and subjective factors (personal preconditions, process and results of activities). "Competence" is a derivative of the concept of "competence", which is semantically the primary category, system, set of knowledge and skills of the individual. Competences are part of professional competence, which is defined as the knowledge and skills acquired by a person in a particular professional field, as well as the range of powers of any official or body [5; 12].

In turn, modern scientists [5] have formulated 10 basic competencies that are characteristic of management staff: strategic and analytical thinking; possession of a system for solving management problems; generation of ideas; leadership; communicativeness; emotional and volitional sphere; flexibility of behavior; business qualities; organizational and managerial qualities; management culture.

It should be noted that the educational and professional training program for future managers of physical culture provides for the comprehensive formation of all the above competencies, the presence of which, in turn, ensures the acquisition of managerial competence.

In the course of the research we identified managerial competencies, which, according to experts, are the most important for the implementation of future management activities of physical culture managers. Among them, the first five positions are: leadership, generation of ideas, communication, mastery of management systems and business skills. The level of agreement of experts' opinions is high, as the coefficient of variation was V = 8.3%.

As a result of the analysis of expert assessment we have formed the generalized matrix of managerial competence of the manager of physical culture (Table 1):

Table 1

Generalized matrix of managerial competence of the manager of physical culture (according to the results of own research)

Competences	Strategic and analytical thinking	Possession of a system for solving management problems	Generation of ideas	Leadership	Communicative	Emotional and volitional sphere	Flexibility of behavior	Business qualities	Organizational and managerial qualities	Management culture
Strategic and analytical thinking		1	1	0	0	2	2	0	1	0
Possession of a system for solving management problems	1		0	0	2	1	2	1	1	2
Generation of ideas	1	2		1	0	1	2	1	1	1
Leadership	2	2	1		1	1	1	1	1	1
Communicativeness	2	0	2	1		1	1	1	1	1
Emotional and volitional sphere	0	1	1	1	1		0	2	1	1
Flexibility of behavior	0	0	0	1	1	2		1	2	0
Business qualities	2	1	1	1	1	0	1		1	2

Continuation of Table 1

Organizational and managerial qualities	1	1	1	1	1	1	0	1		2
Management culture	2	0	1	1	1	1	2	0	0	

Note*:
where "2" is the priority of the competence, the name of which is indicated in the vertical column on the left;
"0" - the priority of the competence, the name of which is indicated in the horizontal line above;
"1" - competencies are equal in value

Since today self-assessment and self-analysis of students' learning outcomes play an important role in the process of obtaining higher education, we asked applicants for the second (Master's) level of higher education to assess their level of managerial competence. They had to assess on a 10-point scale the level of each of the ten competencies acquired in the learning process. As a result of self-assessment of masters, we received an overall average score for all competencies, namely: "organizational and managerial qualities" - 7.8 points, with the highest scores (8.6), they set such competencies as "mastery of management systems", "communicativeness", "emotional and volitional sphere". We compared the obtained results of self-assessment of managerial competencies of students with the generalized model of managerial competence of future managers of physical culture proposed by experts.

Thus, applicants for the second (Master's) level of higher education, according to the results of self-assessment, do not have the maximum scores on the main competencies that, according to experts, they will need in future professional activities, namely: leadership (7.6 points), generation ideas (7.6 points), communication (8.6 points), mastery of the system of solving managerial problems (8.6 points) and business qualities (7.4 points). Therefore, these competencies should be purposefully developed in the process of professional training of managers (Figure 1).

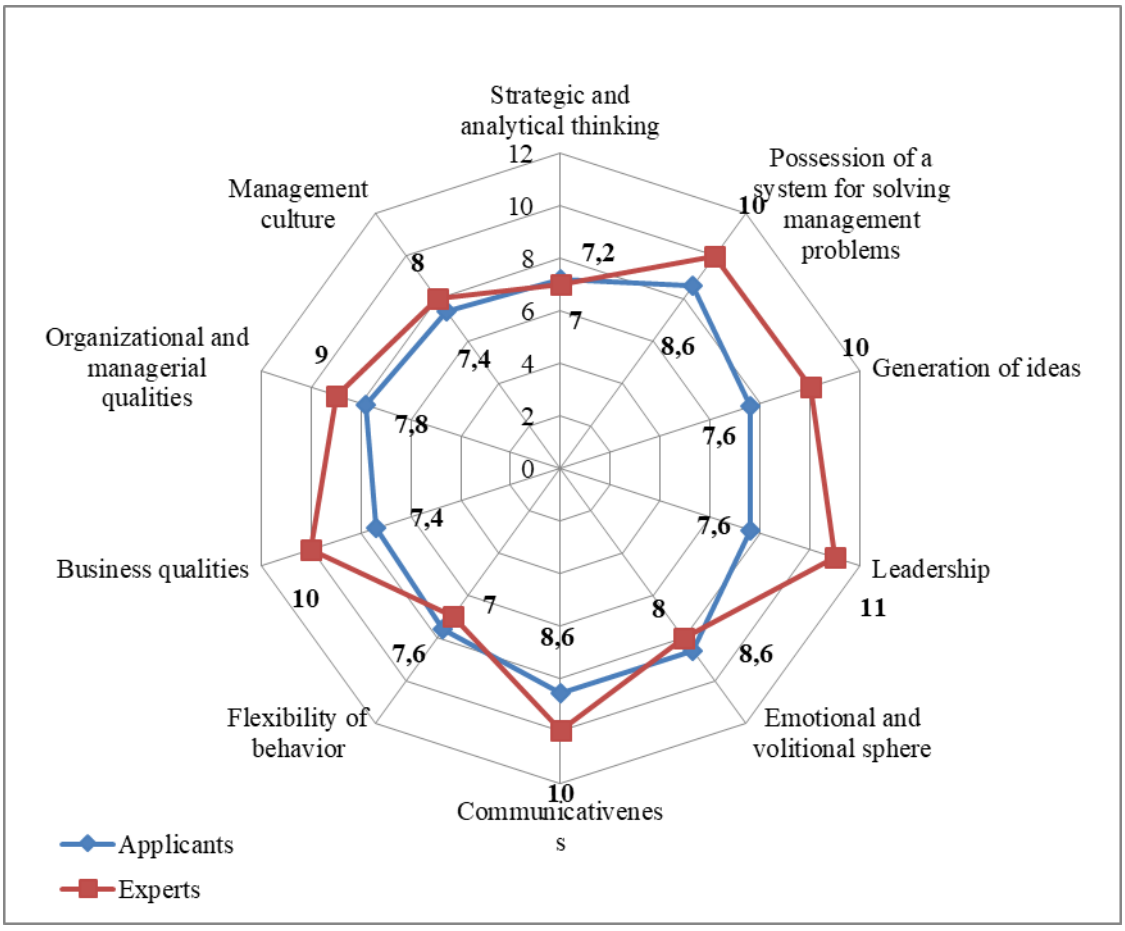

Figure 1. Comparison of the results of self-assessment of managerial competencies of students with the model of managerial competence of experts

Solving this problem requires, in our opinion, the introduction into the educational process of scientifically sound technology for the formation of managerial competence in future managers of physical culture, taking into account modern requirements for this profession.

In the course of our research, under the "technology of formation of managerial competence" we understood a set of psychological and pedagogical methods, techniques, tools, techniques, joint activities of participants in the pedagogical process, which interact in a certain order to achieve a specific pedagogical result - competence formation. We are convinced that such technology will not only determine the system of professional activity of the teacher to create the necessary conditions and opportunities for the successful acquisition of future managers of

physical culture management competencies, but also ensure their further professional development.

Thus, the purpose of the technology developed by us: the formation of managerial competence in future managers of physical culture. To solve this goal it is planned to purposefully influence the main components of the educational process, in particular the initial process through the acquisition of knowledge, skills, the educational process through focus on socially and professionally significant norms of behavior and professionally important qualities, and in general worldview through the formation of correct life values, sociability, growth of self-esteem and personal potential.

The training of future managers in the process of forming managerial competence is based on such traditional and innovative principles of learning as: *differentiation and individualization of learning*, i.e. taking into account individual characteristics of students, combination of group and individual, active and interactive forms of learning; *systematicity and consistency*, in particular, the provision of interdisciplinary links of disciplines; *scientific and social conditionality of learning* and the principle of *practical orientation* and other didactic principles.

Characterizing the technology of formation of managerial competence of future managers of physical culture by structure, it, like any pedagogical technology, contains semantic and procedural components. Under the semantic part we understand the system of knowledge about the tools to achieve goals, the effectiveness of the learning process and so on. This part includes setting, clarifying and formulating goals, pedagogical conditions and stages of learning. We are convinced that the formation of managerial competence of future managers of physical culture will be effective if we take into account the following pedagogical conditions: creating a positive motivational guideline for professional mobility in personality-oriented learning; use of interdisciplinary links in the process of training future managers; the use of modern information technology to teach students the means of solving professional problems.

Acquisition of managerial competence of future managers of physical culture occurs in the unity of motivational and orientation, planning and creative, creative and developmental and reflexive and creative stages. At the motivational and orientation stage, an effective system of motivating the student to study is created on the basis of his value orientation in relation to self-management and the development of managerial competence. At the planning and creative stage, applying the personality and oriented approach to the training of future managers, an individual targeted program of professional development is created. At the creative and developmental stage, the formation of skills of productive self-organization is carried out. At the reflexive and creative stage the assessment and analysis of both educational and managerial result of formation of skills of self-control and self-analysis on the basis of the reflexive approach is provided.

Under the procedural (methodical) part of technology, we understand the organization of direct activities of students and management of the learning process. The procedural and methodical part includes the didactic system itself, which includes motivational support, methods, organizational forms, methodological techniques, didactic tools. Thus, motivational support is provided by forming a clear worldview of future managers regarding professional activities; targeting continuous self-development and self-improvement; creation, improvement and implementation of interesting, modern and diverse educational material; involvement in group activities with the distribution of functions; through active practical and independent activity, as well as through the transfer of experience of real specialists in the field of sports management, etc.

The main methods aimed at forming the managerial competence of future managers of physical culture include: design, interactive methods, case method, method of "brainstorming", method of coaching, facilitation, feedback, "world cafe", etc. In the process of training managers in addition to traditional lectures, seminars, practical classes and independent work, it is advisable to use such organizational forms as lecture-training, problem lecture, lecture-discussion, seminar-conference, business and role-playing games, training and others. Particular attention should also

be paid to methodological techniques, such as activating students' mental activity, stimulation, control, activation of attention, memorization and didactic tools (didactic materials, technical teaching aids) (Figure 2).

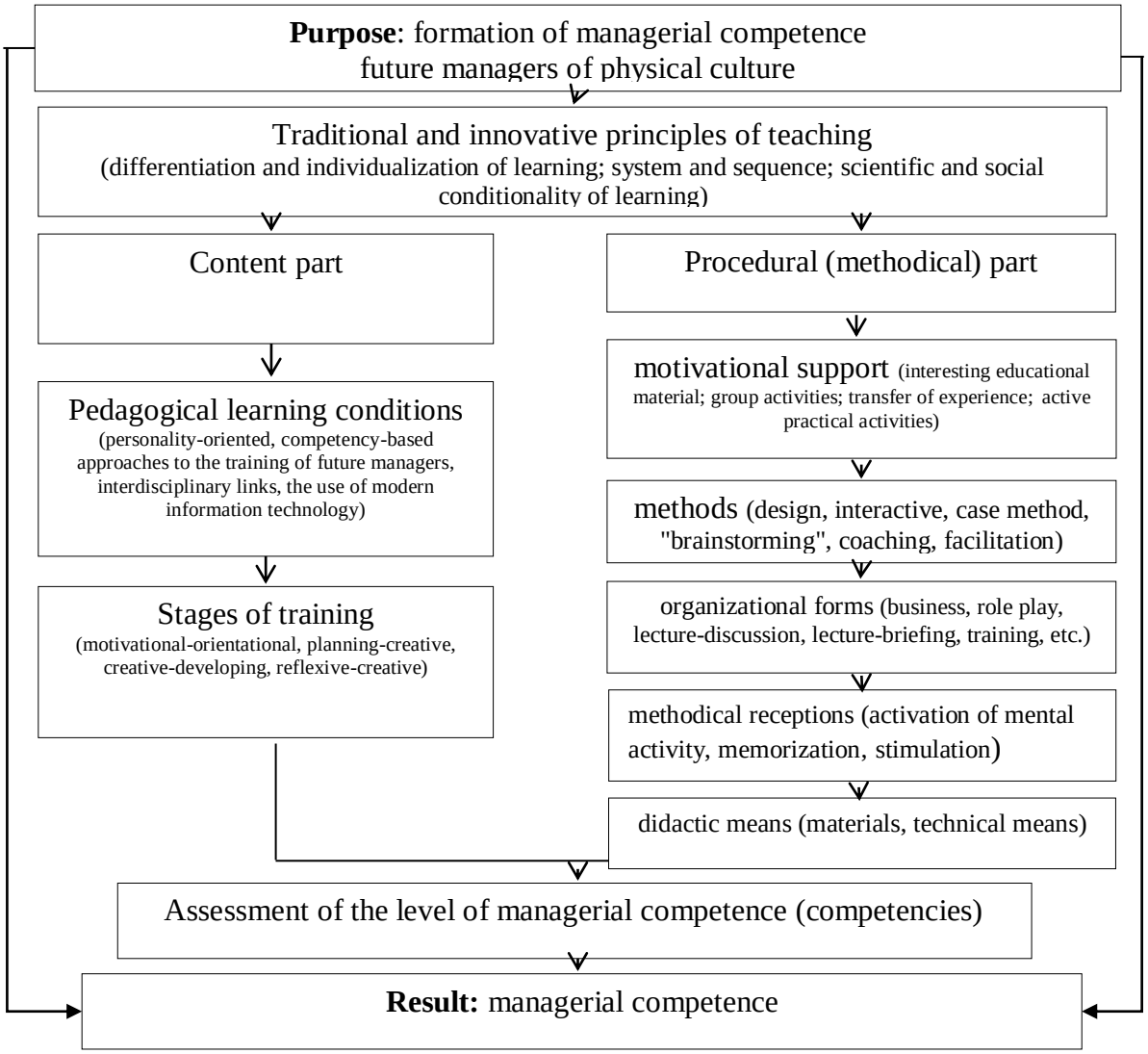

Figure 2. Technology of formation of managerial competence of future managers of physical culture

An important component of our technology is to assess the level of managerial competence, which allows you to create some feedback in order to identify underdeveloped managerial competencies and correct the process of training managers to form managerial competence of future managers.

Conclusions / Discussion

Thus, the analysis of literature sources showed that the manager of physical culture is an important and popular profession for the development of the sports industry. It was found that the authors [1; 2; 5; 8; 11] considered the professional competence of the manager as a leader, manager in modern conditions of functioning of organizations. The literature covers the concepts of "competence", "competency", "managerial competence", "managerial competencies" quite widely and comprehensively. In particular, there are works on the problem of forming competencies in future managers of physical culture and sports [6; 7; 9; 12].

In the course of our research, managerial competencies were identified that are most important for the future management of physical culture managers: leadership, idea generation, communication, mastery of the system of solving management problems and business qualities. The survey of second (Master's) level students of higher education on self-assessment and self-analysis of learning outcomes also shows that these competencies should be purposefully developed in the process of professional training of future managers of physical culture.

Prospects for further research are in further scientific research and substantiation of an effective method of objective assessment of managerial competence of future managers of physical culture.

Conflict of interests. The authors declare that no conflict of interest.

Financing sources. This article didn’t get the financial support from the state, public or commercial organization.

References

1. Bereka, V. Ye. (2008), "Formation of professional competence of the future manager of education", Pedahohichnyi dyskurs. Vypusk 4. pp.20-26. (in Ukr.).

2. Demchenko, Yu. M. (2016), "Improving the professional competence of the head of an educational institution as a factor of innovation in the current socio-cultural situation", Pedahohichni nauky. Vypusk LXXII. Tom 1. pp. 91-96. (in Ukr.).

3. Dubrevskyi, Yu. M. (2008), "Management competence as a component of professional training of future specialists in physical education and sports", Pedahohika, psykholohiia ta medyko-biolohichni problemy fizychnoho vykhovannia i sportu. №6. pp. 91–93. (in Ukr.).

4. Zakon Ukrainy «Pro vyshchu osvitu» (2014), Vidomosti Verkhovnoi Rady (VVR), № 37-38, st.2004. URL: https://zakon.rada.gov.ua/laws/show/1556-18#Text (in Ukr.).

5. Zghalat-Lozynska, L. O., Holovach N. V. (2018), "Method of assessing the development of management personnel in domestic enterprises", Innovatsiina ekonomika. №9-10. pp.69-73. (in Ukr.).

6. Kovalenko, Yu. M. (2019), "Theoretical bases of formation of managerial competence of future managers of sports activity", Innovatsiina pedahohika, Vypusk 13. T.1. pp. 75-78. (in Ukr.).

7. Kryshtanovych, S. V. (2018), "The system of formation of key competencies of future managers of physical culture and sports", Naukovyi visnyk Uzhhorodskoho universytetu. Seriia : Pedahohika, sotsialna robota : zb. nauk. pr. Uzhhorod. Vyp. 1(42). pp. 122-125. (in Ukr.).

8. Leonova, S. V. (2012), "Diagnosis of staff competence based on the use of the principles of pattern recognition theory", Naukovi zapysky Lvivskoho universytetu biznesu ta prava. Vyp. 8. pp. 151-155. URL: http://nbuv.gov.ua/UJRN/Nzlubp_2012_8_37. (in Ukr.).

9. Svertniev, O. A. (2017), "Characteristics of the main competencies of the manager of physical culture and sports in the modern conditions of reforming higher education", Imidzh suchasnoho pedahoha. №7 (176). pp. 19-22. (in Ukr.).

10. Daniel Soucie (2020), "Effective Managerial Leadership in Sport Organizations", Journal of Sport Management. Volume 8: Issue 1, pp. 1–13. (in Eng.).

11. Prystupa, Y., Kryshtanovych, S., Danylevych, M., Lapychak, I., Kryshtanovych, M., Sikorskyi, P., Podolyak, Z. Basarab, V. (2020), "Features of formation the professional competence of future managers of physical culture and

sports", Journal of Physical Education and Sport, Vol 20 (Supplement issue 1), Art 64, pp 441 – 446. (in Eng.).

12. Robert Wood, Tim Payne (1998), Competency-Based Recruitment and Selection. Paperbac, 214 p. (in Eng.).

Received: 21.09.2020.

Published: 26.10.2020.

Information about the Authors

Oleksandr Aghyppo: Doctor of Science (Pedagogical), Professor; Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.

orcid.org/0000-0001-7489-7605

E-mail: ajippoal@gmail.com

Maryna Korolova: Candidate of Juridical Sciences (Ph.D), Kharkiv State Academy of Physical Culture: 99 Klochkivska Str.,

Kharkiv, 61058, Ukraine.

orcid.org/0000-0003-2931-2190

E-mail: m.korolova@khdafk.com

UDC [796.011.2/352:340.134](477)

ISSN (English ed. Online) 2311-6374

2020. Vol. 8. No. 5, pp.17-33

IMPORTANCE OF DECENTRALIZATION FOR THE FURTHER DEVELOPMENT OF SPORTS IN UKRAINE

Tetiana Dorofieieva[1],

Vladimir Prikhodko[2]

Kharkiv National Pedagogical University named after G.S. Skovoroda[1] ,

Kharkiv, Ukraine

Prydniprovska State Academy of Physical Culture and Sports[2],

Dnipro, Ukraine

Purpose: to substantiate the need to spread the practice of decentralization of power in the field of sports in Ukraine, which will contribute to its further development.

Material and methods: generalization of literature and materials from the Internet, abstraction, idealization, analysis and synthesis, induction and deduction.

Results: the content of legislative acts of Ukraine on sports development was analyzed, which allowed to establish significant gaps in their content (declarativeness) and to determine the need for qualitative improvement of regional management of sports development. The problem of low efficiency of the state management of sports development in Ukraine needs further elaboration, as it is characterized by extremely weak implementation of the laws of Ukraine, current regulations and departmental acts.

Conclusions: the analysis shows that the adopted laws and regulations are not those that largely contribute to the development of sports in the field. This is due to the fact that a significant part of their content is marked by declarativeness and lack of established indicators. Decentralization of power creates stronger organizational and financial preconditions for the reform of physical culture and sports according to the «European model». And this, given the high level of public administration (when the leadership is interested in promoting development, ie qualitative change), can ensure the development of sports. This model of competent management allows you to combine resources and opportunities, including the funds of the state body of sports management, other ministries and agencies involved in physical culture and sports, as well as local authorities and public organizations (national sports federations, existing federations in regions and cities, sports clubs, etc.).

Keywords: decentralization, sports development, local authorities.

Introduction

In every democratic country, based on the principle of separation of powers in the interests of ensuring high quality public administration in various fields, where sport is no exception, it is necessary to delimit the competence of public administration bodies. But this process requires determining the optimal level of concentration of power at each institutional level in the public administration system, subject to the necessary condition for further transfer of "surplus" powers to those entities that are closest to the population, i.e. their decentralization.

Decentralization means a way of defining and delimiting the tasks and functions of management, in which most of them are transferred from the level of central bodies to the lower level and become their own tasks and powers of lower levels [2, p. 9]. In this way, a significant part of the administrative activity is entrusted to local authorities or other state-authorized entities.

Decentralization of power in the state significantly contributes to the development of democracy, because, as a result, there is an expansion of the influence of territorial communities, social groups and the general public on matters

of public importance. Therefore, a democratic state seeks to involve the professional community in the implementation of public functions of government in order to optimally meet the diverse needs of each individual and the people as a whole [5; 6].

It is clear that this refers to both the higher (national) level of the government, and the regional and, of course, local level. After all, all power can be concentrated in the hands of central executive bodies and their territorial bodies, as is the case in totalitarian countries [1; 3; 8], or instead to constitute a system of powers granted to various public authorities and other entities, in particular, on the basis of territorial (we are talking about local self-government) [10; 15; 16; 17], the logic of jurisdiction, etc.

Thus, governance in the field of sports at the local level to address existing local affairs can be carried out both through central government by appointing "top" officials of the state apparatus operating on the ground (we are talking about officials of relevant authorities) and within the decentralized system of government, which provides for the provision of functions to elected bodies (subjects) of local self-government and other amateur public organizations (clubs, societies, etc.).

The purpose of the study is to substantiate the need to spread in Ukraine the practice of decentralization of power in the field of sports, which will contribute to its further development.

Material and Methods of the research

The group of methods of theoretical research is used: generalization of literature and materials from the Internet, abstraction, idealization, analysis and synthesis, induction and deduction.

Results of the research

The problem of low efficiency of the state management of sports development in Ukraine needs further elaboration, as it is characterized by extremely weak implementation of the laws of Ukraine, current regulations and departmental acts. For example, the Cabinet of Ministers of Ukraine adopted the Resolution "On approval of the State target social program for the development of physical culture and sports for

the period up to 2020" № 115 of 1.03.2017 [14]. The implementation of the Program was to solve important social problems defined by the Resolution:

- to increase the annual coverage of the population by physical activity by 1-2%;

- to create conditions for social adaptation and rehabilitation of disabled people and people with disabilities;

- to increase the level of readiness of young people for service in the Armed Forces and other military formations formed in accordance with the law, in law enforcement agencies, rescue and other special services in order to protect sovereignty and independence;

- to increase the level of interest of children and youth in social, preventive actions aimed at a conscious attitude to their own health;

- to raise the level of awareness and awareness of different groups of the population on the formation of a healthy lifestyle, prevention of negative phenomena among children and youth;

- to ensure the provision of quality physical culture and sports services by sports clubs and physical culture and health facilities that operate in accordance with established standards;

- to involve up to 13% of children and youth aged 6 to 18 in CYSS, to create conditions for the development of reserve sports and effective replenishment of national teams;

- to ensure the preservation of the leading positions of Ukrainian athletes in international competitions of various levels to raise the prestige of the state in the world sports community;

- to ensure the preservation and creation of an extensive network of modern sports facilities (gyms, swimming pools, sports grounds, etc.) that meet national and international standards, in particular with the involvement of investors, etc.

Unfortunately, there is no public information on the status of implementation of these points, but it is obvious that most of them, if implemented, only partially. Referring to the analysis of the problems of public administration in the field of

physical culture and sports, we believe that the legislation adopted in recent years has not put on the agenda a real (real and systematic) solution to the existing practical problems. First of all, let's analyze the forecast of the amount of funding defined in the specified Program (Table 1).

Table 1

Forecast volumes of financing of physical culture and sports [14, p. 4]

Sources of funding	Volume of financing, thousand UAH	Including by years			
		2017	2018	2019	2020
State budget	8 806 282,1	2 182 625	2 004 450,3	2 061 014,1	2 558 192,7
Local budget	13 651 515,3	2 983 585,1	3 277 919,4	3 565 381,6	3 824 629,2
Other sources	2 867 035,3	533 276,3	743 852	694 236,7	895 670,2
Total	25 324 832,6	5 699 486,4	6 026 221,7	6 320 632,4	7 278 492,1

Stating the growth trend, it is important to analyze not the absolute growth of funding for physical culture and sports from the state budget, as it is influenced by many factors (state of the economy, the need to increase pensions, military action and the need to build a modern army, etc.), but to pay attention to the projected growth from local budgets.

After all, the share of local budgets in 2018 exceeded 50% of the consolidated budget of the country.

Thus, if in 2015 the revenues of local budgets amounted to UAH 98.2 billion, then in 2016 UAH 146.6 billion, in 2017 UAH 192.7 billion, and in 2018. UAH 233.9 billion (the increase in revenues to the general fund in 2017 compared to 2016 in comparable conditions and excluding territories not controlled by the Ukrainian authorities amounted to 21.9% or + 41,976.8 million UAH). In January-December 2019, the general fund of local budgets (excluding inter-budget transfers) received UAH 275,016.4 million. The increase in revenues to the general fund against 2018 (in comparable conditions and excluding territories not under the control of the Ukrainian authorities) amounted to 17.6% or + 41,085.8 million hryvnias [4].

However, this is evidenced by the data in table. 1, provided for a significantly smaller relative increase in local budgets aimed at the development of physical culture and sports, which can be explained by insufficient attention of central government and weak lobbying to attract this source of funding for grassroots sports and high-achievement sports. For example, in 2018, compared to 2017, such an increase should have amounted to UAH 259.2 million, which indicates an increase in funding of only 7.3%. As you can see, at the planning level in the Resolution "On approval of the State target social program for the development of physical culture and sports for the period up to 2020" was a relative reduction in funding for physical culture and sports on the ground in relative terms.

