

Dynamics of security specialists' physical condition during professional training

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Abstract:

The article analyzes the level and dynamics of the indicators of future security specialists' physical condition during their higher education study and service activities (the 2016 admission campaign, n = 106). It is found that the level of future security specialists' physical condition during professional training is defined as higher than average. It is specified that there is a significant improvement in the indicators in students' physical condition in Year 1 ($p < 0.01$) and an inadequate deterioration after a year of service activities ($p > 0.05$). It is discovered that the number of individuals with above average physical condition has increased, whereas the number of individuals with low physical condition has decreased during higher education study. The findings indicate the effectiveness of students' physical training and prove the need to improve it in the system of professional training due to increasing the volume of general physical training.

Keywords: physical condition, security specialist, general physical training, special physical training.

Introduction

Given a radical restructuring of law enforcement agencies in Ukraine, the requirements for professional training of future security specialists are increasing. Particular attention is paid to the level of physical training of candidates for law enforcement services.

An important criterion for such training is the level of physical condition. It is determined by analyzing the indicators of the cardiovascular system, body weight, age, etc. Special literature indicates that physical condition characterizes the individual's personality, state of health, body type, functional capabilities, physical ability, etc. (Krutsevych, 2008, p. 11).

The process of assessing physical condition in future security specialists can be considered as an indicator of the health-improving efficiency of physical exercises; as an indicator of readiness for various loads; a general criterion for the effectiveness of physical training (Drozd, 1998; Kyslenko et al., 2018; Prontenko et al., 2016; Prontenko et al., 2017).

Professional training of future security specialists takes place under specific conditions related to a significant amount of educational material, information overload and reduced motor activity (Plisko, Radziievskiy, & Bondarenko, 2018). The hypodynamic mode of activity causes a set of functional disorders, which affect the functions of blood circulation, respiration, musculoskeletal system, metabolic processes and leads to a significant deterioration of adaptive capacity and, consequently, the individual's inability to effectively withstand some negative factors of such activity. It results in detraining, deteriorating physical condition and low physical ability (Apanasenko, & Dolzhenko, 2007; Bondarenko, 2018; Dubrovskiy, 2005).

Physical training aims to optimize physical condition, strengthen and preserve health and develop the necessary physical skills in future security specialists. The system of physical training in law enforcement agencies involves general physical training and tactic of self-defence and personal security. Higher education institutions with specific educational conditions offer a course in special physical training aimed at developing special knowledge and skills in employing physical influence, techniques of self-defence and hand-to-hand combat, developing and improving professionally important physical qualities (Antoshkiv, & Petryshyn, 2004). Some scholars prove that one cannot improve professionally important physical qualities without having a sufficient level of general physical training (Antoshkiv, & Petryshyn, 2004; Babenko, 2004; Drozd, 1998;

Dubrovskiy, 2005). An inadequate level of general physical training leads to deteriorating physical condition and health, low effectiveness of professional training and, subsequently, service activities (Bondarenko, 2018).

According to some researches on physical education and sport, the problem of improving physical condition and ability should be approached from a perspective of adaptation theory (Apanasenko, & Dolzhenko, 2007; Prontenko et al., 2017; Krutsevych, 2008). Adaptation is a process of adjusting the structure and functions of the body and organs to the environment (Krutsevych, 2008). It is also proved that physical exercises are the main means of training all physiological systems of the body. Systematic physical exercises cause the three main positive effects in the body: morphological and functional changes observed in a state of rest; increasing functionality of the body; increasing efficiency (profitability) of body activity, in particular the organs and systems during certain muscular activity. Training effects arise only when the training load exceeds the usual load and reaches the optimum intensity, duration and is used with a certain periodicity.

Some scientific studies indicate that one should exercise no less than three times per week in order to enhance the level of physical ability (Dubrovskiy, 2005; Prontenko et al., 2017). Lowering the frequency of educational or training sessions down to two times per week allows the individual to maintain the level of his/her physical ability. One session per week only retains but does not stop the disappearance of positive training effects. Therefore, when planning training sessions of special physical training, one should take into account the main methodological principles of physical education and specificity of the education process in the field of physical education. From the standpoint of increasing physical ability and improving physical condition in future security specialists, the principle of systematicity is important, which involves planning the education process in the form of a certain algorithm ensuring the logic and interconnection between various aspects of management. It requires that physical exercises should not be limited to occasional measures but carried out continuously and consistently (Plisko, Radziievskiy, & Bondarenko, 2018).

The analysis of training schedule shows that training does not always adhere to the principle of systematicity. Practical classes are distributed with a different periodicity, normally two times per week or occasionally one time per week or none at all. It negatively affects the level of physical skills in future specialists. Taking into account the specificity of future security specialists' training activities, it is important that teaching staff and officers involve them in systematic physical training.

A thorough analysis of future security specialists' service activities indicates significant workload (irregular working hours, protection of civil order, etc.). Under such conditions, raising the level of physical condition is only possible due to additional physical training in free time.

