

REVIEW ARTICLE

IMPACT OF MOTOR ACTIVITY ON PROMOTION OF HEALTH AND RESTORATION OF MENTAL CAPACITY OF TEACHING STAFF

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ABSTRACT

The aim: To find out the impact of exercise on promotion of health and restoration of mental capacity of instructors of higher educational institutions with specific learning environment

Materials and methods: The research was conducted in 2018-2021. Research methods: theoretical analysis of literature sources, documentary method, pedagogical observation. The theoretical analysis of literature sources and documentary method allowed to clarify the role, place and objectives of physical training in the professional activities of the instructors; the pedagogical observation was used in the analysis of the instructors' professional activities.

Conclusions: It was found that the instructors' professional activities are influenced by many negative factors: low motor activity, length of working day and week, forced working position, stress, mental overload, stress, lack of time for physical training. These factors result in the appearance of excess weight, dysfunction of major body systems, reduced mental capacity, the emergence of various diseases and labour costs. All this has a negative impact on the learning process of cadets.

The direction for improving the physical training of instructors is to increase the amount of general physical training, conducting training sessions with different orientations taking into account age, physical condition, teaching load of instructors, as well as class time. A high level of instructors' general physical fitness will allow to effectively perform training tasks; strengthen their health; maintain a high level of mental capacity for a long time; extend professional longevity.

KEY WORDS: health, mental capacity, instructor, exercise

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INTRODUCTION

The professional activities of an academic employee i. e. an instructor officer in a modern higher educational institution of Ukraine with specific learning environment (HEI SLE) is associated with a large training load, constant growth of educational information, high level of responsibility for cadets' training outcomes, overload of the intellectual sphere, high nervous and emotional stress, prolonged limitation of motor activity and maintaining static posture [1-3]. These factors lead to decreased mental and physical performance, deterioration of major body systems (especially cardiorespiratory), excess body weight, and systematic action can worsen health and cause various diseases (atherosclerosis, hypertension, coronary heart disease) etc.) [4-6]. In addition, the instructor officer is a role model for cadets, which determines the need for exercise to promote health and prevent the impact of negative factors on the effectiveness of training activities.

Many scientists [7-9] have found a close relationship between the indicators of health, mental capacity and the level of physical fitness (the volume of motor activity) of

servicemen and law enforcement officers. A significant amount of work is devoted to the scientific substantiation of physical training of law enforcement officers and servicemen [10-12]. Instead, the issue of improving the physical training of the teaching staff of HEI SLE in order to increase the level of physical fitness of instructor officers, promote their health and improve (restore) mental capacity in the process of service (training) activities is one of the least studied.

THE AIM

The aim is to find out the impact of exercise on promotion of health and restoration of mental capacity of instructors of HEI SLE.

MATERIALS AND METHODS

The research was conducted on the basis of the National Academy of Internal Affairs (NAIA) in 2018-2021. Research methods: theoretical analysis of literature sources,

documentary method, pedagogical observation. The theoretical analysis of literature sources and documentary method allowed to obtain information on the research topic. 22 sources on the topic of the article from the databases PubMed, Scopus, Web of Science Core Collection and others were analysed. We got acquainted with the research of leading scientists and scientifically substantiated the factual material obtained during the research with the help of the analysis of scientific works and literature sources. The role, place and tasks of physical training in the professional activities of the teaching staff of HEI SLE were clarified. The pedagogical observation was used in assessing the effectiveness of the current system of physical training in HEI SLE, analysing professional activities of the teaching staff.

The procedure for organizing the study was previously agreed with the committee on compliance with Academic Integrity and Ethics of the NAIA. The topic of the study was approved by the Academic Council of the NAIA (Protocol No. 11 of 25.07.2018). In accordance with the provisions of the committee on compliance with Academic Integrity and Ethics of the NAIA the members of the scientific community are guided by the rules of ethical conduct and professional communication; respect the principles, values, norms, rules, and conditions of academic honesty in their activities.

