

Dynamics of the physical fitness and circumference sizes of body parts as a motivation for self-improvement and self-control in students

ANNA HAKMAN¹, OLENA ANDRIEIEVA², HALYNA BEZVERKHNIYA³, NATALIA MOSKALENKO⁴,
VIKTORIA TSYBULSKA⁵, TETIANA OSADCHENKO⁶, SERGIY SAVCHUK⁷, VOLODY
MYRKOVALCHUK⁸, YAROSLAV FILAK⁹

¹ YuriyFedkovych Chernivtsi National University, UKRAINE

² National University of Physical Education and Sport of Ukraine, Kyiv, UKRAINE

^{3,7,8} Lutsk National Technical University, UKRAINE

⁴ Prydniprovsk State Academy of Physical Culture and Sports, UKRAINE

^{5,6} PavloTychyna Uman State Pedagogical University, UKRAINE

⁹ Uzhhorod National University, UKRAINE

Published online: January 31, 2020

(Accepted for publication: January 05, 2020)

DOI:10.7752/jpes.2020.01015

Abstract

The purpose of this study was to determine the increase in indicators of physical qualities and circumference sizes of the body in students as a motivational component of physical self-improvement. Research data: During the study, an “individual portfolio for self-control of students’ physical condition” was developed for students from the Faculty of Natural Sciences and Geography. The formative assessment involved 60 second-year students (30 males and 30 females) from the PavloTychynaUman State Pedagogical University. During the year, a 5-stage control was performed to record changes in students’ physical condition. At the end of the formative assessment, the proposed hypotheses were checked, and the findings were preliminarily summarized. To achieve the set goal, the following research methods were used: literature analysis, self-description of physical development, physiological methods, anthropometric methods, pedagogical testing of physical fitness and mathematical statistics. Findings: The revealed dynamics of deterioration of the physical fitness starting from the second year determined the selection of the second-year students for the formative assessment. During this assessment, physical education was aimed at managing the physical condition not only by teachers but also by the students themselves. The theory of reflection formed the basis of the developed “individual portfolio for self-control of students’ physical condition.” Self-control by physical fitness in students was based on the principles of the control theory (cybernetics). The organizational and methodological conditions for the physical training of second-year students were adapted to build effective management (through the 5-stage control) of the students’ physical condition. Specifically, more attention was paid to special methodical classes. The criteria for assessing the physical condition in students involved the dynamics of physical development, functional status, physical health, motivation to physical activity and physical training classes. The growth and improvement of all physical condition indicators in students were reliably established during the academic year. Significant improvements were achieved by females (the level of their physical health improved from low to medium). Whereas changes in males were not significant. In the self-assessment of students, the following regularity was established: the more second-year students are aware of the methods of self-control over their physical condition, the better they assess their level of knowledge in managing their physical condition, the more motivated they are to continue to keep a check list and improve their physical performance.

Keywords: self-control, physical condition, motivation, students

Introduction

The modern system of students’ physical training is in crisis and requires significant changes. The introduction of the Bologna system with the reorientation of the educational space failed to solve problems in education. On the contrary, the adopted system only deepened the problems, especially in terms of the introduction of extracurricular forms.

Students have a low level of physical fitness, low motivation, lack of interest in physical training classes, an unformed value attitude to individual physical training classes (N. Moskalenko, N. Korzh, 2016). In the modern physical education system, a very important task is the search for new stimuli that should motivate the youth to physical self-improvement through physical activities. Only the combination of compulsory and extracurricular activities, increase in health, fitness and group sports activities in higher educational institutions, consideration of students’ personal preferences in selecting physical activities, strengthening of the material and

technical sports base in higher educational institutions can overcome a negative trend in health status and physical fitness in students (T. Krutsevych, N. Pangelova, 2016).

The peculiarity of physical education is that only self-awareness of the need for physical improvement and physical development can be a potent motivation for performing physical exercises using natural factors and forming a way of life that would contribute to the achievement of both personal and social goals. Of great importance is the students' ability to manage the process of self-development and self-improvement, where useful information about actual changes in physical condition and its management could be used not only by teachers but also by students (Kotov, E.A., 2003, Tsybulska, V.V., 2015; Krutsevych, T.Yu., Podlyesny, O.I., 2008).

