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The Role of Physical Education in the Professional Activity of Teaching Staff

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Abstract

The work revealed the influence of the negative factors of professional activity on the health state and working capacity of the teachers of higher military educational establishments; substantiated the role and importance of physical exercise for the reduction of the negative impact of professional activity and the improvement of the mental capacity of teaching staff at the theoretical level. The study determined that the main negative factors of the professional activity of teaching staff that worsened their performance included a low level of motor activity, high nervous-emotional tension, overwork of the intellectual sphere. The research established that the main task of the physical education of the teachers is to increase and constantly improve the level of their general physical fitness. The efficiency of the professional activity of the teachers depends on the degree of development of the following physical qualities: strength, static endurance of the trunk muscles, and the level of general endurance. Ensuring the formation of the core and improving the blood supply to the brain, static endurance of the trunk muscles (back and abdominal muscles) increases the efficiency of the teachers' activity and reduces the risk of occupational diseases.



Keywords: physical education, professional activity, teaching staff

1. Introduction

There is a constant need in society to train military professionals who are skilled, highly moral, and faithful to state ideals. The teaching staff of higher military educational institutions (HMEI) plays an important role in the training of future highly-qualified defenders of the Homeland. The professional activity of an instructor officer at HMEI is carried out in the conditions of the constant growth of the volume of educational information, a high level of responsibility for the results of training, overwork of the intellectual sphere, high nervous-emotional stress, long-term limitation of physical activity and keeping a static position [1, 2]. These factors lead to a decrease in the mental capacity of the HMEI teachers and the deterioration of their professional activity.

According to many scientists [3-7], physical training plays an important role in forming the military personnel's readiness for professional activity, enhancing their physical and mental capacity and resistance to negative factors. It is conditioned by the fact that the means of physical training provide the development and improvement of not only the physical but also the mental nature of people. Properly used means of physical training can significantly improve the professional performance of military professionals of various specialties [8-11].

The scientists [12-17] established close interrelationships among professional performance, health, mental capacity and the level of physical fitness of military personnel.

The problem of improving the physical preparedness of the instructor officers of HMEI is extremely important, and the high level of physical fitness is the basis for improving their health, mental capacity and the efficiency of their professional (teaching) activity.

2. Methodology

The aim of the article is to substantiate the role of physical training in improving the professional activity of the teaching staff of higher military educational institutions.

The tasks are

1) to reveal the influence of the negative factors of teaching activity on the health status and working capacity of the teaching staff of HMEI;

2) to theoretically substantiate the role and importance of physical exercises for the reduction of the negative impact of professional activity and the improvement of the mental capacity of the teaching staff of HMEI.

The study was conducted at S. P. Koroliiv Zhytomyr Military Institute.

The research methods included theoretical analysis and generalization of scientific and methodological literature, normative documents on the organization of the educational process at HMEI, pedagogical observation.

Researches related to the involvement of cadets were carried out in compliance with all relevant national regulations and institutional policies (Order of the Minister of Defense of Ukraine "On Approval of the Regulation on the Organization of Scientific, Scientific and Technical Activities in the Armed Forces of Ukraine" dated 27.07.16, No. 385).

3. Results and Discussion

One of the prevailing tendencies in the structure of the modern work of teaching staff is not only its increasing intellectualization and a sharp increase in the requirements for the quality and speed of mental and psychomotor operations.

The teaching workload of an instructor officer at the modern HMEI of Ukraine accounts for about 20 hours a week; accordingly, one conducts 2 (sometimes 3) training classes with cadets each day – the daily workload accounts for 4 (sometimes 6) hours of classes. The rest of the instructor officers' teaching hours are devoted to the preparation for classes (the development of methodical recommendations, writing of lecture notes, etc.); consultations, work with coursework and degree works; conducting curatorial work; the participation in the educational-methodical, scientific work of the department (writing of scientific works, educational-methodical materials, preparation for conferences, etc.); the improvement of personal



professional training (writing dissertation, etc.); the execution of commands and participation in other activities, according to functional responsibilities. Thus, the instructor officers of HMEI spend most of the working hours indoors in a forced position (sitting or standing) that clearly demonstrates the effect of a large number of negative factors on the organism's systems of teachers, including hypodynamia and hypokinesia, the duration of working day and week, nervous-emotional tension, mental overwork, and stress, etc. In addition, bad habits and the lack of time for physical training do not ensure the necessary level of physical fitness and health of the instructor officers. Such activity has been happening for many years, and the factors mentioned lead to a significant decrease in mental and physical performance, deterioration of health and activity of the basic systems of an organism, a decrease in the efficiency of professional activity, and cause various diseases in the case of systematic action.