RESULTS

Observations of the professional activities of instructors in the modern HEI SLE showed that their training load is about 20 hours a week; respectively, they conduct 2-3 pairs of training sessions with cadets every day i. e. the daily workload is 4-6 hours of training sessions. The rest of the working time of instructors is devoted to preparation for training sessions (development of methodological recommendations, writing notes, etc.); conducting consultations, working with course papers and final year projects; conducting curatorial work; participation in educational and methodical as well as scientific work (writing scientific articles, educational and methodical materials, preparation for participation in conferences, etc.); improving personal professional training; compliance with the orders of commanders and participation in other activities in accordance with official duties. Thus, instructors spend most of their working time indoors in a forced position (sitting or standing), which convincingly demonstrates the effect of a significant number of negative factors on instructors' body systems, including: hypodynamics, duration of the working day and week, neuro-emotional tension, mental overload and stress and others. In addition, bad habits and lack of time for physical training do not allow to ensure a full recovery of mental capacity and the necessary level of health and physical fitness of instructors. It is important to note that such activities occur over many years, and with age, these factors lead to a significant decrease in mental and physical working capacity, deteriorating the state of health and the functioning of major body systems.

Exercise is important for promoting health, preventing disease and improving the mental and physical working capacity of law enforcement officers. Physical training should ensure excellent level of health, high productivity of law enforcement activities and a range of recreational and rehabilitation measures. Regular and well-organized exercise stimulates and regulates metabolism and the activity of important functional systems, which in general purposefully affects the health promotion, enhancement of mental and physical working capacity and improves the efficiency of instructors' service activities. Many researchers have pointed out the place of exercises in motor activity. They emphasized the need for exercise to increase the synthesis of proteins and nucleic acids in the body, improve the immunobiological properties of blood and skin, increase resistance to a number of infectious diseases. Exercise is considered as prevention and an effective means of combating the negative effects of hypodynamics, such as overweight. Exercise is an important means of preventing coronary insufficiency, atherosclerosis and their complications, due to the fact that insufficient motor activity is the first ranking among "risk factors" contributing to the development of these diseases. It was revealed a significant link between prolonged "muscle starvation" and the acceleration of age-related changes in the cardiovascular system. Under the conditions of the experiment, the scientists have shown that the constant activation of the circulatory system through exercise helps to strengthen its structure and functional capacity. It was experimentally proven that exercise under the conditions of hypodynamics within close quarters helps maintain mental stability, has a beneficial effect on the functional state of the central nervous system and higher nervous activity.

Regular exercise reduces the risk of hypertension by 8-10 %, delays the development of atherosclerosis, reduces the risk of sore throat and improves general physical and mental state. Law enforcement officers who lead an active lifestyle are much less likely to get sick. Exercise stimulates the intestines, which reduces the time of contact of carcinogenic substances with the intestinal mucosa; reduces the risk of prostate disease; stimulates the immune system, especially leukocytes, which destroy cancer cells; prevents osteoporosis (decrease in bone density, which is likely to violate the integrity) by strengthening skeletal muscles and musculoskeletal system; improves the work of the heart and respiratory organs; contributes to the normalization of body weight. Physical training contributes to the prevention of musculoskeletal diseases (radiculitis, osteochondrosis, etc.) that occur as a result of insufficient motor activity and uneven load distribution due to the peculiarities of the main working position. Exercise is an effective means of improving such professionally important qualities of law enforcement officers as concentration, stability and switching of attention, memory, logical thinking and more.

It was found the need for integrated use of various means of physical training to optimize the physical condition of law enforcement officers, whose activities take place in conditions of limited motor activity. Our recommenda-

tions as to the content of physical training are to integrally include training sessions during the week in the form of a group of means of directed influence: general developmental, gymnastic, strength exercises, cyclic exercises of moderate intensity. Physical training with an emphasis on the development of endurance (general, strength) has a positive effect on solving the tasks of professional activities of persons with low motion behaviour. It was found that the general level of development of employees' physical qualities depends largely on the development of endurance and strength qualities. Therefore, physical training sessions for instructor officers, whose work is accompanied by the influence of hypodynamics, should be built on the principle of versatile training.