Psychologists point out that self-assessment and self-control are significant internal stimuli. Internal control is the optimal stimulus for self-regulation and self-improvement (S. Zanyuk, 2004, M.O. Agapova, 2013). Awareness of their physical condition allows students to regulate and control their physical performance and balance themselves with the environment (Wrzniewski, I.I., 2013).

Methods

During the study, an "individual portfolio for self-control of students' physical condition" was developed for the students from the Faculty of Natural Sciences and Geography. The formative assessment involved 60 second-year students (30 males and 30 females) from the Pavlo Tychyna Uman State Pedagogical University. During the year, a 5-stage control was carried out to record changes in the students' physical condition. At the end of the formative assessment, the proposed hypotheses were checked, and the findings were preliminarily summarized.

Self-description of physical development. O.Yu. Marchenko's methodology consists of 70 statements relating to the physical development and physical fitness of the person. Depending on the respondent's agreement or disagreement with the statement, they have 6 options to answer: "false", "mostly false", "rather false than true", "rather true than false", "basically true", "true". "Self-description of physical development" characterizes self-assessment in general in addition to 10 indicators of physical development and physical fitness ("health", "coordination of movements", "physical activity", "slenderness of the body", "athletic performance", "global physical self", "external view", "strength", "flexibility", and "endurance").

Physiological methods. Physiological methods included the following measurements: 1) blood pressure (systolic and diastolic) using electronic tonometer; 2) heart rate at rest by palpation; 3) hand dynamometry; and 4) vital capacity (VC) using spirometer. The physical health indices were calculated according to the table for the "rapid assessment of the level of somatic health" developed by G.L. Apanasenko. The assessment of physical health included the determination of such indicators at rest as VC, heart rate at rest, blood pressure, body height and weight, and hand dynamometry. The test included five indicators: strength index, vital index, Ruffier index, Robinson index, and body weight to body height ratio. The total score for all indicators obtained by comparison with the corresponding scale determined the level of physical health - low, below average, average, above average and high.

Anthropometric methods. The study of physical development involved the measurement of somatometric (body height and weight and circumferences of various body parts - biceps, neck, pelvis, hip, waist, and calf) indicators in order to trace their pattern of changes and determine the balance of body build in males and females under the guideline values and standards according to indices.

Pedagogical testing of physical fitness. Testing of physical fitness involved simple motor tests that reflect the level of development of the main physical qualities: standing start running for 30 meters, running 4×9 meters, standing long jump, seated position tilting, body raising within 30 seconds, complex strength exercises. Testing was carried out in accordance with the instructions and with the use of the necessary equipment and accessories. For the convenience of recording, the individual testing portfolio was developed by V.V. Tsybulska to test students' physical fitness.

The results of the summative and formative assessments were subjected to conventional methods of mathematical statistics. The calculations involved arithmetic mean values (\bar{x}), mean root square deviation (S), significance of differences between the control stages in the formative assessment using Student's t-test (significance levels $p < 0.01$ and $p < 0.05$). The experimentally obtained data were processed on a PC using a standard software package (MS Excel; Statistica - 6.0).

Results

Because the introduction of check lists was based on the stimulation of reflection on physical improvement, the pattern of changes in indicators as feedback from the self-management was identified as the motivational "core" of self-improvement.

The results of the increase in physical fitness in second-year students proved the effective use of physical self-control. During the self-control year, positive dynamics of the physical performance were observed both in males and females (see Table 1). In females, the greatest changes were found in strength abilities under

the strength test [more than 40% compared with the initial level - 21.9 ± 3.05 kg vs. 31.5 ± 3.3 kg ($p < 0.05$)] and in speed endurance [more than 25% - 1.60 ± 0.03 seconds vs. 1.15 ± 0.02 seconds ($p < 0.05$)]. In males, the biggest changes over the course of the self-control year were recorded in the development of flexibility [more than 25% of the annual increase - 16.9 ± 3.67 cm vs. 19.03 ± 3.73 cm ($p < 0.05$)] and speed [more than 15 % of the annual increase - 1.12 ± 0.06 seconds vs. 1.00 ± 0.06 seconds ($p < 0.05$)]. Both males and females showed almost the same increase in explosive strength (approx. 10%).

