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Artur ODEROV*

<https://orcid.org/0000-0002-7791-0825>

Serhii ROMANCHUK***

<https://orcid.org/0000-0002-2246-6587>

Svitlana INDYKA*****

<https://orcid.org/0000-0003-0676-9227>

Maksym KUZNETSOV**

<https://orcid.org/0000-0002-6928-7674>

Dmytro POHREBNIAK****

<https://orcid.org/0000-0001-8364-663X>

Natalia BIELIKOVA*****

<https://orcid.org/0000-0003-2789-7586>

Analysis of the level of physical fitness of cadets of the Military College of Sergeants of the National Academy of Land Forces in Lviv at the primary stage

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* PhD, National Academy of the Army, Department of Physical Education, Special Physical Training and Sports, e-mail: stroyova@ukr.net

** PhD, National Academy of the Army, Department of Physical Education, Special Physical Training and Sports, e-mail: kuz-maxim@ukr.net

*** Doctor in Physical Education and Sports, National Academy of the Army, Department of Physical Education, Special Physical Training and Sports, e-mail: asv-fpis@ukr.net

**** PhD, National Defence University of Ukraine named after Ivan Cherniakhovskyi, Department of physical education, special physical training and sport, e-mail: dimanyoy@ukr.net

***** Ph.D in Physical Education and Sports, Lesya Ukrainka Volyn National University, Faculty of Physical Culture, Sports & Health, Lutsk, Ukraine

***** Doctor of Pedagogical Sciences, Lesya Ukrainka Volyn National University, Faculty of Physical Culture, Sports & Health, Lutsk, Ukraine

Analiza poziomu sprawności fizycznej podchorążych Wojskowej Szkoły Sierżantów Narodowej Akademii Wojsk Lądowych we Lwowie na etapie podstawowym

Streszczenie

Wprowadzenie: Wyposażenie żołnierzy w nowoczesny sprzęt wojskowy, techniczne środki transportu znacznie ułatwiło wykonywanie wielu elementów działań wojennych, ale jednocześnie przyczyniło się do pewnego negatywnego wpływu na ich ciało i psychikę, zwiększyło potrzebę ogólnego i specjalnego treningu fizycznego. Potrzeba zintegrowanego wykorzystania wychowania fizycznego i sportu jest dobrze znana i uzasadniona naukowo. System wyszkolenia fizycznego wojsk jako element aktywności zawodowej zapewnia funkcjonowanie personelu zgodnie z wymogami sprawności fizycznej. Dlatego aktualnym zagadnieniem jest doskonalenie treści wychowania fizycznego podchorążych wojskowych wyższych szkół sierżantów z uwzględnieniem kategorii żołnierzy.

Cel: Określenie i poprawa dynamiki ogólnej i specjalnej sprawności fizycznej podchorążych z uwzględnieniem kategorii żołnierzy.

Wyniki: Badania poziomu wydolności fizycznej podchorążych Wojskowej Szkoły Sierżantów Narodowej Akademii Wojsk Lądowych we Lwowie wykazały, że podczas szkolenia podchorążych w pierwszym roku wskaźniki sprawności fizycznej ogólnej i specjalnej wykazują pozytywne zmiany, ale nie stwierdzono istotnej różnicy ($p > 0.05$).

Słowa kluczowe: Wojskowa Szkoła Sierżantów Narodowej Akademii Wojsk Lądowych we Lwowie, podchorążowie, Siły Zbrojne, trening ogólny, trening fizyczny, trening fizyczny specjalny.

Abstract

Introduction: Providing troops with modern military equipment, technical means of transportation has greatly facilitated the implementation of many elements of military activities by servicemen, but at the same time contributed to some negative impact on their body and psyche, increased the need for general and special physical training [2, 3]. The need for integrated use of physical education and sports is well known and scientifically sound. The system of physical training of troops as a component of professional activity ensures the functioning of personnel in accordance with the requirements of physical fitness. Thus, the topical issue is to improve the content of physical training of cadets of military colleges of sergeants, taking into account the categories of servicemen.

Purpose: Determining and improving the dynamics of general and special physical fitness of cadets, taking into account the categories of servicemen.

Results: A study of the level of physical fitness of cadets of the military college of sergeants showed that during the training of cadets in the first year indicators of general and special physical fitness have positive changes, but no significant difference was found ($p > 0.05$).