The analysis of scientific works [18-20] showed that low motor activity leads to various disorders of the organism's systems and metabolism, excess weight that adversely affects the state of health and causes various kinds of diseases. First of all, it affects the cardiovascular system (atherosclerosis, hypertension, coronary heart disease, etc.), and the musculoskeletal system. This gives rise to detraining (the deterioration of the ability to stand functional loads).

Low motor activity, nervous and emotional tension lead to chronic stress. According to statistics, hypertension, atherosclerosis, obesity currently account for over 80 % fatal cases in the middle and elderly age [21, 22]. Reduced motor activity adversely affects the condition of the muscular system. Muscles become flaccid, decrease in size. The core does not perform its main function (the spine is not in a normal position) that leads to a deterioration of blood supply to the brain and consequently, the decrease in mental and physical performance of the instructor officers [23-25]. The atrophic changes of a part of muscular fibers are also noticeable; the layer of fat tissue between them is increased. The stability and reliability of movement coordination disappear; muscle strength and endurance are reduced. Muscle atrophy has a negative effect on the adaptive mechanisms of blood circulation during physical activity and ultimately has a negative influence on the health of the instructor officers and their performance.

Staying in a static posture (sitting position) for a long time reduces the amount of circulating blood because of its deposition in the capillaries and congestion in the lower extremities. This provokes swelling of the lower extremities, an increase in the straining of the venous vessels of the lower leg, with the subsequent development of varicose veins. The impact of hypodynamia leads to a decrease in pulmonary ventilation and respiratory volume. The absence of a systematic load on respiratory organs causes the weakening of respiratory muscles that leads to a decrease in vital capacity of lungs. The limitation of physical activity is accompanied by natural deterioration of the organism's adaptability. The character and diversity of the changes are characterized primarily by a decrease in resistance to unfavorable factors of working activity. The permanent limitation of motor activity can lead to the biochemical reactions disorder, a decrease of the nervous system functions, deterioration of oxygen delivery to the heart muscle and brain, an increase in energy intensity [26, 27].

A long-term decrease in motor activity contributes to the weakening of metabolism that leads to fat deposits and body weight gain. People with excess weight do not have the desire for active movements. The lack of movement affects the functioning of the cardiovascular system, resulting in increased heart rate, reduced stroke volume and mass of the heart muscle. Hypodynamia increases the number of people with physical detraining with age [18, 21, 28].

Teaching activity requires officers to maintain a permanent working position for a long time. However, its maintenance for a long time (static regime) is often more tedious than the work, which is accompanied by low motor activity. In conditions of static moderate work, the correlation between pulmonary ventilation and blood supply to the lungs is interrupted because of irregular breathing and the decrease in oxygen saturation. Consequently, the body develops the phenomenon of oxygen deprivation (hypoxia) and accumulate carbon dioxide. Only some military personnel can stand the 4-hour sitting position, which localizes fatigue in the muscles of the neck, back, and legs, without complaints. The cardiovascular system suffers the most. The study determined that the more uncomfortable the posture is, the higher the neuromuscular energy cost to maintain postures is. In the case of long-term keeping of the

same posture, blood circulation is deteriorated, congestive phenomena appear, and working capacity is decreased [1, 2, 27, 29].

In addition to the mentioned adverse factors, the instructor officers experience high nervous and emotional tension. The nervous-emotional tension results in decreased performance, increased heart rate, breathing and blood pressure, high maintenance attention distribution, reduced attention and memory, increased number of mistakes, and rapidly arising exhaustion. The exhaustion is based on a decrease in the functional abilities of an organism, its reserves. As the professional activity of instructor officers is closer to mental and intellectual work, one of the first signs of exhaustion is a decrease in mental activity. The exhaustion decreases memory, concentration, distribution, and switching of attention, muscle strength, endurance, movement coordination, and speed of reactions [2, 20, 27]. The fatigue can also result in irritability, and decreased well-being. Concerning the reduction of muscular energy cost and the increase of mental load, it appears there is no need for the constant physical improvement of the instructor officers. However, research shows that reducing the amount of muscle energy cost in the process of working activity does not reduce but increases the physical fitness requirements for teachers in many cases [8, 9, 18].