Table 1 **Improvement of physical performance, %**

Test exercises	Males (n=30)	Females (n=30)
60-meter run	17.7	11.8
400-meter run	10.7	28.1
Long jump, m	10.7	12.4
Dynamometry	14.6	43.8
Trunk flexion	29.3	13.8

The calculations of muscular development in second-year male students using the circumference sizes (see Table 4.19) and the method by Pogasiy V. (based on the homeostatic properties of physical development indicators, in particular the pelvis) allowed us to simulate the proper circumference sizes of various body parts in males and compare them with the actual data. It was determined that the circumference sizes of various body parts in males were below the average standard of a balanced athletic development. At the beginning of the assessment, the difference between the actual data and the average standard of the chest was 14.63 cm. In other parts of the body, the difference was less pronounced: the difference in the biceps was 2.42; in the neck - 3.45; in the hip - 6.84 cm; in the waist - 5.16 cm; in the calf - 2.02 cm.

Table 2. **Circumference sizes of different body parts in second-year male students**

Body part	Indicators							
	Beginning of the assessment				End of the assessment			
	Actual data, cm	Average standard, cm	Difference,		Actual data, cm	Average standard, cm	Inconsistency	
$\Delta \bar{x}$			%	$\Delta \bar{x}$			%	
Biceps	27.7	30.12	-2.42	-8.7	29.13	30.18	-1.05	-3.8
Neck	35.6	39.05	-3.45	-9.7	35.77	39.13	-3.36	-9.4
Chest	90.82	105.45	-14.63	-16.1	95.25	105.67	-10.42	-11.5
Hip	49.69	56.53	-6.84	-13.8	52.95	56.64	-3.69	6.5
Waist	74.6	79.8	-5.16	-6.9	76.82	79.97	-3.15	-4.2
Calf	35.7	37.72	-2.02	-5.7	36.64	37.79	-1.15	-3.2

After a year of self-control, the actual data on the circumference sizes of various body parts in male students exhibited positive changes: the inconsistency between the average standard of the balanced athletic development decreased. This was possible due to certain muscular development, especially the biceps (the difference between the actual data and the average standard was only 1.05 cm), the waist (difference of 3.15 cm) and the calf (difference of 1.15 cm). These results are consistent with the increased physical fitness. An inconsistency in chest circumference of 14.63 cm decreased to 10.42 cm. The circumference sizes of the neck remained almost unchanged - 3.45 cm at the beginning of the assessment vs. 3.36 cm at the end of the assessment. Self-control of physical condition in male students became the motivation for achieving the balanced athletic development. The positive dynamics towards the balanced athletic development can be clearly seen in the change in circumference sizes of various body parts in the second-year male students during the assessment (see Table 3).

Table 3 **Dynamics of reduction in inconsistencies (according to the average standard of balanced athletic development) in second-year male students between the control stages, %**

Analysis stage	Anthropometric data					
	Chest circumference	Biceps circumference	Neck circumference	Hip circumference	Waist circumference	Calf circumference
Stage I	16.1	8.4	9.7	13.8	6.9	5.7
Stage II	15.6	8.3	9.7	13.3	7.1	5.7
Stage III	14.9	7.9	9.5	12.7	6.8	5.4
Stage IV	13.7	7.5	9.5	10.4	5.8	5.2
Stage V	11.5	3.8	9.4	7.4	4.2	3.2

Thus, over the course of the self-control year, the inconsistency (in %) of the biceps circumference decreased by more than two times: 8.7% at the beginning of the assessment vs. 3.8% at the end of the assessment.

A significant decrease in inconsistencies was observed in the circumference sizes of the hip (13.8% vs. 6.5%), waist (6.9% vs. 4.2%), and calf (5.7% vs. 3.2%).