Keywords: Military College of Sergeants of the National Academy of Land Forces in Lviv, Cadets, Armed Forces, General Physical Training, Physical Training, Special Physical Training.

Introduction

With the beginning of hostilities in our country, there is a period of technical re-equipment and reorganization of the Armed Forces of Ukraine, which in-

cludes increasing the number of troops and staffing on a voluntary basis, and significantly increasing the importance of military training of servicemen of various specialties [13]. Professionalization of the Armed Forces of Ukraine is objectively due to the complex process of reforming the army, aimed at creating a well-trained and armed army [2].

To date, the training of any serviceman cannot be complete if it is limited to the ability to use military equipment and weapons. The basis of successful performance of professional and combat tasks is the ability of each serviceman, as well as the unit as a whole, to make the most of all the power of military equipment in the shortest possible time [4, 12].

Scientists [5, 8, 9, 14] note that progressive changes in the use of units and increasing the number of servicemen of the Armed Forces of Ukraine have created an urgent problem of a comprehensive reform of the training and education of cadets - future commanders of various ranks - from sergeant to officer, because no unit can function effectively without quality leadership. One of the main components of this task is the creation of a professional sergeant and non-commissioned officer in the Armed Forces of Ukraine, which should become the basis of the future Armed Forces of Ukraine [1].

The system of physical training of troops as a component of professional activity is a set of components that create the process of physical improvement of the personnel of the Armed Forces and ensure its functioning in accordance with the requirements for the physical fitness of servicemen. The system of physical training largely depends on the level of socio-economic development of the state, its ability to provide the necessary support to fully address the problems of ensuring the sovereignty of the state [6].

Significant changes in the application of the Armed Forces, with the beginning of the ATO (OOS) could not but affect the system of physical training of the Armed Forces of Ukraine. The relocation of Ukrainian Armed Forces units from permanent locations to the east of the country has led to a decrease in attention to physical training. The material and financial support of physical training has significantly decreased, the number of sports events has decreased, research work in the field of special physical training has slowed down, the provision of qualified personnel does not meet the needs, the level of physical development of the pre-prescription contingent is constantly deteriorating [7].

Physical training in the Land Forces is considered by specialists as a set of measures for the physical development of soldiers, aimed at improving general and special physical qualities, the formation of military-applied skills, development of moral and psychological qualities. It is determined by a number of objective laws of improving a person's physical capabilities. Equally important is versatility in mastering motor skills. The formation and improvement of servicemen's skills in the use of military equipment and weapons is faster and more

effective if they already have a large stock of motor skills, previously practiced with the help of various physical exercises. Versatile physical training is important to improve the overall health of servicemen.

Thus, the topical issue is to improve the content of physical training of cadets of military colleges of sergeants, taking into account the categories of servicemen. And the purpose of our work is to determine and improve the dynamics of physical fitness and functional status of cadets of the Military College in the educational process, taking into account the categories of servicemen.

Materials and Methods

The study was conducted on the basis of the Military College of Sergeants of the National Academy of Land Forces (Lviv). The study involved 30 cadets of the first year of study (17.6 ± 0.2 years old; range: 17–21 years old). The study was conducted on mandatory control exercises in accordance with the requirements of the Provisional Guidelines for Physical Training in the Armed Forces of Ukraine (TNFP-2014), which determine the level of general physical fitness (100-m run, cross-country pull-up, 1000-m run) and special physical preparedness (shuttle running 6×100 m and 3000 m steeplechase).

During the study, the following research methods were used: pedagogical methods (observation, testing) – to determine the dynamics of the level of physical fitness of cadets; methods of mathematical statistics – for processing experimental data and determining reliability. The results of the study were calculated using *Microsoft Office Excel*. Significance of differences between sample values was checked using Student's t-test and was considered statistically significant at $p < 0.05$ – 0.001 . To calculate the empirical two-sample value of the t-test for dependent samples in the situation of testing the hypothesis of difference between two dependent samples, the formula mentioned below was used.