Accordingly, as for the expected results of the State Targeted Social Program for the Development of Physical Culture and Sports until 2020, and they are closely related to funding, there is no reason to hope that it will give a significant impetus to sports development, as a proportional increase in financial resources was provided. The calculations also do not include the construction of sports facilities required on the ground and in the center for training athletes in priority sports (Annex 3 to the Resolution of the Cabinet of Ministers of Ukraine, № 115, from 1.03.2015 "On approval of the State target social program for physical culture and sports for the period up to 2020 "[14]).

Thus, the analysis of the content of the Resolution "On approval of the State target social program for the development of physical culture and sports for the period up to 2020" № 115 from 1.03.2017 indicates an acute problem of weak influence on sports by the state, and this indicates the following : the government does not direct local authorities to increase funds for the development of grassroots sports and high-achievement sports as an important segment of the social sphere in proportion to the increase in local budgets; even some increase in funding for the construction of sports facilities for representative competitions takes place, rather, as places for cultural recreation, without taking into account the need to create conditions in the areas of development of their chosen priority Olympic sports; thus, the central authorities (the Cabinet of Ministers of Ukraine and the relevant Ministry,

which prepares the relevant draft resolutions and lobbies for their adoption), have very little influence with specific macro tools on the development of high-achievement sports in Olympic sports on the ground. The same "blurred", not quantified guidelines are written in the Concept of reforming the field of physical education and sports for the functioning of sports facilities, sports federations, sports clubs, etc. [8].

The processes of decentralization of power, associated with the transfer of a significant amount of power and responsibility from central authorities to the local level (in the region, cities and united territorial communities), necessitated greater involvement of local authorities in the development of physical culture and sports. This was the reason for the adoption by the Verkhovna Rada of Ukraine of the Resolution "On ensuring sustainable development of physical culture and sports in the context of decentralization of power" [13]. In this Resolution, the legislator provided for measures to regulate both mass sports and certain elements of high-achievement sports (although, for example, the activities of CYSS affect both one and the other). But, unfortunately, a significant part of the points of this extremely important Resolution is also declarative, and therefore they are unlikely to be implemented properly.

Thus, in this Resolution the Verkhovna Rada recommended the President of Ukraine to facilitate the inclusion in the evaluation criteria of the heads of local executive bodies of the effectiveness of implementation, approved by the Decree of the President of Ukraine of February 9, 2016 № 42/2016

It was recommended to make the “Program of Sustainable Development of Ukraine for 2020” “Program of Promotion of Physical Culture and Sports” and “Program of Healthy Lifestyle and Longevity” referred to the vector of the movement “Responsibility and Social Justice” as priority issues for the National Council of Reforms as a priority (deadlines for consideration of these issues have not been determined).

This concerns the noted need of the Verkhovna Rada itself to speed up the consideration and adoption of the following extremely important and expected bills:

- on amendments to the Tax Code of Ukraine to ensure the stable development of physical culture and sports (Reg. № 2068);

- on amendments to some legislative acts of Ukraine on the provision of social services (Reg. № 2245);

- on amendments to Article 90 of the Budget Code of Ukraine on financing the sphere of physical culture and sports (Reg. № 2223a);

- on amendments to the Tax Code of Ukraine regarding the taxation of Olympic, Paralympic and Deaflympic training bases (Reg. № 4453);

- on amendments to Article 1 of the Law of Ukraine "On Physical Culture and Sports" on the recognition of Ukrainian national sports;

- on amendments to Article 43 of the Law of Ukraine "On Physical Culture and Sports" to ensure the rights of athletes of the highest category who serve in the Armed Forces of Ukraine and law enforcement agencies;

- on amendments to some laws of Ukraine on the use of sports weapons;

- on amendments to the Law of Ukraine "On Higher Education" to promote physical activity of students;

- on amendments to the Budget Code of Ukraine on deduction of part of revenues from excise duty on the sale of tobacco and alcohol products as a source of additional funding to strengthen the material and technical base of physical culture;

- on amendments to the Tax Code of Ukraine to stimulate business entities that invest in the construction of infrastructure in the field of physical culture and sports;

- holding an "hour of questions to the Government" on compliance with the requirements of the legislation on the development of physical culture and sports.

Similarly (declaratively, at the level of desire) identified the need to "Immediately approve the state target social program for the development of physical culture and sports for the period up to 2020"; to promote the training and participation of national teams of Ukraine in world and European championships and other international sporting events; propose mechanisms of responsibility of heads of central and local executive bodies, local governments, educational institutions for creating inappropriate conditions for leading a healthy lifestyle and ensuring

physiological norms of physical activity of schoolchildren and students, standards of physical fitness; to ensure the organization of a comprehensive inventory of physical culture and health infrastructure in Ukraine, etc.

Therefore, the order of the Ministry of Education and Science of Ukraine to provide in the standards of higher education for the first (bachelor's) level within each specialty the competence of the graduate on the ability to use different types and forms of physical activity for active recreation and healthy living, as well as relevant learning outcomes, in particular regarding the implementation of the established standards of physical fitness, because the hours for the course "Physical Education" are reduced.

The following advice to higher education institutions has not been implemented: “In order to form this competence and achieve appropriate learning outcomes, to provide students with physical education classes for at least two years of study in the amount of 4 hours per week, given that physical education classes have restorative and recreational value". A similar thing happened with other instructions defined in the Resolution [13]. Namely, to supplement the technological requirements for ensuring the implementation of educational activities in the field of higher education (Licensing conditions for educational activities of educational institutions, approved by the Cabinet of Ministers of Ukraine from December 30, 2015 № 1187) in terms of providing higher education students with gyms, stadiums and sports playgrounds (in square meters per student).

Together with the Ministry of Youth and Sports of Ukraine in 2016 to determine strategic directions for modernization of physical education of children and youth in schools, taking into account international experience and domestic realities in order to shape the health of the younger generation, preserve the nation's gene pool and strengthen the state's defense capabilities.

In order to improve the division of persons into medical groups, prevent deaths in physical education lessons, ensure clear regulation and organization of control (medical, pedagogical, medical-pedagogical) over the process of physical education, increase the effectiveness of physical education in educational institutions together

with the Ministry of Youth and Sports of Ukraine and the Ministry of Health of Ukraine to approve the order on the organization of medical, pedagogical and medical-pedagogical control during physical education and sports in educational institutions of Ukraine, recognizing as invalid the order № 518/674 from 20.07.2009 "On ensuring medical and pedagogical control over the physical education of students in secondary schools."

To introduce changes to the order № 1085 of October 15, 2015 on the inclusion in the list of mandatory documents submitted with the application for participation in the competitive selection to higher education institutions, medical certificate form № 086/o, in case of disability - copies a document on the assignment of a disability group. To recommend to the rectors of higher education institutions to promote the creation of sports infrastructure in dormitories in order to attract student youth to regular sports.

The same happened with the order of the Ministry of Regional Development, Construction and Housing of Ukraine to amend the indicators of socio-economic development of the regions in terms of assessing the state of development of physical culture and sports. The same, recorded and not implemented, applies to most of the recommendations to local authorities, local governments on the following:

to take action on: the creation of conditions for regular organized physical activity of the population in order to promote health, taking into account the interests, wishes, abilities and individual characteristics; preservation and development of the network of physical culture and health-improving establishments at the place of residence, work and in places of mass recreation of the population with the use of public-private partnership mechanisms as a condition of involvement of different segments of the population in health-improving leisure; subordination of children's and youth sports schools of communal form of ownership to structural subdivisions of local state administrations, local self-government bodies implementing state policy in the field of physical culture and sports, in order to regulate the financing of such institutions at the expense of local budgets; leasing of sports and material and technical base of educational institutions and local funds of communal property to

children's and youth sports schools that provide physical culture and health and sports services on a free basis; directing in the prescribed manner to restore the sports infrastructure of the state fund of regional development and subventions from the state budget to local budgets for the implementation of measures for socio-economic development of individual territories; providing support for the activities of sports and recreation camps for the rehabilitation and recreation of children engaged in sports.

The same is not specific part of the recommendations for ensuring:

- an annual increase in expenditures from local budgets for the development of physical culture and sports;

- addressing the issues of improving the living conditions of athletes - participants of the XXXI Summer Olympic Games, XV Summer Paralympic Games, X World Games in non-Olympic sports and their personal coaches, especially internally displaced persons;

- creation in the established order at the expense of means of local budgets of regular sports teams of reserve sports and centers of Olympic preparation;

- preservation of existing and creation of new centers of physical health of the population "Sports for all" taking into account opportunities and needs of regions;

- conducting an annual assessment of the physical fitness of the population of Ukraine since 2017;

- implementation of social norms and standards in the field of physical culture and sports, approved by the order of the Ministry of Youth and Sports of Ukraine dated March 28, 2013 № 1 "On approval of the State social standard in the field of physical culture and sports";

- placement of social advertising on the benefits of a healthy lifestyle, physical activity, the formation of responsibility for their own health and the establishment of the national idea of a socially active, physically healthy and spiritually rich person;

- search and attraction of investors, patrons for the restoration and reconstruction of sports infrastructure;

- compliance with the requirements of the legislation on the provision of financial support from the relevant local budgets to local branches of all-Ukrainian public organizations of physical culture and sports;

- compliance with the requirements of the Decree of the President of Ukraine of February 9, 2016 № 42/2016 "On the National Strategy for Physical Activity in Ukraine for the period up to 2025" Physical activity - a healthy lifestyle - a healthy nation "to determine regional action plans Strategies and their financial support;

- resolving the issue of payment for utilities by children's and youth sports schools at preferential tariffs set for the population;

- conducting informational and educational work to promote a healthy lifestyle among the citizens of Ukraine, physical education and sports, the achievements of the best Ukrainian athletes, the establishment of patriotism.

The same applies to the stated wishes on "ensuring the exercise of the right of citizens to exercise and recommend sports to newly elected heads of united territorial communities", namely the following items: to include in the charter of the united territorial community (UTC) the development of physical culture and sports and preserving and strengthening the health of the population as priority areas of community activities; to approve programs of development of physical culture and sports and to provide their financing; to provide in the staff list of the staff of the UTC council the position of a specialist responsible for the development of physical culture and sports in the territory of this community; to promote the creation and operation of physical culture and sports clubs and children's and youth sports schools; take measures to develop and strengthen the material and sports base of UTC, including at the expense of subventions from the state budget to local budgets for the formation of the infrastructure of the united territorial communities.

The same applies to the recommendation of the National Council of Ukraine on Television and Radio Broadcasting to provide for the allocation of a share of airtime in the licensed conditions of television and radio organizations to cover sports events and promote a healthy lifestyle, etc. The control over the implementation of the Resolution was entrusted to the Committee of the Verkhovna Rada of Ukraine on

Family, Youth Policy, Sports and Tourism, but it is clear, according to the analysis of the document, that this control cannot be effective.

It is obvious that a significant part of the measures set out in the Resolution, unfortunately, will not be implemented. This is due to the vagueness, not the specificity of individual items, which does not mobilize officials to implement them and complicates control. For example, this is such an important point of the Resolution as "annual increase in expenditures from local budgets for the development of physical culture and sports." If the Resolution to this item, following the example of a number of European countries, added: “In the budgets of cities and UTC funding of physical culture and sports can’t be less than 3%, and in regional budgets less than 2% of the annual total budget, and respectively 3 % and 2% of their over fulfillment", it would give a strong impetus to the development of the sphere (for example, in the budgets for 2018 for physical culture and sports in Lviv was provided a little more than 1%, in Rivne about the same, in the Dnieper more than 1, 5%, and in Kharkiv 2%) [11, pp. 262-263].

Conclusions/Discussion

Thus, the analysis shows that the laws and regulations adopted in Ukraine are not those that in large part effectively contribute to the development of sports in the field. This is due to the fact that a significant part of their content is marked by declarativeness and the lack of clearly defined indicators.

The decentralization of power that is taking place, according to the potential available in this practice, creates qualitatively different, more powerful organizational and financial prerequisites for the reform of physical education and sports according to the "European model" [12; 18; 19; 20]. And this, in the case of simultaneously ensuring a significantly different level of public administration (when the leadership will be sincerely interested not only in maintaining the status quo, but also in promoting development, i.e. qualitative change), can provide a new reality in sports in Ukraine. This model, with competent management of the sphere, allows combining the resources and capabilities of the state, including the funds of a specialized government body, ministries and departments responsible for physical culture and

sports, as well as local authorities and public organizations (national sports federations, federations, existing in regions and cities, sports clubs).

The current state and level of public administration of sports on the ground is critical and hinders positive change in this social sphere. As you can see, it is necessary to create new and effective legal, organizational and financial preconditions for a significant impact on improving the state of sports.

Conflict of interests. The authors declare that no conflict of interest.

Financing sources. This article didn't get the financial support from the state, public or commercial organization.

References

1. Bliznevskiy, A. Yu. (2015), Programmno-tselevoe upravlenie razvitiem sferyi` fizicheskoy kulturyi i sporta v prostranstve Krasnoyarskogo kraya [Program-target management of development of sphere of physical culture and sports in space of the Krasnoyarsk Territory]: dis.dokt.ped.nauk : 13.00.04. Krasnoyarsk. 381 p. (in Russ.).
2. Boryslavska, O., Zaverukha, I., Zakharchenko, E., Kurinnyi, O., Shkolyk, A., Toppervin, N. (2012), Detsentralizatsiia publichnoi vlady: dosvid Yevropeiskykh krain ta perspektyvy Ukrainy [Decentralization of public power: the experience of European countries and prospects of Ukraine]: naukove vydannia. Kyiv : TOV «Sofiia». 128 p. (in Ukr.).
3. Bortnitskiy, T., Bittel, Ya., Mentelskiy, P. (2015), Samoupravlenie kak put k blagopoluchiyu. Polskiy opyit detsentralizatsii vlasti [Self-government as a way to well-being. Polish experience of decentralization of power]. 105 p. URL: http://decentralizationnow.eu/old/ru/images/materialy/PODRECZNIK_INTERNET_ru.pdf (in Russ.).
4. Vykonannia dokhodiv mistsevykh biudzhetiv za sichen-hruden 2019 roku [Execution of local budget revenues for January-December 2019.].URL : https://mof.gov.ua/storage/files/Довідка_викон_МБ_2019_рік_оновл.pdf (in Ukr.).

5. Zhurba, M. A. (2017), "Foreign experience of state regulation of physical culture and sports", Aktualni problemy derzhavy i prava: zb. nauk. pr. / redkol.: V.V. Zavalniuk ta in. Odesa : Vydavnychyi dim Helvetyka, Vyp. 79, pp. 51-57. (in Ukr.).
6. Kalyna, M. S. (2016), " Actual tasks of the state policy of Ukraine in the field of physical culture and sports in the conditions of globalization and European integration", Investytsii : praktyka ta dosvid, № 21, pp. 91-95. (in Ukr.).
7. Konstitutsiya gosudarstv Evropyi [Constitution of the states of Europe] (2001): v 3-h t.; obsch. red. L.A. Okunkova. Moskva : Norma. 824 p. (in Russ.).
8. Kontseptsiia reformuvannia sfery fizychnoho vykhovannia ta sportu (osnovni polozhennia) [The concept of reforming the field of physical education and sports (basic provisions)] (2014), Kyiv, 13 p. URL: dsmsu.gov.ua/media/ 2014/10/20/8/Koncepciya.pdf. (in Ukr.).
9. Krivoruchko, V. I., Ivanyuzhenkov, B. V., Nelyubin, D. V. (2005), Strategicheskoe upravleniya fizkulturno-sportivnyim kompleksom Rossiyskoy Federatsii [Strategic management of physical culture and sports complex of the Russian Federation] : monografiya. Moskva : Sovetskiy sport, 298 p. (in Russ.).
10. Prykhodko, V., Akhmetov, R., Tomenko, O., Tabinska, S. (2019), "The use of sports rating as a tool for public management of sports development in Ukraine", Sportyvnyi visnyk Prydniprovia, No.1, pp. 53-63. (in Ukr.).
11. Prykhodko, V. V. (2018), Kontseptsiia upravlinnia suchasnoiu systemoiu pidhotovky sportsmeniv [The concept of managing a modern system of training athletes]: monohrafiia. Dnipro, 464 p. (in Ukr.).
12. Prykhodko, V. V. (2017), "Direction, content and principles of the reform of sports of the highest achievements in Ukraine", Sportyvnyi visnyk Prydniprovia, № 1, pp. 308-313. (in Russ.).
13. Pro zabezpechennia staloho rozvytku sfery fizychnoi kultury i sportu v umovakh detsentralizatsii vlady [On ensuring sustainable development of physical culture and sports in the context of decentralization of power] (2016), Postanova Verkhovnoi Rady Ukrainy. Vidomosti Verkhovnoi Rady, № 47. 804 p. (in Ukr.).

14. Pro zatverdzhennia Derzhavnoi tsilovoi sotsialnoi prohramy rozvytku fizychnoi kultury i sportu na period do 2020 r [On approval of the State target social program for the development of physical culture and sports for the period up to 2020] (2020), Postanova Kabinetu Ministriv Ukrainy, № 115, vid 1.03.2017. (in Ukr.).
15. Bazenko, V. A. (2018), "Improvement of management by development of physical culture and sport at the level of territorial community in the conditions of decentralization", The scientific methods. Poland, № 21, Vol.1, pp. 39-43. (in Eng.).
16. Bazenko, V. A. (2015), "Managing efficient development of physical culture and sport by local self-government", New Insights in Public Administration: materials of Scientific Seminar of PhD Students. Odessa, December 3, 2015; Edited by N.Kolisnichenko. Odessa: ORIPA NAPA. pp. 8 – 11. (in Eng.).
17. Rossokha, V. V. Pronko, L. M. (2017), "Association of rural communities as a factor in the development of land relations", Economics, finance, management: topical is sues of science and practice, № 9, pp. 124–135. (in Eng.).
18. Milena M. Parent, Michael L. Naraine and Russell Hoye (2018), "A New Era for Governance Structures and Processes in Canadian National Sport Organizations", Journal of Sport Management, Volume 32, Issue 6, pp. 555-566. https://doi.org/10.1123/jsm.2018-0037(in Eng.).
19. Novakovsky, L., Novakovska, I., Bredikhin, O., Stetsiuk, M., & Skrypnyk, L. (2019), "Risks and problems of forming united territorial communities in Ukraine", Agricultural Science and Practice, No. 6(2), pp. 66-75. https://doi.org/10.15407/agrisp6.02.066(in Eng.).
20. Silva, C. N, Bucek, J. Local (2017), Government and Urban Governance in Europe introduction. Local Government and Urban Governance in Europe. Book Series: Urban book Series. Springer, Cham. 2017. pp. 1–5. (in Eng.).

Received: 23.09.2020.
Published: 26.10.2020.

Information about the Authors

Tetiana Dorofieieva: PhD (Physical Education and Sport), Associate Professor, Kharkiv G.S. Skovoroda National Pedagogical University, Alchevskyh Str 29, Kharkov, 61000, Ukraine.

orcid.org/0000-0001-9025-5645

E-mail: dti16071981@gmail.com

Vladimir Prikhodko: Doctor of Science (Pedagogical), Professor, Prydniprovska State Academy of Physical Culture and Sports: st. Victory Embankment, 10, Dnipro, 49094, Ukraine.

orcid.org/0000-0001-6980-1402

E-mail: komandaODI@ukr.net

UDC [796.835:796.012.4+796.012.2]

ISSN (English ed. Online) 2311-6374

2020. Vol. 8. No. 5, pp.34-44

MODEL CHARACTERISTICS OF PSYCHOPHYSIOLOGICAL INDICATORS OF QUALIFIED KICKBOXERS

Yevhen Myroshnychenko

Yuriy Tropin

Julia Kovalenko

Kharkiv State Academy of Physical Culture,

Kharkiv, Ukraine

Purpose: to determine the model characteristics of psychophysiological indicators of qualified kickboxers.

Material and methods: analysis of scientific and methodological information, Internet sources and generalization of leading practical experience, psychophysiological research methods, methods of mathematical statistics. The study involved 30 qualified kickboxers who train in Kharkiv sports schools and are members of the Kharkiv Regional Kickboxing Federation WPKA. The participants aged 18 to 22 years old. Athletes are qualified as Masters of Sports and Candidates of Master of Sports.

Results: based on the analysis of scientific and methodological information, Internet sources and generalization of best practical experience, it was found that the specifics of competitive activities in martial arts affects the level of psychophysiological reactions that provide high sports results. The evaluation of simple, complex motor reactions and specific perceptions of qualified kickboxers is performed. The results of the study show the homogeneity indicators of simple and complex reactions, as the coefficient of variation is in the range from 5,48 % to 10,07

%, except for the indicator of complex reaction to a moving object that has a high coefficient of variation (26,10 %). Indicators of specific perceptions have a high coefficient of variation (from 14,02 % to 39,01 %). This is due to the fact that specific perceptions reflect, to a greater extent, the individual, genetically determined, characteristic of a particular athlete psychophysiological state. Based on the obtained results, the model characteristics of sensorimotor reactions and specific perceptions of qualified kickboxers are determined.

Conclusions: the analysis and the presented models became the basis for the development of evaluation criteria for sensorimotor reactions and specific perceptions of qualified kickboxers. Model characteristics of psychophysiological indicators of qualified kickboxers are developed and can be the basis for the selection of athletes in the formation of the team.

Keywords: model characteristics, psychophysiological indicators, sensorimotor reactions, specific perceptions, qualified kickboxers.

Introduction

Modern sports training, which aims to achieve maximum results, requires from the athlete the greatest possible, and sometimes excessive intensity of all physiological reserves, including psychophysiological capabilities. However, the current state of affairs shows that the training activities of qualified athletes, aimed at a high result, can no longer be based not only on increasing the amount of load. This is due to the risk of overexertion and overtraining. Therefore, the optimization of the training process should take place primarily on the basis of scientific knowledge, distribution of training loads, considering the characteristics and indicators of individual typological properties of higher nervous activity of athletes [2, 3, 4].

Diagnosis of functional states of the athlete's body is one of the current areas of modern sports science. High sports achievements are closely related to the psychophysiological functions of a human. It is known that full dedication into training and high results in competitions achieved by the athlete, mainly caused by the level of development of psychosensory abilities [6, 8, 11].

A number of authors [7, 9, 13] believe that the psychophysiological functions of a human are the biological foundation of individual-typological features of the higher nervous system, they characterize the process of formation and improvement of special motor skills in training and competitive activities. The adequacy of the reactions of psychophysiological functions to training or competitive loads can be an indicator of both the level of preparedness of the athlete and the development of his processes of fatigue and overexertion.

The main properties of the nervous system determine the functional and psychological fitness of athletes, which affects sports effectiveness, especially in situational sports (various types of martial arts) [1, 7, 14].

The ability to perform a large number of complex technical and tactical actions, anticipating possible actions of the opponent in combat, making non-standard and instant decisions in extreme situations against the background of disturbing factors - all this is a prerequisite for success in competitive activities of kickboxers and reflects their level of psychological preparedness [4, 12].

Training and competitive activities in martial arts contributes to the formation of athletes a whole set of specific reactions and perceptions. They are based on the threshold of perception of stimuli entering various sensory systems. The main role is played by the levels of musculoskeletal, visual, vestibular and auditory sensations. The higher the level of sportsmanship of the athlete, the higher the level of importance of psychophysiological functions to achieve a competitive result [7, 10, 13].

Connection of work with scientific programs, plans and themes. The study was conducted in accordance with the theme of research work of the Kharkiv State Academy of Physical Culture "Psycho-sensory regulation of motor activity of athletes of situational sports" (state registration number 0116U008943).

The purpose of the study: to determine the model characteristics of psychophysiological indicators of qualified kickboxers.

Material and Methods of the research

The following methods were used to solve the research problems: analysis of scientific and methodological information, Internet sources and generalization of best practical experience, psychophysiological research methods, methods of mathematical statistics.

The study involved 30 qualified kickboxers who train in Kharkiv sports schools and are members of the Kharkiv Regional Kickboxing Federation WPKA. The participants aged 18 to 22 years old. Athletes were qualified as Masters of Sports of Ukraine and Candidates of Master of Sports of Ukraine.

Assessment of psychophysiological reactions was performed using a set of tests developed for tablet personal computers [1]. The tests were divided into three groups: evaluation of simple sensorimotor reactions ("Simple motility and resistance to confusing factors", "Simple visual-motor reaction", "Simple auditory-motor reaction"); complex sensorimotor reactions ("Reaction of choice from static objects", "Reaction of distinction", "Reaction to a moving object", "Reaction of choice from dynamic objects"); specific perceptions ("Estimation of sense of tempo", "Estimation of accuracy and speed at reproduction of the set line", "Estimation of perception of changing the size of object").

Results of the research

Based on the analysis of scientific and methodological information, Internet sources and generalization of leading practical experience, it was found that the specifics of competitive activities in martial arts affects the level of development of psychophysiological reactions that provide high sports results [3, 4, 12].

The coefficient of variation was used to determine the homogeneity of the sample observations. It is believed that if the coefficient of variation does not exceed 10%, the sample can be considered as homogeneous [5]. The obtained data show the homogeneity of the indicators of simple and complex reactions of the studied wrestlers (from 5.48% to 10.07%), except for the indicator of the complex reaction to a moving object that has a high coefficient of variation (26.10%). Indicators in tests that reflect the specific perceptions of kickboxers also have a high coefficient of

variation (from 14.02% to 39.01%), this is due to the qualifications of athletes who individually reflect the prediction of the situation (anticipation) (table 1).

Table 1

Coefficient of variation of psychophysiological reactions of qualified kickboxers (n=30)

S No.	Indicators	V, %
Simple reactions		
1	Simple motility (number of touches in 10 s)	7,02
2	Resistance to confusing factors (%)	5,48
3	Simple visual-motor reaction (ms)	7,18
4	Simple auditory-motor response (ms)	6,82
Complex reactions		
5	Selection reaction from static objects (ms)	9,92
6	Reaction to a moving object (ms)	26,10
7	Resolution reaction (ms)	10,07
8	Selection response from dynamic objects (ms)	7,55
Specific perceptions		
9	Estimation of the sense of pace (80 beats / min.$^{-1}$)	39,01
10	Estimation of reproduction of accuracy of the set line (mm)	25,36
11	The playback speed of a given line (mm / s)	30,34
12	Estimation of perception of changing the size of object (s)	14,02

Based on the obtained test results, model characteristics of psychophysiological indicators of qualified kickboxers were developed (table 2).