A characteristic trend toward reducing the inconsistency between the actual data in the second-year male students and the average standard of the balanced athletic development was the abrupt growth of the control indicators from Stage 4 to Stage 5 due to the complete awareness of the self-control method and understanding by students of the goals of their own physical self-improvement. Thus, the reduction in inconsistencies was especially pronounced in the circumference sizes of the chest (a reduction of only 0.5% between Stage 1 and Stage 2; 0.7% between Stage 2 and Stage 3; 2.2% between Stage 4 and Stage 5; the absolute annual increase in the chest circumference in male students was 4.4%, which corresponds to 4.43 cm; and the inconsistency decreased to 11.5% with a subsequent trend toward reduction), the biceps (0.1% between Stage 1 and Stage 2; 0.6% between Stage 2 and Stage 3; 3.7% between Stage 4 and Stage 5) and the hip (0.5% between Stage 1 and Stage 2; 0.7% between Stage 2 and Stage 3; 3% between Stage 4 and Stage 5).

The study of the degree of deviation from standard values of the circumferences sizes of various body parts in the second-year female students (see Table 4) show that the indices of the biceps and waist circumference in females indicate a normal level. The index of hip circumference in the second-year female students corresponds to the indicators of beauty pageant contestants and can be considered ideal.

Table 4. Circumference sizes of different body parts in second-year female students

Index of the circumference sizes of various body parts	Indicators									
	Stage I	Consistency	Stage II	Consistency	Stage III	Consistency	Stage IV	Consistency	Stage V	Consistency
Biceps circumference index	5.94	norm.	5.94	norm.	5.93	norm.	5.93	norm.	5.87	norm.
Waist circumference index	2.41	norm.	2.39	norm.	2.38	norm.	2.38	norm.	2.38	norm.
Hip circumference index	3.26	ideal	3.25	ideal	3.24	ideal	3.24	ideal	3.23	ideal

An additional study of the ideal body weight in females using K. Cooper's formula showed a decrease in the inconsistencies regarding the ideal body weight in the second-year female students during the self-control year: the inconsistency was 5.22 kg at Stage 1 (the ideal body weight for their anthropometric data is 54.3 kg vs. the actual weight of 59.52 kg); 5.05 kg at Stage 2 (the ideal body weight should have been 54.31 kg vs. the actual weight of 59.36 kg); 4.85 kg at Stage 3 (the ideal body weight should have been 54.33 kg vs. the actual weight of 59.18 kg); 4.5 kg at Stage 4 (the ideal body weight should have been 54.35 kg vs. the actual weight of 58.9 kg); and 4.1 kg at Stage 5 (the ideal body weight should have been 54.3 kg vs. the actual weight of 58.4 kg). This slight decrease in body weight is associated with increased biceps and hip circumferences and increased strength abilities. This indicates an increase in muscle mass and a decrease in adipose tissue (waist circumference decreased by 1 cm).

These were the types of positive changes in the body mass and circumference sizes that served as the main stimulus for physical self-improvement and for keeping the check lists in female students.

Discussion

The formation of the students' value-based attitude towards physical education was studied by N.L. Korzh (2016), U.M. Kateryna (2017), O.O. Sadovsky (2017). The main idea of these studies was to increase the students' motivation to various forms of physical training for their physical self-improvement. Currently, researchers in the field of physical culture and sports consider the introduction of new health and fitness forms, models, and technologies ineffective unless they affect the students' awareness and develop skills in students for self-improvement of their physical condition. Based on the theory of self-management and self-regulation of activities as an intrinsic motivation of individual's activity, the issue of developing a system of self-control in students' physical education that is based on self-assessment is essential for modern physical education in higher educational institutions.