Results

The results of the study were evaluated by methods of mathematical statistics using the package of applied computer programs *Statistica5.5*, license number AX908A290603AL. After the pedagogical experiments we carried out calculations of the main univariate statistics:

- arithmetic mean – \bar{x} , standard deviation of the mean – m , dispersion – σ ;
- t-criterion of Student - to establish differences between two samples for the average results, on the assumption of normal distribution of individual values in each sample. At the same time, a 5-integer correlation level – p (cor-

- relation not less than 0.95) was taken as a base; during the analysis of the results in the middle of each sample, the t value was used to compare the results of different samples - for non-compatible samples;
- to calculate the empirical two-vibre value of the t-criterion for the dependent samples in the situation of testing the hypothesis of the difference between two dependent samples, we used the formula:

$$t = \frac{|M_d|}{\sigma_d/\sqrt{N}}$$

M_d – is the average difference in values, σ_d – standard deviation of differences.

The number of degrees of freedom was calculated as $df = N - 1$.

The used methods of mathematical statistics allowed us to fully study the investigated question and carry out experimental verification of the provisions on the protection.

The results of the study showed that the cadets show positive changes in the average results in the 100-meter run (table 1). Thus, at the beginning of the study the arithmetic mean was 14.5s, at the second stage – 14.4s and at the end of the study 14.2s. The comparative analysis showed that the difference between the indicators of the first and second stage of the study has positive changes and is 0.1s. The analysis of indicators between the second and third stage showed an improvement of the result by 0.2s. In general, studies have shown that at all stages of testing there were positive changes between indicators, but no significant difference was found. The study of pull-ups on the crossbar of cadets in the first stage showed that the arithmetic mean was 11.9 times (table 1).

Table 1. Dynamics of the results of general physical training of cadets of the Military College (n = 30)

Observation period	1 st stage	2 nd stage	3 rd stage	p (1 st stage – 2 nd stage)	p (2 nd stage – 3 rd stage)	p (1 st stage – 3 rd stage)
<i>Running for 100 meters, s</i>						
\bar{x}	14.5	14.4	14.2	t = 0.46 > 0.05	t = 0.87 > 0.05	t = 1.27 > 0.05
σ	0.80	0.71	0.76			
m	0.18	0.16	0.17			
<i>Pull-ups on the crossbar, times</i>						
\bar{x}	11.9	12.3	12.8	t = 0.91 > 0.05	t = 1.54 > 0.05	t = 1.87 > 0.05
σ	2.83	3.19	2.57			
m	0.63	0.71	0.58			

Table 1. Dynamics of the results... (cont.)

Observation period	1 st stage	2 nd stage	3 rd stage	p (1 st stage – 2 nd stage)	p (2 nd stage – 3 rd stage)	p (1 st stage – 3 rd stage)
<i>Running for 1000 meters, s</i>						
\bar{x}	256.9	253.6	248.6	t = 0.60 > 0.05	t = 1.09 > 0.05	t = 1.55 > 0.05
σ	19.84	15.24	13.84			
m	4.44	3.41	3.09			

Note: $p < 0.05$ at $t = 2.04$; $p < 0.01$ at $t = 2.75$; $p < 0.001$ at $t = 3.65$

\bar{x} – arithmetic mean, σ – dispersion, m – standard deviation of the mean

Source: own research.

According to the results of the analysis of the second stage, it was found that the performance of cadets compared to the first stage improved by 0.9 times, but there is no significant difference ($p > 0.05$). It is also determined to improve the results of the study group in the third stage compared to the first by 2.4 times ($p > 0.05$). According to the results of the analysis of the results of the 1000-meter run, it was found out that the average value of the indicators at the first stage of the study is 256.9 s (table 1). In the second stage of the study, the indicators did not change significantly compared to the first stage and the difference is 3.3s ($p > 0.05$). The comparative analysis of the results obtained by the cadets in the first and third stages showed that at the end of the study (stage 3) the results of the exercise improved by 5.0 s, but not significantly ($p > 0.05$).

Table 2. Dynamics of results of special physical training of cadets of the military college (n = 30)

Observation period	1 st stage	2 nd stage	3 rd stage	p (1 st stage – 2 nd stage)	p (2 nd stage – 3 rd stage)	p (1 st stage – 3 rd stage)
<i>Shuttle running 6 × 100 meters, s</i>						
\bar{x}	142.7	139.5	139.9	t = 1.19 > 0.05	t = 0.15 > 0.05	t = 1.11 > 0.05
σ	8.04	9.07	8.10			
m	1.80	2.03	1.81			
<i>3000 meter steeplechase, s</i>						
\bar{x}	860.5	855.8	850.4	t = 0.82 > 0.05	t = 1.06 > 0.05	t = 1.94 > 0.05
σ	18.29	17.59	14.14			
m	4.09	3.93	3.16			

Note: $p < 0.05$ at $t = 2.04$; $p < 0.01$ at $t = 2.75$; $p < 0.001$ at $t = 3.65$

Source: own research.