Table 2

Model characteristics of psychophysiological indicators of qualified kickboxers (n=30)

№	Indicators of sensorimotor reactions and specific perceptions	$\overline{X}$	δ	m
Simple reactions				
1	Simple motility (number of touches in 10 s)	27,43	1,93	0,35
2	Resistance to confusing factors (%)	81,82	4,48	0,82
3	Simple visual-motor reaction (ms)	226,34	16,24	2,97
4	Simple auditory-motor reaction (ms)	212,49	14,50	2,65
Complex reactions				
5	Selection reaction from static objects (ms)	579,74	57,52	10,50
6	Reaction to a moving object (ms)	17,99	4,70	0,86
7	Resolution reaction (ms)	277,63	27,95	5,10
8	Response selection from dynamic objects (ms)	339,60	25,63	4,68
Specific perceptions				
9	Estimation of sense of pace (80 beats / min.-1) (ms)	34,85	13,59	2,48
10	Estimation of reproduction of accuracy of the set line (mm)	0,39	0,10	0,02
11	The playback speed of a given line (mm / s)	72,41	21,97	4,01
12	Estimation of perception of change of the size of object (s)	0,81	0,11	0,02

The given analysis and the presented models became a basis for development of estimation criteria of sensorimotor reactions and specific perceptions of qualified kickboxers (table 3). They allow differentiated assessment of the functional state and management of the training process in martial arts.

Table 3

Evaluation criteria for sensorimotor reactions and specific perceptions of qualified kickboxers

№	Indicators of sensorimotor reactions and specific perceptions	High level	Medium level	Low level
Simple reactions				
1	Simple motility (number of touches in 10 s)	>27,43	27,43-25,50	<25,50
2	Resistance to confusing factors (%)	>81,82	81,82-77,34	<77,34
3	Simple visual-motor reaction (ms)	<226,34	226,34-242,58	>242,58
4	Simple auditory-motor response (ms)	<212,49	212,49-226,99	>226,99
Complex reactions				
5	Selection reaction from static objects (ms)	<579,34	579,34-636,86	>636,86
6	Reaction to a moving object (ms)	<17,99	17,99-22,69	>22,69
7	Resolution reaction (ms)	<277,63	277,63-305,58	>305,58
8	Response selection from dynamic objects (ms)	<339,60	339,60-365,23	>365,23
Specific perceptions				
9	Estimation of sense of pace (80 beats / min.-1) (ms)	<34,85	34,85-48,44	>48,44
10	Estimation of reproduction of accuracy of the set line (mm)	<0,39	0,39-0,49	>0,49
11	The playback speed of a given line (mm / s)	>72,41	72,41-50,44	<50,44
12	Estimation of perception of change of the size of object (s)	<0,81	0,81-0,92	>0,92

It was found that the studied kickboxers have the following levels in psychophysiological parameters: in simple sensorimotor reactions from 3 (10%) to 7 (23%) athletes have a low level, from 6 (20%) to 12 (40%) sportsmen have a medium level and from 15 (50%) to 17 (57%) kickboxers have a high level; in complex sensorimotor reactions from 4 (13%) to 5 (17%) athletes have a low level, from 8 (27%) to 10 (33%) sportsmen have a medium level and from 15 (50%) to 18 (60%) kickboxers have a high level; in specific perceptions from 5 (17%) to 6 (20%)

athletes have a low level, from 8 (27%) to 10 (33%) sportsmen have a medium level and from 15 (50%) to 17 (57%) kickboxers have a high level (Figure 1).

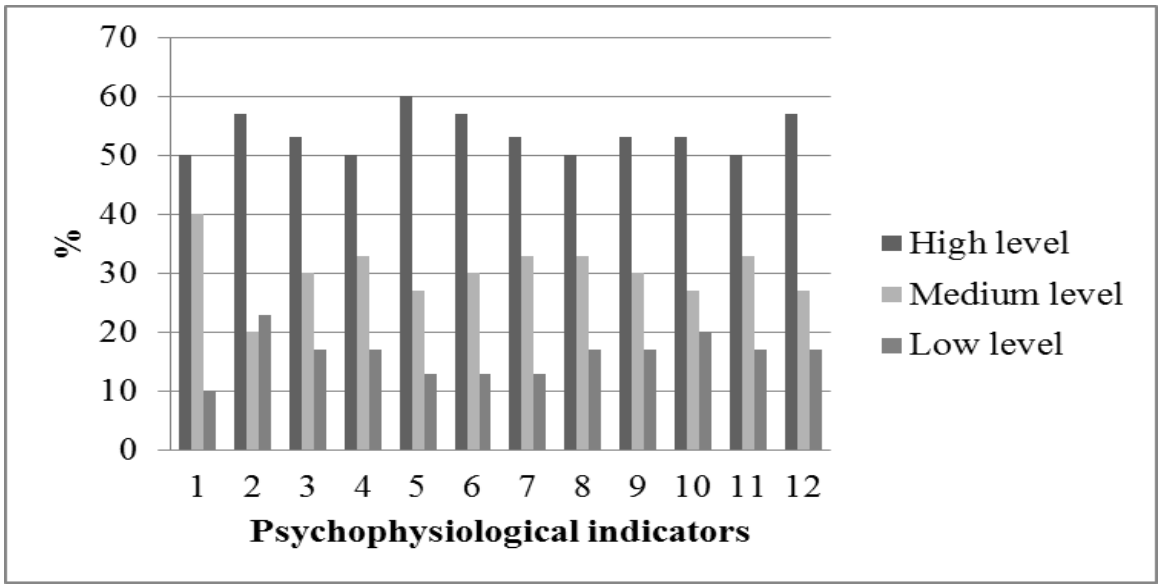

Fig. 1. The level of psychophysiological indicators of the studied kickboxers (n=30)

Note: 1 - simple motility; 2 - resistance to confusing factors; 3 - simple visual-motor reaction; 4 - simple auditory-motor reaction; 5 - selection reaction from static objects; 6 - reaction to a moving object; 7 - resolution reaction; 8 - reaction of choice from dynamic objects; 9 - assessment of the sense of pace; 10 - estimation the speed when playing a given line; 11 - estimate the speed when playing a given line; 12 - assessment of the perception of changing the size of the object.

The obtained data testify to the psychophysiological indicators of athletes as a factor that determines the success in various types of martial arts. This is also confirmed by the results of previous studies, which are presented in scientific papers (Pervachuk, R.V., Tropin, Yu. M., Romanenko, V.V., Chuyev, A. Yu. 2017; Romanenko, V., and et al., 2020; Podrigalo, O., and et al., 2019).

Conclusions / Discussion

The use of modern statistical methods in the analysis of psychophysiological indicators, allows to build mathematical models. They allow you to imagine more clearly the changes taking place in the body of athletes. Rovnyi, A.S., Romanenko, V.V. (2016) studied the model characteristics of sensorimotor reactions and specific perceptions of highly skilled taekwondo practitioners, as a result of which, evaluation

scales were developed. Kozina, Zh. L., Demura, I.M. (2010) used the methods of mathematical modeling to determine the individual tactical manners of the fight in high-class judokas. Zi-Hong, H. (2013) defined the physiological profile of elite Chinese women fighters. The author recommends to compare the data with other wrestlers to help identify individual weaknesses or strengths and develop training programs that will succeed in the fight. Iermakov, S. and et. al. (2016) based on model characteristics identified psychophysiological qualities most important for predicting success in martial arts.

During the study, the following model characteristics of psychophysiological indicators were obtained: simple and complex sensorimotor reactions and specific perceptions. The given analysis and the presented models became a basis for development of estimation criteria of sensorimotor reactions and specific perceptions of qualified kickboxers.

The results of the study indicate the homogeneity of simple and complex reactions, as the coefficient of variation is in the range from 5.48% to 10.07%, in addition to the complex reaction to a moving object that has a high coefficient of variation (26.10 %). Indicators of specific perceptions have a high coefficient of variation (from 14.02% to 39.01%). This is due to the fact that specific perceptions reflect, to a greater extent, the individual, genetically determined, characteristic of a particular athlete psychophysiological state.

It was found that the most studied kickboxers have a high level of manifestation in psychophysiological parameters: in simple sensorimotor reactions from 15 (50%) to 17 (57%) athletes; in complex sensorimotor reactions from 15 (50%) to 18 (60%) sportsmen; in specific perceptions from 15 (50%) to 17 (57%) kickboxers. The average level has: in simple sensorimotor reactions from 6 (20%) to 12 (40%) athletes; in complex sensorimotor reactions from 8 (27%) to 10 (33%) sportsmen; in specific perceptions from 8 (27%) to 10 (33%) kickboxers. Low level has: in simple sensorimotor reactions from 3 (10%) to 7 (23%) athletes; in complex sensorimotor reactions from 4 (13%) to 5 (17%) sportsmen; in specific perceptions from 5 (17%) to 6 (20%) kickboxers.

The developed model characteristics of psychophysiological indicators of qualified kickboxers, in the future, can become the basis for the creation of rapid diagnostics of athletes' readiness for competition.

Prospects for further research will be aimed at determining the correlations between psychophysiological indicators and technical and tactical training of qualified kickboxers.

Conflict of interests. The authors declare that no conflict of interest.

Financing sources. This article didn’t get the financial support from the state, public or commercial organization.

References

1. Ashanyn, V. S., Romanenko, V. V. (2015), "The use of computer technologies to assess sensorimotor reactions in single combats", Slobozhans′kyy naukovo-sportyvnyy visnyk. No. 4, pp. 15-18. (in Russ).
2. Kozina, ZH. L., Demura, I. M. (2010), "The results of the application of methods of mathematical modeling to determine the individual tactical manners of the fight in high-class judokas", Teoriya ta metodyka fizychnoho vykhovannya. No. 7, pp. 17-38. (in Ukr.).
3. Korobeynikov, H. V., Aksyutin, V. V., Smolyar, I. I. (2015), "The relationship between boxing styles and psycho-physiological characteristics", Pedahohika, psykholohiya ta medyko-biolohichni problemy fizychnoho vykhovannya i sportu. No.9, pp. 33-37. (in Ukr.).
4. Korobeynikov, H. V., Tropin, YU. M., Vol′s′kyy, D. S., Zhyrnov, O. V., Korobeynykova, L. H., Chernozub, A. A. (2020), "Development of an algorithm for assessing the neurodynamic properties of kickboxing athletes", Yedynoborstva, No.3, pp. 36-48. (in Ukr.).
5. Nachynskaya, S. V. (2005), Sportyvnaya metrolohyya: posobye dlya studentov vysshykh uchebnykh zavedenyy [Sports metrology: a guide for students of higher education], Moskva, Yzdatel′skyy tsentr «Akademyya», 258 p. (in Russ).

6. Pervachuk, R. V., Tropyn, YU. N., Romanenko, V. V., Chuev, A. YU. (2017), "Model characteristics of sensorimotor reactions and specific perceptions of qualified wrestlers", Slobozhans′kyy naukovo-sportyvnyy visnyk, No. 5, pp. 84-88. (in Russ).
7. Rovnyy, A. S., Romanenko, V. V. (2016), "Model characteristics of sensorimotor reactions and specific perceptions of highly qualified combatants", Yedynoborstva, pp. 54-57. (in Russ).
8. Taymazov, V. A., Holub, YA. V. (2004), Psykhofyzyolohycheskoe sostoyanye sport·smena. Metody otsenky y korrektsyy [Psychophysiological state of the athlete. Methods of assessment and correction], SPb.: Olymp SPb., 129 p. (in Russ).
9. Eckner, J.T., Richardson, J.K., Kim, H., Joshi, M.S., Oh, Y.K., Ashton-Miller, J.A. (2015), "Reliability and criterion validity of a novel clinical test of simple and complex reaction time in athletes", Perceptual and Motor Skills, Vol. 120(3), pp. 841-859. (in Eng.).
10. Iermakov, S., Podrigalo, L., Romanenko, V., Tropin, Y., Boychenko, N., Rovnaya, O. (2016), "Psycho-physiological features of sportsmen in impact and throwing martial arts", Journal of Physical Education and Sport, Vol. 16(2), pp. 433-441. (in Eng.).
11. Zi-Hong, H. (2013), "Physiological profile of elite Chinese female wrestlers", The Journal of Strength & Conditioning Research, T. 27, No. 9, pp. 2374-2395. (in Eng.).
12. Romanenko, V., Podrigalo, L., Cynarski, W., Rovnaya, O., Korobeynikova, L., Goloha, V., Robak, I. (2020), "A comparative analysis of the short-term memory of martial arts' athletes of different level of sportsmanship", Journal of Martial Arts Anthropology, No.20(3), pp. 18-24. (in Eng.).
13. Podrigalo, O., Borisova, O., Podrigalo, L., Iermakov S., Romanenko, V., Podavalenko, O., Volodchenko, O. (2019), "Comparative analysis of the athletes' functional condition in cyclic and situational sports", Physical education of students, No.23(6), pp. 313-319. (in Eng.).
14. Quel, O. M., Bennett, S.J., Lopez-Adan, E. (2015), "Choice reaction time is not related to competition success in karate combat", European Journal of Human Movement, No.35, pp. 41-50. (in Eng.).

Received: 25.09.2020.
Published: 26.10.2020.

Information about the Authors

Yevhen Myroshnychenho: lecturer; Kharkiv State Academy of Physical Culture: 99 Klochkivska St., Kharkiv, 61058, Ukraine.
orcid.org /0000-0002-6501-6770
E-mail: 94hwarangteam@gmail.com

Yuriy Tropin: Phd (Physical Education and Sport), Associate Professor; Kharkiv State Academy of Physical Culture: 99 Klochkivska St., Kharkiv, 61058, Ukraine.
orcid.org /0000-0002-6691-2470
E-mail: tropin.yurij@gmail.com

Julia Kovalenko: senior lecturer; Kharkiv State Academy of Physical Culture: 99 Klochkivska St., Kharkiv, 61058, Ukraine.
orcid.org /0000-0002-5736-4249
E-mail: julawa09@gmail.com

UDC [796.413/.418:796.012.234] -055.25

ISSN (English ed. Online) 2311-6374

2020. Vol. 8 No. 5, pp. 45-55

FEATURES OF METHODOLOGY OF FLEXIBILITY DEVELOPMENT OF FEMALE ATHLETES OF 8-9 YEARS OLD, ENGAGED IN ARTISTIC GYMNASTICS

Alfiia Deineko

Kharkiv State Academy of Physical Culture,
Kharkiv, Ukraine

Purpose: to substantiate the effectiveness of the use of author's methodology of flexibility development of 8-9 years old athletes, engaged in artistic gymnastics.

Material and methods: the research was carried out during the year with a group of athletes (12 female gymnasts) engaged in gymnastics at the Sports School of high sportsmanship in Kharkov. The pedagogical experiment was organized with the aim of improving the content of the educational and training process in artistic gymnastics. The methodology developed in the course of the research consisted of appropriately selected means and methods aimed at ensuring a gradual and systematic increase in the level of flexibility development among young female gymnasts. After the initial testing of the level of flexibility development in the training process of the female gymnasts of the research group, a specially developed author's methodology was additionally included, which was used in the main part of the training session (10-12 minutes). To identify the effectiveness of the author's methodology, analysis and generalization of literary sources, pedagogical observation, testing, pedagogical experiment, methods of mathematical statistics were used.

Results: according to the results of the experiment, an improvement was revealed in almost all the studied indicators, namely, the results of the split on the left leg (45%) and gymnastic exercises in cities (20%) significantly improved.

Conclusions: the obtained results of the study showed the effectiveness of using the proposed methodology of flexibility development of female gymnasts of 8-9 years old (the difference between the average group results shown by female gymnasts in most of the test tasks is statistically significant).

Keywords: flexibility development, gymnastics, 8-9 years old female gymnasts, testing.

Introduction

It is well known that the effectiveness of the training process in gymnastics depends on the means and methods used in training sessions with athletes [2, 5, 10, 13; 14]. Artistic gymnastics as a sport, by the nature of motor activity, refers to the complex coordination and requires athletes to display a wide range of motor skills, skills and qualities that require an appropriate level of physical fitness and constant correction of the training process [16].

According to foreign and domestic experts [2, 4, 9; 10, 13], the technical training of gymnasts should be carried out on the basis of the advanced development of special physical qualities, that is, the advanced development of the physical qualities of gymnasts should be ensured in relation to their technical training.

It should be noted that in the preparation of athletes in artistic gymnastics flexibility is a key quality underlying the system of long-term improvement of gymnastic all-around exercises [17; 19]. All fundamental groups of elements (jumps, balances, turns, inclinations) are performed with maximum amplitude, often exceeds the physiological norm of joint mobility [3; 6; 9; 15; 18].

Despite the fact that all the complex and technical elements in artistic gymnastics are based on a high level of flexibility, increasing its development in young athletes is an integral part of the training process, and therefore an urgent research task for scientific analysis.

Purpose of the research: to substantiate the effectiveness of the use of the author's methodology for the development of flexibility of female athletes of 8-9 years old engaged in artistic gymnastics.

Material and Methods of the research

The pedagogical experiment, in which 12 female athletes aged 8-9 years took part, was organized with the aim of improving the content of the educational and training process in artistic gymnastics.

The methodology developed in the course of the research consisted of appropriately selected means and methods aimed at ensuring a gradual and systematic increase in the level of flexibility development among young gymnasts. After the initial testing of the level of flexibility development in the training process of the female gymnasts of the research group, a specially developed author's methodology was additionally included, which was used in the main part of the training session (10-12 minutes).

This technique involved the use of means and methods that allowed performing exercises, with the prevention of strong pain sensations, in particular, the technique of stretching, stretching at a minimum speed, with muscle relaxation at the maximum point of amplitude, etc. (table 1).

Table 1

Basic set of exercises for the development of flexibility of female gymnasts 8-9 years old

№ i/o	Content of the exercise	Methods and techniques	Dosage	Organizational and methodical instructions
1.	P.p. - a narrow stand of the legs apart, hands up into the lock, palms out. A) taking hands back to each count. B) also in p.p. kneeling and sitting. C) also with the help of a partner in p.p. kneeling and sitting.	G-2; G-4 (1); G-5(3)	8-10 times	Observe the symmetrical position of the hands. The head is raised, passive abduction is performed gently, without spring movements
2.	P.p.. - narrow kneeling position, hands up. 1-3 - tilt back to half- bridge stretch; 4 - p. p.	G- 2	6-8 times	Perform the exercise at a slow pace, without spring movements, with the help of a partner.

Continuation of Table 1

3.	P.p. - lying on your stomach, hands grab the ankle joints of the legs bent back. 1-7 - bend over, straightening your legs ("basket"); 8 - p.p.	G- 4(1, 3); G-5 (2)	6-8 times	Observe a symmetrical body position
4.	P.p. – twine, right on the dais; 1-4 - tilt back; 5-8 - p.p. Same as left	G- 4(3)	6-8 times	Monitor the symmetrical position of the body, relax muscles in case of pain
5.	P.p. – gymnast No. 1 in a stand with her back to the gymnastic wall in a split; gymnast №2 partner pulls the leg back down, then let go; №1 holds position.	G-2; G-4 (2)	6-8 times for each leg	Observe a symmetrical body position. During forced stretching, try to relax the muscles, do not resist
6.	P.p. – main stand, jump rope four times folded down; 1-2 - moving the rope back; 3-4 - also forward.	G- 4(2)	12-16 times	The work of both hands should be simultaneous. Gradually reduce the distance between the arms
7.	P.p. – sead, hands up. A) Slopes for each account. B) Bends with a grip on the ankle joints. C) Elastic slopes. D) Slopes with the help of a partner.	G-2; G-4 (3)	10-12 times	Observe a symmetrical body position. Relax the muscles at the extreme point of amplitude. The amplitude of the movement is maximum.
8.	Swing your legs forward, backward, right, left, inward, outward. A) The same in p.p. sitting, lying on your back. B) Swing back to p.p. lying on your stomach. C) Swing right, left, pulling the leg and holding this position for 5-10 s at the highest point in p.p. sitting, lying on your back.	G-1; G- 3; G-4 (1,2,3); G-6(1)	8-12 times for each leg	Observe a symmetrical body position. Swing to perform with the maximum possible amplitude
9.	P.p. – a female gymnast in a stand with her back to the gymnastic wall in a split with the right, gripping the rail with her hands; performs swings with the left leg back and down in the "ring". The same thing, but on a different foot	G-1; G- 3; G-5(1,2); G-6(2)	10-12 times right, left	Weights and a shock absorber can be used to complicate the exercise.
10.	Twine right, left, straight up	G-4(1)	90-100 s	Monitor breathing, relax muscles at the extreme point of amplitude.

The following abbreviations were used in the table:

G-1 - *a method of joint development of strength and flexibility*, it allowed simultaneously to combine the development of strength and flexibility in the process of performing exercises.

G-2 - *a method of pre-tensioning muscles with their subsequent stretching,* which allowed the ability of muscles to stretch more efficiently after pre-tensioning them.

G-3 - *a ballistic method* that allowed the execution of fast movements with a gradual increase in amplitude.

G-4 - the method of static stretching, allowed stretching the muscles until the moment when further movements are limited by their own tension. Methodological techniques: muscle stretching followed by their isometric tension G 4 (1); passive stretching of muscles with an active content of the limiting position G 4 (2); active stretching of muscles with passive stretching G 4 (3).

G-5 - *method of mixed stretching,* provides for the use of all of the above methodological techniques in various combinations. *Methodical techniques:* performing an exercise with a minimum speed and maximum amplitude and with muscle relaxation at the maximum point of the amplitude G 5 (1); performing an exercise with a minimum speed and maximum amplitude using the weight of one's own body or its parts G 5 (2) performing an exercise with a minimum speed and maximum amplitude using additional forces G- 5(3).

G-6 - *method of dynamic stretching*, was implemented by repeated repetition of movements with a gradual increase in their amplitude, and was based on the ability of muscles to stretch much more when performing the exercise again. *Methodical techniques:* ballistic stretching with a gradual increase in amplitude G 6 (1) performing an exercise with a maximum amplitude and using the weight of one's own body or its parts at a fast pace G 6 (2) performing an exercise with a maximum amplitude at a slow pace G 6 (3) [1; 6; 8].

Results of the research

To check the effectiveness of the developed methodology, a comparative analysis of changes in the level of flexibility development of female gymnasts of 8-9 years old was carried out during the study period (Table 2).

Table 2

Comparative analysis of changes in the level of flexibility development among female gymnasts 8-9 years old during the study period (n=12), ($t_{gr.}$ = 2,07 at p<0,05)

№ i/o	Test	$\overline{X}$ ±m		t_p	P	Increase in res-in, %
		Initial results	Repeated results			
1.	"Bend forward from a sitting position, legs apart, arms up" (degrees)	49,0±2,27	43,0±2,08	1,76	>0,05	12%
2.	"Gymnastic bridge" (points)	5,0±0,19	6,0±0,25	2,37	<0,05	20%
3.	"Twisting the stick" (cm)	39,0±1,85	35,0±1,72	1,49	>0,05	10%
4.	"Performing a twine on the right leg" (cm)	9,0±0,21	8,0±0,20	2,79	<0,05	11%
5.	"Performing a twine on the left leg" (cm)	9,0±0,25	13,1±0,19	2,62	<0,05	45%
6.	"Performing a transverse twine" (cm)	45,0±1,08	41,3±1,08	2,47	<0,05	8%

As can be seen from the presented materials in the test "Bend forward from the sitting position, legs apart, arms up", which was used to determine the mobility in the knee joint, the athletes showed an average group result at the beginning of the study 49,0±2,27 degrees, and at the end – 43,0±2,08 degrees. The difference between these indicators is not statistically significant, since t_p=1,76 <t_{gr}=2,07. The improvement in the result in performing this test is 12% (Table 2).

When performing the next test exercise "Gymnastic bridge", which characterizes the development of mobility in the spine, the athletes at the beginning of the study showed an average group result of 5,0±0,19 points, at the end – 6,0±0,25 points. Comparison of these results by Student's test shows that the difference

between the group mean values is statistically significant $t_p=2,37>t_{gr}=2,07$. This means that the results obtained at the end of the study have objectively improved in relation to the baseline results. Their growth is 20%.

The results of the study also indicate that when performing the "Twisting the stick" test, the athletes showed an average group initial result – 39,0±1,85 cm, and an average group repeated result – 35,0±1,72 cm (Table 2). The difference between these indicators is statistically insignificant. ($p>0,05$).

The obtained indicators characterizing the level of flexibility development indicate an improvement in results during the study by 10%. Determination of the development of flexibility in the hip joints was carried out using tests: "Twine on the right leg", "Twine on the left leg", "Transverse twine".

When performing a twine on the right leg, female gymnasts of 8-9 years old showed an average group result of 9,0±0,21 cm at the beginning of the study and 8,0±0,20 cm at the end. Since $t_p=2,79> t_{gr}=2,07$, it can be concluded that the difference between these indicators is statistically significant.

When performing a twine on the left leg, the athletes showed an average group result of 9,0±0,25 cm at the beginning of the study and 13,1±0,19 cm at the end. The difference between these results is statistically significant because $t_p>t_{gr}$.

The results obtained by the young gymnasts of the "Transverse twine" test (45,0±1,08 cm at the beginning of the study and 41,3±1,08 cm at the end) indicate that the difference between the average results is statistically significant ($p<0,05$). It should be noted that the results shown by gymnasts 8-9 years old in tests for determining the mobility in the hip joints allow us to state the effectiveness of using the developed method of exercises aimed at developing flexibility: the improvement in the result on the right leg is 11%, on the left leg 45% and transverse 8% (Table 2).

Conclusions / Discussion

The results of the research carried out supplement the theoretical provisions formulated in the works of V.M. Kostyukevich [7], V.M. Platonov [10], V.A. Sutuloy, A.Kh. Deineko, A.V. Ryabchenko [12] that the effectiveness of the training process is directly dependent on the means and methods that are used in training

sessions with athletes. However, the constant correction of the training process for the development of flexibility remains relevant today, since all the complex technical elements in artistic gymnastics are based on its high level. Therefore, underestimating the development of flexibility is a gross mistake that hinders the process of improving not only the physical, but also the technical skill of female gymnasts.

The results of the entire complex of the research carried out supplement the data of scientific works [2, 3, 6; 9] on the use of various means and methods of flexibility development in the training process of young female gymnasts.

The study also confirms the conclusions of V. Lenishin [8], L. Manko [9], V. Sutula, A. Deineko [11], A. Khudoliy [13] and other scientists that physical exercises are the main means of improving flexibility that require a greater range of motion in the joints than in everyday life, professional and sports activities. These elementary exercises from basic gymnastics, acting on certain groups of muscles and ligaments, which gradually increase the range of motion to the border possible at this stage.

Thus, the results of the study showed the effectiveness of using the proposed methodology for the development of flexibility of female gymnasts of 8-9 years old (the difference between the average group results shown by female gymnasts in most of the test tasks is statistically significant).

Prospects for further research consist in the introduction of the developed author's methodology for the development of flexibility of gymnasts of 8-9 years old in the educational process of the children's and youth sports school, clubs and specialized educational institutions for its further improvement.