Our research supports the trend identified by Tsybulska V.V. on the inadequate self-assessment of physical health, physical fitness and the actual state in students. After comparing the results of measurement of objective somatic and physiometric indicators and self-assessments, Tsybulska V.V. found that all students

overestimate their health status, defining it as “average”, whereas in fact it is low. In addition, female students inadequately assess (overestimate) their physical fitness. Self-assessment of physical health in second- to fourth-year students of pedagogical specialties corresponded to the average and above average levels, whereas in fact their level of physical health was low (for female students of all years) and below average (for male students of all years). Self-assessment of physical fitness in students also turned out to be inadequate: the majority of second- to fourth-year students of pedagogical specialties (73% to 90% of all respondents’ assessments) overestimate their physical development, considering that it corresponds to the average and above average levels, whereas their actual level of physical development is poor and unsatisfactory.

Having compared the results of the self-assessment of “physical self” and the actual physical fitness test results, O.Yu. Marchenko found that students who do not do sports inadequately perceive their physical abilities (the difference is approximately 20%). Thus, the physical education program at school and at higher educational institutions does not significantly contribute to the formation of individual’s realistic perception of their own physical development. The reduced actual indices of physical activity and physical performance and the inadequate self-assessment reduce the importance of the health and educational effect of physical exercises because students cannot assess the contribution of physical training to the development of their own physical abilities.

In addition, an inconsistency was established in the physical development in male students, which is characteristic of Ukrainian students. Nikitenko Ye. M. determined the inconsistency between the actual circumference sizes and the average standard as 2.4 to 17.4%. The circumference sizes of the chest, hip and biceps were identified as the most problematic areas. According to Nikitenko Ye.M., insufficient development of the muscles of the aforementioned body parts leads to unsatisfactory results in strength and speed-strength exercises. Therefore, he considers it necessary to carry out the correction of muscles by means of physical training.

Conclusion

The dynamics of deterioration of physical fitness starting from the second year, as identified by the summative assessment, determined the selection of the second-year students for the introduction of the developed “individual portfolio for self-control of students’ physical condition”, which involved self-management and self-control over students’ own physical condition, with the teacher being responsible for the informational and corrective aspects. The theory of reflection formed the basis of the developed “individual portfolio for self-control of students’ physical condition.” Self-control by physical fitness in students was based on the principles of the control theory (cybernetics). The individual portfolio was a clear and practical source of information concerning specific changes in each student. The control of changes in the physical condition involved five stages: Stage 1 - preliminary control (September), Stage 2, Stage 3 and Stage 4 - intermediate control (November, January, March), Stage V - final control (May). The organizational and methodological conditions for the physical training of second-year students were adapted to build effective management (via the 5-stage control) of the students’ physical condition: more attention was paid to special methodical classes. The criteria for assessing the physical condition in students involved the dynamics of physical development, functional status, physical health, motivation to physical activity and physical training classes.

The results of a consistent formative assessment showed a positive trend in improving the physical performance in male and female students during the self-control year. In females, the greatest changes were found in strength abilities under the strength test [more than 40% compared with the initial level - 21.9 ± 3.05 kg vs. 31.5 ± 3.3 kg ($p < 0.01$)] and in speed endurance [more than 25% - 1.60 ± 0.03 seconds vs. 1.15 ± 0.02 seconds ($p < 0.05$)]. In males, the biggest changes during the self-control year were recorded in the development of flexibility [more than 25% of the annual increase - 16.9 ± 3.67 cm vs. 19.03 ± 3.73 cm ($p < 0.05$)] and speed [more than 15 % of the annual increase - 1.12 ± 0.06 seconds vs. 1.00 ± 0.06 seconds ($p < 0.05$)]. During the self-control year, physical health had a dynamic toward improvement in both male and female students. There was an increase in the level of physical health in female students - from the low level at the preliminary stage (1 point) to the average level at the final stage (8 points). In male students, the level of physical health improved from the average level (10 points) to the above average level (11 points).

Conflicts of interest. The authors declare that there are no conflicts of interest.

References

- Andrieieva O., Hakman A. Health status and morbidity of children 11-14 years of age during school. *Journal of Physical Education and Sport*, 2018 Supplement issue 2, 1231 – 1236.
- Andrieieva O., Hakman A., Balatska L., Moseychuk Y., Vaskan I. & Kljus O. (2017). Peculiarities of physical activity regimen of 11-14-year-old children during curricular and extracurricular hours. *Journal of Physical Education and Sport*, 17(4), 2422 – 2427.
- Andrieieva, O., Galan Y., Hakman, A., & Holovach, I. (2017). Application of ecological tourism in physical education of primary school age children. *Journal of Physical Education and Sport*, 17 (1), 7-15.