Of particular interest is the use of physical exercises to restore working capacity during mental activity. Many scientists have studied the effects of exercise on some aspects of human mental capacity. It is established that a high level of mental capacity is maintained provided that the optimal excitability of the relevant areas of the cortex of the large hemispheres is supported. As a result of long-term mental work there are inhibitory processes in the higher parts of the brain that cause a decrease in attention, memory, ability to creatively analyse information, factor into errors. Periodic transition to exercise in the form of training sessions can speed up the recovery of mental capacity, relieve fatigue and have a general health effect. A number of scientists note the positive impact of exercise on improving the mental capacity of cadets and students. The efficiency of physical exercises during the examination session was investigated. It was found that regular training sessions, conducted with a moderate load, in a variety of ways and with sufficient emotional impact, have a positive effect on the mental working capacity of trainees. It was found that exercise in the process of mental work helped to improve the mobility of nervous processes and thus created the conditions for longer-term survivability. It was found that the stability of mental work depends on the level of general physical fitness. The indicators of mental capacity were less stable in people with a low level of general physical fitness.

The effectiveness of exercise depends on a number of factors. It is during mental work that the facts of the negative impact of physical activity are most often encountered. Excessive physical activity results in disruption of nerve centres, in the creation of a new dominant system of interdental connections in the higher parts of the brain. This can complicate further mental work, which is based on a completely different mechanism. Significant muscle strain can create persistent fatigue. If the following processes take place during mental work, its productivity may decrease. Therefore, training with a heavy load should take place after the end of mental activity, at the end of the working day.

In the case of performing exercises in the process of mental activity, their selection and duration of performance depend on the nature of mental work. If it consists of the usual mental operations that do not contain complex analytical components, then in this case, moderate loads of increased duration will not reduce the productivity of

the main work. However, if the mental work is creative in nature, associated with the analysis of a wide range of information, then in this case, you cannot break the system of intercentral relations by switching to intense muscular activity. Here the positive effect is achieved by light exercises, the performance of which does not violate the dynamic stereotype of the main work in the cerebral cortex. The content of the complexes that are performed in the process of mental work, shall expediently include: exercises that increase resistance to long-term maintenance of monotonous posture and hypodynamics (general development and exercises with your own body weight); exercises that slightly excite the central nervous system and have a preventive effect (walking, slow running, etc.); exercises that develop the muscles of the back and abdomen, as well as stimulate blood circulation; special exercises that focus the nervous system on future work. However, the daily or weekly cycles of activities, which alternate between mental work and other types of work, must include training sessions aimed at improving general physical fitness. Depending on the conditions, they can take the form of regular physical training sessions, self-training or sports training. Training sessions should end an hour before the main work. Exercises with a heavy load are best done in the afternoon, so that there is a full recovery after muscle tension during the evening rest and night sleep.

Thus the use of exercise in the daily routine of instructors should be aimed at solving the following tasks:

- in the process of teaching profession (between academic studies) – to change the dynamics of subcortical processes, to create an optimal background of excitability; to improve cerebral circulation and metabolism, actively affecting the cardiovascular system; to carry out preventive influence on the musculoskeletal system and digestive organs; to eliminate stagnation (especially in the pelvis and lower extremities); to ensure high mental working capacity (to improve indicators of memory, thinking, attention); to improve emotional state;
- at the end of the working day (after classes and the end of other types of mental activity) – development and improvement of physical qualities (formation of general physical fitness); muscle strengthening (formation of a muscular corset); promoting health, improving the cardiovascular, respiratory and other body systems; reducing the impact of hypodynamics and other adverse factors of service activities; reducing fatigue due to the inclusion of muscle groups that did not participate in the work process into vigorous activity and restoring working capacity.