Thus, adverse factors dramatically worsen the physical condition, performance of the instructor officers of HMEI, and the efficiency of their working activities in general. Therefore, the importance of physical fitness in improving the efficiency of teaching, promoting the health and resistance of the instructor officers' organisms to various negative factors is being increased more than ever.

Physical exercises that should provide excellent health, high productivity and a wide range of recreational and rehabilitation activities are of great importance for health promotion, disease prevention, and performance improvement. Physical training, solving its basic task that is the development of basic physical qualities, health promotion, the formation of motivation for exercise, can solve aspect problems, including the formation of emotional stability, resistance to the hypodynamic regime of activity, etc. The studies showed that, under the influence of unfavorable factors, the performance indicators of working activity are reduced by 20% for the military personnel with high physical fitness, and by 40-50% for those with low physical fitness. A high level of physical fitness reduces the exhaustion and delays it, lets to increase the body's resistance to specific adverse effects [30-33].

Regular and properly organized physical exercise encourages and regulates metabolism and the activity of important functional systems that generally has a deliberate effect on the improvement of health, performance, and the efficiency of the activity of instructor officers. At the same time, the efficiency of physical training for the formation of the required qualities of specialists depends on the variety of means used, their volume and focus [3, 5, 10, 16].

The physical training of military personnel is divided into general and special. The tasks of general physical training are the development and improvement of physical qualities (endurance, power, speed, agility); the improvement of physical development, health, and performance; ensuring the professional longevity and resistance of an organism to adverse factors of the environment and professional activity, reducing the work costs associated with diseases; the education of courage, decisiveness, initiative, persistence, independence, self-confidence, mental stability; the involvement of military personnel in regular physical training and sports, etc. On the basis of general physical training, special qualities are formed, and special physical training is improved. It was proved that, firstly, it is impossible to improve special qualities without a foundation, which is a high level of general physical training, and, secondly, an insufficient level of general physical training of officers leads to a deterioration of physical condition and health, different kind of diseases and a decrease in the efficiency of professional activity [20, 22, 26].

Concerning teaching activity, a low level of general physical fitness of officers leads to excess weight, congestive phenomena of an organism, reducing the strength and tone of muscles of instructor officers, disorders of the basic systems of an organism, reduced efficiency, and such diseases as hypertension, coronary heart disease, etc. All this also has a negative impact on the quality of the cadets' education process. Therefore, an increase in the level of general physical fitness is the main task of the physical training of the instructor officers of HMEI.

The use of physical exercise depends primarily on the nature and peculiarities of the officers' activities. The activity of instructor officers is characterized by intense intellectual workload and pronounced

hypodynamic character, which determines the need to learn literary sources concerning the usage of physical exercises to restore physical and mental performance, strengthen health and reduce the effects of negative factors (primarily, the lack of motor activity).

Many researchers indicated the role of physical exercises in motor activity. Thus, M. S. Ghoncharenko, & V. Je. Novykova [34] emphasized the need to use physical exercises to enhance the activation of the synthesis of proteins and nucleic acids in the body, to improve the immunobiological features of blood and skin, to increase the resistance to a number of infectious diseases. The other scientists [5, 19, 27] consider physical exercises as a means of prevention and an efficient way of combating such negative effects of hypodynamia as excess weight. According to scientists [35, 36], physical exercises are an important means of preventing coronary insufficiency, atherosclerosis and their complications, as an insufficient motor activity takes the first place among the risk factors that contribute to the development of these diseases. The scientific work [10] found a reliable relationship between prolonged “muscular starvation” and the acceleration of age-related changes in the cardiovascular system. The constant activation of the circulatory system through physical exercises helps to strengthen its structure and functional capacity. The experiments with 10-day isolation note a lower intensity of the effects of the neuro-psychic and vegetative functions during the period of applying physical exercises [29].