- Bolotin Alexander & Bakayev Vladislav (2015). Structure and content of the educational technology of managing students' healthy lifestyle. *Journal of Physical Education and Sport* . 15(3). pp.362 - 364.
- Chun Cheng Chuan, Aminuddin Yusof, Chee Chen Soon, Maria Chong Abdullah (2014). Application of theory of planned behavior to predict recreational sports activities participation of students in Malaysia. *Journal of Physical Education and Sport*. 14(2), pp. 172 – 177.
- Hakman A., Nakonechniy I., Moseychuk Y., Liasota T., Palichuk Y. & Vaskan I. (2017). Training methodology and didactic bases of technical movements of 9-11- year-old volleyball players. *Journal of Physical Education and Sport*, 17(4), 2638 – 2642.
- Hakman A., Nakonechniy I., Balatska L., Filak Y., Kljus O., Vaskan I. Peculiarities of physical and mental capacity of 6-9-year-old children under elementary school conditions. *Journal of Physical Education and Sport*, 2018 Supplement issue 2, 1192 – 1198.
- Hakman A., Vaskan I., Kljus O., Liasota T., Palichuk Y., Yachniuk M. Analysis of the acquisition of expertise and mastery of physical skills for performing techniques by young footballers. *Journal of Physical Education and Sport*, 2018 Supplement issue 2, 1237 – 1242.
- Halyna Bezverkhnia, Tetiana Fedirchuk, Viktoria Tsybulska, Mykola Maievskiy, Tetiana Osadchenko, Serhii Ilchenko, Anna Hakman (2019). Formation of motivation for professional and applied physical training in future elementary teachers. *Journal of Physical Education and Sport*, Vol 19 (Supplement issue 2), pp 299 – 304.
- Iedynak G., Galamandjuk L., Kyselytsia O., Nakonechniy I., Hakman A. & Chopik O. (2017). Special aspects of changes in physical readiness indicators of young men with different somatotypes between 15 and 17 years of age. *Journal of Physical Education and Sport*, 17(4), 2690 – 2696.
- Kashuba, V., Futorny, S., Andrieieva, O., Goncharova, N., Carp, I., Bondar, O. & Nosova, N. (2018) Optimization of the processes of adaptation to the conditions of study at school as a component of health forming activities of primary school-age children. *Journal of Physical Education and Sport*, 18(4), 2515 – 2521.
- Kashuba, V., Khmel'nitska, I. & Krupenya, S. (2012) Biomechanical analysis of skilled female gymnasts' technique in «round-off, flic-flac» type on the vault table. *Journal of Physical Education and Sport*, 12(4), 431–435.
- KLÁRA KOVÁCS (2019). Socio-cultural characteristics of sport activity among students in Central and Eastern Europe: Comparative empirical analysis. *Journal of Physical Education and Sport* . 19(1). pp.669 – 676.
- Pasichnyk V., Pityn M., Melnyk V., Karatnyk I., Hakman A., Galan Y. Prerequisites for the physical development of preschool children for the realization of the tasks of physical education. *Physical Activity Review*, 2018, vol. 6, 117-126.
- Wei-Yang Huang & Chih-Chao Hsu (2019). Research on the motivation and attitude of college students' physical education in Taiwan. *Journal of Physical Education and Sport*, Vol 19 (Supplement issue 1), pp. 69 – 79.
- Yarmak O., Blagii O., Palichuk Y., Hakman A., Balatska L., Moroz O., Galan Y. Analysis of the factor structure of the physical condition of girls 17-19 year-old. *Journal Of Human Sport & Exercise. Supplementary Issue: Spring Conferences of Sports Science. Costa Blanca Sports Science Week, 26-28 April 2018. Calpe. Alicante, Spain.* 259-268.
- Yarmak, O., Galan, Y., Hakman, A., Dotsyuk, L., Blagii, O. & Teslitskiy, Yu. (2017). The Use of Modern Means of Health Improving Fitness during the Process of Physical Education of Student Youth. *Journal of Physical Education and Sport*, 17 (3). 1935-1940.
- Yarmak, O., Galan, Y., Nakonechniy, I., Hakman, A., Filak, Y. & Blahii, O. (2017). Screening System of the Physical Condition of Boys Aged 15-17 Years in the Process of Physical Education. *Journal of Physical Education and Sport*, 17 Supplement Issue 3, 1017-1023.
- Apanasenko, G. L., Popova, L. A. *Medical Valeology*. Kyiv: Zdorovye, 1998. 248 p.
- Bezverkhnya, G. V., Mayevsky, M. I. Motivation to Engage in Physical Education in Female Students of Pedagogical Specialties. *Slobozhansky Scientific Sports Journal*. 2015. No. 2(46). pp. 28–33.
- Borodin, Yu. A., Olkhovsky, O. M. Modular Education as an Important Component Towards European Integration of Higher Education. *Pedagogy, Psychology and Biomedical Problems of Physical Education and Sports*. 2005. No. 20. pp. 3–8. The Bologna Process: Structure of the Diploma Supplement / Written by: Z. I. Tymoshenko, I. G. Ogiyenko, A. M. Grekhov et al. Kyiv: European University Press, 2004. 73 p.
- Vynnyk, V. D. Peculiarities of the Formation of Interest and Motivation to Engage in Physical Education. *Theory and Methodology of Physical Education*. 2010. No. 12. pp. 39–42.
- Dutchak, M., Krutsevych, T., Trachuk, S. Conceptual Directions of Improving the System of Physical Education in Schoolchildren and Students for the Introduction of a Healthy Lifestyle. *Dnieper Sports Journal*. 2010. No. 2. pp. 116–119. Galyan, I. M., Galyan, O. I. Motivational and Value Component of the Career Choice of Future Psychologists at the Option Stage. *Scientific Bulletin of Lviv State University of Internal Affairs. Psychology Series: Collection of Studies*. Lviv: LvDUVS, 2012. Rev. 1. pp. 122–131.