It is important to create appropriate conditions to motivate future security specialists to increase the level of physical training and, accordingly, improve physical condition and health.

Some specialists state that only the individual who understands the negative effects of low motor activity is able to maintain a sufficient level of physical condition (Babenko, 2004; Bondarenko, 2018; Kyslenko et al., 2018; Prontenko et al., 2016).

Special literature suggests a number of tests which can help to assess physical condition of the individual (Apanasenko, & Dolzhenko, 2007; Drozd, 1998; Dubrovskiy, 2005). A well-known method involves determining aerobic ability as the leading factor in physical condition, which reflects the state of functional reserves. An informative method of determining the functional state includes using integral functional indicators, which can help to assess physical condition taking into account certain height and weight ratios and the parameters of the body's activity at rest: heart rate and blood pressure. One of them is the index of physical condition, which is determined by the regression equation developed by O. A. Pirohova (1989). It is based on the formula for the interrelation between physiological indicators at rest and the level of maximum physical ability. The components are the following: heart rate, blood pressure, body weight, height and age.

Studying the level of future security specialists' physical condition can help to establish the effectiveness of special physical training in relation to health promotion.

Materials and methods

The research involved the use of theoretical and empirical methods. Theoretical methods include the study and analysis of special literature, curricula, syllabi, departmental documents, as well as synthesis and generalization. Empirical methods include observation of the education process, interviews with teaching staff who conduct classes in special physical training and surveys of students and security specialists.

The research involved the students from the Institute of the Department of Public Security of Ukraine of Taras Shevchenko Kyiv National University (the 2016 admission campaign; $n = 106$) who were admitted to a two-year programme.

The research aims to study the level and dynamics of future security specialists' physical condition during professional training.

The objectives are the following: 1) to determine the initial level of future security specialists' physical condition; 2) to specify the dynamics of indicators in future security specialists' physical condition during professional training and further service activities.

Results

In order to determine the level of future security specialists' physical condition, the index of physical condition was analyzed. In order to determine its initial level, the indicators of the respondents' medical examinations before admission (2016) were taken into account. The study on the dynamics of physical condition indicators consisted of four stages and involved elaborating and analyzing the results of annual medical examinations.

Due to the method of mathematical statistics, the average results of physical condition indicators in future security specialists were determined. They include heart rate at rest; systolic, diastolic and mean blood pressure; age; body weight and height (see Table 1).

It is found out that at the first stage (before admission), the average value of physical condition index in the respondents was equal to 0.669, which corresponds to the average level of physical condition (see Fig. 1). By analyzing these indicators for the period of study, it is proved that the level of physical condition to some extent depends on the stage of the study. The second stage, which coincides with the end of Year 1, physical condition index increased in comparison with the initial level of 0.07 equivalent units and amounted to 0.739 equivalent units ($p < 0,01$), which corresponds to the above average level of physical condition and is more significant than the corresponding indicator at the first stage. In Year 2 (the third stage), physical condition index increased by 0.024 equivalent units and reached 0.763 equivalent units. However, the difference compared to the second stage is not reliable ($p > 0,05$). The value of physical condition index also corresponds to the above average level of physical condition. After a year of service activities (the fourth stage), it slightly decreased and reached 0.745 equivalent units ($p > 0,05$), which in general is significantly higher compared to initial data ($p < 0,001$). This result is explained by the lack of systematic physical training.

Table 1. The indicators of future security specialists' physical condition (2016-2019; n=106)

Indicators of physical condition	Stage 1 (2016)		Stage 2 (2017)		Stage 3 (2018)		Stage 4 (2019)	
	X	m	X	m	X	m	X	m
Heart rate at rest, beats per minute	73.4	1.29	69.9	1.18	69.4	1.05	68.8	1.18
Systolic blood pressure, mm Hg	121.8	1.53	113.3	1.63	108.9	2.10	115.4	1.26
Diastolic blood pressure, mm Hg	74.7	1.24	70.6	1.12	68.1	1.27	68.9	1.05
Mean blood pressure, mm Hg	90.4	0.52	84.6	0.49	81.7	0.48	84.4	0.56
Age, years	16.7	0.09	17.6	0.08	18.6	0.09	19.8	0.08
Weight, kg	75.6	1.82	76.8	1.49	76.8	1.50	78.1	1.49
Height, cm	177.9	0.96	179.1	1.02	179.9	0.94	181.3	1.02
Physical condition index, equivalent units	0.669	0.017	0.739	0.016	0.763	0.014	0.745	0.015
Reliability of difference ($p_{1\text{stage}} - p_{2\text{stage}}$)	$p < 0.01$							
Reliability of difference ($p_{2\text{stage}} - p_{3\text{stage}}$)					$p > 0.05$			
Reliability of difference ($p_{3\text{stage}} - p_{4\text{stage}}$)					$p > 0.05$			
Reliability of difference ($p_{1\text{stage}} - p_{4\text{stage}}$)	$p < 0.001$							