DISCUSSION

An important role in the training of future highly qualified defenders of public order is played by the teaching staff of the HEI SLE. The service activity of instructors, which belongs to the types of mental work, is accompanied by many adverse factors and places high demands on the level of their health, physical fitness, preservation of mental capacity [13-17]. One of the effective ways to promote the health and mental

capacity of instructors is exercise, which must be performed taking into account age, gender, physical condition, fitness and the amount of service load during the day. Summarizing the results of the analysis of the literature sources [18, 19], we can highlight the main tasks of physical training of instructors of HEI SLE, among which: increasing the level of general physical fitness i. e. forming a foundation for the development of special qualities and enhancing the efficiency of service (teaching) activities; promoting health, improving the functionality of the body's major systems, preventing diseases, prolonging professional longevity; ensuring a high level of mental capacity and its restoration; improving resilience to negative factors of service activities; formation of motivation for regular physical exercises and sports.

The scientists [20-22] ascertain that the solution of these problems is possible with a high level of development of instructors' general physical fitness. It is general physical training that improves the condition of the cardiovascular system, respiratory system and the development of qualities that determine the high level of general working capacity of instructors, prevents occupational diseases and injuries, deviations in physical condition and development, and accelerates restoration of spent nervous and muscular energy. In addition, general physical training helps to create a basis for the body to adapt to different types of muscular work and the impact of adverse factors of professional activities. In the process of general physical training, the predominant development of those physical qualities and functional capabilities of the organism that have the greatest impact on the effectiveness of teaching activities is necessary.

CONCLUSIONS

1. It was found that instructors spend most of their service time indoors in a forced position (sitting or standing), which convincingly demonstrates the effect of a significant number of negative factors on instructors' body systems, including: low motor activity, duration of the working day and week, emotional tension, mental overload and stress and others. In addition, bad habits and lack of time for physical training do not allow to ensure a full recovery of mental capacity and the necessary level of health and physical fitness of instructors. These factors result in overweight, stagnation in the body, decreased muscle strength and tone, disruption of the body's major life support systems, reduced mental capacity and the emergence of various diseases.
2. It was established that the means of physical training of instructors, which can contribute to the solution of these problems, should be simple, accessible and at the same time effective and health-improving exercises of general physical training.
3. It was found that the direction for improving the physical training of instructors of HEI SLE determined: increasing the amount of general physical training, conducting training sessions with different orientations taking into account age, physical condition, teaching load of instructors, as well as class time. A high level of instructors'

general physical fitness will allow to effectively perform training tasks; strengthen their physical development, functional capabilities and health; maintain a high level of mental capacity for a long time and quickly restore it during periods of rest; extend professional longevity.