- Zakharina E. A. Formation of Motivation towards Physical Activity in the Process of Physical Education in Students at Higher Educational Institutions: Synopsis of Thesis ... Ph.D. in Physical Education and Sports. Kyiv, 2008. 22 p.
- Kateryna, U. M. Organizational and Methodological Foundations of the Activities of Educational and Recreational Complexes in the Process of Physical Education in Students Synopsis of Thesis ... Ph.D. in Physical Education and Sports. Kyiv, 2017. 19 p.
- Kashuba, V., Andreeva, E., Futorny, S. Modern Approaches to the Health Protection in Students in the Process of Physical Education. *Physical Education of Students*. 2012. No. 5. pp. 50–58.
- Krutsevych, T. Yu, Marchenko, O. Yu. Attitude of Students to Physical Training Classes at Higher Educational Institution. Physical Education and Sports in the Educational System as a Factor of Physical and Spiritual Recovery of the Nation: Proceedings of the International Research and Practical Conference (Minsk, April 8–10, 2009). Minsk, 2009. T. 3. pp. 150–152.
- Tsyos, A., Shevchuk, A., Kasarda, O. Physical Activity as the Motivational and Value Orientation in Students. *Physical Education, Sport and Health Culture in Modern Society*: 2014. No. 4. pp. 83–87.
- Yurchyshyn, Yu. V. Effectiveness of the Current Content of Physical Education in the Formation of Students' Motivation to Physical Activity for Health Improvement. *Physical Education, Sport and Health Culture in Modern Society*. 2012. No. 4. pp. 351–356. Yachnyuk, M. Yu. Methodology of Introduction of Active Tourism in Students' Recreational Activities: Synopsis of Thesis ... Ph.D. in Physical Education and Sports. Kyiv, 2016. 19 p.