The active muscular activity is a reliable guarantee of the prevention of cardiovascular diseases caused by excessive nervous and mental tension. Numerous studies [20, 21, 29] proved that physical training significantly improves the activity of the mechanisms that regulate vascular tone. The cardiovascular system of a trained person has more stable mechanisms of regulation, and sudden significant physical activity of an untrained person can lead to the failure of the compensatory capacity and pathological changes of an organism. Physical exercises improve metabolism and blood circulation, strengthen the heart, blood vessels, lungs, and muscles, have a positive effect on the psycho-emotional sphere, promote activity, enhance performance, and preserve interest in life. It was also proven that physical exercises stimulate intestinal activity that reduces the time of contact of carcinogens with the lining of intestines; reduce the risk of prostate disease; stimulate the immune system, especially leukocytes that destroy cancer cells; strengthen the skeletal muscles and musculoskeletal system, prevent osteoporosis (a decrease in bone density that is likely to damage integrity); improve the heart and respiratory organs activities; promote the normalization of body weight. The physical training also contributes to the prevention of musculoskeletal diseases (radiculitis, osteochondrosis, etc.), which result from the insufficient motor activity and uneven activity distribution because of the peculiarities of the main working position. The important physical qualities of the officers whose activity is related to the sitting working position are the static endurance of the muscles of the back and shoulder girdle.

The investigations [4, 7, 12] indicate the need for comprehensive use of various means of physical training to optimize the physical condition of military personnel whose activity occurs under the conditions of limited motor activity. The content of physical training classes is recommended to comprehensively include the groups of directional impact, including general developmental, gymnastic, power exercises, cyclic exercises of moderate and variable intensity during the week.

The scientists [22, 25, 26] concluded that physical training with an emphasis on the development of endurance (general, power) has a positive effect on solving the tasks of combat duty of operator officers, whose activities occur in the conditions of low motor activity and are similar to teaching. Experimental studies [18] determined that the attention span, indicators of intellectual abilities, and memory of operator officers depend on the degree of development of physical qualities (power, static endurance of the trunk muscles) and the level of general physical fitness. In addition, forming the core and improving blood supply to the brain, the static endurance of the trunk muscles (back and abdominal muscles) increases the efficiency and reduces the risk of occupational diseases. The scientists recommend complex exercises such as walking, running, jumping, exercises for different muscle groups. The peculiarity of the organization of physical training of military personnel, whose activity has a pronounced hypodynamic character, is the use of general physical training with the predominant use of power and endurance exercises. Therefore, physical training classes for instructor officers, whose work is accompanied by the influence of hypodynamia, should be built on the principle of diverse training. Thus, the analysis of the works about the impact of physical exercise on



the improvement of the resistance to negative factors, health promotion, and prolongation of professional longevity of the representatives, whose professional activity is hypodynamic, convincingly proved the applicability of the means of general physical training. At the same time, concerning the diversity of the proposed means, the vast majority of authors point out the importance of the development of general endurance, power characteristics, and static endurance for this category of specialists.

The question of applying physical exercises to restore performance during mental work is of particular interest for researchers. Many works [35-38] studied the influence of physical exercises on some aspects of a person's mental capacity. A high level of mental capacity is maintained under the condition of the optimal excitability of the corresponding areas of the cerebral cortex. Resulting from prolonged mental work, inhibitory processes occur in the higher regions of the brain and cause reduced attention, memory, the ability to creatively analyze information, and lead to mistakes. The periodic transition to the physical exercises in the form of classes can accelerate the restoration of performance, relieve the feeling of fatigue, make a general health impact. Some scientists note the positive impact of physical training on improving mental capacity. Investigating the effectiveness of physical exercises during the exam session, it was found that regular diverse moderate exercises with sufficient emotional impact positively affect the performance of students.

It was established that as a result of intense educational activity, the mental functions, including memory, thinking, attention, are changed the most. The scientists [1, 35, 36] applied three sets of exercises: general developmental, power, and speed. All complexes had a positive impact on performance. More prominent was the impact of the general developmental complex. The training with a focus on speed development also led to increased excitement, making it harder for students to focus on difficult mental work. G. V. Korobeinykov [37] found that physical exercises had helped to improve the mobility of nerve processes in the process of mental work and thus, had created the preconditions for longer preservation of capacity. The author also noted that the stability of mental work depended on the level of general physical fitness. The performance indicators of individuals with a low level of general physical fitness were less stable. At the same time, other researchers [27, 28, 33] state that the efficiency of applying physical exercises depends on a number of factors. The negative impact of physical activity is noticeable most often during mental work. Hard physical activity leads to the nerve centers disorders, to the creation of a new dominant system of intercentral communication in the higher regions of the brain. This can complicate further mental work, which is based on a completely different mechanism. Hard muscular activity can create stable exhaustion. If the next processes take place during mental work, then its productivity may be decreased. Therefore, hard training should occur after the mental activity is finished at the end of the workday.