Conflict of interests. The authors declare that no conflict of interest.

Financing sources. This article didn’t get the financial support from the state, public or commercial organization.

References

1. Alter Maykl Dzh.(2001), Nauka o gibkosti [The Science of Flexibility]. Kiev, 420 p. (in Russ.).

2. Gaverdovskiy, Yu. K. (2014), Teoriya i metodika sportivnoy gimnastiki [Theory and methodology of artistic gymnastics]. Tom 1. Moskva: Sovetskiy sport, 368 p. (in Russ.).

3. Deineko, A. Kh., Bilenka, I. H. (2019), "Improving the development of flexibility of athletes 8-9 years in gymnastics", Naukovyi chasopys Natsionalnoho pedahohichnoho universytetu imeni M.P. Drahomanova. Seriia No. 15: Naukovo-pedahohichni problemy fizychnoi kultury (fizychna kultura i sport), Vyp. 8 (116), pp. 14- 18. (in Ukr.).

4. Deineko, A. Kh. (2017), "Improvement of competitive exercises on the rings of gymnasts 10-12 years by means of special physical training", Slobozhanskyi naukovo-sportyvnyi visnyk, No. 4(60), pp. 32-35. (in Ukr.).

5. Deineko, A. Kh. (2017), "The effectiveness of the use of the game method for the development of speed and strength abilities of trampolines at the stage of initial training", Slobozhanskyi naukovo-sportyvnyi visnyk, No. 3(59), pp.22-25. (in Ukr.).

6. Ismailova, A. S. (2013), Sredstva i osobennosti metodiki razvitiya gibkosti sportsmenok na etape nachalnoy spetsializirovannoy bazovoy podgotovki v hudozhestvennoy gimnastike [Means and features of the methodology for developing the flexibility of athletes at the stage of initial specialized basic training in rhythmic gymnastics]: avtoref. dis. na poluchenie nauch. stepeni kand. ped. nauk: spets. 13.00.04, Moskva, 26 p. (in Russ.).

7. Kostiukevych, V. M. (2007), Teoriia i metodyka trenuvannia sportsmeniv vysokoi kvalifikatsii [Theory and methods of training highly qualified athletes]. Vinnytsia: Planer, 273 p. (in Ukr.).

8. Lenyshyn, V. A. (2016), Udoskonalennia spetsialnoi pidhotovky u hrupovykh vpravakh khudozhnoi himnastyky na etapi spetsializovanoi bazovoi pidhotovky [Improving special training in group exercises of rhythmic gymnastics at the stage of

specialized basic training]: avtoref. dys. na zdobuttia nauk. stup. kand. nauk z fiz. vykhovannia ta sportu: spets. 24.00.01, Lviv, 20 p. (in Ukr.).

9. Manko, L. G. (2015), Razvitie gibkosti u gimnastok 10-12 let na osnove sopryazhennoy fIziko-tehnicheskoy pIdgotovki [The development of flexibility in gymnasts 10-12 years old on the basis of conjugate physical and technical training]: dis. na poluchenie nauch. stepeni kand. ped. nauk: spets. 13.00.04, Sankt-Peterburg, 189 p. (in Russ.).

10. Platonov, V. N. (2015), Sistema podgotovki sportsmenov v olimpiyskom sporte. Obschaya teoriya i ee prakticheskie prilozheniya [The system of training athletes in Olympic sports. General theory and its practical applications]. Kiev, Kn. 2. 752 p. (in Russ.).

11. Sutula, V. O., Deineko, A. Kh. (2015), Osnovna himnastyka v shkoli (5–6 klasy) [Basic gymnastics at school (grades 5-6)]. Kharkov, 108 p. (in Ukr.).

12. Sutula, V. O., Deineko, A. Kh., Riabchenko, O. V. (2019), "Increasing the culture of performing competitive compositions by young gymnasts through the use of non-traditional means of training", Slobozhanskyi naukovo-sportyvnyi visnyk, No. 2(70), pp .44-49. (in Ukr.).

13. Khudolii, O. M. (2008), Osnovy metodyky vykladannia himnastyky [Fundamentals of methods of teaching gymnastics]. Kharkiv : OVS, T. 1. 408 p. (in Ukr.).

14. Carbinatto, M. V., Reis Furtado, L. N. (2019), "Choreographic process in gymnastics for all", Science of Gymnastics Journal, Volume 11, Issue 3, pp.343-354. (in Eng.).

15. Ferri-Caruana, A., Roig-Ballester, N., Romagnoli, M. (2020), "Effect of dynamic range of motion and static stretching techniques on flexibility, strength and jump performance in female gymnasts", Science of Gymnastics Journal, Volume 12., Issue 1, pp.87-100. (in Eng.).

16. Heinen, T., Vinken, P. in Ölsberg, P. (2010), "Manual guidance in gymnastics: a case study", Science of Gymnastics Journal, Volume 2, Issue 3, pp. 43-56. (in Eng.).

17. Heinen, T., Vinken, P., Velentzas, K. (2010), "Does laterality predict twist direction in gymnastics?", Science of Gymnastics Journal, Volume 2, Issue 1, pp. 5-14. (in Eng.).
18. Marinšek, M., Pavletič, M. S. (2020), "Association between muscles' contractile properties and jumping performance in gymnasts", Science of Gymnastics Journal, Volume 12, Issue 1, pp.75-86. (in Eng.).
19. Santos, A. B., Lemos, M. E., Lebre, E., Carvalho, L. A. (2015), "Active and passive lower limb flexibility in high level rhythmic gymnastics", Science of Gymnastics Journal, Volume 7, Issue 2, pp. 55-66. (in Eng.).

Received: 26.09.2020.
Published: 26.10.2020.

Information about the Authors

Alfiia Deineko: PhD (Physical Education and Sport); Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.
orcid.org/0000-0001-7990-7999
E-mail: udeineko@gmail.com

UDC 613.9.003.12

ISSN (English ed. Online) 2311-6374

2020, Vol. 8 No. 5, pp.56-65

ATTITUDE TOWARDS HEALTH OF YOUNG WOMEN WITH ARTERIAL HYPERTENSION

Larysa Ruban[1]

Iryna Zharova[2]

Kharkiv State Academy of Physical Culture[1],
Kharkiv, Ukraine
National University of Ukraine on Physical Education and Sport[2],
Kyiv, Ukraine

Purpose: to reveal the attitude to their health among young women with arterial hypertension on the basis of a review of modern special literature and a questionnaire survey.

Material and methods: the reseach involved 40 women with a diagnosis of arterial hypertension, stage I at the age of 35-42 years, the duration of the disease is less than 3 years. The diagnosis was made by a family doctor, but drug therapy was not taken to correct blood pressure. The women had the following risk factors, namely, a decrease in the level of physical activity, inappropriate nutrition, excess weight, the presence of a large amount of stress in life and smoking. In individual communication, we conducted a survey according to the method of R.A. Berezovskaya "Attitude to health".

Results: the evaluation of the results was carried out on the basis of a qualitative analysis of the obtained data of the questionnaire in all areas of life. When asked about the most important values from all spheres of life, only 18 women rated

their health as a factor important for them at a given moment in life. Content analysis of the definition of “Health” showed that 35% of women believe that this is the harmony of physical and mental well-being. 53% of women believe that lifestyle influences their health. Only 60% of the women surveyed by us in their daily life use recreational activities to maintain their health.

Conclusions: the interviewed young women with arterial hypertension of the 1st stage do not follow the doctor's recommendations, do not undergo preventive examinations, do not follow a healthy lifestyle, and use recreational measures in small quantities. Modification of risk factors for arterial hypertension, development of educational and health-improving programs, aimed at increasing physical activity, will improve the quality of life of young people with hypertension.

Keywords: young women, arterial hypertension, questionnaire "Attitudes towards health".

Introduction

The concept of "attitude to health" is a system of individual, selective connections of the individual with various phenomena of the surrounding reality, promote or, conversely, threaten the health of people, and also determine the individual's assessment of his physical and mental state [3; 8; 9].

The leading problem of modern health care is "diseases of civilization", the first place among which is taken by diseases of the cardiovascular system (CVS). G. L. Apanasenko believes that the development of many somatic diseases is associated with the negative influence of certain social and hygienic factors. So, in people over the age of 35, the risk of developing coronary heart disease with an increased level of blood pressure increases 6 times, with obesity - 3.4 times, with hypodynamia - 4.4 times, with smoking - 6.5 times. Combining several unfavorable social and hygienic factors, the likelihood of developing CVD increases significantly [1; 2; 6; 7].

Among diseases of the circulatory system, diseases associated with increased blood pressure (BP) prevail. Currently, hypertension is the most common disease not

only in Ukraine, but throughout the world. According to population studies for 2000, the prevalence of arterial hypertension (AH) in the world was 25%, and according to WHO forecasts by 2025 it will be almost 60%. AH is considered one of the main risk factors for vascular death in both men and women. According to the WHO, in previous decades, the most serious epidemiological situation was more pronounced among men, which led to an underestimation of the importance of early signs of hypertension in young women [5; 6; 10; 13].

At the urging of the European Society for Hypertension / European Society of Cardiology (ESC / ESH), strategies for lowering blood pressure (BP) have been formed: drug treatment and lifestyle modification. However, the question of intervention in the lifestyle of persons with hypertension is discussed superficially, while drug therapy for hypertension is based on very deep evidence, supported by the largest number of results of randomized controlled trials in clinical medicine [4; 14]. At the urging of the European Society for Hypertension / European Society of Cardiology (ESC / ESH), strategies for lowering blood pressure (BP) have been formed: drug treatment and lifestyle modification. However, the question of intervention in the lifestyle of persons with hypertension is discussed superficially, while drug therapy for hypertension is based on very deep evidence, supported by the largest number of results of randomized controlled trials in clinical medicine.

Purpose and objectives of the study: on the basis of a survey of modern special literature and a survey conducted to identify the attitude to their health in young women with arterial hypertension.

Material and methods of the research

The study was promising, carried out in the scientific problem laboratory of the KSAPC. The study involved 40 women aged 35-42 years with AH grade I, disease duration less than 3 years. The diagnosis was made by a family doctor at primary health care centers, however, drug therapy was not used to correct blood pressure. The women had the following risk factors, namely: decreased physical activity, poor diet, excess weight, the presence of a large amount of stress in life, smoking. The study was carried out in accordance with international bioethics standards and

recommendations of the Bioethics Committee of the Ministry of Health of Ukraine. With all the women, individual communication was tested according to the questionnaire of R.A. Berezovskaya "Attitude to health" [3], which consists of 10 questions and instructions. There is only one answer for each statement. It is recommended not to spend a lot of time thinking about the answers.

Results of the research

Formation of attitudes towards health is a rather complex, contradictory and dynamic process, which is due to two groups of factors:

- external (characteristics of the environment, including the features of the social micro- and macroenvironment, as well as the professional environment in which a person is located);
- internal (individual psychological and personal characteristics of a person, as well as his state of health) [3; 8].

The analysis of the results was carried out on the basis of the analysis of the data obtained using the questionnaire, which was carried out at several levels: each statement was analyzed separately; data analysis was carried out for each question (all statements included in the given question were interpreted) each block of questions or scale was considered separately (all questions and statements included in this scale were analyzed).

Answers to question 1 *(People assess different areas of life differently. Rate how important these values are for you at the moment):* 47% of women who participated in the testing assessed their health as a factor important for them at the moment in their lives; 23% rated a happy family life as an area that is important for them at the moment. Only 26% of women gave their preference to the factor of independence; 4% of the respondents assessed the presence of true friends in their lives. Material well-being is considered an important factor by 66% of women.

Answers to question 2 *(What do you think is necessary in order to achieve success in life?)*: 78% of women believe that perseverance and hard work; 57% preferred health, 34% - ability, 27% - luck (good luck), 41% - support from friends,

acquaintances, however, 70% of women believe that in order to succeed in life, you need to have a good education and material wealth.

On question 3 (*How would you define in a few words (or one phrase) what health is?)* it was necessary to provide your answer (Table 1).

Table 1

Content analysis of the definition of "Health"

Question	Possible answers	Answers, %
How would you in a few words, or in one phrase, define what health is?	Harmony of physical and mental well-being	35
	Absence of painful conditions	25
	Healthy lifestyle	15
	Sport	5
	The basis (basis) of all human activity	10
	This is life (full and active), a taste for life	5
	Wellness (Well-being, calmness, confidence)	5

Question 4 asked to evaluate information about sources that influence a person's awareness of health issues. 43% of women consider the information received from doctors to be very important; 27% of respondents preferred information obtained from Internet resources; 30% of women rely on the experience of relatives, relatives and friends.

Unfortunately, none of the respondents assessed the influence of the media on knowledge in the field of health by, which indicates insufficient coverage of health issues and a healthy lifestyle in the media.

Answer to question 5 *(What factors have the most significant effect on your health?):* 53% of women believe that it is the lifestyle (33% - dietary habits, 20% - bad habits) that affects health; 30% of respondents gave preference to the quality of medical care; 17% - noted the environmental situation as a factor that most significantly affects the state of health.

Question 6 suggested giving an answer to the question: *How do you feel most often when everything is in order with your health?* (Fig. 1).

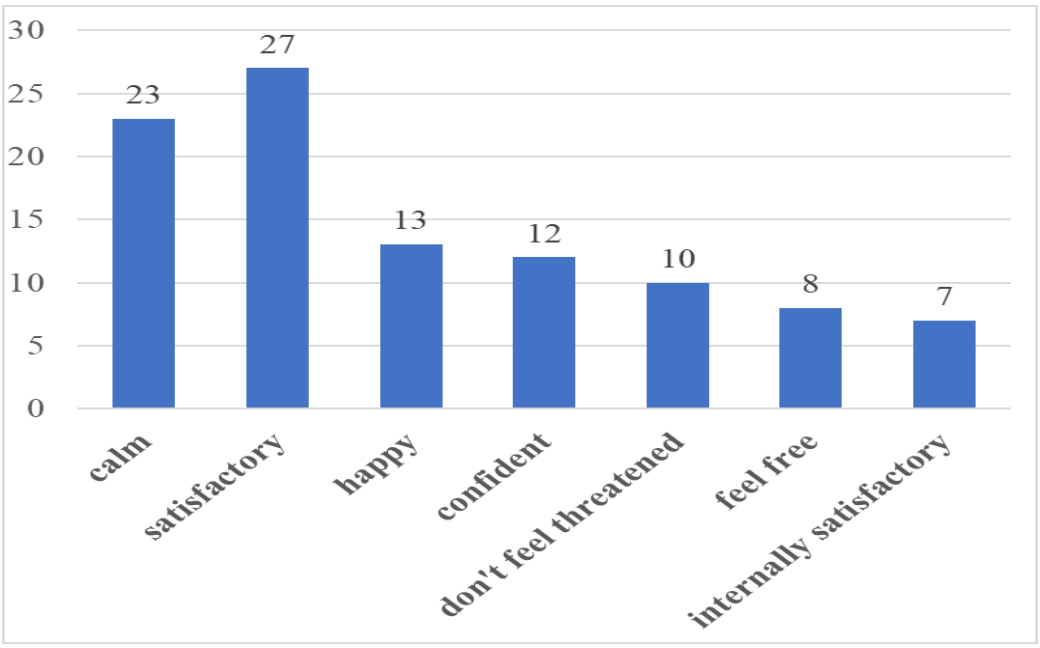

Figure. 1. Answers to questions: How do you feel most often when everything is in order with your health?

On the 7th question about *how you feel most often when you find out about the deterioration of your health*, 18% of women answered that they were alarmed and very nervous, the rest found it difficult to choose an answer.

Question 8: *Are you doing anything to support your health?* The answers to this question are presented in Table 2.

Table 2

Activities that women use to maintain their health

Answer	Respondents, %
Exercise (gymnastics, running, etc.)	4/10%
Practicing diet	5/12,5%
Practicing work and rest	-
Hardening	-
Preventive visit to a doctor	1/2,5%
I keep track of my weight	5/12,5%
I go to the bathhouse or sauna	-
Avoid bad habits	2/5%
I visit sports sections	5/12,5%
I practice special health systems (yoga, Chinese gymnastics and others)	2/5%

Based on the data in the table, we can conclude that only 60% of the women surveyed by us in their daily life carry out activities to maintain their health.

Answer to question 9: *If you take care of your health insufficiently or irregularly, then why****?*** Only 8% of women answered that they lack willpower. The rest of the women explained this answer by the insufficient amount of free time or the lack of understanding of taking care of their own health as a necessary degree.

On the 10th question *about indisposition****,*** we showed who the respondents turn to if necessary. Thus, 7% of women visit a doctor; 8% of respondents try not to pay attention; 20% of women find solutions on their own based on past experience. The rest of the respondents gave the answer "other", but without indicating their actions.

Thus, summing up the results of the survey according to the questionnaire of R.A. Berezovskaya "Attitude to health" we can talk about the irresponsible attitude of women aged 35-42 years with AH stage I to their health.

Conclusions / Discussion

According to the results of the study, it can be argued that young women with AH stage I are irresponsible about their health, namely, they do not follow the doctor's recommendations, do not undergo preventive examinations, do not comply with the components that form a healthy lifestyle, a small number use recreational activities, which confirms data of E.V. Burik (2011), L. D. Boreiko, G. G. Mararash (2020) [4; 5],

In women with hypertension, the number of modified risk factors increases with age, which lead to CVD against the background of high blood pressure. To promote the improvement of the quality of life of young people in the early stages of the disease, it is necessary to exercise RF, introduce educational programs, and optimize recreational and motor activity. All of the above confirms the work Ruban, L. (2018), Makarova, I. et el. (2019) [11, 13].

Thus, the modification of risk factors for the occurrence of hypertension, the development of educational and health-improving programs aimed at increasing

physical activity will help improve the quality of life of young people with hypertension.

Prospects for further research are associated with the creation of the "Women's Health" school, aimed at improving the quality of life through recreational and motor activity.

Conflict of interests. The authors declare that no conflict of interest.

Financing sources. This article didn't get the financial support from the state, public or commercial organization.

References

1. Apanasenko, G. L. (2014). Epidemiya hronicheskih neinfektsionnyih zabolevaniy: strategiya vyizhivaniya [Chronic noncommunicable disease epidemic: a coping strategy], Saarbrukken: Lambert Acad. Publ, 260 p. (in Russ.).
2. "Hypertension. Standards for the provision of medical care by primary care physicians": materialy Nastanovy Yevropeiskoho tovarystva z arterialnoi hipertenzii/Ievropeiskoho tovarystva kardiolohiv (ESC/ESH) 2018 r. z likuvannia arterialnoi hipertenzii, Ukrainskyi medychnyi chasopys, 5(1) (127). URL: https://www.umj.com.ua/article/magazine/127-ix-x (in Ukr.).
3. Berezovskaya, R. A. (2005), "Attitude to health", Praktikum po psihologii zdorovya / pod red. G.S. Nikiforova. SPb.: Piter, pp. 100-110. (in Russ.).
4. Boreiko, L. D., Mararash, H. H. (2020), "Identification of risk factors in patients with hypertension with the participation of a nurse", Klinichna ta eksperymentalna patolohiia, 19(1). pp. 30-37. (in Ukr.).
5. Buryk, Ye. V. (2011), Osoblyvosti perebihu arterialnoi hipertenzii v zalezhnosti vid sposobu zhyttia, stati ta viku patsiientiv [Peculiarities of arterial hypertension depending on the lifestyle, sex and age of patients]: robota na zdobuttia kvalifikatsiinoho stupenia mahistra. Sumy: Vyd-vo SumDMU, 56 p. (in Ukr.).

6. Diachuk, D. D., Moroz, H. Z., Hidzynska, I. M, Lasytsia, T. S. (2008), "Prevalence of risk factors for cardiovascular diseases in Ukraine: a modern view of the problem", Ukrainskyi kardiolohichnyi zhurnal, No. 1, pp. 91–101. (in Ukr.).

7. Kochuieva, M. M., Ruban, L. A., Tymchenko, H. A., Rohozhyn, A. V., Psarova, V. H., Kochuiev, H. I. (2018), "The effectiveness of physical rehabilitation of patients with cardiopulmonary pathology", Mizhnarodnyi medychnyi zhurnal, T.24, No. 4(96), pp. 11-14. (in Ukr.).

8. Nikiforov, G. S. (2005), Praktikum po psihologii zdorovya [Workshop on Health Psychology]. SPb.: PITER, 350 p. (in Russ.).

9. Ruban, L. A., Miroshnichenko, I. A., Sasko, I. A. (2015), "Screening questioning of the subjective assessment of the lifestyle of women of reproductive age ", Slobozhanskyi naukovo-sportyvnyi visnyk, No. 4, pp. 74-77. (in Russ.).

10. Skybchyk, V. A., Solomenchuk, T. M. (2018), "Cardiovascular prevention", Arterialna hipertenziia, No. 2, pp. 79-88. (in Ukr.).

11. Makarova, I., Tsygankov, B., Loginova, I. and Shamov, S. (2019), “Emotional status of patients with controlled hypertension”, Journal of Neurology and Psychiatry named after S.S. Korsakova. Special issues., 119(1), pp. 82-87. (in Eng.).

12. Podzolkov, V., Bragina, A., Radionova, V. and Koloda Yu. A. (2015), “Central and humoral mechanisms of the formation of arterial hypertension in women?”, Systemic hypertension, No. 1, pp. 76–82. (in Eng.).

13. Ruban, L. (2018). “Risk factors for the onset of arterial hypertension in women of the first adulthood in the period of manifestation of the disease”, Slobozhanskyi herald of science and sport, No. 2 (64), pp. 45-47. (in Eng.).

14. Williams, B., Mancia, G., Spiering, W. et al. (2018), "2018 ESC/ESH Guidelines for the management of arterial hypertension: The Task Force for the management of arterial hypertension of the European Society of Cardiology (ESC) and the European Society of Hypertension (ESH)", European Heart Journal, Volume 39, Issue 33, pp. 3021–3104. (in Eng.).

Received: 28.09.2020.
Published: 26.10.2020.

Information about the Authors

Larysa Ruban: PhD (Physical Education and Srort); Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.
orcid. org/0000-0002-7192-0694
E-mail: slarisaruban@gmail.com

Iryna Zharova: Doctor of Science (Physical Education and Srort), Professor; National University of Physical Education and Sports of Ukraine: st. Physical culture, 1, Kiev-150, 03150, Ukraine.
orcid. org/0000-0002-8904-9446
E-mail: aniri2002@ukr.net

UDC 796.894

ISSN (English ed. Online) 2311-6374

2020. Vol. 8 No. 5, pp.66-79

MORPHOLOGICAL FEATURES OF THE PHYSICAL STRUCTURE OF POWERLIFTERS OF DIFFERENT AGE AND LEVEL OF SPORTS QUALIFICATION

Gennady Kucherenko

State Institution «South Ukrainian National Pedagogical University named after K.D. Ushinsky», Odessa, Ukraine

Purpose: to identify and compare the characteristics of the physical development of people engaged in powerlifting, depending on the age and the level of sportsmanship.

Material and methods: to achieve this goal, the physical development of 32 male powerlifters was studied. To determine the physical development of athletes engaged in powerlifting, an anthropometric survey was conducted in a prominent contingent.

Results: according to the results of the calculation of the average values of the Pinier index, which determines the strength of the physique, it was found that in all studied groups a very strong physique prevails, but comparing age groups shows that qualified athletes have a more developed physique than their novice peers also reflected in the average shoulder diameter. The average indicators of the calculation of the Erisman index indicate that the studied contingent is characterized by chest hypertrophy, but the indicators of both groups of qualified athletes on average exceed those in the groups of beginners.

Conclusions: it was found that skilled powerlifters differ on average more weight and body length standing and sitting, relative long-legged, strong physique, chest hypertrophy, but slightly reduced mobility, well-developed muscles of the upper shoulder girdle and thighs and back (as evidenced by dynamometry results). The life index is calculated, which determines the possibilities of oxygen supply to the body and takes into account body weight, on average in all studied groups slightly below normal. This indicates that powerlifting does not sufficiently affect the development of aerobic capacity of athletes. Analysis of body composition indicates the optimal percentage of adipose tissue in all four study groups, which indicates that the comparative disproportion of individual indicators of physical development of athletes is due to the predominance or, conversely, lack of bone and muscle mass, which also confirms compliance with age calculated body mass index.

Keywords: sports morphology, power sports, qualified athletes, anthropometry, athletics.

Introduction

Currently, the development of power sports, in particular powerlifting, has gained unprecedented scope. Hundreds of thousands of people participate in competitions of strongmen, tens of thousands are regularly engaged in powerlifting (strength triathlon), bodybuilding and bodybuilding in sections under the guidance of professional trainers and independently, using available methodological literature [9, p.285; 11, p. 115].

Powerlifting classes increase muscle strength, strengthen ligaments and joints, help develop endurance and other useful qualities, cultivate willpower, self-confidence. Only a strong will can lead to the achievement of goals and to higher sports results.

Contrary to popular notions of strength sports, weightlifters, powerlifters and bodybuilders are similar only in that they chose a universal weight as a means of training - barbells, dumbbells and various exercise machines [2, p. 56; 8, p. 437].

It is impossible to compare not only their appearance, but also the indicators of their training, because training in each of these three sports differs in its specificity.

Human susceptibility to different training methods is also genetically determined. Highly skilled weightlifters tend to have a longer torso compared to leg length. The larger lever allows you to apply more acceleration to the fingerboard when performing tempo movements characteristic of weightlifting [1, p. 98; 7, p. 179].

Just like weightlifters, most powerlifters have a shorter torso than their legs. This gives them an advantage when performing deadlifts and squats.

As for bodybuilders, this is where we see the greatest variety of shapes, volumes and proportions. Among them are athletes with different ratios of torso and limb lengths. But the best has perfect proportions.

However, in the genotypes of the representatives of these three power sports there are common features [10, p. 241].

Genetically gifted weightlifter differs:

1. the predominance in the composition of muscle fibers that contract rapidly;
2. unexpressed structure of the pelvis or shoulder girdle;
3. longer torso compared to the length of the legs;
4. unexpressed trends in the thickness (circumference) of the joints;
5. very mobile elbow and ankle joints.

Genetically gifted bodybuilder is characterized by:

- predominance of rapidly shrinking fibers;
- narrow structure of the pelvis;
- wide structure of a shoulder girdle;
- aesthetically pleasing proportions of body parts;
- relatively small joint circumferences.

Genetically gifted powerlifter distinguishes:

- predominance of rapidly shrinking fibers;
- wide pelvic structure;
- wide structure of a shoulder girdle;

- short torso compared to the legs;
- vagueness of trends in joint thickness;
- longer (compared to average values) hands;
- for athletes equally performing in all three directions, this trend is not typical.

As you can see, a common feature of the three genotypes is a high percentage of rapidly shrinking muscle fibers [6, p. 25].