Given the dynamics of physical condition in future security specialists, one can conclude that before admission the number of individuals with the high level of physical condition was equal to 6.9% (see Table 2). At the second stage, their number reached 19.7%, at the third stage – 28.2%. After a year of service activities, the number of security specialists with the high level of physical condition decreased by 6.9% and amounted to 21.3%. At the first stage, 36.7% of the respondents were at the above average level of physical condition, 43.4% – at the second stage, 48.6% – at the third stage; 42.4% – at the fourth stage. Subsequently, 46.6% of the respondents were at the average level of physical condition. In Year 1, the number of students with the average level of physical condition decreased by 13.1% and amounted to 30.3%, in Year 2 – 18.1%, after a year of service activities – 29.9%.

It is important that there is some decrease in the number of students with the under average level of physical condition. At the first stage, only 9.8% of the respondents were at this level, at the second stage – 6.6%, at the third and fourth stages – 5.1% and 6.4% respectively. The low level of physical condition was not detected.

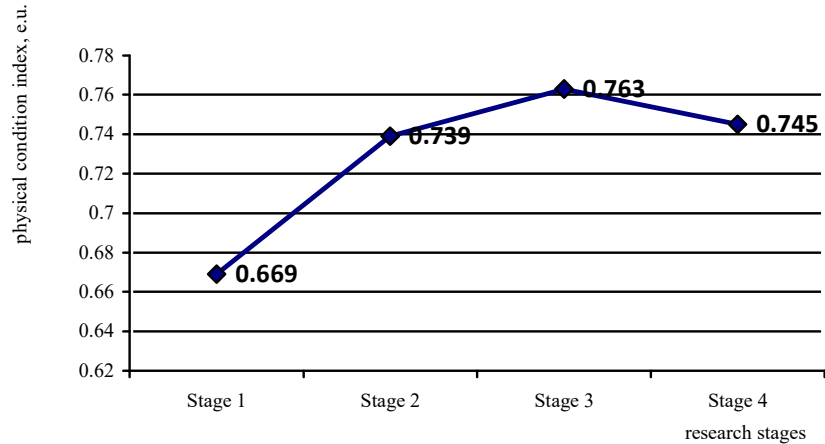


Fig. 1. The dynamics of physical condition indicators in future security specialists during professional training (the 2016 admission campaign; n=106, %)

The obtained results prove the effectiveness of physical training during higher education study. A significant improvement in physical condition index is related to systematic physical training, which mostly includes general physical training. In addition to this, the specificity of professional training motivates future security specialists to attend gyms and sports areas, which positively affects the level of physical ability and improves physical condition.

Table 2. The levels of physical condition in future security specialists during professional training (2016-2018; n=106, %)

Stages of study	Development levels				
	High	Above average	Average	Under average	Low
Year 1 (2016)	6.9	36.7	46.6	9.8	0
Year 2 (2017)	19.7	43.4	30.3	6.6	0
Year 3 (2018)	28.2	48.6	18.1	5.1	0
Year 4 (2019)	21.3	42.4	29.9	6.4	0

At the fourth stage, physical condition index decreased by 0.018 equivalent units. It must be noted that the tendency toward decreasing physical ability and condition of senior students is observed in almost all departmental higher education institutions. Some specialists explain it by adapting (military students) to the specifics of professional training.

According to relevant normative documents, practical physical training in the system of professional training is mainly aimed at developing skills in self-defence and personal security and, therefore, less time is allocated to general physical training. This partly explains the decrease in the physical condition of security specialists after a year of service activities.

Discussion

The analysis of physical condition indicators in future security specialists during professional training shows some positive dynamics. The level of physical condition is determined by the value of physical condition index based on the formula for the interrelations between physiological indicators at rest and the level of maximum physical ability.

In order to determine the initial level of physical condition index, the indicators of the respondents' medical examinations before admission were taken into account. The study on the dynamics of physical condition indicators involved elaborating and analyzing the results of medical examinations conducted during professional training and a year after its completion. It is found that the initial level of physical condition index in future security specialists was equal to 0.669 equivalent units and was defined as average. During Year 1, it reached 0.739 equivalent units. During Year 2, it remained unreliable and reached 0.763 equivalent units. The physical condition of future security specialists during professional training is defined as above average. A year after service activities showed its unreliable deterioration equal to 0.745 equivalent units. However, this indicator has remained significantly higher than before admission.

Conclusions

1. The analysis of physical condition indicators in future security specialists before admission to higher education institutions made it possible such physical condition index, which corresponds to the average level of physical condition.

2. The study of these indicators during professional training shows some positive dynamics in increasing the number of the respondents with the above average level of physical condition and decreasing the number of future security specialists with the low level of physical condition.

The obtained results prove the effectiveness of physical training. The deterioration of physical condition index during service activities highlights the need to improve physical condition due to increasing the volume of general physical training.

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