In accordance with the requirements of TNFP-2014, exercises that characterize the level of special physical fitness are performed with weapons and equipment (tactical unloading system, gas mask, etc.), which significantly increases the burden on servicemen. When studying the level of indicators of the studied group in the shuttle run 6×100 m at the beginning of the experiment it was found out that the arithmetic mean was 142.7 s, at the second stage – 139.5 s and at the end of the study 139.9 s. It was also discovered that the difference between the first and second stage is 3.2 s and is not significant (table 2). According to the results of the analysis of the second stage in comparison with the third, an insignificant deterioration of the cadets' results by 0.4 s was established. Also, the improvement of cadets' results between the first stage and at the end of the study by 2.8 s was determined, but there is no significant difference. The study of running indicators for 3000 meter steeplechase in the first stage showed that the arithmetic mean was 860.5 (table 2). According to the results of the analysis of the second stage, it turned out that the performance of cadets compared to the first stage improved by 4.7 s, but there is no significant difference. The difference between the results of the cadets in the third stage compared to the second stage is not significant and is 5.4 seconds. A comparative analysis of the results obtained by the cadets at the first and third stages showed that at the end of the study the results of the exercise improved by 5.4 s.

In general, studies of test results have shown that during the training of cadets in the first year indicators of general and special physical fitness have positive changes, but no significant difference was found ($p > 0.05$).

Discussion

Previous research has shown that the level of training of servicemen of the Military College of Sergeants at the initial stage of training is insufficient to perform professional and combat tasks. Our main task was to analyze the results of the aforesaid experiment which was aimed at studying the level of physical fitness of first-year cadets of the military college; dynamics of general and special physical fitness of cadets of the military college taking into account categories of servicemen, and also research of a functional condition of cadets of the military college taking into account categories of servicemen.

The study of the level of physical fitness of cadets of the military college of sergeants showed that during the training of cadets in the first year the indicators of general and special physical fitness have positive changes, but no significant difference was found ($p > 0.05$). Thus, the comparative analysis of the results in the 100-meter run showed that the difference between the indicators of

the first and second stages of the study has positive changes and is 0.1 s. The analysis of indicators between the second and third stage showed an improvement of the result by 0.2 s. Research of indicators in pulling up on a crossbar by cadets has established that indicators of cadets at the second stage in comparison with the first one have insignificantly improved by 0.9 times ($p > 0.05$). There was also a significant improvement in the results of the study group in the third stage compared to the first one by 2.4 times ($p < 0.01$). According to the results of the analysis of the results of the 1000-meter run, it was found out that in the second and third stages of the study, the indicators did not change significantly compared to the first one ($p > 0.05$).

The research complemented the results of other researchers regarding the positive effects of the use of physical exercises on overall physical fitness and the health of military servicemen [10].

In the future, the results of our study may be used to determine the effectiveness of the author's program to improve the overall physical fitness of cadets, which in turn shall prove that the proposed content of classes on the author's program can significantly improve their overall physical qualities.

Conclusion

A study of the level of physical fitness of cadets of the military college of sergeants showed that during the training of cadets in the first year indicators of general and special physical fitness have positive changes, but no significant difference was found ($p > 0.05$). Thus, the comparative analysis of the results in the 100-meter run showed that the difference between the indicators of the first and second stages of the study has positive changes and is 0.1 s. The analysis of indicators between the second and third stages showed an improvement of the result by 0.2 s. A study of the indicators of pull-ups on the crossbar of cadets demonstrated that the indicators of cadets in the second stage compared to the first slightly improved by 0.9 times ($p > 0.05$). There was also a significant improvement in the results of the study group in the third stage compared to the first by 2.4 times ($p < 0.01$). According to the results of the analysis of the results of the 1000-meter run, it turned out that in the second and third stages of the study the indicators did not change significantly compared to the first one ($p > 0.05$).

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