REFERENCES

1. Tyagi A., Dhar R.L. Factors affecting health of the police officials: Mediating role of job stress. *Policing: An Int J of Police Strategies and Management*. 2014; 37(3): 649-664. doi:10.1108/PIJPSM-12-2013-0128
2. Bondarenko V., Okhrimenko I., Tverdokhvalova I. et al. Formation of the professionally significant skills and competencies of future police officers during studying at higher educational institutions. *Revista Românească pentru Educație Multidimensională*. 2020; 12(3): 246-267. doi:10.18662/rrem/12.3/320
3. Barko V., Okhrimenko I., Medvediev V. et al. Professional psychological profile of a modern patrol officer as the basis of efficient official activities. *Postmodern Openings*. 2020; 11(3): 01-19. doi:10.18662/po/11.3/197
4. Tsai L. C. F., Nolasco C. A. R., Vaughn M. S. Modelling job stress among police officers: the interplay of work environment, counselling support, and family discussion with co-workers. *Police Practice and Research*. 2018; 19(3): 253-269.
5. Fedorenko O., Dotsenko V., Okhrimenko I. et al. Coping behavior of criminal police officers at different stages of professional activity. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*. 2020; 11(2): 124-146. doi:10.18662/brain/11.2/78
6. Okhrimenko I., Yevdokimova O., Shvets D. et al. Police training or police education: View on the matter. *Inter J Appl Exer Physiol*. 2020; 9(12): 129-136.
7. Prontenko K., Bondarenko V., Bezpaliy S. et al. Physical training as the basis of professional activities of patrol policemen. *Balt J Health Phys Activ*. 2020; 12 (1): 41-53. doi: 10.29359/BJHPA.12.1.05.
8. Bondarenko V., Okhrimenko I., Medvediev V. et al. Effectiveness of means of restoring the working capacity of employees of the security and defense sector in the conditions of rehabilitation after injury. *Acta Balneol*. 2022; 1 (167): 39-43. doi: 10.36740/ABAL202201108.
9. Sanna A., Garbarino S. Fitness for working in a policeman being treated for OSAS. *Med Lav*. 2019; 110(5): 398-402. doi: 10.23749/mdl.v110i5.8778.
10. Prontenko K., Griban G., Bloschchynskiy I. et al. Development of power qualities of cadets of Ukrainian higher military educational institutions during kettlebell lifting training. *Balt J Health Phys Activ*. 2019; 11 (3): 27-38. doi: 10.29359/BJHPA.11.3.04.
11. Musita Z.A., Muthondeki D.K. Assessment of the effectiveness of guidance and counselling establishment programme on administration police officers' self efficacy in Nairobi County, Kenya. *European Journal of Humanities and Social Sciences*. 2021; 1(4): 102-110. doi: 10.24018/ejsocial.2021.1.4.119
12. Griban G., Okhrimenko I., Lyakhova N. et al. Influence of the amount of students' motor activity on their health status and psychophysical readiness for future life. *Acta Balneol*. 2022; 64(2): 150-154. doi: 10.36740/ABAL202202109
13. Bondarenko V., Okhrimenko I., Lyakhova N. et al. Means of police officers' physical and psychological rehabilitation in the conditions of their service activities. *Acta Balneol*. 2021; 4 (166): 273-278. doi: 10.36740/ABAL202104105.
14. Ostapovich V., Barko V., Okhrimenko I. et al. Psychological profile of successful criminal police officer. *Inter J Appl Exer Physiol*. 2020; 9(3): 120-133.

15. Bondarenko V., Okhrimenko I., Yevdokimova O. et al. Professional skills and competencies of the future police officers. *Inter J Appl Exer Physiol.* 2020; 9(5): 35-43.
16. Bano B. Job stress among police personnel. *International Conference on Economics and Finance Research (IPEER).* 2011; 4: 290-293.
17. Bondarenko V., Okhrimenko I., Minenok A. et al. Professionally important psychophysiological qualities of patrol police officers. *Inter J Appl Exer Physiol.* 2020; 9(4): 62-71.
18. Okhrimenko I., Lyhun N. Stress prevention and management during the quarantine. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience.* 2020; 11(2): 157-164. doi:10.18662/brain/11.2Sup1/101
19. Sadiq M. Policing in pandemic: Is perception of workload causing work-family conflict, job dissatisfaction and job stress? *Journal of Public Affairs.* 2020; e2486. doi: 10.1002/PA.2486.
20. Prontenko K., Griban G., Okhrimenko I. et al. Academic performance and mental capacity of cadets engaged in sports during studies. *Revista Dilemas Contemporáneos: Educación, Política y Valores.* 2019;7(23).
21. Adams J., Schneider J., Hubbard M. et al. Measurement of functional capacity requirements of police officers to aid in development of an occupation-specific cardiac rehabilitation training program. *Proc (Bayl Univ Med Cent).* 2010; 23(1): 7-10. doi:10.1080/08998280.2010.11928571.
22. Zhamardiy V., Shkola O., Ulianova V. et al. Influence of fitness technologies on the student youth's physical qualities development. *Revista Dilemas Contemporáneos: Educación, Política y Valores.* 2019;7(49).

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The Authors declare no conflict of interest.

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