Some differences are also due to the content and methods of training. In bodybuilders, the effort is distributed evenly across all muscle groups, and as a result of their development, the external proportions of the athlete improve. Powerlifters and weightlifters care about the development of mainly those muscle groups that ensure the achievement of high strength results. These differences are manifested in the appearance of these three sports.

Bodybuilders strive for a balanced development of all muscle groups.

Weightlifters tend to look the same as any other strength-related sport; exceptions are more powerful trapezius muscles, triceps and rectifiers of the spine, as well as more clearly developed muscles of the upper thighs [3, p. 35].

Powerlifters develop strong muscles of the thighs, buttocks, back, chest, frontal deltoids and triceps.

As for the training method itself, we observe a great variety of exercises in bodybuilders, the number of approaches and repetitions, styles of movements in the exercises. In other words, they use a holistic approach in the development of muscle volume. This approach is acceptable for weightlifters and powerlifters only during certain periods of training cycles, because the increase in strength is less than in the "explosive" mode of exercise, when the weight rarely falls below 60% below the maximum possible in the approach. Such loads are able to stimulate the growth of muscle contractility, necessary for the manifestations of great strength [5, p. 158].

The analysis of strength training in powerlifting shows the unresolved number of issues related to the individualization of the training process and management of the physical condition of athletes, biomechanical parameters of competitive exercises, means of improving special strength training.

Purpose of the study: to identify and compare the characteristics of physical development of people engaged in powerlifting, depending on age and level of sportsmanship.

Material and Methods of research

To achieve this goal, the physical development of 32 male powerlifters was studied, which were divided into 4 groups. The first group (NQ1) included 8 novice athletes aged 17-22 years, whose training experience ranged from 3 months to 1 year. The second group (NQ2) included 8 athletes who do not have sports qualifications, aged 22-42 years, whose training experience ranges from 3 months to 2 years. The third group (QU1) consisted of 9 qualified athletes aged 16-22, including 2 masters of sports of international class, 1 master of sports, 5 Candidates for Masters of Sports and 1 athlete of the second adult category. The fourth group (QU2) consisted of 7 qualified athletes aged 23-51, including Honored Master of Sports, Master of Sports of international class, 4 Masters of Sports and 1 athlete of the 1st adult category. The training experience of qualified athletes is from 1 to 30 years. This distribution of athletes allows more differential assessment of morphological parameters of athletes, taking into account not only the level of sportsmanship, but also the biological age of the studied contingent, because with age in the human body there are certain changes in body composition.

Under the physical development of man understand the complex of morphological and functional properties of the organism that determine the stock of his physical strength. From this definition it is obvious how important the assessment of physical development is for the organization of trainings. The state of health and level of physical development of a person are factors that determine the possibility and nature of exercise. Body structure and condition of the musculoskeletal system are important criteria when choosing means and methods of training [4].

To determine the physical development of athletes engaged in powerlifting, an anthropometric survey (anthropometric measurements) was conducted in a prominent contingent. Anthropometric measurements should be performed in the morning, on

an empty stomach, with standard proven instruments according to generally accepted methods.

Body length (BL) – measured with a height meter or anthropometer. When measuring the subject becomes barefoot on the site of the height meter, heels, buttocks and interscapular area touch the vertical rack, the chin is slightly lowered so that the outer corner of the eye and the auricle were on the same horizontal. It is not necessary that the nape touches the vertical rack. The horizontal bar is lowered and slightly pressed to the crown; the reading is on a scale with an accuracy of 0.5 cm.

Body weight (BW) – measured naked to underwear on medical scales with an accuracy of 0.1 kg.

Neck circumference – measured by a centimeter tape applied under the thyroid cartilage. Chest girth – at the lower corners of the shoulder blades behind and at the level of the nipples in men and children and on the upper edge of the breast in women in front (chest girth is measured in three states: deep breathing, full exhalation and intermediate state). Abdominal girth – at the level of the umbilical point (measured at the time of pause between inhalation and exhalation). Thigh girth – under the buttocks (in the initial position: legs shoulder-width apart with even weight distribution on both legs). Shin girth – in the widest place of the calf muscle (in the initial position: legs shoulder-width apart with even weight distribution on both legs). Shoulder girth at rest - in the widest place of the shoulder muscle (arm hangs freely, muscles in a relaxed state). The girth of a tense shoulder – in the widest part of the shoulder (arm in a horizontal position, bent at the elbow, muscles as tense as possible). Forearm girth – in the widest place (arm hangs freely, muscles are relaxed).

Vital capacity of the lungs (VCL) – the measurement is made in a standing position, when the athlete performs 2-3 deep breaths and full exhalations, then performs 2 attempts of forced exhalation after a deep breath into the mouthpiece of the spirometer (nose during the test must be clamped). The best result is taken into account.

The study of the strength of the muscles of the palm and back is performed using wrist and post dynamometers. The strength of the muscles of the palm is

determined separately for the right and left hands with an accuracy of 2 kg, the strength of the muscles of the back – with an accuracy of 5 kg.

Measurement of body girth is usually performed to assess the proportionality of body structure, which is determined using indices.

Some indicators of girth are included in the formulas for calculating the component composition of the body in determining the fat and muscle content, as well as in determining the somatotype. In the dynamics (with a known influence), the girth indicators can be used as a criterion for the content of adipose or muscle tissue in a particular area of the body [4].

It is well known that determining the component composition of the body is important in sports and is used by coaches and sports doctors to optimize training regimes in preparation for competitions.

The OMRON-BF 306 is used for speed and ease of measuring the percentage of fat. The percentage of body fat is determined on the basis of measuring electrical resistance, taking into account such individual patient data as weight, height, age and sex.

The method of indices is most often used to assess physical development, as it operates on the relations of various anthropometric indicators, which in their relations are quite stable, and deviations indicate the characteristic features of physical development. More often, body mass, body length or their derivatives – body mass index and body surface area – are used as basic indicators included in the indices.

The most commonly used body mass index (Kettle's index, or BMI). The index is calculated according to the following formula:

$$BMI = \frac{BW\ (kg)}{BL\ (m)^2}$$

where: BW – body weight in kg, BL – body length in meters.

Indices of proportionality of body development are widely used, which include the Erisman, Manouvrier, and Pinye indices.

The Erisman Index (EI) determines the proportionality of chest development:

$$EI = CHC\ (cm) - ½\ BL\ (cm)$$

where: BL – body length (cm), CHC – chest coverage in a pause (cm).

The normative indicator of IE for men is +5.8 cm; for women – +3.3 cm. If the index is less than these numbers or with a negative sign, the chest is narrow; if more than these, on the contrary, wide. The Manouvrier Index (MI) determines the percentage of leg length to torso length:

$$MI = \left(\frac{BL\ (standing)}{BL\ (sitting)} - 1\right) x100$$

where: BL standing – body length in the standing position, cm; sitting – body length in a sitting position, cm

The proportionality of the length of the legs and torso corresponds to the value of the index equal to 87-92%, at lower values is determined by the relative short-leggedness, at larger – the relative long-leggedness. Body Proportionality Index (BPI):

$$BPI = BL\ sitting - (BL\ standing - BL\ sitting)$$

regulatory values are 9.5 for men and 12.5 for women.

Body strength index (Pinye index):

Pinye index = BL (cm) - (BW (kg) + CHC (on exhalation, cm))

Grade: less than 10 – strong physique; from 10 to 20 – good; from 21 to 25 – average; from 26 to 35 – weak; more than 36 – very weak.

To assess the capabilities of the respiratory system it is necessary to compare the measured indicator of vital capacity of lungs (VCL) with proper. Proper VCL for men can be determined by the formula:

$$VCL\ (l) = (0.0600 * BL\ (cm)) - (0.0214 * Age\ (years)) - 4{,}650$$

where: BL - body length in cm

Life Index (LI) calculated to assess the body's oxygen supply:

$$LI = \frac{VCL}{BW}$$

where: VCL - vital capacity of the lungs in ml; BW - body weight in kg, standard values for men are 65-70 ml/kg, for women – 55-60 ml/kg.

The analysis of the obtained research results was carried out by the method of

descriptive statistics. By using programs Microsoft Office Excel (Microsoft Corporation, USA) calculated the average values for each of the studied indicators, the standard deviation, as well as the p-criterion of reliability.

Results of the research

According to the results of the research, the average indicators of physical development of the selected contingent are calculated, which are presented in the table.

Table 1

Average indicators of physical development of persons engaged in powerlifting

Indicator	NQ1 M ± σ	NQ2 M ± σ	QU1 M ± σ	QU2 M ± σ
Body weight, kg	77.88 ± 3.71 *	83.50 ± 1.90*	77.56 ± 2.12*	83.07 ± 1.88*
Body length, cm	176.63 ± 2.42*	181.00 ± 3.35*	174.22 ± 1.93*	177.86 ± 1.68*
Body length (sitting), cm	91.44 ± 1.70*	94.13 ± 1.64*	89.33 ± 0.58*	92.00 ± 1.29*
Manouvrier index	93.31 ± 1.62*	92.32 ± 1.76*	95.03 ± 1.81*	93.45 ± 2.04*
PPI	6.25 ± 1.66*	7.25 ± 1.67*	4.44 ± 1.62*	6.14 ± 1.90*
Pinye index	3.25 ± 4.97*	-5.38 ± 3.75*	-1.67 ± 3.52*	-11.93 ± 4.10*
Diameter of shoulders, cm	39.50 ± 1.72*	41.94 ± 0.72*	40.72 ± 0.68*	42.86 ± 0.78*
Neck girth, cm	39.00 ± 1.55*	37.63 ± 0.80*	37.33 ± 0.76*	40.29 ± 0.92*
Abdominal girth, cm	82.38 ± 3.60*	92.00 ± 2.90*	79.00 ± 2.85*	96.71 ± 4.87*
OGK (pause), cm	99.75 ± 3.58*	105.75 ± 2.45*	100.44 ± 1.62*	109.29 ± 2.91*
Erisman index	11.44 ± 3.36*	15.25 ± 3.05*	13.33 ± 2.07*	20.36 ± 3.46*
CHC (breath), cm	104.25 ± 3.34*	109.50 ± 2.31*	105.78 ± 1.61*	114.14 ± 2.96*
CHC (exhale), cm	95.50 ± 2.98*	102.88 ± 2.34*	98.33 ± 1.63*	106.71 ± 2.50*
Excursion, cm	8.75 ± 0.59*	6.63 ± 1.00*	7.44 ± 0.38*	7.43 ± 1.19*
Shoulder circumference, cm	32.63 ± 1.18*	32.63 ± 0.60*	31.61 ± 0.76*	36.86 ± 1.78*
Shoulder girth (tension), cm	36.69 ± 1.73*	37.50 ± 0.85*	36.44 ± 0.65*	40.79 ± 2.00*
Forearm girth, cm	27.69 ± 0.95*	27.69 ± 0.53*	28.22 ± 0.49*	30.00 ± 1.00*
Coverage tightened, cm	57.63 ± 2.40*	58.56 ± 1.11*	57.33 ± 1.07*	65.57 ± 3.16*
Shin circumference, cm	37.44 ± 1.64*	36.88 ± 0.99*	34.89 ± 0.88*	37.57 ± 2.39*
Dynamometry right, kg	52.00 ± 3.31*	56.63 ± 1.12*	55.33 ± 3.18*	60.57 ± 4.55*

Continuation of Table 1

Dynamometry left, kg	48.00 ± 3.95*	51.00 ± 1.56*	52.33 ± 2.89*	55.71 ± 2.71*
Condition dynamometry, kg	146.88 ± 12.28*	148.63 ± 11.04*	168.13 ± 5.66*	185.00 ± 5.88*
VEL, ml	4588.7 ± 199.3*	5225.0 ± 352.5*	4578.8 ± 254.8*	4960.0 ± 243.6*

Proper VL, ml	4426.8 ± 58.7*	4321.0 ± 125.9*	4364.7 ± 49.1*	4185.9 ± 123.6*
Life index	59.39 ± 2.51*	62.42 ± 3.55*	59.86 ± 4.38	59.81 ± 3.02*
Relative fat content, %	18.61 ± 1.62*	21.84 ± 1.95*	16.13 ± 2.00*	22.09 ± 2.61
Body mass index	24.87 ± 0.77*	25.56 ± 0.67*	25.59 ± 0.77*	26.31 ± 0.84*

Note. The result is considered statistically significant if $p < 0.05$.

* - reliability $p < 0,05$.

Comparing the results obtained, we can say that on average more weight and length of the body standing and sitting are observed in the senior groups of beginners and skilled athletes.

Evaluating the calculation of the Manouvrier index, it is seen that on average the optimal ratio of torso and legs is observed in the older group of beginners, in other groups on average there is relative long-leggedness, which is also reflected in the average values of the calculated body proportionality index.

The average values of the Pinye index, which determines the strength of the physique, indicate that all studied groups are dominated by a very strong physique type, but comparing age groups shows that skilled athletes have a more developed physique than their novice peers, which is also reflected in average shoulder diameter. To some extent, this indicates the impact of powerlifting, rather than the manifestation of age.

The highest average neck coverage was observed in the senior group of qualified athletes (40.29 ± 0.92 cm). Relatively the smallest coverage of the abdomen is observed in the group QU1 (79.00 ± 2.85 cm), relatively the largest - in the group QU2 (96.71 ± 4.87 cm), which to some extent indicates the age features of the physique.

The average indicators of the Erisman index calculation indicate that the studied contingent is characterized by chest hypertrophy, but the indicators of both groups of qualified athletes on average exceed those in the groups of beginners.

The best average rate of chest excursion was observed in the younger group of beginners (8.75 ± 0.59 cm), slightly worse indicators were observed in groups QU1 and QU2 (7.44 ± 0.38 cm and 7.43 ± 1.19 cm, respectively), which indicates that insufficient attention is paid to the training of respiratory muscles.

Analyzing the average results of measurements of shoulder girth (relaxed and tense) and forearm, it is seen that in all studied groups the muscles of the upper shoulder girdle are sufficiently developed, which indicates a specific effect of powerlifting even in the early stages of training. It is obvious that in the group QU2 the largest indicators of these coverage were found.

Also, in the group QU2 there was a relatively greater hip coverage (65.57 ± 3.16 cm), which in some way reflects the longtime of powerlifting. Relatively the lowest coverage of the tibia was observed in the group QU1 (34.89 ± 0.88 cm), but this figure is proportional, given that in the group QU1 it does not differ from other groups with severe femoral hypertrophy. That is, we can assume that the load in powerlifting has a relatively more significant impact on the development of thigh muscles.

The average values of posture and wrist dynamometry are expected to be relatively higher in both groups of qualified athletes, although the indicators of posture dynamometry in both groups of beginners are almost the same. This fact indicates the specific effect of powerlifting on the development of back muscle strength.

Analyzing the experimentally obtained indicators of vital capacity of the lungs, it is seen that on average relatively better results were shown by athletes of older groups (NQ2 – 5225.00 ± 352.52 ml and 4960.00 ± 243.63 ml – QU2), which is due to age-related physiological features. This is confirmed by the fact that the calculated values of the appropriate for each age VCL in any of the groups do not exceed the empirically obtained. That is, VCL in all study groups exceeds the age norms. But the calculated vital index, which determines the possibilities of oxygen supply to the body and takes into account body weight, on average in all studied groups is slightly below the sexual norm. This indicates that powerlifting does not sufficiently affect the development of aerobic capacity of athletes.

Analysis of body composition indicates the optimal percentage of adipose tissue in all four study groups, which indicates that the comparative disproportion of individual indicators of physical development of athletes is due to the predominance

or, conversely, lack of bone and muscle mass, which also confirms compliance with age calculated body mass index.

Conclusions / Discussion

According to the results of the analysis of literature sources revealed that the training process in powerlifting must be built using significant strength loads, which are aimed at comprehensive involvement of the muscles involved in the competitive exercise. At the same time, the principle of separate training should be used, when during one day you perform a competitive exercise and auxiliary exercises for the muscles involved in the main exercise. The characteristic influence of certain types of power sports on the formation of morphological features of athletes and their role in the construction of the training process is also determined.

According to the results of the study of physical development of the selected contingent, it was found that skilled powerlifters differ in average greater weight and length of standing and sitting, relative long-legged, strong physique, chest hypertrophy, but slightly reduced mobility, well-developed muscles of the upper shoulder girdle and thighs and back (as evidenced by the results of dynamometry).

The life index is calculated, which determines the possibilities of oxygen supply to the body and takes into account body weight, on average in all studied groups slightly below the sexual norm. This indicates that powerlifting does not sufficiently affect the development of aerobic capacity of athletes.

Analysis of body composition indicates the optimal percentage of adipose tissue in all four study groups, which indicates that the comparative disproportion of individual indicators of physical development of athletes is due to the predominance or, conversely, lack of bone and muscle mass, which also confirms compliance with age calculated body mass index.

The results indicate the feasibility of using the proposed research methods. The novelty of the study lies in the rather informative experimental distribution of the studied groups not only by the level of sportsmanship, but also by age. Thus, it was possible to differentiate the impact of powerlifting on the morphological characteristics of athletes and age-related changes in the physique of the studied

contingent. In general, the obtained results confirm and supplement the statements of Starostin V.G., Krivoshapkina P.I., Platonova D.N., Alekseeva L.S. [4] on the morphological features of the selected contingent. Further research in this area will be to study the features of the functional state of athletes engaged in powerlifting.

Prospects for further research. For the given field of training, it is possible to visit the special features of the functional camp of athletes, to engage in powerlifting.

Conflict of interests. The authors declare that no conflict of interest.

Financing sources. This article didn't get the financial support from the state, public or commercial organization.

References

1. Volozhanin, S. E. (2016), Osnovy pauerliftinga v vuze (tekhnicheskaia podgotovka, printcipy, sredstva i metody, rekomendatcii) [Fundamentals of Powerlifting in the University (technical training, principles, means and methods, recommendations)], Ulan-Ude: Izdatelstvo Buriatskogo gosudarstvennogo universiteta, 172 p. (in Rus.).
2. Zakharov, A. A. (2019), Razvitie sily i myshechnoi vynoslivosti ruk: na primere mas-restlinga [Development of strength and muscular endurance of the arms: the example of mas-wrestling], Iakutsk: Severo-Vostochnyi federalnyi universitet, 117 p. (in Rus.).
3. Kovtun, I. (2017), Prokachai sebia: zaniatiia s sobstvennym vesom [Pump Yourself: Lessons with Your Own Weight], Samizdat, 84 p. (in Rus.).
4. Starostin, V. G., Krivoshapkin P. I., Platonov D. N., Alekseeva L. S. (2019), Morfofunktcionalnye issledovaniia v fizicheskoi kulture i sporte [Morphofunctional studies in physical culture and sports], Iakutsk : Izdatelskii dom SVFU, 183 p. (in Rus.).
5. Stetsenko, A. I. (2008), Pauerliftynh. Teoriia i metodyka vykladannia [Powerlifting. Theory and methods of teaching], Cherkasy: Vyd. vid. ChNU imeni Bohdana Khmelnytskoho, 460 p. (in Ukr.).

6. Shutova, T. N., Dodonov, A. P. (2017), Modelirovanie trenirovochnogo protcessa kvalifitcirovannykh pauerlifterov [Modeling the training process of qualified powerlifters], M.: REU im. G. V. Plekhanova, 78 p. (in Rus.).
7. Boyle, M. (2019), New Functional Training for Sports, Human Kinetics, 480 p. (in Eng.).
8. Contreras, Br. and Cordoza, G. (2019), Glute Lab: The Art and Science of Strength and Physique Training, Victory Belt Publishing Inc, 996 p. (in Eng.).
9. Ferriss, T. (2016), Tools of Titans : The Tactics, Routines, and Habits of Billionaires, Icons, and World-Class Performers, Houghton Mifflin Harcourt Publishing Company, 736 p. (in Eng.).
10. Israetel, M., Hoffman, J. and Smith, Ch.W. (2015), Scientific principles of strength training, N.p., 317 p. (in Eng.).
11. Schuller, R. (2016), Powerlifting Over 50. Mastering the Skills for an Empowered Body and Life. Create Space Independent Publishing Platform, 298 (in Eng.).

Received: 29.09.2020.
Published: 26.10.2020.

Information about the Authors

Gennady Kucherenko: Candidate of Pedagogical Sciences; State Institution «South Ukrainian National Pedagogical University named after K.D. Ushinsky»: 65039, Odessa, Fontanskaya road, 4.
orcid.org/0000-0002-4516-8873
E-mail: aniram6889@gmail.com

UDC 615.825:616.727.3

ISSN (English ed. Online) 2311-6374

2020. Vol. 8 No. 5, pp. 80-91

PHYSICAL THERAPY FOR CHRONIC LATERAL ELBOW TENDOPATHY (TENNIS ELBOW)

Borys Pustovoit

Sviatoslava Pashkevych

Liana Duhina

Kharkiv State Academy of Physical Culture,

Kharkiv, Ukraine

Purpose: to evaluate the effectiveness of inclusion of exercises for scapula stabilizers in physical therapy (PhT) of patients with chronic lateral tendopathy of the elbow joint (CLTEJ).

Material and methods: a three-month reseach involved 32 patients who were divided into two groups – the main (MG) – 17 people and the control (CG) – 15. MG of patients performed an PhT program consisting of: patient training, exercises for the shoulder blade and forearm (elbow/wrist), deep soft tissue massage in conjunction with Mill's manipulation, phonophoresis with hydrocortitisone. CG of patients had the same program, but without exercise for scapula stabilizers. Evaluation of results according to the criteria - determination of the intensity of pain syndrome (visual analog scale -VAS); measurement of muscle strength of the forearm and hands (dynamometry); test questionnaire of the functional state of the upper limb - Disability of the Arm, Shoulder and Hand Outcome Measure (DASH).

Results: the authors identified the features of the use of FT for the rehabilitation of patients with CLTEJ with exercises for scapular stabilizers in combination with deep soft tissue massage and Mill' manipulation.

Conclusions: This used rehabilitation complex had an advantage over the PhT only with special exercises for the forearm, as evidenced by reliable positive changes in VAS and the DASH scale ($p<0,005$ and $p<0,001$ respectively) in the short-trained performance assessment period.

Keywords: lateral elbow tendopathy, physical therapy.

Introduction

Treatment for lateral tendonitis of the elbow joint (LTEJ) is common in the medical practice of many specialists: orthopedic traumatologists, neurologists, rheumatologists, surgeons, family physicians, physicians of physical and rehabilitation medicine, physical therapists, etc. [1, 2]. Today there are many thoughts even about the name of this pathology. The terms "tennis elbow", "lateral elbow tendopathy", "lateral epicondylitis", "enthesopathy" and others are found in the medical literature. So, Stasinopoulos D, Johnson MI., 2006 [21] believe that the terms "lateral epicondylitis", "lateral epicondylosis", "tennis elbow" do not fully reflect the pathophysiological, anatomical and etiological factors. They, like a number of other researchers [8; 11] note that the term “lateral tendopathy of the elbow joint” is more appropriate. LTEJ therapy is versatile and includes many methods, both conservative and operational [4; 9; 13]. Modern research has not yet proven the benefits of a specific approach to the treatment of LTEJ and this is difficult for clinicians [25]. Epidemiological data show that the prevalence of LTEJ is 5 - 10%, mainly middle-aged people - from 30 to 60 years old - without gender difference [25].

Due to the prevalence of right-handers in human nature, LTEJ most often affects the right hand of patients who are engaged in manual monotonous labor or sports exercises. Among patients with this pathology, tennis players (mostly amateurs), pianists, artists, locksmiths, carpenters, blacksmiths, masseurs and many others are most often encountered. In the mechanism of the disease, there is necessarily a long-term receipt of microtraumas of the tendons of the forearm, elbow

joint or a powerful long-term effect on the body of industrial harmful factors, such as phenol, mercury, acid fumes, ionizing radiation [19; 22].

Patients often complain of pain or burning sensation in the lateral epicondyle of the humerus, which extends down the forearm and sometimes to the shoulder segment. This pain is usually triggered or exacerbated by a variety of activities, including resisting wrist extension, such as grasping objects or twisting towels. In addition, patients often complain of weakness in grasping and difficulty in flexing. Usually, normal elbow movement persists even in severe cases [1]. The degree of pain often ranges from mild to severe and intermittent to persistent, seriously affecting patients' quality of daily life. In about 80% of cases, LTLS symptoms improve within a year, often after the trauma factor stops acting, but at the end of 20% it becomes chronic [24]. Clinical, instrumental and laboratory methods are used to establish the diagnosis. [1; 3; 15].

Analysis of modern scientific literature shows that complex therapy of LTEJ does not have a sufficient evidence base to confirm or refute its effectiveness. All this determined the need for further study of the effect of PhT programs in patients with LTEJ [2, 13; 15; 21].

Purpose of the study was to evaluate the effectiveness of the inclusion of exercises for scapula stabilizers in PT in patients with chronic LTEJ.

Material and methods of research

The study involved patients who were undergoing rehabilitation treatment at the Fortis medical health center (clinical base of the KhDAFK) with a diagnosis of chronic LTEJ at the stage of unstable remission. The study was conducted during 2019-2020 with the participation of 32 patients with their informed consent (mean age 39,4 ± 0,5). Men -21, women - 11.

The criteria for the inclusion of patients in the reseach: the presence of symptoms for more than 3 months; the absence of severe somatic pathology; absence of pathology of the shoulder and wrist joints.

Exclusion criteria for patients from the reseach: significant pain syndrome; previous surgical interventions on the joint; rheumatoid arthritis; instability of the

shoulder or elbow joint; a history of elbow fracture; high degree extensor tendon ruptures (more than 50%); cervical radiculopathy.

Patients were stratified by sex and age, then randomly (according to tables of random numbers) were divided into two groups - the main (MG) and the control (CG). The MG included 17 patients (11 men and 6 women); in the CG - 15 patients (10 men and 5 women).

LTEJ treatment usually has five therapeutic goals: control of elbow pain, maintaining mobility of the affected limb, improving grip strength and endurance, restoring normal function of the affected limb, and preventing further deterioration. [16].

Patients of both groups received one group session on LTEJ prevention (patient education) [4], 13 individual sessions with a physical therapist (exercise, recommendations for home exercises), 6 manual interventions (deep soft tissue massage in combination with Mill' manipulation [17]), 8 procedures of apparatus physiotherapy (phonophoresis with hydrocortisone [5]). The duration of the physical therapist session was 45 minutes. Patients with CG after warm-up and general physical training (15 min) performed special exercises only for the forearm (30 min). In the main part of the session, MG patients performed special exercises for the stabilizers of the scapula and forearm with the same structure of the session. The set of special exercises for the forearm/hand included isometric, eccentric and stretching exercises, exercises with an elastic band, dumbbells, an elastic roll for twisting.