In the case of performing exercises in the process of mental activity, their selection and duration of performance should depend on the nature of the mental work. If it consists of habitual mental operations that do not contain complex analytical components, then the moderate activity of increased duration will not cause a decrease in productivity of the main work. But if the mental work is creative, connected with the analysis of a wide range of information, then one should not bring down the system of inter-central relations by switching to intensive muscular activity. In this case, the positive effect is achieved by light exercises, which do not violate the dynamic stereotype of the main work in the cerebral cortex. Performing physical exercises in the process of mental activity, one should also avoid excessive emotional impact, which can also increase the excitability of the central nervous system and complicate further involvement in mental work.

Thus, it is advisable to include the exercises that increase resistance to long-term keeping identical position and hypodynamia (general developmental exercises and exercises with the weight of one's own body); the exercises that slightly excite the central nervous system and have a preventive effect (walking, slow running, etc.); the exercises that develop back and abdominal muscles, and stimulate blood circulation; special exercises that make the nervous system focused on future work in the content of complexes performed in the process of mental work. Daily or weekly activity cycles, which alternate with mental work and other work, must always include training aimed at improving general physical fitness. Depending on the conditions, they may take the form of regular physical training, independent training or sports training. The classes should be completed one hour before the main work. It is better to carry out hard training in the

afternoon for a full recovery of working capacity after a muscular strain during the evening rest and nighttime sleep.

The high level of physical preparedness of the instructor officers will make it possible to carry out the tasks of teaching activity effectively; to strengthen physical development, functional abilities, and health; to maintain a high level of mental performance for a long time and quickly recover these indicators during rest periods; to prolong professional longevity.

Thus, in order to reduce the effects of negative factors of professional activity, to promote health and to restore the mental capacity of the teaching staff, the daily use of physical exercises by instructor officers should be aimed at solving the following tasks:

- in the process of teaching activity (between training classes), to change the dynamics of subcortical processes, to create the optimal excitement background; to improve blood circulation and metabolism by affecting the cardiovascular system actively; to carry out preventive influence on the musculoskeletal system and digestive organs; to eliminate congestion (especially in the pelvic region and in the lower extremities); to provide high mental capacity (to improve memory, thinking, attention); to improve emotional state;

- at the end of the working day (after conducting classes and finishing other kinds of mental activity), to develop and improve physical qualities (to form general physical fitness); to form the core; to promote health, improve the activity of cardiovascular, respiratory and other systems of an organism; to reduce the impact of hypodynamia and other adverse factors of working activity; to reduce exhaustion by engaging muscle groups, which were not involved in the work, in the intense activity, and to restore performance.

The resolution of these tasks is possible provided the high level of development of the general physical fitness of instructor officers. The general physical training improves the condition of the cardiovascular and respiratory systems and develop the qualities, which cause a high level of the general working capacity of officers, prevents occupational diseases and injuries, abnormalities of physical condition and development, and speeds up the recovery of nervous and muscular energy. In addition, general physical training helps to create the basis for the adaptation of an organism to various types of muscular work and the effects of adverse factors of professional activity.

4. Conclusions

1. The professional activity of the teaching staff of HMEI, which occurs in conditions of low motor activity and other adverse factors, places high demands on their level of physical fitness, health, and mental capacity. The insufficient level of these indicators leads to a decrease in the efficiency of the teaching activity of officers, which consequently, has a negative impact on the quality of training of cadets and students.

2. The tasks of physical training of the teaching staff of HMEI were determined to be an increase in the level of general physical fitness; the improvement of health, functional abilities of major body systems, disease prevention, professional longevity extension; ensuring a high level of mental capacity; the improvement of resistance to negative factors of teaching activity; the formation of motivation for systematic physical exercises and sports.

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