The program is designed for 3 months, classes were conducted first in a medical wellness center, and then home exercises with keeping a diary were recommended. Clinical evaluation was carried out by independent experts of the intervention and after 3 months to establish the short-term effect of treatment.

A number of criteria were selected to evaluate the results of the reseach. The intensity of pain syndrome, which is the leading clinical manifestation of LTEJ, was determined using a visual analog scale (VAS). The scale is the generally accepted worldwide standard for the definition of pain and has a gradation in cm (or mm) from 0 to 10, where 0 equals no pain and 10 equals maximum pain intensity. The strength

of the muscles of the forearm and hand was measured according to the method of hand dynamometry (using a medical electronic hand dynamometer MEHD-120) [6].

According to modern approaches in PhT, along with the violation of structure and function, it is necessary to assess the activity and participation of patients. The test questionnaire of the functional state of the upper limb (Disability of the Arm, Shoulder and Hand Outcome Measure - DASH) was used to assess the dynamics of the activity of daily life. The main section of the questionnaire contains 30 items-questions related to the functional state of the limb over the last week. At the same time, 21 questions determine the severity of performing various physical actions through limiting the function of the hand and shoulder; 6 - concern the expressiveness of some symptoms and 3 - social-role functions. Each item has 5 answer options, which are evaluated in points from 1 to 5. The sum of points for all items is listed on a 100-point scale. Thus, DASH scores an upper limb disability from 0 - no disability to 100 - significant disability. An excellent result is considered to be up to 25 points, from 26 to 50 - good, from 51 to 75 - satisfactory and from 76 to 100 points - unsatisfactory [7; 14].

Statistical analysis was performed using the SPSS program to calculate descriptive statistics, all data are presented as the average and its error. Differences between the baseline and post-intervention indicators were calculated using a paired t-test, between the comparison groups - using a t-test for independent samples, the significance level was considered significant at $p < 0.05$. When comparing gender, age, VAS, DASH and relative hand dynamometry, no statistical difference was found between MG and CG patients (Table 1).

Results of the research

The duration of the disease was 3.4 ± 0.9 years on average. Each of the patients during the course of the disease underwent 3 to 4 courses of conservative treatment by different methods with unstable remission of the disease. The following factors were named by the patients as the cause of the disease: professional workload on the hand (locksmiths, masons, musicians, programmers), sports (tennis), hobbies (fishing).

Table 1

Indicators of comparison group patients before physical therapy

Indicators	MG, M±m (n=17)	CG, M±m (n=15)	p
Gender Men / women	11/6	10/5	-
Age (years)	38,5±2,4	38,9±2,8	>0,05
VAS (cm)	5,20±0,47	5,15±0,45	>0,05
Dynamometry (kg)	14,3±1,6	13,8±1,5	>0,05
DASH (points)	64,5±6,5	64,0±6,4	>0,05

Upon completion of the PhT program, patients of both groups underwent a second examination in order to assess the effectiveness of the proposed measures.

After three months of PhT, there was a decrease in pain on the VAS scale in both groups (p<0,05), and a significant difference was found between the comparison groups (p <0,005) (Table 2).

Table 2

Dynamics of indicators of pain syndrome in patients of MG and CG according to the VAS scale (cm)

Indicators	MG (n=17)		CG (n=15)		p between groups
	before PT	after PT	before PT	after PT	
VAS (cm)	5,20±0,47	2,45±0,19	5,15±0,45	3,35±0,24	<0,005
p in dynamics in groups	<0,05		<0,05		

The results of the assessment of wrist dynamometry showed a significant recovery of muscle strength for patients with MG and CG without a significant difference between the groups (p> 0.05) (Table 3).

Table 3

Dynamics of indicators of the relative strength of the muscles of the forearm and hand in patients of MG and CG (kg)

Indicators	MG (n=17)		CG (n=15)		p between groups
	before PT	after PT	before PT	after PT	
Dynamometry (%)	14,3±1,6	17,9±1,9	13,8±1,5	18,4±1,9	>0,05
p in dynamics in groups	<0,05		<0,05		

The dynamics of everyday life activity according to the analysis of the results of the DASH questionnaire showed that the patients of both groups significantly

improved the indicators of the functional state of the upper limb (p <0,05, p <0,001), but the DASH indicators in patients in MG are significantly better than in patients in the CG (p <0.001) (Table 4).

Table 4

Dynamics of indicators of the functional state of the upper limb, DASH

Indicators	MG (n=17)		CG (n=15)		p between groups
	before PT	after PT	before PT	after PT	
DASH (points)	64,5±6,5	34,0±6,4	64,0±6,4	49,0±6,4	<0,001
p in dynamics in groups	<0,001		<0,05		

Conclusions / Discussion

Study results show that patient education, forearm (elbow/wrist) exercises, deep soft tissue massage combined with Mill manipulation, phonophoresis with hydrocortisone, and home exercise diary can significantly ease pain, improve activity in daily life, and strengthen strength. indicators of the forearm and hand. Incorporating scapula stabilizer exercises, altered muscle-fascial chain function, improved activity, and reduced pain complaints at 3 months based on significant differences in VAS and DASH scores. According to the meta-analysis [10], the results of measuring the hand strength with LTEJ are on average 17 kg, which was higher than the baseline values obtained in the study and corresponded to the results of the CG and MG patients after the implementation of the PhT program. That is, the functional capabilities of the muscles of the hand and forearm of patients with LTEJ to PhT were low, which could contribute to the chronicity of the disease.

The DASH scale had low scores both at the beginning and after the PhT program. When compared with the indicators of other studies of LTEJ patients [26], it was found that the scale scores were almost two times lower, which may indicate a more severe impact of the pathology on the condition of Ukrainian patients. The study and assessment of the sensation of pain behind VAS generally coincided with the assessments of other studies of LTEJ [18] and also had a positive trend over three months of the program. Various physical exercises are recommended for the treatment of LTEJ. Recently, eccentric exercise has gradually become the first line of

conservative treatment for LTEJ. Clinical trials have shown that they are highly effective in treating LTEJ when compared to a combination of several traditional exercise [23].

According to Day J. M. et al. (2019), scapula muscle training can be an important element for solving rehabilitation problems in patients with LTEJ [12]. Sethi K., Noohu M. M. (2018) also investigated the influence of the scapular muscles and the position of the scapula on the activity of the short radial extensor of the hand and the common extensor of the fingers in persons with chronic LTEJ. That is, in the opinion of many scientists, strengthening of the scapula muscles should be used in conjunction with apparatus physiotherapy in persons with chronic LTEJ to reduce pain, strengthen the compression force without pain, and improve functional results and activity [20]. The obtained results of the PhT program confirm the effectiveness of the inclusion of exercises for the stabilizers of the scapula to reduce pain, improve the functional state of the upper limb in the absence of a significant effect on the strength of the muscles of the forearm and hand.

Chiropractic and Mill' manipulation have some advantages over other treatments LTEJ [17] that were used in the current study, and found positive in the combined treatment effect. Researchers prove that corticosteroid injections are better than NSAIDs in improving patient outcomes within four weeks, with no long-term effect after 12 months [26], so phonophoresis with hydrocortisone may have an effect when used in a PhT program, which has been implemented found positive short-term effectiveness.

Patient education for LTEJ is a necessary part of restorative treatment. Without proper understanding by the patient of the factors damaging his condition, in all likelihood, recurrence or exacerbation of symptoms. Changing activity and avoiding fatigue are important parts of any treatment protocol. Turning the palm upward while lifting and avoiding the lowering exercise can transfer force from the lateral epicondyle to the medial epicondyle and help relieve pain [16].

The inclusion of exercises for the stabilizers of the scapula significantly ($p < 0.05$) improves the recovery process in the short-term period of LTEJ therapy, in

general, the rehabilitation program as part of physical exercises, deep massage of soft tissues in combination with Mill's manipulation, phonophoresis with hydrocortisone, as well as keeping a diary of performance home exercise is effective. The results obtained have an effect in a fairly short time interval and require a longer verification.

Prospects for further research include the continuation of studies to determine the long-term effects (up to 12 months).

Conflict of interests. The authors declare that no conflict of interest.

Financing sources. This article didn’t get the financial support from the state, public or commercial organization.

References

1. Beziazychna, O. V., Polkovnyk-Markova, V. S. (2017), "Score assessment of the impact of the rehabilitation program on the clinical and functional elbow joint of tennis players after epicondylitis", Fizychna reabilitatsiia ta rekreatsiino-ozdorovchi tekhnolohii. № 2. pp. 17-23. (in Ukr.).
2. Makarchik, A. V. (2019), Loktevoy epikondilit. Lechenie meditsinskimi fizicheskimi faktorami [Elbow epicondylitis. Treatment with medical physical factors]. Gomel: GU «RNPTs RMiECh». 11 p. (in Russ.).
3. Melnichuk, K. N. (2015), "Analiz problemyi travm i zabolevaniy oporno-dvigatelnogo apparata u tennisistov", Uchenyie zapiski universiteta Lesgafta. No. 3 (121). pp. 64-68. (in Russ.).
4. Skaba, Yu. Yu., Pashkevych, S. A. (2020), "Modern programs of physical therapy of patients diagnosed with lateral epicondylitis in the post-hospital stage", Fizychna reabilitatsiia ta rekreatsiino-ozdorovchi tekhnolohii. №3. pp. 39-53. (in Ukr.).
5. Ushakov, A. A. (2009), Prakticheskaya fizioterapiya [Practical physiotherapy]. Moskva: Meditsinskoe informatsionnoe agentstvo. 608 p. (in Russ.).

6. Fizychna, reabilitatsiina ta sportyvna medytsyna [Physical, rehabilitation and sports medicine] (2019) / za red. V.M. Sokruta. Kramatorsk: Kashtan. 480 p. (in Ukr.).

7. Chernihivska, S. A., Kaniuka, Ye. V., Zabara, O. Yu. Bondaruk, D. O., Melnyk, O. V., Mahera, V. S. (2019), "The relevance of the means of physical rehabilitation in patients with scapular pain syndrome", Ukrainskyi visnyk medyko-sotsialnoi ekspertyzy, Vyp. 2. pp. 18-23. (in Ukr.).

8. Bisset, L. M., Vicenzino, B. (2015), "Physiotherapy management of lateral epicondylalgia", Journal Physiother. 61. pp. 174-181. (in Eng.).

9. Bisset, L., Paungmali, A., Vicenzino, B., Beller, E. (2005), "A systematic review and meta-analysis of clinical trials on physical interventions for lateral epicondylalgia", British Journal of Sports Medicine. 39. pp. 411-422. (in Eng.).

10. Bobos, P., Nazari, G., Lu, Z., & MacDermid, J. C. (2020), "Measurement Properties of the Hand Grip Strength Assessment: A Systematic Review With Meta-analysis", Archives of physical medicine and rehabilitation. 101(3). pp. 553–565.

11. Coombes, B. K., Bisset, L., Vicenzino, B. (2015), "Management of Lateral Elbow Tendinopathy: One Size Does Not Fit All", Journal Orthop Sports Phys Ther. 45. (in Eng.).

12. Day, J. M., Lucado, A. M., & Uhl, T. L. (2019), "A comprehensive rehabilitation program for treating lateral elbow tendinopathy", International journal of sports physical therapy. No. 14(5). pp. 818–829. (in Eng.).

13. Dingemanse, R., Randsdorp, M., Koes, B. W. (2014), "Huisstede B.M. Evidence for the effectiveness of electrophysical modalities for treatment of medial and lateral epicondylitis: a systematic review", British Journal of Sports Medicine. 48. pp. 957-965. (in Eng.).

14. Hudak, P. L., Amadio, P. C., Bombardier, C. (1996), "Development of an upper extremity outcomemeasure: the DASH (disabilities of the arm, shoulder and hand) [corrected]. The Upper ExtremityCollaborative Group (UECG)", Am J Ind Med, No. 29(6). pp. 602-608. (in Eng.).

15. Keijsers, R., Koenraadt, K., Turkenburg, J., Beumer, A., Bertram, T., Eygendaal, D. (2020), "Ultrasound Measurements oft he ECRB Tendon Shows Remarkable Variationsin Patients with Lateral Epicondylitis", Arch Bone Jt Surg. 8(2). pp. 168-172. (in Eng.).

16. Ma, K. L., & Wang, H. Q. (2020), "Management of Lateral Epicondylitis: A Narrative Literature Review", Pain research & management, Volume 2020, Article ID 6965381. (in Eng.).

17. Nagrale, A. V., Herd, C. R., Ganvir, S., & Ramteke, G. (2009), "Cyriax physiotherapy versus phonophoresis with supervised exercise in subjects with lateral epicondylalgia: a randomized clinical trial", The Journal of manual & manipulative therapy. 17(3), pp. 171–178. (in Eng.).

18. Nowotny, J., El-Zayat, B., Goronzy, J., Biewener, A., Bausenhart, F., Greiner, S., & Kasten, P. (2018), "Prospective randomized controlled trial in the treatment of lateral epicondylitis with a new dynamic wrist orthosis", European journal of medical research. No. 23(1). 43p. (in Eng.).

19. Pitzer, M. E., Seidenberg, P. H., Bader, D. A. (2014), "Elbow tendinopathy", Med Clin North Am. No. 98(4): pp. 833-849. (in Eng.).

20. Sethi, K., & Noohu, M. M. (2018), "Scapular muscles strengthening on pain, functional outcome and muscle activity in chronic lateral epicondylalgia", Journal of orthopaedic science : official journal of the Japanese Orthopaedic Association. No. 23(5). pp. 777–782. (in Eng.).

21. Stasinopoulos, D., Johnson, M. I. (2006), "Lateral elbow tendinopathy' is the most appropriate diagnostic term for the condition commonly referred-to as lateral epicondylitis", Med Hypotheses. 67. pp. 1400-1402. (in Eng.).

22. Tosti, R., Jennings, J., Sewards, J. M. (2013), "Lateral epicondylitis of the elbow", Am J Med. 126. 357p. (in Eng.).

23. Tyler, T. F., Thomas, G. C., Nicholas, S. J., McHugh, M. P. (2010), "Addition of isolated wrist extensor eccentric exercise to standard treatment for chronic lateral epicondylosis: a prospective randomized trial", Journal of Shoulder and Elbow Surgery, No. 19(6). pp. 917–922. (in Eng.).

24. Vicente Vanaclocha-Vanaclocha, Nieves Saiz-Sapena, José María Ortiz-Criado and Leyre Vanaclocha (2019), "Chronic Pain Associated with Lateral Epicondylitis: Treatment with Radiofrequency" [Online First], IntechOpen, DOI: 10.5772/intechopen.90479. (in Eng.).
25. Waugh, E. J., Jaglal, S. B., Davis, A. M., Tomlinson, G., Verrier, M. C. (2004), "Factors associated with prognosis of lateral epicondylitis after 8 weeks of physical therapy", Arch Phys Med Rehabil. 85. pp. 308-318. (in Eng.).
26. Wolf, J. M., Ozer, K., Scott, F., Gordon, M. J., & Williams, A. E. (2011), "Comparison of autologous blood, corticosteroid, and saline injection in the treatment of lateral epicondylitis: a prospective, randomized, controlled multicenter study", The Journal of hand surgery. No. 36(8). pp. 1269–1272.

Received: 30.09.2020.
Published: 26.10.2020.

Information about the Authors

Borys Pustovoit: Doctor of Science (Medicine), Professor; Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.
orcid.org/0000-0001-7534-4404
E-mail: pustovoit203@gmail.com

Sviatoslava Pashkevych: Candidate of Medical Sciences, Associate Professor, Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.
orcid.org/0000-0002-4842-4350
E-mail: sviatoslava.pashkevych@gmail.com

Liana Duhina: PhD (Physical Education and Sport), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.
orcid.org/ 0000-0002-4278-4830
E-mail: Lianadugina@gmail.com

UDC 796.01+796.03+612

ISSN (English ed. Online) 2311-6374

2020. Vol. 8 No. 5, pp.92-103

DETERMINATION OF THE REQUIREMENTS FOR THE COMPLEX OF PHYSICAL PREPARATION DURING THE TRAINING PROCESS OF ATHLETES IN MILITARY AVIATION PENTATHLON

Andrey Poltavets[1]

Viacheslav Mulyk[2]

Andriy Kyyko[2]

Kharkiv National University of the Air Force named after Ivan Kozhedub, Kharkiv, Ukraine[1]

Kharkiv State Academy of Physical Culture, Kharkiv, Ukraine[2]

Purpose: to analyze the initial indicators characterizing the level of development of physiometric parameters among first-year cadets of a higher educational institution, who are the applicants for the national team in international military aviation pentathlon.

Material and methods: analysis of literary sources, testing, statistical analysis. The reseach was involved 48 first-year cadets of the Kharkiv National University of the Air Force named after Ivan Kozhedub (men) aged 17-18, of whom 38 Candidates in Master of Sports and 10 Masters of Sports.

Results: taking into account the initial data on the distribution of male cadets of the first course of KhNUPS by types of sports, the indicators of the proportionality coefficient and the strength of the physique were determined in order to prevent the influence of any random parameters on the final results of the reseach. To solve the goals and objectives of the research, we have selected and systematized tests to assess

the functional state of the cardiovascular system. The data on the indicator of physical performance according to the PWC170 test were determined and analyzed. The analysis of the results in the form of a verbal description, tables, an analytical description of the obtained patterns is carried out.

Conclusions: it was determined that the training of athletes in military aviation pentathlon in the future requires the development of a universal complex of physical exercises, the implementation of which does not require special equipment, it is understandable, and meets the requirements of training. The importance of assessing the functional state of the cardiovascular system in the process of selecting athletes for the national team in international military aviation pentathlon and for determining the algorithm for further training has been determined. It has been established that the training for a long time in one or another (game, cyclic, complex coordination, martial arts) kind of sport before being included in the national team in the military aviation pentathlon makes it necessary to develop a universal complex of physical training and the method of circular training (crossfit) is such that most consistent with the requirements of a universal complex of physical exercises to prepare for competitions in military aviation pentathlon competitions.

Keywords: military aviation pentathlon, physiometric parameters, functional state, circuit training, crossfit.

Introduction

It is known that the International Military Sports Council (IMSC) or the Conseil International du Sport Militaire (CISM) is one of the largest interdisciplinary sports organizations in the world, which is under the influence of the US Army and receives support from its representatives in Europe and has in its ranks 140 countries. Completed in 1948 in Nice [1, 3]. Its main purpose is to organize and support sports competitions between members of the armed forces, to promote the development of military-applied sports and to expand ties between armies [2]. It is also known that in order to exchange experiences and scientifically study issues related to sports training, in 1957 the Academy of CISM was established with sections of physical

training and sports, sports medicine and sports training [2, 3].

The International Council of Military and Applied Sports annually organize a number of major competitions in certain sports, which involve both ordinary servicemen and top athletes from around the world [2, 3].

One of the most popular and at the same time complex sports is the competition with MAP (military aviation pentathlon), which is held under the auspices of CISM and consists of air and sports competitions [3].

To use a list of individual exercises for training or to search for an existing set of exercises that already make up a certain system, it is necessary to understand the features of each of the components of the sports competition in MAP tournaments with the definition of generalizing qualities that affect the result as a whole, considering to obtain a high result features of the functional state of the leading systems of the body. The relevance of monitoring the latter is an important component of the management of the training process in the application of loads in preparation for competitions.

It is known that the final result of the competition is influenced by a lot of initial data. Even with the successful distribution of athletes who are planned to be included in the team of military aviation pentathlon by somatoscopic and somatometric indicators, it is important to determine the physiometric parameters of each of them. Since the results of military aviation pentathlon are determined in individual and team competitions, depend on the threshold parameters of speed and strength of the athlete, it is important to achieve maximum physiological capabilities of the body on the day of competition, especially during the final tournament - overcoming the obstacle course and orienteering.

The purpose of the study is to analyze the initial indicators that characterize the level of development of physiometric parameters in first-year cadets of higher education, who are candidates for the national team in international military aviation pentathlon.

Material and Methods of research

In order to avoid the influence of any random parameters on the final results and to determine the maximum stratification of the study participants - cadets-candidates for the national team in international military aviation pentathlon, we determined:

- coefficient of proportionality (CP) = (D1 - D2) × 100%, where D1 - standing height, D2 - sitting height (CP 97-92% - normal body proportion);

- body strength index (according to Pinier) (BS) = C - (M + O), where C is height, M is body weight, O is chest circumference on exhalation (BS is less than 10 - strong physique), 10-20 - physique is good, 21-25 - average physique, 26-35 - physique is weak, 36 and more - physique is very weak).

Testing was conducted during the first week of training (i.e. 01.09.2018 - 08.09.2018).

To solve the purpose and objectives of research, we have selected and systematized tests to assess the functional state of the cardiovascular system:

- determination of blood pressure response to exercise: normotonic - increase or stability of systolic blood pressure, decrease in diastolic blood pressure, hypotonic - decrease in systolic and diastolic blood pressure, hypertonic - increase in systolic and diastolic blood pressure, diastonic - decrease in systolic blood pressure, increase in diastolic blood pressure 4, 5];

- determination of the reserve of the cardiovascular system (CVS) (RC - reserve capabilities) according to Carvonen's formula: RC = 220 - B - heart rate, where 220 - maximum allowable heart rate (HR), B - age, heart rate - heart rate in calm [5,6]

- determination of the Rufier index (IR) = (6 × (P1 + P2 + P3) -200/10 - reactive properties of the CVS: measured the heart rate of the subjects at rest for 10 seconds (P1), then measured the heart rate (P2) in the first 10 seconds after 20 deep squats in 30 seconds with arms outstretched (sitting position), heart rate was measured for the third time in the last 10 seconds (P3) of the first minute of the recovery period. The results of calculations to assess the level of performance /

functional state of heart rate were rated as low> 15, less than average - 9-14, average - 7-9, above average - 3-6, high <3 [4,5];

- determination of physical performance by test PWC170. Test PWC170 is recommended by the WHO to assess both general and special performance in athletes, reproducing aerobic performance. The study was performed on a bicycle ergometer by performing two loads of moderate power without rest. The pedaling frequency was constant in the range of 60-80 revolutions, the duration of each load from 3 to 6 minutes. The intensity of the first load was 1 w / kg, the second - 2 w / kg. At the end of each exercise for the last 30 seconds, heart rate was determined. The calculations were performed according to the formula of Karpman V.L. [7,8]: PWC170 = P1 + (P2 - P1) × 170 - heart rate1 / heart rate2 - heart rate1 (W), where P1 and P2 - power 1 and 2 load, heart rate1 and heart rate2 - pulse at the end of 1 and 2 loads. Used a bicycle ergometer Spirit CR800, Taiwan.

To determine the initial values of the above indicators, we used the method of circular training (crossfit) - a set of exercises for strength and endurance. We chose this method precisely because each training session using this technique necessarily includes exercises that develop endurance, flexibility, strength and coordination [9,10]. The more rounds of a set of exercises per unit time an athlete does, the higher his functionality.

A number of exercises were selected for testing, consisting of sprinting for 400 m, L-pull-up 10 times, burpee 20 times, jumping rope for 30 seconds, flexion and extension of the arms lying on the floor 20 times, jumping on the stand 10 times. Count the number of complete circles under the conditions of high-quality exercises for 30 minutes.

Methods of parametric statistics were used to process the obtained data (Glanz S., 1999). Statistical processing of data entered in Excel spreadsheets was performed. Quantitative characteristics of the main functional indicators were processed statistically, namely, determined the arithmetic mean, the error of the mean. The significance of the obtained data was checked using Student's t-test (for n <100) at a given level of reliability p = 0.95. To be able to use the Student's t test, the Fischer-

Snedekor test was calculated - the ratio of the larger variance to the smaller. All mathematical operations and graphical constructions were performed using the software packages "Microsoft Office XP": "Microsoft XP Home" and "Microsoft Excel XP" on a personal computer (license numbers: 00049 153 409 442 and 74017 640 0000106 57664, respectively).

Results of the research

Given the initial data on the distribution of male cadets of the first year of KhNUPS, it was important to determine the proportionality and strength of their physique in order to prevent the impact of any random parameters on the final results (Table 1).

Table 1

The results of the comparison of the coefficient of proportionality and strength of the physique of first-year cadets depending on the sport, $\bar{x}$ + m

№	Test	Group I (n_1=12)	Group II (n_2=14)	Group III (n_3=10)	Group IV (n_4=12)
1	CP, %	93,6±1,4	95,4±1,4	95,6±1,2	94,1±1,1
	CP: t, p	$t_{1,2}$=1,52 $p_{1,2}$>0,05; $t_{1,3}$=1,44 $p_{1,3}$>0,05; $t_{1,4}$=1,63 $p_{1,4}$>0,05; $t_{2,3}$=1,36 $p_{2,3}$>0,05; $t_{2,4}$=1,46 $p_{2,4}$>0,05; $t_{3,4}$=0,54 $p_{3,4}$>0,05			
2	BS, conv. units	14,8±1,7	16,1±1,6	10,7±1,4	9,4±1,2
	BS: t, p	$t_{1,2}$=1,37 ($p_{1,2}$>0,05); **$t_{1,3}$=3,25 $p_{1,3}$<0,05; $t_{1,4}$=3,21 $p_{1,4}$<0,01**; **$t_{2,3}$=3,17 $p_{2,3}$<0,01; $t_{2,4}$=2,72 ($p_{2,4}$<0,05);** $t_{3,4}$=0,61 ($p_{3,4}$>0,05)			

Groups: Group I - game sports; Group II - cyclic sports; Group III - complex coordination sports; Group IV - martial arts.

Tests: KP - Coefficient of proportionality; BS - body strength index.

When analyzing the data in table 1, during the evaluation of the initial indicators of the coefficient of proportionality, no statistically significant differences were identified ($p < 0.05$). However, it should be noted that, despite the fact that all cadets without exception, this figure was in the range of reference values - 92 - 97% - the proportion of the body is normal, in the studied groups II and III its figures were greater, 95.4 ± 1, 4% and 95.6 ± 1.2%, respectively, than in groups I and IV - 93.6 ± 1.4% and 94.1 ± 1.1%, respectively, which characterizes the cyclical and complex coordination sports as such , which more than game and sports martial arts contribute

to the development of normal body proportions, which should be taken into account in preparation for competitions in military aviation pentathlon.

In turn, the analysis of the strength of the physique revealed significant statistical differences at the initial level among the cadets-candidates for the national team in military aviation pentathlon. Thus, in the subjects of group I, 12 cadets, who on the eve of admission to the free economic zone had sporting achievements in game sports, the strength of the physique according to Pinier was 14.8 ± 1.7, which indicated the characteristics of their good body structure, and probably ($p_{1,3}$<0,05) differed from the figures of this indicator in group III (10,7 ± 1,4) and in group IV (9,4 ± 1,2) ($p_{1,4}$<0,01), where the cadets determined the strong physique of the body.

In the stydy group II, this indicator was at the initial level of 16.1 ± 1.6, which was not statistically different from its value in group I, but probably ($p_{2,3}$<0.01) differed from the data in group III, 10.7 ± 1.4 and in group IV - 9.4 ± 1.2 ($p_{2,4}$<0.05).

Given the data obtained, it can be noted that the development of a strong physique is more conducive to martial arts and complex coordination sports. Game and cyclic sports develop a good physique, but not as strong as the previous ones, which should be taken into account when developing a training complex for athletes in military aviation pentathlon.

When passing the circles, which consist of a set of exercises on the crossfit system, an analysis of the number of circles, which were completed in a full 30 minutes (Figure 1).

Thus, the cadets, who at the time of admission to KhNUPS had sporting achievements in game sports, the average number of rounds of crossfit exercises for 30 minutes was 1.7 ± 0.2, in cyclic - 1.4 ± 0.1, in difficult -coordination - 2,0 ± 0,1, representatives of martial arts passed the offered crossfit test on the average full 1,6 ± 0,2 circles. Given the data obtained, it can be noted that the sports activity the day before, which had cadets-applicants for membership in the national team in military aviation pentathlon, emphasizes certain qualities of development of abilities, including body shape in general, which should be taken into account in the development of a training complex to achieve results in the sports competition VAP.

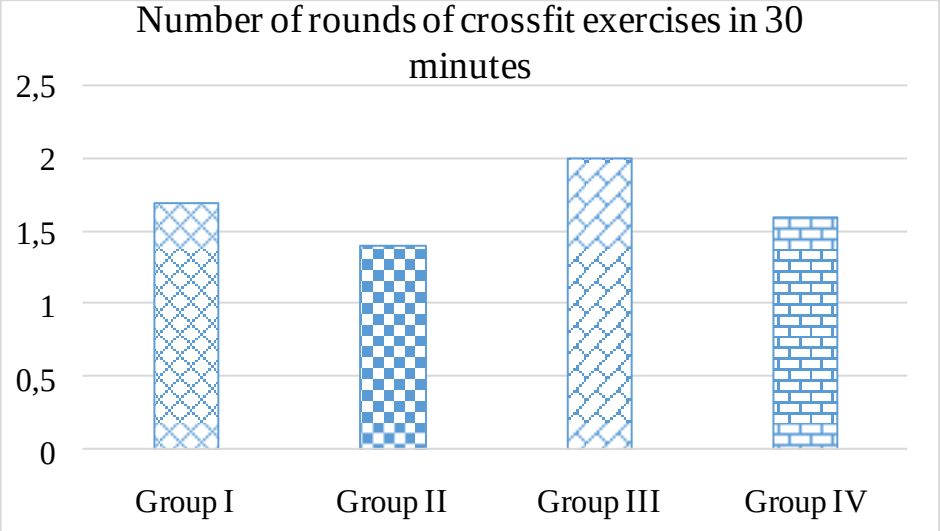

Figure 1. The number of rounds of crossfit exercises, which are fully passed by cadets, depending on the original sport for 30 minutes, where: Group I - game sports; Group II - cyclic sports; Group III - complex coordination sports; Group IV - martial arts

An important point in determining the functional state of the cadets was the measurement and statistical analysis of tests to assess the functional state of the cardiovascular system, which we conducted immediately after passing the circles of crossfit exercises (table 2).

It should be noted that in all subjects without exception in determining the body's response to exercise was recorded normotonic blood pressure response, which is a favorable factor for further intensive training. When analyzing the state of RC and IR after 30 minutes of cross-fit exercises, no statistical differences ($p < 0.05$) were recorded between the values in groups of cadets, which makes these tests not indicative in relation to the assessment of the functional state of the organism. This may be due to a sufficient level of training of cadets at the time of the test, or its diagnostic weakness in relation to the studied contingent.

When analyzing the physical performance of the test PWC170, on the contrary, were found statistically significant differences between the data in different groups of cadets.

Table 2

The results of determining the CVS reserve according to the Carvonen formula, the reactive properties of the CVS according to the Rufier index, physical performance according to the PWC170 test in first-year cadets depending on the sport, $\bar{x}$ + m

№	Test	Group I (n_1=12)	Group II (n_2=14)	Group III (n_3=10)	Group IV (n_4=12)
1	RC, ум. од.	141,4±3,9	142,6±4,2	146,8±3,1	144,2±3,9
	RC: t, p	$t_{1,2}$=1,54 $p_{1,2}$>0,05; $t_{1,3}$=1,46 $p_{1,3}$>0,05; $t_{1,4}$=1,61 $p_{1,4}$>0,05; $t_{2,3}$=1,38 $p_{2,3}$>0,05; $t_{2,4}$=1,44 $p_{2,4}$>0,05; $t_{3,4}$=0,56 $p_{3,4}$>0,05			
2	IR, conv. units	3,1±0,2	3,2±0,4	2,9±0,4	3,1±0,4
	IR: t, p	$t_{1,2}$=1,56 $p_{1,2}$>0,05; $t_{1,3}$=1,43 $p_{1,3}$>0,05; $t_{1,4}$=1,58 $p_{1,4}$>0,05; $t_{2,3}$=1,36 $p_{2,3}$>0,05; $t_{2,4}$=1,42 $p_{2,4}$>0,05; $t_{3,4}$=0,59 $p_{3,4}$>0,05			
3	PWC170, к/m.	1608,4±42,2	1674,1±29,2	1141,7±37,1	1259,4±41,6
	PWC170: t,p	$t_{1,2}$=1,53 $p_{1,2}$>0,05; **$t_{1,3}$=2,47 ($p_{1,3}$<0,05); $t_{1,4}$=2,21 ($p_{1,4}$<0,05); $t_{2,3}$=2,18 ($p_{2,3}$<0,05); $t_{2,4}$=2,3 $p_{2,4}$<0,05;** $t_{3,4}$=1,54 ($p_{3,4}$>0,05)			

Groups: Group I - game sports; Group II - cyclic sports; Group III - complex coordination sports; Group IV - martial arts.

Tests: RC - reserve capabilities of the cardiovascular system; IR - Rufier index (reactive properties of the cardiovascular system); PWC170 - physical performance.

Thus, in group I, where cadets had sports achievements in game sports, mainly basketball, volleyball, football, the rate of aerobic productivity of the body after undergoing 1.7 cross-fit range of exercises for 30 minutes was 1608.4 ± 42.2 kg / min., which probably ($p_{1,3}$<0,05) exceeded its value, 1141,7 ± 37,1 kg / min, in group III - sports achievements in complex coordination sports - after passing 2 full circles of crossfit exercises for 30 minutes and in group IV ($p_{1,4}$<0,05) - sports achievements in martial arts, 1259,4 ± 41,6 kg / min.

In turn, in group II, where the cadets at the time of the study had sporting achievements in cyclic sports, mainly cycling, triathlon, performance in areas of moderate and high power (the leading source of energy - oxidative processes) after passing 1.4 crossfit -circle of exercise for 30 minutes was a maximum of 1674.1 ± 29.2 kg / min, which probably exceeded its value in groups III ($p_{2,3}$<0.05) and IV ($p_{2,4}$<0.05), and testified in favor of the most optimal level of functioning of their cardiorespiratory system.

Conclusions / Discussion

Given the heterogeneity of the starting capabilities of the body of athletes in determining the composition of the national team in military aviation pentathlon, it is determined that the training of athletes further requires the development of a universal set of exercises that do not require special equipment, is understandable and meets the requirements the number of repetitions of multidirectional skills can be formed by accelerating their performance and increasing their number depending on the phase of the training process with reaching the peak of opportunities immediately before the competition.

The introduction of testing to assess the functional state of the cardiovascular system in the process of selection of athletes to the national team in international military aviation pentathlon is an important point in determining the appropriate algorithm for further training.

Long-term practice of one or another (game, cyclic, complex-coordination, martial arts) sport on the eve of the status of a candidate for membership in the national team in military aviation pentathlon makes it necessary to develop a universal set of physical training, where for a certain number skill exercises can be formed by accelerating their performance and increasing their number depending on the phase of the training process with reaching the peak of opportunities just before the competition.

The crossfit method is the one that best meets the requirements for a universal set of physical exercises to prepare for military aviation pentathlon competitions.

Conflict of interests. The authors declare that no conflict of interest.

Financing sources. This article didn’t get the financial support from the state, public or commercial organization.

References

1. Aulik, I. V. (1990), Opredelenie fizicheckoi rabotocpocobnocti v klinike i sporte [Determination of physical workability in the clinic and in sports]. Moskva: Meditsina, 147 p. (in Russ.)

2. Kirpenko, V. M., Zolochevskii, V. V. and Poltavets, A. I. (2020), Podolannya pereshkod. Smuga pereshkod CISM [Overcoming obstacles. CISM obstacle course.]. Kharkiv: KhNUPS im.I.Kozheduba, 104 p. (in Ukr).

3. Kirpenko, V. M., Piddubnii, O., G. and Poltavets, A. I. (2016), Aeronavtichne bagatoborstvo [Aeronautical all-around.]. Kharkiv: KhNUPS im.I.Kozheduba, 168 p. (in Ukr).

4. Landa, B.Kh. (2011), Metodika kompleksnoi otsenki fizicheskogo razvitiya i fizicheskoi podgotovlennosti [Methodology for a comprehensive assessment of physical development and physical fitness].Moskva: Sovetskii sport, 348 p. (in Russ.)

5. Shchegolev, V. A., Sivak, A. N., Kochin, A. A. and Egorov, V. Yu. (2016), "Training of specialists in the military-physical profile in the armed forces of the leading NATO countries", Teoriya i praktika fizicheskoi kultury, №2, pp. 61-66. (in Russ.).

6. Knapik, J., Sharp, M., Darakjy, S. et al. (2006), "Temporal changes in the physical fitness of US army recruits", Sports Med, 36, pp. 613-634. (in Eng.)

7. Leyk, D, Erley, O, Ridder, D, Leurs et al. (2007) "Age related changes in marathon and half-marathon performances", Int J Sports Med, 28, pp. 513-517. (in Eng.)

8. Osipov, A.,Kudryavtsev, M., Gatilov, K.et al. (2017), "The use of functional training — crossfit methods to improve the level of special training of athletes who specialize in combat sambo", Journal of Physical Education and Sport, 17 Suppl., №3, pp. 2013–2018. (in Eng.)

9. Pattyn, N., Coeckelberghs, E., Buys, R., et al. (2014), "Aerobic interval training vs. moderate continuous training in coronary artery disease patients: A systematic review and meta-analysis", Sports Med, 44, pp. 687-700. (in Eng.)

10. Pryimakov, O., Iermakov, S. Kolenkov, O. et al (2016), "Monitoring of functional fitness of combat athletes during the precompetitive preparation stage", Journal of Physical Education and Sport, No. 16 (2), pp. 551–561. (in Eng.)

Received: 01.10.2020.

Published: 26.10.2020.

Information about the Authors

Andriy Poltavets: Ivan Kozhedub Kharkiv National Air Force University: Klochkivska str. 99, Kharkiv, 61058, Ukraine.
orcid.org/0000-0003-0695-4465
E-mail: apoltavec82@gmail.com

Viacheslav Mulyk: Doctor of Science (Physical Education and Srort), Prof., Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058,Ukraine.
orcid.org/0000-0002-4441-1253
E-mail: mulyk.viacheslav@gmail.com

Andriy Kyyko: PhD (Physical Education and Srort), Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058,Ukraine.
orcid.org/0000-0002-6248-3576
E-mail: kiyko8000@gmail.com

UDC 796.01+796.03+612

ISSN (English ed. Online) 2311-6374

2020. Vol. 8 No. 5, pp.104-115

DIFFERENTIATION OF LOADS IN THE BASIC MESOCYCLE ACCORDING TO SPECIAL PHYSICAL READINESS IN YOUNG WEIGHTLIFTERS 14-15 YEARS OLD, TAKING INTO ACCOUNT THE PHASES OF A SPECIFIC BIOLOGICAL CYCLE

Lydmila Kanunova[1]

Oleksandr Piven[1]

Evgeny Plotnikov[2]

Kharkiv State Academy of Physical Culture[1],

Kharkiv National Automobile and Road University[2],

Kharkiv, Ukraine[2]

Purpose: to determine the effectiveness of using complexes of strength-oriented exercises in the basic mesocycle according to the special physical readiness of young weightlifters of 14-15 years old, taking into account the phase of the ovarian-menstrual cycle.

Material and methods: in accordance with the methodological approach to solving the problem and the set tasks, the research program included a set of methods: analysis of scientific and methodological literature, determination of special physical fitness with the help of pedagogical testing of young women weights, pedagogical observation of the training process and methods of mathematical statistics.

Results: modern approaches are presented regarding the peculiarities of building the training process of young weightlifters of 14-15 years old, a detailed structure of building a basic mesocycle according to SPP is presented, taking into

account the differentiation of the load of special power-oriented complexes in different phases of the ovarian-menstrual cycle. The experiment involved the control and experimental groups, in which they used different approaches to planning the training process and the peculiarity of which is that in the experimental group special complexes of strength preparedness were used, taking into account the efficiency in different phases of the OMC.

Conclusions: the introduction of the methodology of the training process of young weightlifters of 14-15 years old in the basic mesocycle of the annual macrocycle, taking into account the phases of the ovarian-menstrual cycle, contributed to a significant increase in the indicators of general and special-auxiliary exercises in the experimental group in relation to the control one in the snatch of 8 kg kettlebells in 10 min ($t = 2.15$; $p < 0.05$) in squatting with a 24 kg kettlebell on the shoulders by 10.2 times ($t = 2.28$; $p < 0.05$) and deadlift - by 6.7 times ($t = 2.25$; $p < 0.05$).

Keywords: young athletes, specific biological cycle, OMC phases, microcycles, mesocycles.

Introduction

Modern sport is characterized by a steady increase in sports achievements, accompanied by an increase in the volume and intensity of the training load. Such an approach to the training process often leads to overstrain of regulatory systems, depletion of the adaptive reserve and shortening of the performance time of athletes, does not allow achieving high sports results. The functioning of physiological systems and adaptation processes in the body of women differ from those in men. This is due to one of the main biological characteristics of the female body associated with reproductive function - the cyclic functions of the hypothalamic-pituitary-ovarian-adrenal system. A number of studies (A. G. Radzievsky, 1990; F. A. Iordansky 2012; V. V. Mulik 2001; 2016; L. Ya. - G. Shakhlina, 1995-2014) [3-5; 12-14], including foreign ones (A. M. Burrows, S. R. Bird, 2005; S. B da Silva, 2006; A. J. Anderson, M. A. Babcock, 2008) [16-22], is devoted to the influence of sex

hormones in the system of women's sports training. Experts have established the dependence of the manifestation of the working capacity of athletes of various sports specializations and the reaction of their body depending on the change in the concentration of sex hormones during the menstrual cycle (MC) (A.G. Radzievsky, 1990; L. Ya.-G. Shakhlina, 1995–2014) [4; 9;10].

Purpose of the study is to determine the effectiveness of using complexes of strength-oriented exercises in the basic mesocycle from the special physical readiness of young weight-lifters 14-15 years old, taking into account the phase of the ovarian-menstrual cycle.

Material and Methods of research

According to the methodological approach in solving the problem and the set tasks, the research program included a set of methods: analysis of scientific and methodological literature, determination of special physical preparedness with the help of pedagogical testing of young weight-lifters, pedagogical observation of the training process and methods of mathematical statistics.

The reseach involved young pupils of the Children's and Youth Sports School No. 16 and Sports School No.8, Kharkov. The experiment involved 22 young athletes weight-lifters 14-15 years old, who were divided into two groups: control and experimental, 11 athletes in each group. The participants of the experiment trained six times a week, the control group – according to the sports school program, the experimental group trained according to the developed method using the load of prisoners depending on the phases of the OMC.

The experiment was carried out at the educational and training base of Sports School No. 8 and Children's and Youth Sports School No. 16.

Results of the research

Sports training of young female athletes involved in kettlebell lifting provides for the use of means and methods that affect the development of such physical qualities as strength, strength endurance and speed-strength training. Under the influence of training, the athlete's body undergoes certain changes. In the process of adaptation to physical activity, the level of physical performance and fitness of

athletes increases. One of the manifestations of the body's adaptation to power manifestations is muscle hypertrophy. However, in order for the changes in the body of female athletes to have a positive character, the coach must choose the optimal regimen and develop a training complex during the ovarian-menstrual cycle and choose the right rest, recovery procedures, contribute to a faster growth of sportsmanship (V. Mulik, 2001; V. M. Platonov, 2004; M. S. Prudnikova, 2009;) [4; 9; 10].

At that time, to date, there are no studies on the construction of an annual macrocycle of training young female athletes involved in kettlebell lifting, taking into account the ovarian-menstrual cycle. Sports training involves the use of means and methods of training aimed at improving the level of development of physical qualities. Long-term exposure to stress on the body causes changes in the functional state of the organ systems (respiratory), and as a result, the overall level of preparedness and physical performance increases. However, in order for the influence of sports to have a positive character, the coach must select an adequate level of load, taking into account the phases of the ovarian-menstrual cycle, taking into account the individual characteristics of female athletes [3; 4; 5 ;6; 7].

Taking into account the recommendations of leading experts in the field of construction of training process of preparation of athletes (B. Platonov, 2004; VV Mulik 2017) [4-5; 8-9], it is reasonable to construct a two-cycle annual training of young athletes involved in kettlebell lifting, taking into account the specialty of the OMC during a one-year macrocycle.

In our study, the construction of a one-year macrocycle for training young athletes is based on the generally accepted theory of periodization (V.M. Platonov), which provides for the division of the macrostructure into preparatory, competitive and transitional periods, and when menarche appears, we have introduced a developed experimental technique for constructing a basic mesocycle (basic on SPP) in the preparatory period, developed taking into account the phases of the ovarian-menstrual cycle (Tables 1, 2).

Table 1

The content of the training program of young female weight-lifters 14-15 years old from the control and experimental groups in the basic mesocycle with SPP, taking into account the ovarian-mental cycle

Indicators of training loads and classification of muscle groups	Mesocycle									
	Basic SPP									
	Retracting		Shock		Leading		Shock		Retracting	
	Menstrual		Post menstrual		Ovulatory		Post ovulatory		Before menstrual	
	CG	EG	CG	EG	CG	EG	CG	EG	CG	EG
Load range as a percentage of maximum.	80	50	90	85	60	30	90	100	70	55
Number of training days	6	4	8	11	6	2	10	12	6	5
Number of repeats	88	62	96	105	75	42	102	110	90	60
Number of attempts	5	3	5	5-6	3	2	5	6	5	3
Exercise time, min, s										
Kettlebell snatch	10	6	10	10	8-10	3-4	10	10	8	5
Kettlebell push	10	7	10	10	8-10	3-4	10	10	8	6
Pauses between repeats, s	0,5	1,0	0,5	0,5	0,6	1,2	0,5	0,4	0,6	0,9
Rest between attempts, min										
In competitive exercises	5	8	6	6	6	10	5	5	5	7
In specially assisted exercises	3	5	4	4	6	10	4	3	3	5
Number of muscle groups training in the OMC phases										
Thigh muscles	3	2	4	5	2	1	5	6	3	2
Back muscles	4	2	3-4	5	2	1	4	7	3	3
Pectoral muscles	2	2	3	4	2	1	4	4	2	2
Deltoid muscles	2	2	4	5	2	1	5	6	2	2
Biceps muscle	1	2	2	2	2	1	3	4	2	2
Three-headed muscle	3	2	4	5	2	1	4	6	3	3
Forearm muscles	2	2	5	6	2	1	4	7	2	2
Abdominal muscles	3	0	5	6	2	1	8	10	3	2

CG - control group; EG - experimental group

The total amount of loads in the basic mesocycles did not have a significant difference between the groups ($p>0,05$).

The proposed approach to planning in the annual macrocycles of the basic mesocycle for young female athletes weight-lifters, taking into account the phases of

the ovarian-menstrual cycle, modified from the works of V.V. Mulik (2017). Table 1 shows a more detailed content of the training process in the preparatory period of the basic mesocycle on SPP. The experimental group trained for five microcycles (retraction, shock, leadinf, shock, retraction) of the basic mesocycle, using in each phase of the OMC a set of strength exercises was developed, in which the load on different muscle groups varies (Table 1).

The proposed methodology, according to which young female athletes of the experimental group were trained in the basic mesocycle according to the SPP of the preparatory period, consisted in the correctness of the training burden when planning the course of the basic mesocycle, which took into account the differentiation of the number of kettlebell lifts (NKL), as well as in kilograms and tons, which is shown in Table 2. All data shown in the table are average values.

Table 2

The total volume of training work performed by young female weight-lifters 14-15 years old from the control and experimental groups in the basic mesocycle on SPP taking into account the ovarian-mental cycle

Indicators of training work	**Mesocycle**									
	Basic SPP									
	Retracting		**Shock**		**Leading**		**Shock**		**Retracting**	
	Menstrual		Post menstrual		Ovulatory		Post ovulatory		Before menstrual	
	CG	**EG**	**CG**	**EG**	**CG**	**EG**	**CG**	**EG**	**CG**	**EG**
Competitive exercises										
Kettlebell snatch, NKL	440	248	480	630	375	84	510	660	450	180
Kettlebell snatch volume, kg	7040	3968	7680	10080	6000	1344	8160	10560	7200	2880
Kettlebell push, NKL	320	150	350	350	150	62	390	410	280	120
Kettlebell push, volume, kg	10240	4800	11200	11200	4800	1984	12480	13120	8960	3840
Special preparatory exercises										
Squat with a kettlebell 24 kg, NKL	290	96	330	450	165	84	510	660	450	180
Squats with kettlebell 24 kg, volume, kg	6960	2304	7920	10800	3960	2016	12240	15840	10800	4320

Continuation of Table 1

Deadlift with a kettlebell of 24 kg, NKL	240	66	280	390	105	24	310	420	250	60
Deadlift with a kettlebell 24 kg, volume, kg	5760	1584	6720	9360	2520	576	7440	10080	6000	1440

CG - control group; EG - experimental group; NKL - number of kettlebell lifts; KG - kilograms

In the basic SPP mesocycle, much attention was paid to competitive exercises, therefore the total volume was 63 thousand 776 kilograms, the most attention was paid to the snatch exercise, since it is the first competitive exercise, as well as specially preparatory exercises, which amounted to the NKL 2 thousand 430 lifts, since the task of this the mesocycle was to construct a harmonious distribution of loads among the five phases of the CMC. In turn, the female athletes of the control group trained, not taking into account the differentiation of the load in different phases and achieved results in competitive exercises, respectively, 83 thousand 760 kilograms.

As a result of the use of the author's methodology of the developed complex of the training process among female weight-lifters of 14-15 years old in the basic mesocycle on SPP of the preparatory period of the annual macrocycle, taking into account the specific biological cycle, significantly better results of the test indicators of young weight-lifters of the experimental group were obtained (Table 3)

Table 3

Indicators of competitive and special-preparatory exercises of female weight-lifters in the control (CG, n = 11) and experimental (EG, n = 11) groups at the beginning and at the end of the experiment $\overline{X} \pm m$

Indicators		Groups of athletes		t	p
		CG	EG		
Snatch of a kettlebell 8 kg in 10 minutes, number of times	before	52,2±2,9	51,0±2,5	0,34	>0,05
	after	77,0±3,4	88,5±2,9	**2,57**	**<0,05**
Squats with kettlebell 24 kg, number of times	before	12,1±2,8	12,8±2,2	0,19	>0,05
	after	27,9±3,0	38,1±3,3	**2,28**	**<0,05**
Deadlift with a kettlebell 24 kg, number of times	before	36,4±2,2	37,3±2,4	0,27	>0,05
	after	52,6±2,3	59,9±2,1	**2,25**	**<0,05**

As a result of the use of the author's methodology of the used complex of strength exercises among 14-15 year old female weight-lifters with a differentiating approach in each of the phases of the OMC, the female weight-lifters of the experimental group showed significantly better results of tests of competitive and special-preparatory exercises ($p < 0,05$).

The increase in test results in a weight-lifters in the experimental group was higher in: snatch of a kettlebell by 7,8 times ($t = 2,15$; $p < 0,05$) in a squat exercise with a 24 kg kettlebell on the shoulders by 10.2 times ($t=2,28$; $p<0,05$) and deadlift – by 6,7 times ($t=2,25$; $p<0,05$) (Table 3).

Thus, a comparative analysis of the indices of competitive exercises and special physical fitness of female athletes in the control and experimental groups at the beginning and at the end of the experiment showed that the level of special physical fitness of athletes in the experimental group significantly increased under the influence of the proposed methodology, in which the developed complexes of strength exercises were used that differentiate load in different phases of the ovarian menstrual cycle in a female weight-lifters 14-15 years old.

Conclusions / Discussion

The analysis of the scientific literature testifies to isolated studies in kettlebell lifting. In recent years, scientists have conducted research on the content and methodology of the training process of young female weight-lifters 14-15 years old with various methods of developing motor skills and strength qualities (Yu.V. Verkhoshansky 2013), planning the training process during the annual macrocycle of athletes 14-15 years (V. Platonov, 2014, 2015) and the influence of the training process of young athletes-kettlebell athletes 14-15 years old on the manifestation of physical qualities (M.S. Ipolitov). However, the influence on the working capacity of physical loads of young female weight-lifters of 14-15 years old during a specific biological cycle has not yet been determined and, in accordance with this, the planning of training loads.

The conducted research confirmed the results of other authors [1, 2] about the need to take into account the influence of training on the physical indicators of

female athletes aged 14-15 at the stage of initial training. Also, the data of domestic [4-5; eight; nine; 11] and foreign [16-22] authors on the issues of increasing the level of the most significant indicators of physical qualities on the body of young athletes involved in kettlebell lifting.

Today, there is a number of scientific studies that consider the issues of the peculiarities of building the training process of female athletes based on taking into account the working capacity in different periods (phases) of a specific biological cycle. The works of A.R. Radzievsky, Yu.T. Poholenchuk, N.V. Svechnikov, B.P. Pangelova, T.A. Lozy, S.K. Fomina, A. Ya. Kvale, Yu.A. Karp, L.Ya.-G. Shakhlin, who determined the functional state of female athletes during a specific biological cycle. The issues of building the training process of young athletes have been studied to a lesser extent, especially during the formation of a specific biological cycle.

The introduction of the methodology of the training process of young female weight-lifters 14-15 years old in the basic mesocycle of the annual macrocycle, taking into account the phases of the ovarian-menstrual cycle, contributed to a significant increase in the indicators of general and special-auxiliary exercises in the experimental group in relation to the control one in the snatch of 8 kg kettlebells in 10 minutes ($t=2,15$; $p<0,05$) in squatting with a 24 kg kettlebell on the shoulders by 10,2 times ($t=2,28$; $p<0,05$) and deadlift - by 6.7 times ($t=2,25$; $p<0,05$).

Prospects for further research envisage the determination of the construction of the training process of young female weight-lifters 14-15 years old in separate mesocycles, taking into account the phases of the OMC during the annual macrocycle.

Conflict of interests. The authors declare that no conflict of interest.

Financing sources. This article didn’t get the financial support from the state, public or commercial organization.

References

1. Verhoshanskiy, Yu. V. (2013), Osnovyi spetsialnoy silovoy podgotovki v sporte [Fundamentals of special strength training in sports.]. Moskva : Sovetskiy sport, 215 p. (in Russ.).

2. Dzhym, V. Yu. (2013), "Comparative analysis of the technique of jerk exercises in weightlifting and weightlifting", Pedahohika, psykholohiia ta medyko-biolohichni problemy fizychnoho vykhovannia i sportu. No. 11. pp. 10–16. (in Russ.).

3. Iordanskaya, F. A. (2012), Muzhchina i zhenschina v sporte vyisshih dostizheniy: Problemyi polovogo dimorfizma [Man and woman in elite sport: Problems of sexual dimorphism]: monografiya. Moskva: Sovetskiy sport, 256 p. (in Russ.).

4. Mulik, V. V. (2001), The system of long-term sports improvement in complicated conditions of conjugation of the main aspects of athletes' fitness (based on skiing) : avtoref. dis. na soiskanie uch. stepeni d-ra nauk po fiz. vosp. i sportu : spets. 24.00.01 «Olimpiyskiy i professionalnyiy sport». Kyiv, 21 p. (in Russ.).

5. Mulyk, V. V. (2016), "Modern aspects of building the training process of athletes", Slobozhanskyi naukovo-sportyvnyi visnyk. No. 5(55). pp. 57–62. (in Ukr.).

6. Novikov, V. P. (1990), "Characteristics of the development of strength in schoolchildren 7 - 10 years old", Vozrastnyie osobennosti fiziologicheskih sistem detey i podrostkov. Moskva. pp. 203-204. (in Russ.).

7. Oleshko, V. H. (2011), Pidhotovka sportsmeniv u sylovykh vydakh sportu [Training of athletes in power sports]: navch. posib. dlia vuziv. Kyiv : DIA, 444 p. (in Ukr.).

8. Platonov, V. N. (2004), Sistema podgotovki sportsmenov v olimpiyskom sporte. Obschaya teoriya i ee prakticheskie prilozheniya [The system of training athletes in Olympic sports. General theory and its practical applications]. Kiev : Olimpiyskaya literatura, 808 p. (in Russ.).

9. Platonov, V. N. (2015), Sistema podgotovki sportsmenov v olimpiyskom sporte. Obschaya teoriya i ee prakticheskie prilozheniya [The system of training

athletes in Olympic sports. General theory and its practical applications]: uchebnik dlya trenerov : v 2 kn. Kiev. : Olimpiyskaya literatura, Kn. 2. 752 p. (in Russ.).

10. Prudnykova, M. S., Mulyk, V. V. (2009), "The influence of physical activity on the functional state and personal qualities of young cyclists 12-15 years old during the formation of the UMC", Slobozhanskyi naukovo-sportyvnyi visnyk. No. 3. pp. 164–167. (in Russ.).

11. Rovnyi, A. S. (2001), Formation of the system of sensory control of precise movements of athletes: avtoref. dys. na zdobuttia nauk. stupenia d-ra nauk z fiz. vykhovannia i sportu: spets. 24.00.02. Fizychna kultura, fizychne vykhovannia riznykh hrup naselennia. Kyiv, 40 p. (in Ukr.).

12. Shahlina, L. G. (2000), "Women and sports at the turn of the third millennium", Nauka v olimpiyskom spopte, No. 4. p. 10–22. (in Russ.).

13. Shahlina, L. G. (1995), Biomedical foundations of managing the process of sports training for women: avtoref. dis ... d-ra med. nauk. Kiev, 32 p. (in Russ.).

14. Shahlina, L. G. (1999), "Problems of sexual dimorphism in elite sports", Teoriya i praktika fizicheskoy kulturyi. No. 6. pp. 51–55. (in Russ.).

15. Sheyko, B. I. (2008), "Planning Technique for Beginner Powerlifters", Mir silyi. No. 4. pp. 28-29. (in Russ.).

16. Casazza, G. A. Jacobs, K. A., Suh S. et al. (2004), "Menstrual cycle phase and oral contraceptive effects on triglyceride mobilization during exercise", J. Appl. Physiol. Vol. 97. pp. 302–309. (in Eng.).

17. Horton, T. J., Miller, E. K., Bourret, K. (2006), "No effect of menstrual cycle phase on glycerol or palmitate kinetics during 90 min of moderate exercise", J. Appl. Physiol. Vol. 100. pp. 917–925. (in Eng.).

18. Jacobs, K. A., Cassaza, G. A., Suh, S. [et al.] (2005), "Fatty acid re-esterification but not oxidation is increased by oral contraceptive use in women", J. Appl. Physiol. Vol. 98. pp. 1720–1731. (in Eng.).

19. Janse de Jonge, X. A. (2003), "Effects of the menstrual cycle on exercise performance", Sports Med. Vol. 33. pp. 833–851. (in Eng.).

20. Kenney, L. W., Wilmore, J. H., CostiiL, D. L. (2012), Physiology of sport and exercise. Champaign: Human Kinetics, 621 p. (in Eng.).
21. Nimmo, M. A. (2009), The female athletes : olympic text-book of science in sport / ed. by R. J. Maughan. Blackwell Sci. Publ. P. 382–400. (in Eng.).
22. Wilmore, Jack H., Costill, David L., Kenney, W. Larry (2008), Physiology of sport and exercise. Human Kinetics, 574 p. (in Eng.).

Received: 02.10.2020.
Published: 26.10.2020.

Information about the Authors

Lydmila Kanunova: Kharkiv State Academy of Physical Culture: st. Klochkivska, 99, Kharkov, 61058, Ukraine.
orcid.org/0000-0003-3545-5438
E-mail: lkanunova17@gmail.com

Oleksandr Piven: PhD (physical education), Kharkiv State Academy of Physical Culture: st. Klochkivska, 99, Kharkov, 61058, Ukraine.
orcid.org/ 0000-0002-2490-5205
E-mail: piven_oleksandr@ukr.net

Evgeny Plotnikov: Kharkiv National Automobile and Road University: st. Yaroslav the Wise, 25, Kharkov, 61002, Ukraine.
orcid.org/ 0000-0003-3978-7771
E-mail: kharkovgirjasport@ukr.net

UDC [796.035:796.062:796.01:612]-055.2

ISSN (English ed. Online) 2311-6374

2020, Vol. 8 No. 5, pp.116-128

FEATURES OF THE ORGANIZATION OF HEALTH-IMPROVING AND RECREATIONAL MOTOR ACTIVITY OF OLDER WOMEN

Galina Putiatina

Kharkiv State Academy of Physical Culture, Kharkiv, Ukraine

Purpose: to characterize modern approaches and methods of organizing health-improving and recreational motor activity of older women.

Material and methods: in this study, a methodological approach was used, according to which the organization of health-improving and recreational motor activity of older women was considered from the point of view of the interaction of different order systems. To achieve this goal, a set of complementary methods was used: analysis of literary sources, documents and Internet resources; analysis of advanced foreign and domestic experience, system analysis method, comparison and contrast method, organizational analysis.

Results: it was found that in the composition of the Ukrainian population, the numerical advantage of women over men is observed from the age of 38 and increases with age. In the age group 65 years and older, the number of women is almost 2 times higher than the number of men. The expediency of introducing an experimental approach to increasing the level of health-improving and recreational motor activity of older women by means of health-improving physical culture has been substantiated.

Conclusions: as a result of the analysis of the current state of development of the domestic system of health-improving and recreational motor activity, factors have

been identified that enhance the role of health-improving motor activity, in particular for older women: the need to inform citizens about the benefits of a healthy lifestyle, regular physical activity; the need to introduce effective mechanisms for the prevention of chronic non-communicable diseases, which have become the main cause of premature mortality; increased negative impact on human health due to a decrease in the volume and intensity of physical activity; a low level of attraction of persons to specially organized physical activity (especially older women), which contradicts the general trends in the development of civilization.

Keywords: health, health-improving and recreational physical activity, women, old age, organization.

Introduction

Now the number of older people in the world is more than 600 million. According to experts, in fifty years there will be more than 2 billion. Currently, Ukraine is one of the 30 oldest countries in the world in terms of the proportion of people aged 60 and over: in 2013, this proportion was 21,4% of the total population; in 2015 – 21,8%; in 2019 – 23,9%. According to the national demographic forecast for the period up to 2025, the share of people over 60 years old will be 25% of the total population, in 2030 – more than 26%; in 2061 – 31,2%. The demographic load in 2019 on the population aged 16-59 (per 1000 people) is 399 people aged 60 [5].

The inevitability of demographic aging requires an adequate response of society to changes in the socio-demographic conditions of the population's life and the consequences of accelerated aging. The socio-economic consequences of demographic aging are associated primarily with a decrease in the number of people of working age, an increase in the demographic and economic burden on people of working age, and an increase in demand for social and medical services among elderly citizens. The problem to be addressed by the state policy is characterized by low indicators of health status and the level of availability of quality medical care; the level of medical care and prevention of morbidity throughout a person's life; the level of awareness of healthy lifestyles in old age, ways to achieve healthy and active

longevity, as well as the possibilities of receiving geriatric care; insufficient development of the corresponding infrastructure [7, 9, 11].

Overcoming the contradiction between a high level of human capital development and an insufficient level of social capital development is the key mechanism for changing the entire paradigm of the socio-economic development of Ukraine. One of the priority tasks of domestic policy in Ukraine for the coming years is the preservation and development of the national human capital of the state as the main factor of economic growth, a significant role in the preservation of which is played by the system of health-improving and recreational motor activity of the population [8].

Purpose – to characterize modern approaches and methods of organizing health-improving and recreational motor activity of older women.

Material and Methods of research

In this study, a methodological approach was used, according to which the organization of health-improving and recreational motor activity of older women was considered from the point of view of the interaction of systems of a different order. To achieve this goal, a set of complementary methods was used: analysis of literary sources, documents and Internet resources; analysis of advanced foreign and domestic experience, system analysis method, comparison and collation method, organizational analysis.

Results of the research

The most significant feature of long-term changes in the age composition of the population is its aging as an objective result of the evolution of demographic processes. The age structure of the population, which had the shape of a pyramid with three clearly geometrically defined groups (0-28, 29-59 and 60 and older), now tends to change the species associated with an increase in the proportion of people aged 60 years and older, children and youth. This can lead to the creation of unknown structural characteristics of the life and labor potential of the state.

Numerous studies of domestic and foreign scientists indicate that the aging process of the body can be significantly slowed down with the help of systematic

physical exercises that stimulate the activity of the endocrine system, improve metabolism, prevent the development of degenerative changes in organs and tissues, increase the endurance of the nervous system and the ability of a person to adapt to environmental conditions. In the end, rational physical activity contributes to the preservation of health, increased efficiency and vitality. [4, 13, 14, 15, 16]

Aging, unfortunately, is accompanied by negative changes in the state of health, reducing physical activity and a person's ability to self-service. Over the past 50 years, the aging process of the nation on a global scale has been developing at a high speed, and any ignorance of this process can have negative consequences for one or another state.

The resident population in Ukraine by the beginning of 2020 amounted to 41,732.8 thousand citizens. The structure of the resident population by sex: women - 53.6%, men - 46.4%. Average life expectancy at birth: women - 76.98 years, men - 66.92 years. In the composition of the Ukrainian population, the numerical advantage of women over men is observed from the age of 38 and increases with age. In the age group 65 years and older, the number of women is almost 2 times higher than the number of men. The significant difference between indicators by sex is due to the fact that in the age groups of 20-60 years, the mortality rate of women is three times less than the mortality rate of men. Among the causes of death of both women and men, in the first and second places are diseases of the circulatory system and neoplasms, in third in women - diseases of the digestive system, in men - external causes (Table 1).

Table 1

The number of the elderly population in Ukraine by sex and age groups (as of 01.01.2020), thousand people

Age groups	Women	Men
60–64	1644569	1187126
65-69	1459202	926765
70–74	1072110	589588
75–79	849699	375317
80–84	1358264	515554
Total persons over 60 years old	**6383844**	**3594350**

Source: data of the State Statistics Committee of Ukraine and calculations on them

Therefore, the aging of the population is a serious challenge to the financial and economic system, primarily in the field of public finance and the labor market.

However, it should be understood that older people are not a burden for society, they can also be a prerequisite for improving living standards in the country, a powerful factor in the humanization of society. The critical scale and rate of loss of human capital are integral risks for Ukraine, identified in the context of global risks. This should orient the real sector of the national economy towards the modernization of innovation and the use of human creative potential. Thus, a new human-centrist model of economic development is being formed, in which the effective implementation of human and social capital is one of the mechanisms for the transition to a model of sustainable development of Ukraine.

Supporting the global goals of sustainable development until 2030 proclaimed by resolution of the United Nations General Assembly dated September 25, 2015 No. 70/1 and the results of their adaptation, taking into account the specifics of Ukraine's development, set out in the National Report "Sustainable Development Goals: Ukraine", the priorities of state policy are determined, namely ensuring healthy lifestyles and promoting well-being for all at all ages.

In the modern scientific and methodological literature, the problems of health-improving and recreational motor activity are quite thoroughly presented, in particular: a dialectical approach to structural-functional management in the system of health-improving and recreational motor activity of the population has been formed [1]; sufficient theoretical and empirical knowledge about strategies and recommendations for a healthy lifestyle and physical activity has been accumulated [10].

At the same time, the analysis of literature data indicates an insufficient number of studies highlighting the features of using a set of health-improving measures for older women.

Authors Andreeva O.V., Gakman A.V., Duditska S.P., Medved A.N. state that the absence of a healthy lifestyle and a low level of physical activity cause a sharply accelerated rate of aging, characteristic of people of all ages, reflects the general the

trend of deterioration in the quality of life, health level, low level of physical fitness of citizens in our country and puts forward the task of preventing premature aging as one of the strategic. At the same time, the authors substantiate the advantages of attracting older people to health-improving and recreational motor activity in a sanatorium-resort complex as a prospect for the development and implementation of various technologies or programs of health-improving and recreational motor activity in health-improving complexes that will effectively fill the leisure time of older people [2, 4].

Futorny S. proposed the development of a special content of recreational and health-improving activities for older women in health groups, combines traditional means of physical culture with elements of eastern health-improving systems, taking into account the motivational needs and psychophysical capabilities of older women, and also allows you to choose adequate means of physical culture and physical activity and their rational combination, to increase the effectiveness of recreational and health-improving activities and to ensure the optimization of the level of psychophysical state of older women [12].

The implementation of the state policy in the field of physical culture and sports is aimed at ensuring equal rights and opportunities for physical culture and sports for all categories of the population of Ukraine, stimulating the creation of sports infrastructure, improving state policy in the field of physical culture and sports, as well as promoting the popularization and dissemination of a healthy lifestyle, organization of meaningful leisure.

However, the imperfection of the system of relations between the state and other subjects of the sphere is obvious, hinders the popularization of physical culture and sports; an insufficient number of information and social campaigns aimed at popularizing a healthy lifestyle, motivational presentations of mass sports.

The development of physical culture and sports and the organization of leisure of the population is one of the main tasks of the demographic growth of Ukraine, as the basis of the demographic development of the nation, the solution of which, unfortunately, is not given enough attention.

The problem of a healthy lifestyle is complex, because it has many interdependent components. The mechanism for its solution should provide for a complex of socio-economic, legal, environmental, sanitary and hygienic, propaganda, educational, educational, organizational and other methods. In Ukraine, a number of projects are currently being implemented aimed at solving this problem, namely the international project EMSP (Health Promotion Schools, 2003). In Ukraine, youth-friendly clinics began to be implemented with the assistance of UNICEF since 1998, the target audience of these structures is children and youth.

In a society that is aging, the full range of opportunities for older persons must expand, including employment and professional development opportunities, which are quite successfully implemented through the lifelong education system. In Ukraine, since 2009, in some regions (Kiev, Chernivtsi), Universities of the third age have been functioning for pensioners, who, through training, create conditions for the prevention of depression in the elderly. According to a study by the World Health Organization, Ukraine ranks first in the world in the prevalence of depression, especially among people of retirement age [16]. Participation in the educational process helps a person to keep up with the times, train memory, develop intelligence.

The results of a study by the analytical platform in the field of fitness Fitnessconnect indicate that more than 81% of the price segment of the fitness services market falls within the range of average annual prices from UAH 3,000 to UAH 15,000. The most active part of the clients of fitness clubs are young people aged 31-35 who have achieved a stable income and realized the need to lead a healthy lifestyle [17].

Analysis of global and domestic fitness trends suggests that fitness programs for the elderly, which occupy the fourth place in the world ranking, are practically absent on the fitness services market in Ukraine [3].

Thus, the contingent of elderly women (60-74 years old), unfortunately, remains outside the field of vision of health professionals, education and the field of fitness and recreation. In particular, the development and implementation of

scientifically based complex special programs for self-study, taking into account their physical condition, remains unresolved.

It is proposed to carry out activities on the formation of a healthy lifestyle, hygienic education and recreational and recreational motor activity of older women through the implementation of the "School of Active Aging" project. The purpose of which is to create conditions for assessing the health status of older women, especially taking into account its certain qualitative aspects (preservation of vital activity, the absence of serious functional limitations, etc.), while it is facing a number of organizational, methodological and informational problems and limitations.The functional purpose of such organizational structures should be based on seven key features of a healthy nation: high life expectancy; active lifestyle; healthy food culture; psychological health; environmental friendliness; active tourism social interaction.

The implementation of this project provides for the development of a mechanism for promoting a healthy lifestyle of all age groups as a prerequisite for active aging and longevity, and, in particular, promoting physical activity of older persons (through the exchange of experience and best practices in this area, the introduction of targeted programs at the local community level, the development of recommendations for the promotion of physical activity in all types of health facilities, awareness-raising campaigns in the media); adaptation of the system of health-improving and recreational physical activity to the needs of the elderly population (training specialists in this area, improving the state of the relevant infrastructure, increasing the "health literacy" of the older persons, their relatives and volunteers); prevention of accidents among the older people (raising awareness of the population about the factors of accidents and effective preventive measures; introducing programs of physical exercise, physiotherapy and training, expanding access to preventive measures for high-risk elderly groups); development of a set of indicators and a mechanism for monitoring the level of involvement of older people in physical culture and sports;introduction of recommendations for prescription by doctors, including family doctors, of physical activity as an effective means of

reducing the risk of non-communicable diseases, primary prevention of chronic non-communicable diseases and physical rehabilitation; introduction and stimulation of productive aging - continuation of stay in the labor market - through the coordination of the interests of stakeholders using such a dialogue tool as the “Bulletin of Productive Aging”, which was developed by Kirnos I.A.

This should be a scientifically grounded system of principles, socio-economic and political mechanisms for the balanced development of individuals and society in Ukraine. Particular attention in implementing this approach deserves the creation of an environment conducive to the older people.

The introduction of a responsible attitude of society to the problems of older people will ensure the continuation of the work of older people, the promotion of their volunteer activities; formation of a policy of lifelong learning with the aim of attracting elderly citizens to participate in educational processes, expanding the opportunities for mastering new professional and general educational skills, in particular in the areas of modern communications, computer and information literacy; preserving the health and well-being of elderly citizens.

Conclusions / Discussion

The preservation and strengthening of the physical health of older women is one of the most important tasks in the sphere of physical culture and sports in the context of the implementation of the main provisions of the National Strategy for Health-Improving Physical Activity in Ukraine for the period up to 2025 "Physical Activity - Healthy Lifestyle - Healthy Nation". Caring for the elderly should not be focused on disease alone. It provides for the provision of their general well-being, which is based on the interconnection of physical, mental, spiritual, social, economic and environmental factors.

Analysis of the current state of development of the domestic system of health-improving and recreational motor activity indicates that the strengthening of the role of health-improving motor activity is due to the following factors:

- need to inform citizens about the benefits of a healthy lifestyle, regular physical activity;

- need to introduce effective mechanisms for the prevention of chronic non-communicable diseases have become the main cause of premature mortality;
- strengthening of the negative impact on human health due to a decrease in the volume and intensity of physical activity;
- low level of involvement of persons in specially organized physical activity (especially older women), which contradicts the general trends in the development of civilization.

We agree with the opinion of other authors, in particular with A.V. Andreeva, A. V. Gakman, S. P. Duditskoi, A.M. Medved (2019), I.A. Kirnos (2018), S. Futorny (2019) and other, the main ways to implement the proposed approach is to popularize a healthy lifestyle at the personal, social and state levels; availability of fitness and active lifestyle for the elderly; attraction of investments into the industry.

Discussion issues remain the expediency and prospects of using various health-improving and recreational technologies that are used for women of all ages and their effectiveness, taking into account a number of methodological provisions: meaningful processing of existing experience, which may result in the improvement of the process of organizing health-improving and recreational motor activity of women.

Prospects for further research in this direction are in the experimental confirmation of the effectiveness of the proposed approach to the organization of health-improving and recreational motor activity of older women.

Conflict of interests. The authors declare that no conflict of interest.

Financing sources. This article didn’t get the financial support from the state, public or commercial organization.

References

1. Azhyppo, O., Putiatina, G. (2017), "Dialectical approach to structural and functional management in the system of health and recreation activities of the

population", Slobozhanskyi naukovo-sportyvnyi visnyk, no. 6 (62), pp. 7-10. (in Ukr.).

2. Andrieieva, O. V., Hakman, A. V., Duditska, S. P., Medvid, A. M. (2019), " The peculiarities of the activity of women of the sick in the regime of the day of the sanatorium complex", Sportyvna medytsyna i fizychna reabilitatsiia, no. 2, pp. 46 – 50. (in Ukr.).

3. Vorobiova, A. (2019), " World and national fitness trends", Sportyvna nauka ta zdorovia liudyny, № 1(1), pp. 10-17. (in Ukr.).

4. Hakman, A. V. (2018), "The role of rocket activity and old age processes for people who are abducted", Molodyi vchenyi, no. 3.3 (55.3), pp. 34-38. (in Ukr.).

5. Derzhavna sluzhba statystyky Ukrainy (2020): ofitsiinyi sait, Kyiv, available at: www.ukrstat.gov.ua (accessed 2 October 2020). (in Ukr.).

6. Kirnos, I. O. (2018), "Productive old: dialogue as a tool for the use of interest in stakeholders", Visnyk ONU imeni I.I. Mechnykova, T. 23, Vypusk 3 (68), pp. 134 – 140. (in Ukr.).

7. Naselennia Ukrainy. Imperatyvy demohrafichnoho starinnia [Population of Ukraine. Imperatives of demonraphic antiquity] (2014). Kyiv: VD "ADEFUkraina", 288 p. (in Ukr.).

8. Postanova Kabinetu Ministriv Ukrainy «Pro zatverdzhennia Stratehii rozvytku fizychnoi kultury i sportu na period do 2028 roku» vid 4 lystopada 2020 r. № 1089. Kyiv, available at: https://zakon.rada.gov.ua/laws/show/1089-2020-%D0%BF#Text (accessed 12 September 2020). (in Ukr.).

9. Rozporiadzhennia Kabinetu Ministriv Ukrainy «Pro skhvalennia Stratehii derzhavnoi polityky z pytan zdorovoho ta aktyvnoho dovholittia naselennia na period do 2022 roku» vid 11 sichnia 2018 r. № 10-r. Kyiv, available at: https://zakon.rada.gov.ua/laws/show/10-2018-%D1%80#Text (accessed 10 September 2020). (in Ukr.).

10. Strategii i rekomendatsii po zdorovomu obrazu zhizni i dvigatelnoy aktivnosti (2013): sb. materialov VOZ / sost. E. V. Imas, M.V. Dutchak, S. V. Trachuk. K.: NUFVSU, Olimpiyskaya literatura, 528 p. (in Russ.).

11. Ukaz Prezydenta Ukrainy "Pro Tsili staloho rozvytku Ukrainy na period do 2030 roku": za stanom vid 30 veresnia 2019 roku. Kyiv. № 722/2019, available at: https://zakon.rada.gov.ua/laws/show/722/2019#Text (accessed 12 September 2020). (in Ukr.).

12. Futornyi, S. (2019), "Injection to take health and recreational activities to the functional camp of women of the sick in health groups", Visnyk Prykarpatskoho universytetu. Seriia: Fizychna kultura, Vypusk 34, pp. 26-32. (in Ukr.).

13. Andreeva, O., Hakman, A., Balatska, L. (2016), "Factors which determine the involvement of elderly people to health and recreational physical activity" , Trends and perspectives in physical culture and sports: The VI-th Edition international scientific conference, Suceava, 26-27th of May 2016. Suceava: University Ştefancel Mare, pp. 41-46. (in Eng.).

14. Andrieieva, O., Hakman, A., Kashuba, V., Vasylenko, M., Patsaliuk, K., Koshura, A. et al. (2019), "Effects of physical activity on aging processes in elderly persons", Journal of Physical Education and Sport, no. 4, pp.308-314. (in Eng.).

15. Chulhwan, Choi, Chul-Ho, Bum (2019), "Physical leisure activity and work for quality of life in the elderly", Journal of Physical Education and Sport, no. 2, pp. 1230-35. (in Eng.).

16. Fitnessconnect (2020), ofitsiinyi sait, Kyiv, available at: https://research.fitnessconnect.com.ua (accessed 11 September 2020) (in Ukr.)

17. WHO Regional Office for Europe (2020), Coronavirus disease (COVID-19) pandemic: Visit COVID-19 site for news, technical guidance and protection advice, Copenhagen, available at: http://www.euro.who. int/en/home (accessed 8 October 2020). (in Eng.).

Received: 05.10.2020.

Published: 26.10.2020.

Information about the Authors

Galina Putiatina: PhD (Physical Education and Sport), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.

orcid.org/0000-0002-9932-8326

E-mail: putiatina.g@khdafk.com

SLOBOZHANSKYI

HERALD

OF SCIENCE AND SPORT

The authors are responsible for the reliability of the presented results

Editor:

Svetlana STADNYK

Publication of Kharkiv State Academy of Physical Culture

Kharkiv State Academy of Physical Culture
Ukraine, 61058, Kharkiv, 99 Klochkivska Street
+38 (057) 705-23-01
slobozhanskyi.nsv@khdafk.com